

Effects of Exports and Imports on Level of Productivity

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ABSTRACT

Total factor productivity (TFP) as well as its qualitative and quantitative development merits special attention in Iran's economic, social, and cultural development plans. Economic growth is to a large extent rooted in the development of trade. In the context of a currently low level of factor productivity along with lack of proper policies for the suitable utilization of resources, a good knowledge of this variable could be helpful. This study tries to evaluate the effects of exports and imports on the level of productivity using the Vector Auto regression (VAR) Model during 1977-2008. The empirical results suggest the existence of Granger causality running from imports and non-oil exports to total factor productivity and the absence of any causal relation between oil exports and TFP. Meanwhile, there is Granger causality between government development expenditures and total factor productivity while there is no such relationship between government current expenditures and total factor productivity. There is also a causal relationship between government development expenditures and imports and between imports and exports. Furthermore, total factor productivity is the Granger cause of non-oil exports while non-oil exports are not the Granger cause of imports. Imports are the Granger cause of total factor productivity; however, non-oil exports, imports, and total factor productivity are not the Granger cause of development expenditures.

Key words: Total Factor Productivity (TFP), Iran, Vector Auto regression (VAR) Model, Government Current Expenditures, Government Development Expenditures, Government Size

1. INTRODUCTION

Among discussed studied in growth literature investigation of cooperation effect in foreign trade and productivity have special important. Exports increasing due to trade release will bring productivity increase. For example, this productivity increase can verify through using scale gain. Recent theoretical studies show that not only trade will be effective on level of productivity, but also through technology imports, the rate is growth. Some of economist in study of trade and growth knows one of the main reasons the economy speed to become industrialize and decrease important of agriculture parts. Therefore, understanding logical relation between suitable trade and increase total factor productivity and economy growth for compilation suit policy making for macroeconomics requiring general outlook in tow part of economy supply and demand for evaluation of suitable model and introduce appropriate way between productivity and important roles of trade component. That suitable trade orientation will bring through increase of total factor productivity, expansion of industrial products and finally economy growth. In this research after measuring variable role, that related to foreign trade (exports expansion and imports replacement) that will achieve in shape of suitable model. In addition, one of suitable method of measuring the total factor productivity will achieve the total factor productivity. In this article, evaluate economy effect (export and import) with use vector auto regression model (VAR) during 1977-2008 in Iran. and for this purpose in beginning introduce subject literature that consist of two part trade (export-import), economy growth, productivity and subject background, and then make productivity model, model introduction, produce interpretive model, enduring variable test, active model analysis, variance analysis, Granger cause and finally will evaluate conclusion.

1-1.Trade (export-import), economy growth and productivity

This theory is not new that foreign trade has positive effect on rate of productivity growth. The supporters of export development strategy discussed for a very long time that external effect cause of export parts increase productivity in whole of economy. Trade Theoreticians offered various model in decade of 1990 that according to these trade with increased number of market range affected on economy growth. Above-mentioned model predict that trade have positive effect on economy development through increase of productivity growth. For example in Young, model leaving through function (that show spillover effect between goods) is noticeable of main factor for productivity growth. According to above-mentioned model, until one country have not complete use of learning process through function, and don't achieve requiring specialization to produce related goods. The trade release cause more productivity and economy growth. ROMER state that

trade difficulties was preemptive factor for present new product, and using imports organization then attracts new technology, and in this way leaves destructive effect on product effectiveness.

If following trade release productivity increase the obtain profit of it will be more than effectiveness result of fixed profit on trade traditional theory. In addition, the relation between international trade and productivity can explain by competitive powers. Since leading, an economy to foreign trade cause more rivalry and have positive effect on level of productivity and product quality and variation in developing countries. So domestic organization by more performance use as existent profit and improve their productivity in short-term. Nevertheless, this question raised yet, that what extend the trade and foreign rivalry can raise higher rate of productivity. In economy development literature accomplished many studies because of cross-country data, about relation between foreign trade policies and country economy development, the experimental found that obtain are not same and certain. Aside from these contradictory evidences, even positive unity of trade variable and economy development interpreted in various ways. For example some of researchers believed that long-term unity observed between exports, economy development, and its only reflection of quicker gathering of resources in economies base on export, and can't assign it to the active result of export on productivity development.

