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Deterring Export Potential of Pakistan

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Abstract:

This paper has empirically explored the major determinants of deterring export potential by time series data from 1989-2018 for Pakistan. The purpose of the paper was to examine the challenges faced by the export sector in Pakistan. The Auto Regressive Distributed Lag (ARDL) testing co-integration approach was used to investigate the relationship between exports as dependent variable and manufacturing, investment and inflation as independent variables. Study found that there is no co-integration between dependent and independent variables in log run. It is recommended that policy makers should make policies to strengthen the export sector to ensure continuous and rapid economic growth in Pakistan.

Keywords: Exports, Manufacturing, Investment, Inflation, ARDL

1. INTRODUCTION

Exports are major sector of Pakistan. It provides employment opportunities to 40% of population. Our exports are based on, textile and clothing, and food items. Exports contribute to economy's GDP. But our exports remain low from last 20 years. There are various reasons of declining exports that is, energy crises to textile sector, changing in environment, and decline in investment, oil crises, electricity and gas tariffs, lack of product range and innovation, trade

deficit. Government should take some solid steps to increase exports, i.e. Pakistan should produce value-added products adopt new technology. Product differentiation is necessary to increase in real GDP. Foreign investment is important to the economy to import the products. Imports of Pakistan have exceeding since 1950, and Pakistan is facing deficit in its BOP. In 1991 exports were US$5.9 billion. In 1992 exports rises to US$ 6.9 billion and imports were US$ 9.3 billion. In 1993 trade deficit was US$ 2.5 billion. Pakistan's terms of trade expressed in an index set at 100 in FY 1981, were 78.0 in FY 1991 and 82.7 in FY 1992. Import-substitution industrialization policies were introduced to encourage the exports in 1950s and 1960s.In 1980s subsidies were provided to industries to increase exports. In early 1990s exports were based on two primary goods cotton and rice. In 1992, raw cotton, cotton yarn, cotton cloth, and cotton waste account for 37 % of all exports. Exports of readymade garments were 15%, synthetic textiles 6 %, and rice 6 %. In 1980 share of primary goods rose .1986 to 1993 share of primary goods fall from 35 to 16%. In 1991 and 1992 various actions was taken by the government to liberalize the trade. Import licensing was ended for most goods, and import duties were cut. Foreign companies were allowed to take part in exports of goods. Governments also promise to remove tariffs form remaining goods, and reduce the many exemptions and concessions on duties. Textile and clothing also playing a significant role in Pakistan's economy. In 2006 textile and clothing sector was improving, afterwards performance started declining. In 2006 exports of textile and clothing sector was US $ 11376 million, and by the end of year 2008 it declined to US $ 11092 million. Textile sector showed its performance internationally till the end of 2006. Exports of leather sector are also declining, if the situation persisted, Indian market will take hold of Pakistan's leather goods. 2007 to 2008 leather exports decline to 14%, mostly due to the energy crisis and everyday load-shedding of electricity and gas. Electricity breakdown badly affect the leather processing, also had bad effect on its quality.

Export sector have significant contribution to increase the Pakistan GDP. Pakistan's total value of exports in 2014 were US$20.29 billion, these exports were consist of different commodities like, textiles (garments, bed linen, cotton cloth, yarn), leather goods, sports goods, chemicals, manufactures, carpets and rugs .Pakistan's

