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Factors Affecting the Non-Oil Exports In Iranian Economy

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Abstract

In this paper we investigate the relationship between non-oil exports in Iran with some macro economic variables such as: gross domestic products, oil export revenue, private consumption and inflation.

Estimation of the model shows that there is a positive and statistically significant relationship between, GDP and non-oil exports and oil export revenue, inflation and trend variable and a negative and significant relationship between non-oil exports and private sector consumption.

Keywords: Non-oil export, Oil export Revenue, Inflation, Private Consumption, Gross Domestic Product, International Trade.

1- Introduction

In this paper our aim is to find the relationship between the non-oil exports of Iran and some economic variables on the basis of international trade theories and some of researches done by other economists.

The hypotheses we are going to test are as follows:

a) There is a negative and statistically significant relationship between growth rate of GDP and growth rate of non-oil exports.

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b) There is a positive and statistically significant relationship between non-oil exports and revenue earned from export of oil.

c) There is a positive and statistically significant relationship between rate of growth of private consumption and the rate of growth of non-oil exports.

d) In Iranian economy there is a positive relationship between rate of inflation and rate of growth of non-oil exports.

In classical theories of international trade, it is emphasized that trade is the engine of growth and its basic normative premise is that free trade is beneficial to all trading partners. The questions raised by classical trade theorists like Adam Smith and Ricardo were as follows:

1- Why is international trade mutually advantageous?

2- What factors determine the goods to be traded?

To measure the effects of trade, classical trade theorists developed the labor theory of value. This meant that all costs can be reduced ultimately to units of labor, which in turn are directly related to the prices that must be charged for the products.

Factor Endowment Theory

Heckscher and Ohlin abandoned the classical labor theory of value and replaced it with a new theory that acknowledged the effects of all factors of production: land, labor, capital and management as determinants of international trade. They based their works upon the following premises:

Due to existing large quantities of factors of production

1- Countries differ in the proportion of their factors of production, that is their factor endowments.

2- Commodities also differ in combination of factors they require in their production that is in their factor intensities.

Assuming that factor intensities of particular commodities remain the same in different countries, the Heckscher-Ohlin model states that each country will export those goods whose production is relatively intensive in the country's abundant factor and import those that are intensive in the factors it lacks (B.J.Berry, E.C.Conkling, D.Michael Ray, 1993)

Determinants of Trade:

Under the ideal conditions assumed by classical economists the principal determinants of trade are those relating to supply and demand. However in reality other influences distort the ideal pattern by acting as impediments to trade.

a) Supply factors: Supply factors as determinants of trade are base of classical theories called absolute and comparative cost advantages or Heckscher-Ohlin factor endowment theory.

b) Demand factors: Demand for goods and services are not identical in different countries. If two countries have identical production possibilities but, unlike structure of demand e.g. because of unidentical taste they can trade with each other. Therefore one of the demand factors as determinant of trade is taste. The other one is the effective demand or purchasing power of people. If national income in a country increases, the purchasing power will increase, too and hence we have more demand for goods, some of which should be imported from abroad, cultural differences also can be responsible for some of the differences among countries' demand structures.

Developing countries and the world trade

Roughly 75 percent imports of less developed countries are from developed countries and roughly the same percentage of their exports goes to developed countries. So trade among the less developed countries themselves is quite limited in volume and accounting only for a quarter of their total trade.

A prominent feature of less developed countries trade is the composition of their exports as for example in 1979 primary products (agricultural products, raw materials and fuels) accounted for some 77 percent of total values of less developed countries exports. This implies that despite efforts made by less developed counties to industrialize and expand their exports of manufactured products, they still they remain dependent on non-manufactured goods as a source of their export earnings. Moreover, the manufactured goods that the less developed countries export, such as textiles and apparels, generally are labor intensive and require low level of technology in production.

But it should be noted that the dominance of primary products in the export trade of less developed countries has been diminishing from 1960s and 1970s. Since then the less developed countries as a group have been increasing their exports of manufactured goods rather than primary products during the past 30 years. However, this does not suggest that the less developed countries have been transformed from economies based on primary products to economies based on manufactured goods. Moreover the increase in exports of manufactured goods has not taken place evenly among the less developed countries.