1-2. Subject background: experimental evidences

Tybout and Westbrook [1] examined the effect of trade releases on productivity on basis of Panel data for some of industrial factory in Mexico during (1984-1995). The obtain result show that follow by release in most industry average cost decreased specially in product exchangeable goods. The mainly cost decrease about importable goods due to relative important of productivity, and its more inexpensive about exportable goods cause of imports organization. In this study, the saving profit calculated in small scale.

Amiti and Konings [2] examined the effect of trade release on total factor productivity, with use regression model base on micro data on level of organization. The obtain result about effect of support on total factor productivity was severely sensitive on way of productivity measuring.

Bjurek and Durevall [3] studied the effect of market release especially plane of structural modification on total factor productivity during (1991-1995) in Zimbabwe, with use panel data on industry infrastructure during (1980-1995). The obtain result show that during structural modification the total factor productivity have not average development. However, at end of two year (1994-1995) the most infrastructures experienced positive development in total factor productivity.

Chand and Sen [4] examined the trade release effect on productivity development according panel data from 30 industries during 1973-1988 in India. The obtain result evaluated above-mentioned effect positive. Moreover, mediator organization release has had more effect on total factor productivity as regards importation of final goods.

Sjoholm [5] with use product function approach on micro data on level of Indonesia organization show that, the foreign trade cooperation leading to development of organization productivity. In fact, exportable organization has higher productivity growth.

Kim [6] examined the release effect on productivity and market rivalry and scale effectiveness with use 36 factory during (1966-1988) in Korea. He supposed incomplete rivalry in model, show that trade release improved productivity growth, rivalry and scale effectiveness.

Miller And Upadhyay [7] examined the effect of open economy degree, trade policies and human recourses on total factor productivity, with use panel data for group of developed and developing country. The obtain result show that more open economy degree led to total factor productivity higher growth. The effect of human recourses on productivity depends on open economy degree in countries with low income. This effect is negative for poor counties with more limitation on foreign trade and above-mentioned effect is positive for poor countries with more open economy.

Ferreira and Rossi [8] studied the effect of trade improving on total factor productivity with regard to panel data from 16 industries for 13 years during (1985-1997) in Brazil. Their studies result show that there is stability and logical relation between trade improving and industrial performance. According to the effect of tariff, decrease is considerable on growth rate of total factor productivity and individually of each worker.

Yaghmaian [9] discussed the result of experimental test on neoclassical theory supporter base on export growth. He uses the regression analysis bas on sectional and time series data for 66 developing countries during year (1971-1980 and 1981-1990). The obtain result show that distribution part of employment and produce and side of factory part have role in raising economy quantitative performance. There is no statistical certification for export growth theory in this study. In addition, growth theory base on export studied with use causality test. Neoclassical theory or trade growth base on the causal relation from export to economy growth is one of experimental and theoretical conflict subject [10, 11]. Young [12, 13] examined direction of causal relation between export growth and produce for 37 countries with use extended test. In addition, they found that there were not statistical certification from neoclassical theory of export growth only in fore country Indonesia, Egypt, Southeast Asia Countries, or other country just became industry. In three countries, the test result confirms this theory, that product growth leading to more growth of export. However, about other five countries economy growth had less export growth. The Young [13] result generally does not achieved experimental

certification for export growth theory. Generally, in study by Dodaro[10] obtained some result for 87 developing countries; in addition, he does not find any experimental certification for export growth theory in country that called became recently industry. Dodaro [10] result just confirmed in this theory seven poor and low-income countries. In addition, many studies examined about relation between trade and economy growth in Iran. That we pointed to some of it.

Akbary and KarimyHasinjah[14] studied the effect of export development on economy growth and investment base on FEDR product function for year 1977-1996. The obtain result of this study show that industry and oil export growth effect on economy development on vast level is logical and strong. Moreover, above-mentioned relation is two sides and there is economy growth to development of industry export. In this way the growth of non-oil export, (mainly consist of traditional and agricultural goods) have no effect on economy growth. In addition, accomplishment of capital in economy was effective on economy and non-oil export and industry and non-industry export development have no meaningful effect on it. On level of parts the effect of export growth on increase value of industry and mine parts, by far is greater than agriculture part. Shoraka and Safavi[15] studied the relation between economy and exports growth in agricultural, industry and services with use Granger causality test and Fedrmodel during 1960-1994. the result of this study show that in IRAN non-oil export had positive effect on economy growth, and this effect in industry part is more than other part. They [15] studied the exports effect In Iran industry growth with use-modified shape of Chenery data model with nine separating industry infrastructure in side of other industry growth resources. The obtain result show that Iran industry part growth mainly depend on expansion of domestic request. The export development effect of industry imports was negative on growth of this part during (1980-1990). This effect also is positive for years (1990-1994) means the year of first program of economy, social, cultural, development of country, but have small part. About infrastructure country industry, wood, foodstuffs, machinery, chemical and weaving industry one by one had more growth rate through development of industrial imports.