main exports partners are, US (15.87 percent of total value of exports), UAE (12.35 percent), Afghanistan (8.48 percent), UK (4.7 percent), China (4.44 percent). Major reasons of crisis faced by exports sector of Pakistan are due to lack of research and development in cotton sector and also low cost of cotton is producing in Pakistan. Formers are changing to other cash crops due to low profitability. Pesticide sector also need proper R&D. Pakistan is still using the out dated machinery in textile sector. Result came in the form of declining exports. Cost of production is much higher in Pakistan due to outdated technology and unskilled workers, as compared to other countries like India, Bangladesh & China. Cost of production is increasing in textile and other sectors due to higher interest rate, inflation, and Exchange Rate. Due to all these reasons exports remains low, and we cannot compete in international market. Due to load shedding production of textile and others sectors reduced up to 30%. Exports orders are also decreasing due to load shedding of electricity. Cost of production is increasing due to increase in electricity tariffs. Mill owners use the alternate sources of energy, like generator, which causes the increase in cost of production further. Due to such situations the ability of competitiveness is badly affected in international market. Finance bill for year 2009 -10 was not favorable for textile industry at all. 0.5% tax was imposed on domestic sale, and 1% withholding tax on import of textile and articles etc. Reintroduction of minimum tax on domestic sales can increase the liquidity problem, which is already very high. Textile industry is facing negative generation of funds due to high markup rate. Tight monetary policy is also another major reason of the increasing cost of production. High interest rate causes the severe effect on production of goods. 1% withholding tax also badly affects the production process. High interest rate creates severe problems for exporters. Government should take some solid steps to remove slowdown in textile sector. Increase in Industries in Pakistan draws a positive impact on exports, as manufacturing of goods and services increase out- put will increase, in result exports of a country will increase. If Investment increases in a country, goods & services will be produce at low cost, and exports will also increase. If inflation increases of an economy, it draws a negative impact on the exports of the country. When inflation increases, prices of goods increases, cost of production will also increase. This causes the low exports in economy. Pakistan is facing

low productivity due to outdated machinery in textile sector. To overcome this problem Pakistan textile industry needs high investment. To attain the government exports targets Pakistan textile industry was in need of Rs1, 400 billion (US$32 billion) for investment. There are some internal and external factors which restrict the foreign direct investment. Pakistan political and economic situation decreases the foreign direct investment which not only badly affect the textile sector also the other industries.

The primary aim of this paper is to empirically explore the factors causing slow growth of exports, to find new exports potentials, to know the new dimensional of export market and to suggest some policy recommendation for the potential building of the exports base of Pakistan. The significance of this paper is to know about other factors which affect the exports, what are those factors and how they affect exports, to know how investment and innovation can increase exports of the country and to know about how international trade can increase exports.

The rest of this research paper is arranged as follows. Brief literature of the earlier studies which is discussed in detail in section 2. Data and methodology in section 3. The results and discussion in section 4 and conclusion in section 5.

2. LITERATURE REVIEW

Previously many researchers of the world have worked on this topic but their geographical area, variables selection and econometric techniques are different from this researcher study. Some of the research work of the earlier researchers have discussed as follows: *Wizar and Ahmed (2015)*, analyzed the decomposition of Pakistan's export growth to APEC markets for the period 2003 to 2011. Export of a country increases the demand and production of goods and services. Subsidies tax holidays given to them. Exports are declining due to uncertainty of exchange rate, and technologic change. Asia Pacific Economic Cooperation (APEC) is an organization consisting of 21 counties. Pakistan export to these countries are 37% and import are 40%. This shows huge difference between imports and exports. To analyze the export he uses four categories, world trade effect, commodity composition effect, market distribution effects, and competiveness effect. He suggested that polices can increase foreign

exchange earnings and export of a country. *Shaheen,* investigated the fluctuations in exchange rates and its impact on macroeconomic performance of Pakistan. Study analyzes how exchange rate effects the inflation, import & exports. Secondary data was used for this purpose. She concludes that decrease in value of pak rupee against dollar export will increase and import will decrease. It also increases the investment in the country. She suggested that strong economic planning is needed to stabilize our currency. *Ghafoor and Zafar (2014),* discussed about determinants of leather exports from Pakistan from 1980-2010 by using time series data. Finished leather exports was taken as a dependent variable and export price, real exchange rate, trade openness, hides and skin productions was taken as independent variables. Study showed that exchange rate have negative impact on leather exports. It is suggested that to promote the exports, need to develop quality standards.

Saqib and Sana (2012), stated the exchange rate volatility and its effect on Pakistan's export volume by using time series data from 1981 to 2010. Variables selected for model are imports, exports, real effective exchange rate and total reserves. Theory suggested that export and real exchange rate are inversely related. Import has positively impact on exports. He suggested that exports can be increased by focusing on R & D in textile sector. *Akmal and Saleem (2012),* investigated the export growth of textile and economic development in Pakistan and India from 2001 to 2007. Paper shows that export of Pakistan is declining during these years, and the reasons are, low quality of cotton, increase in inflation, global recession, and electricity and gas crises. He suggested that introduce R & D programs, decrease in inflation and interest rate, give subsidy, and take steps to attract FDI. *Siddiqi, et al. (2012),* discussed about determinants of exports, demand of textile and clothing sector of Pakistan from 1971 -2009. To check the long run relationship between export demand and its determinants; variables used CPI, E.R, T.O, GDP. Textile and clothing sector is facing problem and the major reason are policy imbalances, energy crises, inflation, and decline in FDI. He suggested that Pakistan should produce value added products, adopt new technology. Product differentiation is necessary to increase in real GDP.