Most of the increases in the last 40 years have been concentrated in a handful of East Asian countries and in some African countries such as Chad and Mali the percentage of manufactured goods in their exports has declined (J.S.Hodgson and M.G.Herander 1983)

Empirical Research:

In order to test the effect of export on rate of growth of GDP, G.Feder (1983) used a neo-classical production function and estimated the following regression equation for a sample of 31 semi-industrialized countries for the period of 1964-1973 by ordinary least square method.

$$\frac{Y}{Y} = 0.002 + 0.178\ \frac{I}{Y} + 0.747\ \frac{L}{L} + 0.422\ \frac{X}{Y}$$

[0.18] [3.542] [2.862] [5.454]

$R^2 = 0.69$

The figures in brackets are t values. The coefficient of ratio of export to GDP is positive (0.422) and highly significant (t = 5.454).

So his hypothesis that export can affect the rate of growth of GDP cannot be rejected (G. Feder 1983).

Ballasa, B. (1978), in his work, tries to answer the following question:

"Does export promotion strategy compared to import substitution strategy have greater impact on developing countries growth performance?"

The countries he chooses contains one of the Latin American and one of Asian and four of East Asian countries which have adopted export promotion strategy and four Latin American countries following import

substitution strategy. He concludes that in those countries that have followed export promotion strategy, growth rates are higher than the other group.

Chow 1987 in his paper examines the causal relationship between growth of export and industrial development in eight newly industrialized countries (NICS), for the period of 1960-1984.

Sym's causality test shows that there is a powerful two directional causal relationship between these two variables.

Khan and Saqib 1993 used time series for the period of 1972-1988 for Pakistan. They studied the relationship between export and the rate of growth of GDP. They concluded that there was a strong relationship between export and economic growth in Pakistan.

Shoraka and Safari tested the relationship between export and growth-in economic sectors in Iranian Economy for the period of 1993-1999. They used Granger Causality Test and then estimated the Feder growth model.

They concluded that there was a relationship between growth of exports and growth of GDP. In agricultural sector, the growth of total exports and non-oil exports did not show any significant effect on value added of this sector. But in industrial and service sectors the effects of total exports and non-oil exports showed a significant effect on value added of these sectors.

Taghavi and Nakhjavani 2002 used available data for the period of 1978-2000 and estimated two regression equations for testing causality between growth rate of GDP and growth rate of non-oil exports in Iranian Economy:

1- $ggdp_t = \beta o + \beta_1 gtotnexp_t + \beta_2\ gtotexp_t\text{-}1$

2- $gtotexp_t = \alpha o + \alpha_1\ ggdp_t + \alpha_2\ ggdp_t\text{ -}1$

Using Augmented Dicky-Fuller unit root test they made sure that they avoid the possibility of running a spurious regression. Estimated equations are as follows:

1- $ggdp_t = 2.61 + 0.055\ gtotnexp_t - 0.088\ gtotnexp_t\text{ -}1$

[10] [0.9] [-1.47]

$R^2 = 0.12$ F = 1.26 Dw = 1.31

$$2\text{- } gtotnexp_t = 12.44 + 0.118\ ggdp_t - 0.887\ ggdp_t\text{-}1$$
$$[1.53] \quad [0.13] \quad [-1.47]$$

ggdp is the growth rate of gross domestic products and totnexp is the growth rate of non-oil exports.

They found out that because the coefficients t statistics are less than 1.69 and not significant and DW of 1.31, the hypotheses that there is a causal relationship between growth rate of GDP and growth rate of non-oil exports cannot be accepted.

A large group of economists believe that export is the engine of growth. But this statement is not true for all countries at all times. Many research findings, reveal that export of goods and services are not a cause of growth.

Tung and Marshall 1985 tested the causality between export and the rate of growth, for a group of 37 developing countries. They found that only in four of them there was a causal relationship between exports and growth.

Kunset and Marin 1989 for Australia have found that export growth does not have any effects on rate of growth of GDP.

Sharma 1991 has tested the causal relationship between exports and growth of GDP in a group of five industrialized countries (Germany, Italy, Japan, United Kingdom and U.S.A) and has found that in Germany and Japan export effects GDP growth rate and in USA and United Kingdom GDP growth rate affects export.

Sharma and Dhaket 1994 test the relationship between rate of growth of export and rate of growth of GDP for 30 developing countries. They found that in 6 countries export is the cause of growth of GDP, in 8 countries growth of GDP is the cause of growth in export. In 11 countries there was no relationship between export and GDP. In 5 of the countries there was a relationship in both directions.