GalalNainy and RezazadehMohamady[16].with use produce function model and study eight oil-rich country like IRAN calculated that export effect(oil and non-oil) on economy growth of this countries have been less than other developing countries.

Farjady and Lally[17] studied export effect and imported variable (including related, capital and consumer import). On economy growth base on produce, function model for years (1962-1995). The obtain result show that there is one positive and strong relation between import and export growth rate and economy. The effect of capital and relative imports goods on economy growth is positive and meaningful, however consumer import have not important effect on economy growth, moreover, in comparison to increase import of capital goods to domestic capital goods the economy growth will be increase.

KianyandHasanvand[18] achieved this result with use Granger causality method that export growth (oil, non-oil) has not effect on economy.

Motevasely[19] examined the export effect on gross domestic product with use Granger causality test for years 1960-1996. TavakoliandEsfahaniHashemian[20] examined the relation between export on product growth in industrial and agricultural infrastructure and basis of two numeral classifications ISIC, the agriculture part with use Feder product function model and on year 1368-1996 information. The result of this research show that the country industry and infrastructure react positive and meaningful toward export growth. Moreover, the reaction of foodstuff industry has been more than other industry toward change of export growth in comparison to industry parts with agricultural have more effectiveness toward it exports.

Azimi[21] studied the effect of non- oil export on economy growth base on side effect and productivity with uses product function model, the result of this research does not approve non-oil export effect on growth of gross domestic product without oil in Iran according to statistical data on year 1968-1998.

PRODUCTIVITY MODELING

In this article, for calculation of total factor productivity use from economy testing method. In this way at first, consider certain function model for product function and then evaluated it by economy testing method, and finally according to evaluated function can estimate attraction of work and capital product. After obtain the attraction of work and capital can estimate amount of total factor productivity differences on mentioned years. Therefore, for estimate total it needs evaluate of product function as follows:

$$(1) y = AK^\alpha L^\beta \quad 0 < \alpha, \beta < 1$$

A is total productivity index here with have not limited $\beta + \alpha$ output possibility is possible. Toward unstable scale. Divide equation (1) by L, the equation-specifying base on product and individual capital.

$$y = AK^\alpha L^{\alpha + \beta - 1}$$

This product function could have output toward fixed, increasing or reducer scale it is depend on $\beta + \alpha$ one by one great, equal or less than, with calculate logarithm from equation (2) and again rewriting of it will be follow the estimable product function .

$$Lny = LnA + \alpha LnK + (\alpha + \beta - 1)LnL$$

The output condition toward stable scale demand, that mean the L_nL index is equal zero ($1-\beta+\alpha$). Then after estimate equation (4) for each part, separately total productivity for each of economy part with use follow equation.

$$LnTFP = LnA = LnY - \alpha LnK - \beta LnL$$

In fact, in above-mentioned equation LN of total factor productivity and LNA is just SOLO remain that calculate in this way.

Model used in this study are as follows.

$$TFP = f(DLX, DLM, DLGI, DLGC, DUM)$$

DLX: Logarithm subtracting exports.

DLM: Subtracting log importation

DLGI: Logarithmic difference between the construction costs

DLGC: Logarithmic difference between current government spending

DUM: Virtual variables for the war years

5 -The analytical model:

To determine the effect of imports and exports on total factor productivity model, Kim (2008) has selected the base model

$$TFP_t = B_0 + \sum_{i=0}^l B_{1i} DIMP_{t-i} + \sum_{i=0}^m B_{2i} DLEXP_{t-i} + \sum_{i=0}^m B_{3i} DLGI_{t-i} + \sum_{i=0}^m B_{4i} DLGC_{t-i}$$

In the above expression

Total factor productivity: total factor productivity

DLEXP: Log difference of exports

DLIMP: Subtracting log importation

DLGI: Logarithmic difference between expenditure of cost

DLGC: Logarithmic difference between current costs

Exports, imports, the size of the data series used when the central bank and the capital stock of the achievements and employment obtained.