Alam (2011), discussed about validity of exports led growth hypothesis. By using the last 27 years data, investigates the

relationship between exports, imports, & GDP. Exports and economic growth increases due to international trade. Trade openness generates employment opportunities and increases the BOP. Pakistan exports have been fluctuating 3% per year for past two decades. Exports growth is low due to social, political, economic problems. Power shortage is the main reason for low exports. Heavy taxation and high bank rates are another problems facing by the export sector. Economic growth increased in 2004 -2008 and GDP was 7%, and exports were 16% per year. *A report of Govt of Punjab (2012),* showed the decline in export during IHFY12 relative to IHF11. All major sector of textile industry fall in December, 2011. Shortage of electricity and gas was the major reasons of low exports. This drop affects the current account balance and pak rupee value. In July-December (2011) export decreased by 13.81% in volume and increased by 1.68% in value. Reduction in export decreases the tax collection and creates unemployment. He concludes, exports can be increased by providing electricity and gas to industrial sectors. *Khan, & Khan (2010),* discussed about Pakistan textile industry facing new challenges. Textile industry is contributing 46% of GDP, Pakistan textile industry is very large, and 60 to 70% machines are needed to replace for competitive market. Increase in export of value added product, was positive sign for textile sector. Growth of textile sector start declining after 2006, and the reasons were lack of research and development in cotton sector, lack of modernized equipment, increasing cost of production, electricity crises, gas shortage, tight monetary policy, lack of new investment, and effect of global recession. He suggested some measure for improvement of textile sector i.e. focus on value addition, technology up gradation, electricity and gas tariff, exploration of new export markets. *Tariq and Najeeb (1995),* discussed about export earnings instability in Pakistan. Various policies have been adopted in Pakistan to boost up the exports. Our exports are based on primary goods, food and raw materials, which remains low due to uncertain whether conditions. Massive taxes and tariffs are also caused of decreasing supply. Countries depending on raw materials earn less, and food exporting countries earn more from the exports. Pakistan share in world market is 0.18% having perfectly elastic demand curve. A country whose exports based on few commodities faces unstable exports earning. If exports go to many different countries exports receipts will stable.

Author uses the time series data from 1970-91 variables are; commodity concentration, geographic concentration of exports, the ratio of primary products, and raw material ratio. He suggested that encouragement of food export will reduce instability. Therefore, Pakistan should make meaningful polices to diversify its export.

3. METHODOLOGY AND DATA

This paper has empirically explored the major determinants of deterring export potential by time series data from 1989-2018 for Pakistan, using co-integration technique to investigate the relationship among manufacturing, investment, inflation (independent variables) and export (dependent variable) of the study. According to unit root test (ADF) all variables are stationery at level and at first difference and intercept. In this paper we examined the Exports of Pakistan as dependent variable while Manufacturing, Investment, and Inflation are taken as independent variables. We examined the impact of independent variables on dependent variable. In the study five different exports products were selected from exports sectors i.e cotton, finish leather, textile & clothing, sports goods, vegetables & fruits. The data used for analysis from 1989 to 2018 (30 years), and collected from Word Bank Development Indicator (WDI). Since 1947 Pakistan exports were facing different challenges and BOP remains in deficit. But from last 30 years different measures have been taken to improve the exports, and there is sharp increase in exports from 1985 to 2014. Secondary data were used (1985-2014) to capture the effect of relationship between independent variables which have direct or indirect impact on exports. Dependent variable is exports and Independent variables are manufacturing, investment, and inflation. Multiple regression analysis is used to check the long run relationship between dependent and independent variables. In this study simple linear regression technique is used to analyze the model. Augmented Dickey Fuller Test (ADF) test is used to check the individual stationarity of each variable. Co –integration technique and Auto Regressive Distributed Lag (ARDL) Model is used to examine the relationship between independent and dependent variables. Error Correction Model (ECM) is used to check the long run relationship between variables. Multiple regression model is used and the derived model is given as under:

$$Exports = \beta 0 + \beta 1\ Manu + \beta 2\ Inv + \beta 3\ Inf + \mu$$

In the above model Exp is exports used as percentage of GDP, Manu is manufacturing percentage of GDP, Inv is investment used as percentage of GDP, Inf is Inflation and μ indicate the error term.