Relation between export and economic growth in a group of countries:

Shahrestani H. and Mirzajad M. 2003 used Feders model and time series for the period of 1970-2003 for Iran and then tested the relation between export and growth of GDP by pooling data method. The equation they estimated is as follows:

$$NGGR=\alpha_o+\alpha_1 NLGR+\alpha_2 NKGR+\alpha_3 UPCGR+\alpha_4 NXPGR+\alpha_5 IIGR+\alpha_6 DUMREV+E$$

In which dependent variable is rate of growth of non-oil GDP and independent variables are:

NLGR = non-oil labor growth rate

NKGR = capital stock growth rate in non-oil sector

UPCGR= growth rate of consumption of urban household multiplied by share of urban consumption to total private consumption

XNPGR = NXGR ($\frac{NX}{NGG}$) = ratio of non-oil export to non-oil GDP multiplied by rate of growth of non-oil export

IIGR = intermediate goods import growth rate

DUMREV=Dummy variable for Iranian Revolution

To avoid spurious regression they used Augmented Dicky Fuller Unit Roots test and found that all the variables were stationary. Their results are reported in table below:

Table 1 – The Model without Oil export (First model)

Independent variable	Coefficient	t-statistics	ADF statistics
NLGR	1.99	3.91	-3.95
NKGR	0.13	1.44	-2.12
UPCGR	0.21	1.78	-3.05
NXPGR	0.01	1.54	-4.14
IIGR	0.1	3.19	-3.64
DUMREV	-4.92	3.3	-
R^2 =0.68	D.W=2.02	F=12.54	

As the table show the coefficient of NXPGR is not significant even at 90 percent confidence interval.

Then they estimated another model in which the oil export revenue is included.

The dependent variable in this model is rate of growth of GDP (GGR) and extra independent variables are:

OXPGR = effect of oil export on rate of growth of GDP

VINDPGR = industrialization index = rate of growth of value added in industrial sector multiplied by share of industry in GDP

Other independent variables are as in model 1, with oil sector now is included.

The result of their estimation is reported in table No. 2, bellow:

Table 2

Independent variable	Coefficient	t-statistics	ADF statistics
LGR	0.02	2.32	-3.94
KGR	0	-0.03	-2.54
UPCGR	0.0006	0.45	-2.96
NXPGR	0.026	4.14	-4.38
OXPGR	0.009	9.56	-3.37
VINDPGR	0.002	0.17	-4.31
IIGR	0.0009	2.63	-3.49
DUMREV	-0.035	2.56	-
AR(1)	0.39	2.08	
R^2 =0.85	D.W=2.08	F=18.2	

As table 2 shows, rate of growth of non-oil export (NXPGR) and effect of oil export revenues coefficients are respectively positive (0.026 and 0.009) and significant at 99 percent confidence interval (t of 4.14 and 9.56).

Ghasemi, A. (2003) using a log-linear model estimates the relationship between non-oil export and real exchange rate and GDP of trading partner for Iranian Economy.

The model is as follows:

$LRNOOILEXP_t=\beta_{o+}\beta_1 LREXCHANGE_t+\beta_2 LYF_t+\beta_3 LRNOOILEP_{t-1}+\beta_4 5966+U_{2t}$

The dependent variable is the real US Dollar value of non-oil export in year t divided by geometric mean of consumer price index in six major importer of Iran's non-oil export.

$REXCHANGE_t$ is real exchange rate for non-oil export.

YF_t , is weighted average of income of six major importer of Iran non-oil exports, D5966 is a dummy variable for the period of war of Iran and Iraq. The time series are for the period of 1959-1998. Using an ADF unit root test, he found that all series were I(0), and thus there could not be a spurious regression. His findings are reported in the table below:

Independent variable	Coefficient	t-statistics
$LREXCHANGE_t$	0.446	2.946
LYF_t	0.329	2.129
$LRNOOILEXP_{t-1}$	0.693	6.616
D5966	-0.31	-2.344
MA(6)	0.556	4.59
MA(7)	0.877	6.518
R^2 =0.933 R^{-2}=0.92	D.W=2.189	F=74

All coefficients of independent variables have expected signs and are significant at 99 percent confidence level. So real exchange rate and income of importer of Iranian non-oil exports affect the volume of non-oil export positively and significantly.