6 –Enduring test variables:

Dickey unit basic tests -one of the most common tests that Fuller generalized during process to identify the time series that used.

In this study the Dickey Fuller test extended for time-series variables to save space, I summarize the results described in Table 1 reported and it found that all the variables considered in this paper are static.

Table 1. DICKE Fuller unit basic test results for the extended time series model

Explanation	Probe	DICKY extended statist			Series name
		10%	5%	1%	
It is on enduring level	0.0055	- 3.22	- 3.58	- 4.33	Total factor productivity
It is on enduring level	0.0001	- 1.6	- 1.95	- 2.56	DLX
It is on enduring level	0.0008	- 1.6	- 1.95	- 2.56	DLM
It is on enduring level	0.01	- 1.6	- 1.95	- 2.65	DLGC
It is on enduring level	0.08	- 1.6	- 1.95	- 2.65	DLGI

7 –Dynamic analysis model (accounting problems)

Two important tools of VAR model, response functions and variance can be stimulated in this study using the dynamic model analyzed.

Reaction excitation is functions useful tool for analyzing the dynamic behavior of the model variables occur in the other model variables are unpredictable shocks.

Forecast error variance of changes show in the target variable its own shocks and shocks of other variables in the system at different times.

Reaction functions show the dynamic behavior of variables over time when measured against a standard deviation of shock to other variables.

In other words, the response is a function of reaction the endogenous variables to shocks due to system error.

1-7 -the shock response functions contain current government spending

If a shock on the productivity of all factors of production into imports from the total productivity of production factors have a descending trend in the third period reached its Max, then decreased, and then increased will damped in the long-term trend.

•If, shock on export of the total productivity factors production into then had a downward trend during the first quarter reached its Max and then the process has fallen and eventually will damp.

•If,ashockfromthe currentgovernmentspendingtototalproductivityof factors of productioninto First,anupward trendandreachedthethird termto theMax andthenadecreasing trend and eventuallywill damped.

2-7-responsefunctionscontain theimpactof governmentdevelopmentexpenditure

•If,ashockon theproductivityof allfactors of productionintoimports from Thetotalproductivityof productionfactorshaveadescendingtrendinthethirdperiodreached itsMax andthendownandthenupthe process will damped in the long-term.

•If,ashockon theexportofthetotalproductivityof factors of productioninto Firstthenhadadownward trendin thefourthperiodandreachedtheirMax Thetrendhas decreasedandeventually will damped.

•If, a shocktotheconstructioncostsofthetotalproductivityof factors of productioninto First,anupward trendandreachedthethird termto theMax andthenadecreasing trendandeventually will damped.

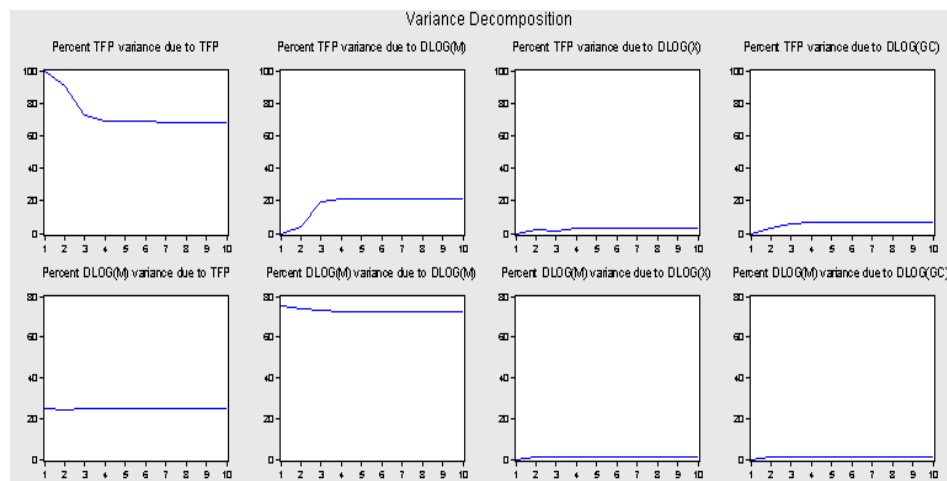
8 –Analysisof Variance

SinceVARmodelsincludingnon-binding parametersareexcessive, theycannotusedto predict inshort-term. Thevariancecan be sequenceofchangesthataffecthowthe sequenceofitscomponents andthe extentof theimpairmentcomponentinfluenced byothervariableswithinthe system.