4. RESULT OF THE STUDY

Study shows that all the variables are stationery; there is long run relationship between dependent and independent variables. But other economic factors make the model insignificant, and we reject our null hypothesis. Null Hypothesis Ex has a unit root means the variable is non-stationery, and alternative Hypothesis Ex have not unit root means variable is stationary. To check the stationerity apply unit root test and variable is stationery at first difference and intercept. Because ADF test statistics value is greater than the critical value at 5 % probability is 0.001, which means at 5% the variable is Stationery and significant. So we reject the null hypothesis and accept the alternative hypothesis.

Null Hypothesis Manu has a unit root means the variable is non-stationery, and alternative Hypothesis Manu have not unit root means variable is stationary. To check the stationerity apply unit root test and variable is stationery at 1st difference and intercept. Because ADF test statistics value is greater than the critical value at 5 % probability is 0.000, which means at 5% the variable is Stationery and significant. So we reject the null hypothesis and accept the alternative hypothesis. ***(Appendix B)***

Null Hypothesis Inv has a unit root means the variable is non-stationery, and alternative Hypothesis inv has not unit root means variable is stationary. To check the stationerity apply unit root test and variable is stationery at level, trend and intercept. Because ADF test statistics value is greater than the critical value at 5 % probability is 0.003, which means at 5% the variable is Stationery and significant. So we reject the null hypothesis and accept the alternative hypothesis. ***(Appendix C)***

Null Hypothesis Inf has a unit root means the variable is non-stationery, and alternative Hypothesis inf has not unit root means

variable is stationary. To check the stationerity apply unit root test and variable is stationery at 1st difference and intercept. Because ADF test statistics value is greater than the critical value at 5 % probability is 0.000, which means at 5% the variable is Stationery and significant. So we reject the null hypothesis and accept the alternative hypothesis. ***(Appendix D)***

Results for Co-Integration Technique:

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.287766	0.0019
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

If the value of R^2 is greater than Durbin Watson statistics, we cannot accept the model. i.e model is superiors, Null hypothesis is U has unit root means u is non stationery. We make residuals and check stationarity at level and non between dependent and independent variables by applying unit root test. Here the absolute value of A.D Fuller test (3.28) is greater than the critical value (1.95) at 5% level of significance, P value (0.001) is also highly significant. We reject null hypothesis, and accept alternate hypothesis means u is stationery, and model is not superiors. There is long run (co integration) relationship between dependent and independent variables.

(***Appendix E***)

Results of Error Correction Model (ECM):

Dependent variable: Exp : Value of C : 0.111061

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.111061	0.157243	0.706302	0.4868
D(MANU)	0.492215	0.160086	3.074693	0.0052
D(INV)	0.159784	0.319254	0.500492	0.6213
D(INF)	-0.091584	0.052562	-1.742401	0.0942
UI(-1)	-0.353206	0.103979	-3.396911	0.0024

As the value of t-statistics for D (MANU) is 3.07 which is greater than 2 and shows that variable is significant and shows positive

relationship with dependent variable LEXP in short run. The value of t-statistics for D(INV) is 0.50 which is less than 2 and shows that variable is insignificant and shows negative relationship with dependent variable LEXP in short run. The value of t-statistics for D (INF) is -1.74 which is less than 2 and shows that variable is insignificant and shows negative relationship with dependent variable LEXP in short run. The value of UI (-1) is -0.3532, mean error correction term actually correct the disequilibrium of the system. Here we are using annual data in the model, so error correction term correctly the disequilibrium at the rate of 35.32% annually. Here P value is less than 5%, which mean our dependent and independent variables have a long run equilibrium relationship. Because error correction term is negative and significant. In the model value of R^2 (0.44) is less than the value of D.W (1.66). Which means error correction model is not a non-sense model, so we accept the model.

(Appendix F)

Results for Ordinary Least Square (OLS)

When apply OLS on our model we find that variables inv and inf are in significant at 5% level of significance, means investment and inflation does have not positive effect on exports of Pakistan, t-statistics vales of inv and inf are also less than 2, so, we reject null hypothesis and accept the alternative hypothesis that, investment, and inflation does not have positive effect on Exports of Pakistan. While variable manufacturing is significant at 5 % level means manu have positive effect on exports of Pakistan. We accept out null hypothesis and reject alternate hypothesis.