Ghasemi H., in his Ph.D. dissertation 2003 has tested the following hypothesis:

rate of growth of non-oil export of Iran has a negative and significant relationship with the rate of inflation in Iran and a positive and significant relationship with employment growth rate and value added in agricultural sector, after testing series for stationary by Augmented Dicky-Fuller unit root tests the equation estimated is:

$Gtotnexp_t = \beta_o + \beta_1 Gtotemp_t + \beta_2 Gagri_t + \beta_3 Infla_{t-1}$

$Gtotnexp_t$ = non-oil export growth rate

$Gtotemp_t$ = employment growth rate

$Gagri_t$ = growth of value-added in agricultural sector

$Infla_{t-1}$ = rate inflation of previous period

The time series are for the period of 1978 to 2000. The coefficients estimates with t , R^2 , D.W and F statistics are shown in table below:

Independent variable	Coefficient	t-statistics
$Gtotemp_t$	17.74	4.03
Gagri	3.58	2.46
Infla	-1.24	-2.44
R^2 =0.94	F = 10.76	DW = 1.99

As the table shows, the coefficients have the expected signs and t. values show that all the coefficient are statistically significant at 99 percent confidence level.

Research Methodology and Model Estimation

In order to test our hypothesis, after making sure that our time series are co integrated, we use Augmented Dicky-Fuller unit root test, to avoid running a spurious regression equation, we estimate the following model:

$LEXPNO_t = C_o + C_1LY_t + C_2LIO_t + C_3LPC_t + C_4INF + C_5T + \sum_t$

In our log linear model variables are:

$LEXPNO_t$= log of Iran's non-oil exports

LY = log of GDP of Iran

LIO = log of oil export revenue

LPC = log of private sector consumption

LINF = inflation rate for Iranian Economy

D57 = dummy variable for Iran-Iraq war

Table 3: The DF and ADF test results are shown in the following table:

Variable	Non random element	Number of lags	Test statistic	Critical values
LY	Intercept	1	-1.56	-3.57* -2.92** -2.59***
LIO	Intercept	1	0.43	-3.65* -2.95** -2.61***
LPC	Intercept	2	1.65	-3.57* -2.92** -2.6***
LEXPNO	Intercept	1	-2.52	-4.17* -3.51** -3.18***
INF	Intercept	1	-3.79	-3.62* -2.95** -2.16***
GY	Intercept	-	-3.8	-3.57* -2.92** -2.59***
GIO	Intercept	-	3.23	-2.64* -1.95** -1.62***
GEXPNO	Intercept	1	-4.43	-3.58* -2.92** -2.6***
GPC	Intercept	-	3.57	-3.57* -2.92** -2.52***
GINF	-	-	-	

* 99 percent
** 95 percent
*** 90 percent

As the table shows, since the absolute value of t statistic for all variable, except INF, is less than MC Kinnon critical value, so all variable except INF are non-stationary at level. But their difference are stationary, so they are all, except INF are I(1) variables and INF is a I(0) variable.

Now use the trace and max eigen value text to determine the number of co-integrated vector (results are shown in appendix). We found that there is on

co-integrated vector for our model. So we estimate the long-run model with Juhnson-Jusilius method:

Lexpno = 47.68 + 1.57 LIO – 6.04 LPC + 0.51 LY

(se = 0.2) (se = 0.44) (se = 0.34)

(t = 7.83) (t = 13.49) (t = 1.49)

0.039 INF + 0.25 time

(se = 0.005) (se = 0.02)

(t = 7.19) (t = 15.15)

Table 4

Independent variable	The long run relationship	Se	T
LY	0.51	0.34	1.49
LIO	-0.4+1.57	0.2	7.83
LPC	6.04	0.43	13.49
INF	0.039	0.0005	7.19
C_1	-47.68		
Time	0.25	0.02	15.15

Since our variables have unit roots we can not run a VAR model in level and can not test the Granger Causality Test.

Conclusion

Our estimation result summarized in table 4, shows that:

1- Since the coefficient of LY is +0.51 with the t value of 1.49 we can not accept our first hypothesis and should accept the alternative hypothesis that with 90 percent confidence there is a positive and significant relationship between grow rate of GDP and growth rate of non-oil export of Iran.