Asalreadymentionedtheexcitationfunctions ofreactionsofshocktoanendogenousvariable Othervariablesareplottedon Variancechangesintheendogenousvariablestoshocks in otherendogenousvariables can be separated Inthis waythe contribution ofshocksto differentvariables in the modelforecast errorvariance Avariablein the shortand long termare expected.Theforecast errorvariance, thevolatilityof eachvariableinresponse toshocksto thevariablesenteredintothe model This waywe willbe able toshareeachvariableonothervariableschangesover timearemeasured.Indeed,thevarianceofeachshockinthe forecast turns out to beaspecificvariable. Whengovernmentspendingisnowthelargest singlevariableinexplainingthe variance Total factorproductivityinmanufacturinghaslongbeenimporting andvariableexplainingthe varianceinproductivityisthe lowestshare ofexports,Butwhentheconstructioncostsare Variableexplainingthelargestvarianceinproductivityis thecost offactors of production. Constructionandvariableexplainingthe varianceinproductivityisthe lowestshare ofexports.

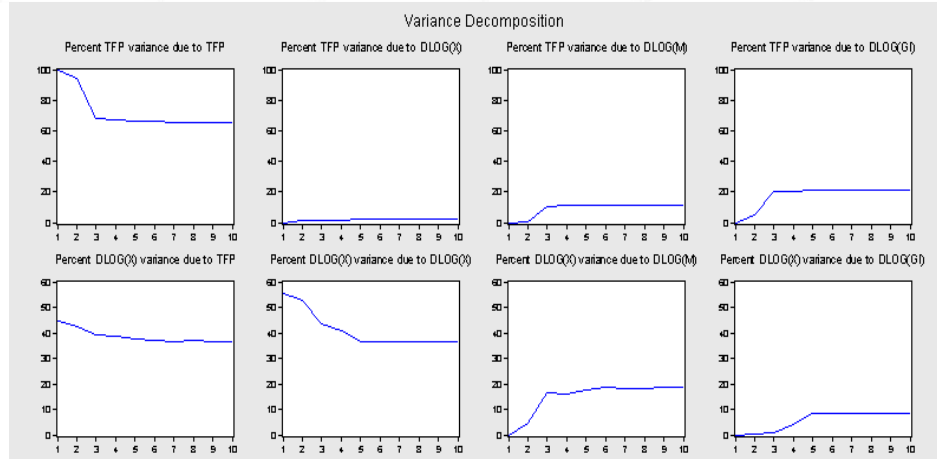
A) Thestategovernmentisnowspending

Variance Decomposition of TFP: Period	S.E.	TFP	DLOG (M)	DLOG (X)	DLOG (GC)
1	0.000846	100.0000	0.000000	0.000000	0.000000
2	0.000891	90.33277	4.410891	2.117109	3.139227
3	0.000998	72.71127	19.37283	1.687071	6.228828
4	0.001027	68.75378	21.00522	3.221051	7.019954
5	0.001052	68.68584	21.24104	3.164529	6.908586
6	0.001053	68.63117	21.18880	3.165741	7.014295
7	0.001055	68.39514	21.38278	3.166143	7.055944
8	0.001057	68.25319	21.46781	3.210073	7.068923
9	0.001058	68.22490	21.45315	3.215389	7.106562
10	0.001058	68.18436	21.48751	3.215192	7.112939