(Appendix G)

Results for Auto Regressive Distributed Lag (ARDL) Model

There are 4 lags used for the dependent and 4 for the first independent and 3 for the second independent and 4 for the third independent variable using AIC criteria. By using Bounds F test to we see there is co integration or not. ***(Appendix H)***

Test Statistic	Value	k
F-statistic	4.826991	3

Critical Value Bounds		
Significance	I0 Bound	I1 Bound

10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

(Appendix I)

Here F value is greater than I1 Bound values; there is co integration between variables. then we go for long run results .But results shows that there is no co integration because all the long run coefficients are insignificant and the coefficient of co-integration Eq (-1) is negative and insignificant which is with the short run coefficients.

(Appendix J)

5. CONCLUSION AND RECOMMENDATIONS

This paper has empirically explored the major determinants of deterring export potential by using time series data from 1989-2018 for Pakistan, using ARDL co-integration technique to investigate the relationship among manufacturing, investment, inflation as independent variables and export as dependent variable. To check the stationarity of variables Augmented Dickey Fuller (ADF) unit root test is used to examine the stationary properties for long run relationship of time series variables. By applying unit root test (ADF) all variables are stationery at level and at first difference and intercept. The purpose of the paper was to examine the challenges faced by the export sector in Pakistan. This study has applied the ARDL co-integration technique to investigate the relationship among the exports, manufacturing, investment, and inflation. We used the unit root test (ADF) for checking the stationarity of the variables and dependent variable exports are stationary at first difference and intercept, while independent variables manufacturing, is stationery at first difference and intercept, investment is stationery at level, trend and intercept and inflation is stationery at first difference and intercept at 5% level of significance. Which enable us to use co-integration technique & ECM. In the long run as we have analyzed by using co-integration technique that absolute value of A.D Fuller test (3.28) is greater than the critical value (1.95) at 5% level of significance, P value (0.001) is also highly significant. We reject null hypothesis, and accept alternate hypothesis means u is stationery,

and model is not superiors. There is long run (co integration) relationship between dependent and independent variables**.** By using the ECM we find that variable Manu is significant and shows positive relationship with dependent variable LEXP in short run. Variable INV is insignificant and shows negative relationship with dependent variable LEXP in short run. Variable INF is insignificant and shows negative relationship with dependent variable LEXP in short run. The value of UI(-1) is negative and significant which mean our dependent and independent variables have a long run equilibrium relationship. By applying OLS we find that inv & inf is insignificant while manu is significant at 5% level of significance. ARDL model shows that there is no co integration because all the long run coefficients are insignificant.

There are some other economic factors causing the declining exports like, fluctuating Exchange Rate when country's currency appreciate, foreigners have to pay more for the country's products, they find our products expensive, which cause to declining exports. Our exports are based on primary goods, which cannot compete in international market, because our products are not good in quality, for this reason our exports remains low. Manufacturing industries produce goods on high cost, Government do not provide them subsidy on production, and firms produce goods on high cost, which cause the declining exports. Global recession is another reason of declining exports, our products remains unsold in international market, due to low demand, and our exports fall. Under the WTO rules some trade policies are not in favor of Pakistan's exports, which discourage our exports growth. Energy crises is one of the major reason of low exports growth in Pakistan. Due to some of these factors our estimated model is not stationery, and we reject our Null hypothesis. Furthermore we would like to suggest some recommendations for policy makers such as modernized equipment and technology should be used for production, Research and Development in cotton sector should be improved, Provide opportunities to domestic and foreign investors by improving the law & order situation in country to raise exports, Energy crises can be reduced by having new power plants. Subsidy should be given to industries in the form of tax exemption and there should be no trade barriers for example import and export quota and import and export tariff or some other kind of trade restrictions. Then there will be more economic growth.