2- Since the coefficient of LIO is 1.57 and its t value is 7.83, with 99 percent confidence we can accept our second hypothesis.

3- Since the coefficient of LPC is -6.04 and its t value is 13.49, with 99 percent confidence we can reject our hypothesis and accept the alternative hypothesis that there is a negative and significant relationship between growth of private sector consumption and growth of non-oil exports.

4- Since the coefficient INF is 0.039 and its t value is 7.19 we can not reject our hypothesis, so there is a positive and significant relationship between growth of inflation an growth of non-oil export.

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Appendix

ADF Test Statistic	-1.568840	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable:	D(LY)		
Method:	Least Squares		
Date:	04/10/09	Time:	21:07
Sample(adjusted):	1340	1386	
Included observations:	47 after adjusting endpoints		

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LY(-1)	-0.023628	0.015061	-1.568840	0.1238
D(LY(-1))	0.469207	0.128531	3.650523	0.0007
C	0.311824	0.184345	1.691522	0.0978

R-squared	0.310435	**Mean dependent var**	0.048693
Adjusted R-squared	0.279091	**S.D. dependent var**	0.068164
S.E. of regression	0.057876	**Akaike info criterion**	-2.799332
Sum squared resid	0.147383	**Schwarz criterion**	-2.681238
Log likelihood	68.78431	**F-statistic**	9.904173
Durbin-Watson stat	1.995719	**Prob(F-statistic)**	0.000281

ADF Test Statistic	-3.801089	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable:	D(LY,2)		
Method:	Least Squares		
Date:	04/10/09	Time:	21:07
Sample(adjusted):	1340	1386	
Included observations:	47 after adjusting endpoints		

Variable	Coefficient	Std.Error	t.Statistic	Prob.
D(LY(-1))	-0.481147	0.126581	-3.801089	0.0004
C	0.023080	0.010613	2.174802	0.0349

R-squared	0.243039	**Mean dependent var**	-0.000671
Adjusted R-squared	0.226218	**S.D. dependent var**	0.066854
S.E. of regression	0.058808	**Akaike info criterion**	-2.787456
Sum squared resid	0.155627	**Schwarz criterion**	-2.708726
Log likelihood	67.50522	**F-statistic**	14.44828
Durbin-Watson stat	2.033645	**Prob(F-statistic)**	0.000431

ADF Test Statistic	0.433127	1% Critical Value*	-3.6576
		5% Critical Value	-2.9591
		10% Critical Value	-2.6181

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable:	D(IO)		
Method:	Least Squares		
Date:	04/10/09	Time:	21:16
Sample(adjusted):	1354	1384	
Included observations:	31 after adjusting endpoints		

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IO(-1)	0.102327	0.236251	0.433127	0.6682
D(IO(-1))	-0.112276	0.250382	-0.448416	0.6573
C	-655.1874	4219.314	-0.155283	0.8777

R-squared	0.008605	Mean dependent var	1058.258
Adjusted R-squared	-0.062209	S.D. dependent var	6236.942
S.E. of regression	6428.012	Akaike info criterion	20.46648
Sum squared resid	1.16E+09	Schwarz criterion	20.60526
Log likelihood	-314.2305	F-statistic	0.121518
Durbin-Watson stat	1.795934	Prob(F-statistic)	0.886039

ADF Test Statistic	-3.230206	1% Critical Value*	-2.6423
		5% Critical Value	-1.9526
		10% Critical Value	-1.6216

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable:	D(IO,2)		
Method:	Least Squares		
Date:	04/10/09	Time:	21:18
Sample(adjusted):	1355	1384	
Included observations:	30 after adjusting endpoints		

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(IO(-1))	-1.084457	0.335724	-3.230206	0.0032
D(IO(-1),2)	0.064496	0.213050	0.302726	0.7643
R-squared	0.429479	**Mean dependent var**	616.1667	
Adjusted R-squared	0.409103	**S.D. dependent var**	8504.944	
S.E. of regression	6537.736	**Akaike info criterion**	20.47291	
Sum squared resid	1.20E+09	**Schwarz criterion**	20.56632	
Log likelihood	-305.0936	**F-statistic**	21.07792	
Durbin-Watson stat	1.683727	**Prob(F-statistic)**	0.000085	
ADF Test Statistic	1.653802	1% Critical Value*	-3.5778	
		5% Critical Value	-2.9256	
		10% Critical Value	-2.6005	

*MacKinnon critical values for rejection of hypothesis of a unit root.