Whenthere is governmentdevelopmentexpenditure

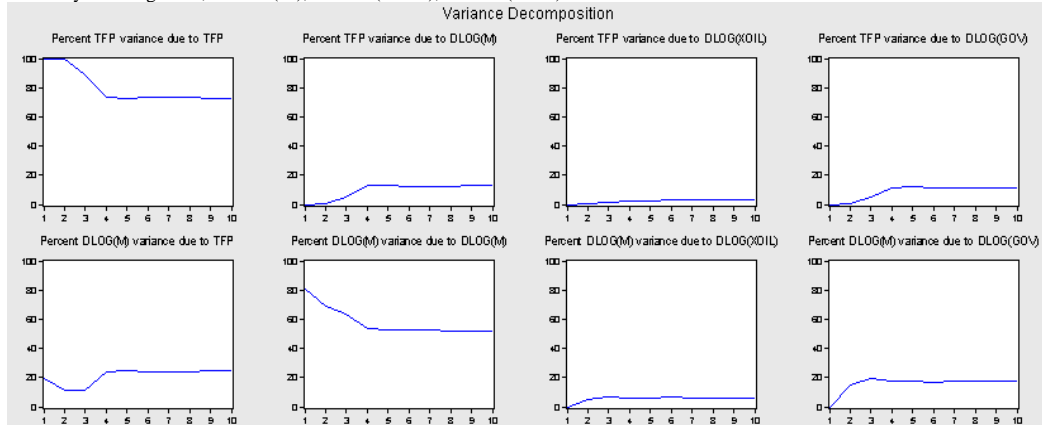
Variance Decomposition of TFP:					
Period	S.E.	TFP	DLOG(X)	DLOG(M)	DLOG(GI)
1	0.000728	100.0000	0.000000	0.000000	0.000000
2	0.000751	94.27657	1.205098	0.005147	4.513183
3	0.000898	68.44916	1.473383	10.08758	19.98988
4	0.000909	66.91093	1.473734	10.91226	20.70308
5	0.000921	66.13463	1.808749	10.83344	21.22318
6	0.000925	65.92171	1.865737	11.16508	21.04748
7	0.000928	65.67391	2.025893	11.22368	21.07651
8	0.000928	65.67877	2.026223	11.22720	21.06780
9	0.000928	65.61689	2.046153	11.26700	21.06997
10	0.000929	65.59544	2.050560	11.28886	21.06514



A. When there is an oil export.

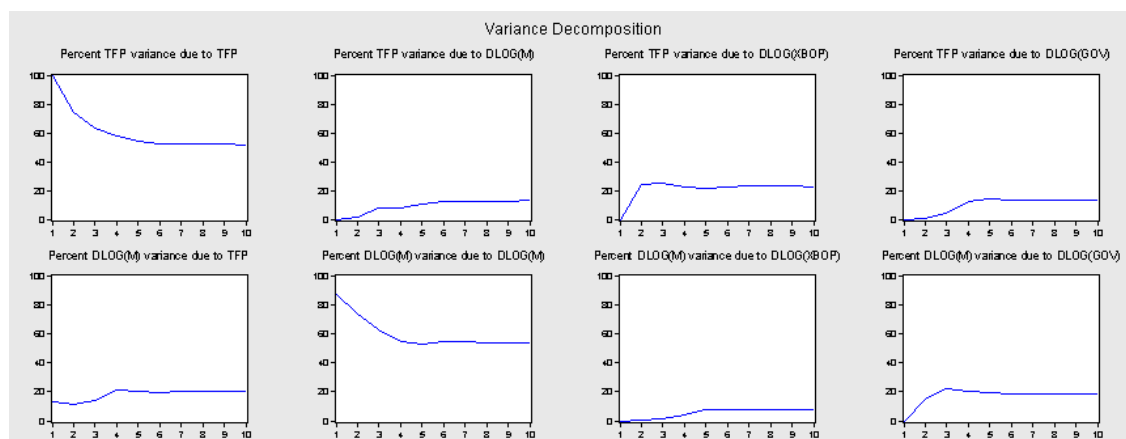
Period	S.E.	TFP	DLOG(M)	DLOG(XOIL)	DLOG(GOV)
1	0.000859	100.0000	0.000000	0.000000	0.000000
2	0.000866	99.61438	0.014881	0.093646	0.277091
3	0.000918	88.58526	4.669493	1.700895	5.044347
4	0.001012	73.29397	12.68265	2.461788	11.56160
5	0.001019	72.74692	12.87782	2.629862	11.74540
6	0.001061	73.86126	12.21017	2.989267	10.93931
7	0.001062	73.84377	12.18446	3.051967	10.91980
8	0.001067	73.45437	12.45174	3.116772	10.97712
9	0.001072	72.76029	12.64561	3.172048	11.42205
10	0.001074	72.55111	12.83945	3.168286	11.44115

Cholesky ordering: TFP, DLOG (M), DLOG (XOIL), DLOG (GOV)



When there are non-oil exports.