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Data used in this Research:

Years	Exports (Exp)	Manufacturing (Manu)	Investment (Inv)	Inflation (Inf)
1989	10.42334879	15.90348702	0.421864139	5.6
1990	11.90074831	16.27641158	0.331452681	3.5
1991	13.23483006	16.64626313	0.387921207	4.7
1992	13.5864232	16.78798727	0.484736861	8.8
1993	13.88311014	16.61450428	0.524258312	7.8
1994	15.53830689	17.41130809	0.612997637	9.1
1995	16.99694312	17.13259731	0.568544195	11.8
1996	17.35930183	16.85551456	0.691843695	9.5
1997	16.30647519	16.67462555	0.677094209	10
1998	16.28251545	16.78098889	0.811304165	12.4
1999	16.70996966	16.31344211	1.19175194	12.3
2000	16.90310178	16.04831568	1.456054495	10.4
2001	16.08195323	15.87955519	1.14722858	11.4
2002	16.48479118	15.84713352	0.813610046	6.2
2003	15.35349933	15.48000086	0.844795025	4.1
2004	13.44132462	14.67709333	0.416484258	4.4
2005	14.65953961	15.50074377	0.529665859	3.1
2006	15.2236172	15.50468179	1.138205214	3.3
2007	16.71896741	15.99909841	0.641481502	2.9
2008	15.6668995	17.18848413	1.141075209	7.4
2009	15.68949543	18.5646611	2.010007068	9.1
2010	14.13396282	13.80707348	3.112977982	7.9
2011	13.21461341	14.03439607	3.668322816	7.6
2012	12.38231088	15.18925415	3.197360002	20.3
2013	12.39575242	13.38731082	1.390402267	13.6
2014	13.51626785	13.64236648	1.137498326	13.9
2015	13.96666966	14.32295458	0.612274928	11.9
2016	12.39666276	14.48185526	0.38225897	9.7
2017	13.2199912	14.0133498	0.573859603	7.7
2018	12.34661036	14.06341388	0.720198669	7.2

Appendix A

Null Hypothesis: D(EX) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.478128	0.0014
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(EX,2)

Method: Least Squares

Date: 12/24/15 Time: 18:29

Sample (adjusted): 1987 2014
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EX(-1))	-0.851111	0.190060	-4.478128	0.0001
C	0.001053	0.196662	0.005353	0.9958

R-squared	0.435441	Mean dependent var	-0.083956
Adjusted R-squared	0.413727	S.D. dependent var	1.352749
S.E. of regression	1.035780	Akaike info criterion	2.976935
Sum squared resid	27.89382	Schwarz criterion	3.072092
Log likelihood	-39.67709	Hannan-Quinn criter.	3.006025
F-statistic	20.05363	Durbin-Watson stat	2.042058
Prob(F-statistic)	0.000133		

Appendix B

Null Hypothesis: D(MANU) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.054864	0.0000
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MANU,2)
Method: Least Squares
Date: 12/24/15 Time: 18:32
Sample (adjusted): 1988 2014
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MANU(-1))	-1.751822	0.289325	-6.054864	0.0000
D(MANU(-1),2)	0.416770	0.184343	2.260844	0.0331
C	-0.145688	0.202953	-0.717841	0.4798

R-squared	0.687349	Mean dependent var	-0.011844
Adjusted R-squared	0.661294	S.D. dependent var	1.803162

S.E. of regression	1.049412	Akaike info criterion	3.038775
Sum squared resid	26.43035	Schwarz criterion	3.182757
Log likelihood	-38.02347	Hannan-Quinn criter.	3.081589
F-statistic	26.38143	Durbin-Watson stat	1.942664
Prob(F-statistic)	0.000001		

Appendix C

Null Hypothesis: INV has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 6 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.977315	0.0030
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INV)
Method: Least Squares
Date: 12/24/15 Time: 18:35
Sample (adjusted): 1992 2014
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INV(-1)	-2.240072	0.450056	-4.977315	0.0002
D(INV(-1))	1.868395	0.352389	5.302084	0.0001
D(INV(-2))	1.552289	0.378338	4.102917	0.0011
D(INV(-3))	1.328247	0.328915	4.038273	0.0012
D(INV(-4))	0.980486	0.305351	3.211007	0.0063
D(INV(-5))	0.800157	0.254785	3.140521	0.0072
D(INV(-6))	1.017210	0.342038	2.973973	0.0101
C	-0.026043	0.249940	-0.104196	0.9185
@TREND(1985)	0.143808	0.034416	4.178462	0.0009