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
PC(-1)	0.029880	0.018067	1.653802	0.1056
D(PC(-1))	0.383777	0.162932	2.355449	0.0232
D(PC(-2))	0.124888	0.166591	0.749669	0.4576
C	-211.3927	1765.437	-0.119740	0.9053
R-squared	0.369827	**Mean dependent var**	5365.415	
Adjusted R-squared	0.324815	**S.D. dependent var**	7020.050	
S.E. of regression	5768.352	**Akaike info criterion**	20.24110	
Sum squared resid	1.40E+09	**Schwarz criterion**	20.40011	
Log likelihood	-461.5453	**F-statistic**	8.216117	
Durbin-Watson stat	1.886094	**Prob(F-statistic)**	0.000204	

ADF Test Statistic	-2.523906	1% Critical Value*	-4.1728
		5% Critical Value	-3.5112
		10% Critical Value	-3.1854

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable:	D(LEXPNO)		
Method:	Least Squares		
Date:	04/10/09	Time:	21:25
Sample(adjusted):	1340	1384	
Included observations:	45 after adjusting endpoints		

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXPNO(-1)	-0.231566	0.091749	-2.523906	0.0156
D(LEXPNO(-1))	0.331018	0.151986	2.177953	0.0352
C	1.071831	0.412993	2.595274	0.0131
@TREND(1338)	0.022409	0.008671	2.584467	0.0134
R-squared	0.179716	**Mean dependent var**		0.101047
Adjusted R-squared	0.119695	**S.D. dependent var**		0.238634
S.E. of regression	0.223898	**Akaike info criterion**		-0.070567
Sum squared resid	2.055338	**Schwarz criterion**		0.090025
Log likelihood	5.587763	**F-statistic**		2.994224
Durbin-Watson stat	1.959795	**Prob(F-statistic)**		0.041702

ADF Test Statistic	-4.430738	1% Critical Value*	-3.5850
		5% Critical Value	-2.9286
		10% Critical Value	-2.6021

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LEXPNO,2)
Method: Least Squares
Date: 04/10/09 Time: 21.27
Sample(adjusted): 1341 1384
Included observations: 44 after adjusting endpoints

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LEXPNO(-1))	-0.880649	0.198759	-4.430738	0.0001
D(LEXPNO(-1),2)	0.125708	0.158308	0.794072	0.4317
C	0.088692	0.040552	2.187130	0.0345
R-squared	0.389461	**Mean dependent var**		0.006421
Adjusted R-squared	0.359679	**S.D. dependent var**		0.299394
S.E. of regression	0.239575	**Akaike info criterion**		0.045849
Sum squared resid	2.353252	**Schwarz criterion**		0.167498
Log likelihood	1.991321	**F-statistic**		13.07689
Durbin-Watson stat	1.922242	**Prob(F-statistic)**		0.000040

Date: 04/10/09 Time: 21:44
Sample (adjusted): 1354 1384
Included observations: 31 after adjustments
Trend assumption: Linear deterministic trend

Series: LEXPNO LIO LPC LY INF

Lags interval (in first differences): 1 to 1

Unrestricted co integration Rank Test (Trace)

Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.676607	74.21983	69.81889	0.0213
At most 1	0.551948	39.22433	47.85613	0.2515
At most 2	0.245969	14.33611	29.79707	0.8212
At most 3	0.161989	5.584145	15.49471	0.7440
At most 4	0.003404	0.105696	3.841466	0.7451

Trace test indicates 1 co integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

** MacKinnon-Haug-Michelis (1999) p-values

Unrestricted co integration Rank Test (Maximum Eigenvalue)

Hypothesized	**Eigenvalue**	**Max-Eigen**	**0.05**	**Prob.****

No. of CE(s)		Statistic	Critical Value	
None *	0.676607	34.99550	33.87687	0.0367
At most 1	0.551948	24.88822	27.58434	0.1066
At most 2	0.245969	8.751968	21.13162	0.8519
At most 3	0.161989	5.478449	14.26460	0.6806
At most 4	0.003404	0.105696	3.841466	0.7451

Max-eigenvalue test indicates 1 co integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

** MacKinnon-Haug-Michelis (1999) p-values

Unrestricted co integrating coefficients (normalized by b'*S11*b=I):

LEXPNO	LIO	LPC	LY	INF
-1.505407	0.030256	1.053141	4.420542	0.245827
1.643751	0.215744	4.848451	-11.62580	-0.014036
-1.740601	-4.896906	1.612594	10.05016	-0.013940
-0.942763	1.867540	6.665200	-6.236456	-0.000153
-0.759052	-2.786588	-1.969069	2.743462	0.032590

Unrestricted Adjustment Coefficients (alpha):

D(LEXPNO)	-0.066674	-0.016594	0.069485	0.048970	-0.002006
D(LIO)	-0.006428	0.096912	0.123545	-0.065344	0.001112
D(LPC)	-0.011218	-0.001962	0.002418	-0.009636	-0.001963
D(LY)	-0.003616	0.037841	0.009142	-0.003030	-0.000535
D(INF)	-4.011755	-0.022433	-0.881520	0.034677	0.223079

1 Co integrating Equation(s): Log likelihood 22.87186

Normalized co integrating coefficients (standard error in parentheses)

LEXPNO	LIO	LPC	LY	INF
	-0.020098	-0.699573	-2.936444	-0.163296
	(0.48130)	(0.81380)	(1.09951)	(0.02000)

Adjustment coefficients (standard error in parentheses)

D(LEXPNO)	0.100372
	(0.06009)
D(LIO)	0.009677
	(0.09996)
D(LPC)	0.016888
	(0.01302)
D(LY)	0.005444
	(0.01706)
D(INF)	6.039323
	(1.55114)

2 Cointegrating Equation(s): Log likelihood 35.31597

Normalized cointegrating coefficients (standard error in parentheses)

LEXPNO	**LIO**	**LPC**	**LY**	**INF**
1.000000	0.000000	-0.214978	-3.485720	-0.142745
		(0.68960)	(0.81530)	(0.01663)
0.000000	1.000000	24.11103	-27.32928	1.022512
		(8.04775)	(9.51461)	(0.19411)

Adjustment coefficients (standard error in parentheses)

D(LEXPNO)	0.073096	-0.005597
	(0.08865)	(0.00866)
D(LIO)	0.168976	0.020714
	(0.14128)	(0.01381)
D(LPC)	0.013664	-0.000763
	(0.01926)	(0.00188)
D(LY)	0.067646	0.008055
	(0.01848)	(0.00181)
D(INF)	6.002448	-0.126221
	(2.29663)	(0.22447)
3 Cointegrating Equation(s):	Log likelihood	39.69195

Normalized cointegrating coefficients (standard error in parentheses)

LEXPNO	LIO	LPC	LY	INF
1.000000	0.000000	0.000000	-3.719687	-0.134196
			(0.37225)	(0.01587)
0.000000	1.000000	0.000000	-1.088586	0.063643
			(0.37819)	(0.01612)
0.000000	0.000000	1.000000	-1.088327	0.039769
			(0.18421)	(0.00785)

Adjustment coefficients (standard error in parentheses)

D(LEXPNO)	-0.047850	-0.345861	-0.038619
	(0.10508)	(0.18214)	(0.19385)
D(LIO)	-0.046067	-0.584277	0.662329
	(0.16445)	(0.28504)	(0.30337)
D(LPC)	0.009455	-0.012603	-0.017426
	(0.02440)	(0.04229)	(0.04501)
D(LY)	0.051733	-0.036714	0.194406
	(0.02284)	(0.03959)	(0.04214)
D(INF)	7.536823	4.190501	-5.755247
	(2.86916)	(4.97300)	(5.29283)

4 Cointegrating Equation(s): Log likelihood 42.43118

Normalized cointegrating coefficients (standard error in parentheses)

LEXPNO	LIO	LPC	LY	INF
1.000000	0.000000	0.000000	0.000000	4.027668
				(0.95987)
0.000000	1.000000	0.000000	0.000000	1.281634
				(0.28955)
0.000000	0.000000	1.000000	0.000000	1.257471
				(0.28697)
0.000000	0.000000	0.000000	1.000000	1.118875
				(0.25972)

Adjustment coefficients (standard error in parentheses)