R-squared	0.739632	Mean dependent var	0.006594
Adjusted R-squared	0.590851	S.D. dependent var	0.592964
S.E. of regression	0.379288	Akaike info criterion	1.185130
Sum squared resid	2.014032	Schwarz criterion	1.629454
Log likelihood	-4.628995	Hannan-Quinn criter.	1.296876

F-statistic	4.971264	Durbin-Watson stat	1.806331
Prob(F-statistic)	0.004501		

Appendix D

Null Hypothesis: D(INF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.624244	0.0000
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INF,2)
Method: Least Squares
Date: 12/24/15 Time: 18:38
Sample (adjusted): 1987 2014
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	-1.248939	0.188541	-6.624244	0.0000
C	0.150813	0.643104	0.234508	0.8164

R-squared	0.627937	Mean dependent var	0.057143
Adjusted R-squared	0.613627	S.D. dependent var	5.473331
S.E. of regression	3.402164	Akaike info criterion	5.355450
Sum squared resid	300.9427	Schwarz criterion	5.450607
Log likelihood	-72.97630	Hannan-Quinn criter.	5.384540
F-statistic	43.88061	Durbin-Watson stat	2.032757
Prob(F-statistic)	0.000001		

Appendix E

Null Hypothesis: UI has a unit root
Exogenous: None
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.287766	0.0019
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UI)
Method: Least Squares
Date: 12/24/15 Time: 19:49
Sample (adjusted): 1986 2014
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UI(-1)	-0.392906	0.119506	-3.287766	0.0027
R-squared	0.271571	Mean dependent var		0.112395
Adjusted R-squared	0.271571	S.D. dependent var		1.165034
S.E. of regression	0.994334	Akaike info criterion		2.860387
Sum squared resid	27.68359	Schwarz criterion		2.907535
Log likelihood	-40.47560	Hannan-Quinn criter.		2.875153
Durbin-Watson stat	1.976333			

Appendix F

Dependent Variable: D(EX)

Method: Least Squares

Date: 12/24/15 Time: 19:58

Sample (adjusted): 1986 2014

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.111061	0.157243	0.706302	0.4868
D(MANU)	0.492215	0.160086	3.074693	0.0052
D(INV)	0.159784	0.319254	0.500492	0.6213
D(INF)	-0.091584	0.052562	-1.742401	0.0942
UI(-1)	-0.353206	0.103979	-3.396911	0.0024
R-squared	0.441179	Mean dependent var		0.066319

Adjusted R-squared	0.348042	S.D. dependent var	1.045645
S.E. of regression	0.844295	Akaike info criterion	2.654956
Sum squared resid	17.10801	Schwarz criterion	2.890696
Log likelihood	-33.49686	Hannan-Quinn criter.	2.728787
F-statistic	4.736888	Durbin-Watson stat	1.667986
Prob(F-statistic)	0.005837		

Appendix G

Dependent Variable: EX
Method: Least Squares
Date: 12/30/15 Time: 13:40
Sample: 1985 2014
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MANU	0.892545	0.044573	20.02432	0.0000
INV	0.197962	0.374140	0.529112	0.6011
INF	0.034968	0.082064	0.426100	0.6734

R-squared	0.279418	Mean dependent var	14.53393
Adjusted R-squared	0.226041	S.D. dependent var	1.837685
S.E. of regression	1.616702	Akaike info criterion	3.893293
Sum squared resid	70.57060	Schwarz criterion	4.033413
Log likelihood	-55.39940	Hannan-Quinn criter.	3.938119
Durbin-Watson stat	0.621266		

Appendix H

Dependent Variable: EX
Method: ARDL
Date: 01/03/16 Time: 17:42
Sample (adjusted): 1989 2014
Included observations: 26 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): MANU INV INF
Fixed regressors: C
Number of models evalulated: 500
Selected Model: ARDL(4, 4, 3, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*

EX(-1)	0.091910	0.291936	0.314830	0.7621
EX(-2)	0.162588	0.385983	0.421232	0.6862
EX(-3)	-0.613029	0.507225	-1.208595	0.2661
EX(-4)	0.848319	0.356712	2.378164	0.0490
MANU	0.601244	0.365358	1.645631	0.1438
MANU(-1)	0.339761	0.430396	0.789414	0.4558
MANU(-2)	-0.565461	0.461747	-1.224612	0.2603
MANU(-3)	0.506204	0.453231	1.116880	0.3009
MANU(-4)	-0.371606	0.484192	-0.767477	0.4679
INV	0.016676	0.803113	0.020765	0.9840
INV(-1)	-1.527730	1.339728	-1.140328	0.2917
INV(-2)	1.715956	1.137546	1.508471	0.1752
INV(-3)	-1.769643	0.818460	-2.162161	0.0674
INF	-0.150297	0.114243	-1.315593	0.2298
INF(-1)	0.248440	0.131583	1.888079	0.1010
INF(-2)	0.121250	0.106754	1.135792	0.2934
INF(-3)	0.064841	0.128756	0.503597	0.6300
INF(-4)	-0.216220	0.117941	-1.833291	0.1094
C	0.868077	8.163597	0.106335	0.9183

R-squared	0.939173	Mean dependent var	14.87972
Adjusted R-squared	0.782759	S.D. dependent var	1.654216
S.E. of regression	0.771015	Akaike info criterion	2.467134
Sum squared resid	4.161248	Schwarz criterion	3.386512
Log likelihood	-13.07274	Hannan-Quinn criter.	2.731882
F-statistic	6.004430	Durbin-Watson stat	2.348904
Prob(F-statistic)	0.011031		

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

Appendix I

ARDL Bounds Test
Date: 01/03/16 Time: 18:31
Sample: 1989 2014
Included observations: 26

Test Statistic	Value	k
F-statistic	4.826991	3

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.72	3.77
5%	3.23	4.35

2.5%	3.69	4.89
1%	4.29	5.61

Test Equation:
Dependent Variable: D(EX)
Method: Least Squares
Date: 01/03/16 Time: 18:31
Sample: 1989 2014
Included observations: 26

Variable	Coefficient	Std. Error
D(EX(-1))	-0.228426	0.233035
D(EX(-2))	-0.324495	0.294392
D(EX(-3))	-0.908760	0.354949
D(MANU)	0.741752	0.275300
D(MANU(-1))	0.216271	0.379235
D(MANU(-2))	0.177746	0.412622
D(MANU(-3))	0.840954	0.430926
D(INV)	-0.548380	0.690917
D(INV(-1))	-0.226378	0.502544
D(INV(-2))	0.886571	0.663529
D(INF)	-0.223044	0.115055
C	-7.667569	3.950456
MANU(-1)	1.040892	0.313037
INV(-1)	-0.780781	0.469507
INF	0.126480	0.078293
EX(-1)	-0.581792	0.190085

R-squared	0.761521
Adjusted R-squared	0.403803
S.E. of regression	0.796415
Sum squared resid	6.342767
Log likelihood	-18.55224
F-statistic	2.128831
Prob(F-statistic)	0.115150

Appendix J

ARDL Cointegrating And Long Run Form
Dependent Variable: EX
Selected Model: ARDL(4, 4, 3, 4)
Date: 01/03/16 Time: 18:51
Sample: 1985 2014
Included observations: 26

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EX(-1))	-0.397878	0.270562	-1.470560	0.1849
D(EX(-2))	-0.235289	0.289764	-0.812002	0.4435
D(EX(-3))	-0.848319	0.356712	-2.378164	0.0490
D(MANU)	0.601244	0.365358	1.645631	0.1438
D(MANU(-1))	0.565461	0.461747	1.224612	0.2603
D(MANU(-2))	-0.506204	0.453231	-1.116880	0.3009
D(MANU(-3))	0.371606	0.484192	0.767477	0.4679
D(INV)	0.016676	0.803113	0.020765	0.9840
D(INV(-1))	-1.715956	1.137546	-1.508471	0.1752
D(INV(-2))	1.769643	0.818460	2.162161	0.0674
D(INF)	-0.150297	0.114243	-1.315593	0.2298
D(INF)	-0.121250	0.106754	-1.135792	0.2934
D(INF)	-0.064841	0.128756	-0.503597	0.6300
D(INF)	0.216220	0.117941	1.833291	0.1094
CointEq(-1)	-0.510212	0.302483	-1.686747	0.1355

Cointeq = EX - (0.9999*MANU -3.0668*INV + 0.1333*INF + 1.7014)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MANU	0.999864	0.878927	1.137596	0.2927
INV	-3.066845	2.892768	-1.060177	0.3243
INF	0.133305	0.172945	0.770795	0.4660
C	1.701405	16.635276	0.102277	0.9214