D(LEXPNO)	-0.094018	-0.254406	0.287778	0.291116
	(0.10668)	(0.18772)	(0.30291)	(0.61425)
D(LIO)	0.015536	-0.706309	0.226800	0.494075
	(0.16873)	(0.29690)	(0.47908)	(0.97149)
D(LPC)	0.018539	-0.030598	-0.081649	0.057608
	(0.02504)	(0.04406)	(0.07110)	(0.14418)
D(LY)	0.054589	-0.042372	0.174213	-0.345149
	(0.02401)	(0.04224)	(0.06816)	(0.13822)
D(INF)	7.504131	4.255262	-5.524119	-26.54901
	(3.02431)	(5.32158)	(8.58698)	(17.4130)

Date: 04/10/09 Time: 23:01
Sample(adjusted): 1354 1384
Included observations: 31 after adjusting endpoints
Standard errors & t-statistics in parentheses

Cointegrating Eq:	**CointEq1**
LEXPNO(-1)	1.000000
LIO(-1)	-1.576684
	(0.20134)
	(-7.83099)
LPC(-1)	6.043000
	(0.44785)
	(13.4933)
LY(-1)	-0.519205
	(0.34753)
	(-1.49398)
INF(-1)	-0.039174
	(0.00545)
	(-7.19229)
@TREND(38)	-0.253030
	(0.01670)
	(-15.1558)
C	-47.68797

Error Correction:	**D(LEXPNO)**	**D(LIO)**	**D(LPC)**	**D(LY)**	**D(INF)**
CointEq1	0.303640	0.277566	-0.056591	-0.005657	15.61986
	(0.13611)	(0.22860)	(0.02956)	(0.04025)	(3.40878)
	(2.23084)	(1.21419)	(-1.91462)	(-0.14054)	(4.58224)
D(LEXPNO(-1))	-0.079713	-0.698938	-0.039182	-0.089604	-3.248683
	(0.21199)	(0.35604)	(0.04604)	(0.06269)	(5.30911)
	(-0.37603)	(-1.96308)	(-0.85112)	(-1.42936)	(-0.61191)
D(LIO(-1))	0.104908	-0.019634	0.004736	-0.034292	6.909592
	(0.16848)	(0.28296)	(0.03659)	(0.04982)	(4.21941)
	(0.62268)	(-0.06939)	(0.12945)	(-0.68831)	(1.63757)

D(LPC(-1))	-1.649307	-0.473822	0.289270	0.212231	-25.92980
	(0.70593)	(1.18563)	(0.15330)	(0.20875)	(17.6796)
	(-2.33635)	(-0.39964)	(1.88697)	(1.01666)	(-1.46665)
D(LY(-1))	3.148688	1.331563	0.078515	0.389261	60.03828
	(0.87020)	(1.46153)	(0.18897)	(0.25733)	(21.7936)
	(3.61834)	(0.91107)	(0.41549)	(1.51269)	(2.75486)
D(INF(-1))	-0.012990	0.007867	0.001283	-0.000355	-0.145141
	(0.00539)	(0.00905)	(0.00117)	(0.00159)	(0.13488)
	(-2.41193)	(0.86968)	(1.09693)	(-0.22274)	(-1.07607)
C	0.089076	0.069706	0.028691	0.013033	-0.549027
	(0.04877)	(0.08192)	(0.01059)	(0.01442)	(1.22150)
	(1.82633)	(0.85095)	(2.70885)	(0.90366)	(-0.44947)
R-squared	0.510336	0.177343	0.586690	0.341048	0.621337
Adj. R-squared	0.387920	-0.028321	0.483362	0.176310	0.526671
Sum sq. resids	1.095975	3.091547	0.051684	0.095840	687.4133
S.E. equation	0.213695	0.358907	0.046406	0.063193	5.351843
F-statistic	4.168861	0.862297	5.677965	2.070248	6.563476
Log likelihood	7.819215	-8.254701	55.16023	45.58845	-92.02080
Akaike AIC	-0.052853	0.984174	-3.107112	-2.489578	6.388438
Schwarz SC	0.270951	1.307978	-2.783308	-2.165774	6.712242
Mean dependent	0.093262	0.030337	0.041548	0.024561	-0.094361
S.D. dependent	0.273143	0.353931	0.064562	0.069628	7.778964

Determinant Residual Covariance	7.36E-08
Log Likelihood	34.64289
Akaike Information Criteria	0.410136
Schwarz Criteria	2.306700