Variance Decomposition of TFP:					
Period	S.E.	TFP	DLOG(M)	DLOG(XBOP)	DLOG(GOV)
1	0.000717	100.0000	0.000000	0.000000	0.000000
2	0.000835	73.68986	1.437837	24.24060	0.631699
3	0.000916	63.06225	7.505521	25.09998	4.332251
4	0.000981	57.52104	8.127893	22.34626	12.00481
5	0.001013	54.06293	10.47365	21.34880	14.11463
6	0.001048	52.70871	12.19607	21.86766	13.22756
7	0.001060	51.95329	11.98217	23.12125	12.94330
8	0.001069	52.16251	12.11906	22.92894	12.78949
9	0.001071	51.97635	12.12668	22.87559	13.02138
10	0.001078	51.32143	12.89636	22.60249	13.17971



Granger causality:

An important application of VAR causality relationship between variables. Granger causality only in the sense of causality can be assessed with continuous variables. In this case based on the Granger causality are between exports and imports with the interruption of the total productivity of factors of production are and the results showed that imports Granger cause productivity is total factor productivity. Non-oil exports Granger because productivity is total factor productivity but oil exports Granger because productivity is total factor productivity. Current government spending Granger causes productivity is total factor productivity but civil government expenditure Granger causes productivity is total factor productivity to determine the cost of the two parts separated including current, development expenditure is As well as exports, including oil exports, and non-oil separated into two parts.

2. CONCLUSION

- Government development expenditure is Granger causes total factor productivity. Because the development cost to develop infrastructure, education and human capital and etc. therefore can result into total factor productivity boost.

- The construction cost of imports is due to Granger. Providing the infrastructure and the possibility of expanding production and imports of intermediate materials will be provided.

- Total factor productivity is the production of non-oil exports Granger cause. It provides a competitive country in the world.

- Imports Granger cause productivity is total factor productivity. It provides possibility of importing machinery and raw materials, production and export of products.

- Non-oil exports, imports and total factor productivity, primarily because of Granger's construction costs and construction costs, now are the oil revenue.

- Non-oil imports do not Granger cause. Because of non-oil have many exchange.

•Oil exports Granger is not cause total factor productivity because of the oil exports of raw materials and... and high technology that could boost productivity of all factors of production.

•Non-oil exports Granger because total factor productivity because of the non-oil exports to the higher required technology. In addition, we also demand mainly by developed countries like Britain, Germany and... are indicating that this type of technology exports was higher could raise the productivity of all factors of production.

There are government current expenditures. There are government development expenditures.

VAR Granger Causality/Block Exogeneity Wald Tests Date: 09/12/10 Time: 22:27 Sample: 1356 1386 Included observations: 27				VAR Granger Causality/Block Exogeneity Wald Tests Date: 09/12/10 Time: 22:29 Sample: 1356 1386 Included observations: 27			
Dependent variable: TFP				Dependent variable: TFP			
Excluded	Chi-sq	df	Prob.	Excluded	Chi-sq	df	Prob.
DLOG(M)	7.489736	2	0.0236	DLOG(X)	0.868070	2	0.6479
DLOG(X)	0.532963	2	0.7661	DLOG(M)	15.42236	2	0.0004
DLOG(GC)	2.207254	2	0.3317	DLOG(GI)	8.932879	2	0.0115
All	13.96808	6	0.0300	All	24.81189	6	0.0004
Dependent variable: DLOG(M)				Dependent variable: DLOG(X)			
Excluded	Chi-sq	df	Prob.	Excluded	Chi-sq	df	Prob.
TFP	0.570549	2	0.7518	TFP	6.775556	2	0.0338
DLOG(X)	0.232999	2	0.8900	DLOG(M)	10.98808	2	0.0041
DLOG(GC)	0.268272	2	0.8745	DLOG(GI)	1.897547	2	0.3872
All	1.126906	6	0.9803	All	16.59776	6	0.0109
Dependent variable: DLOG(X)				Dependent variable: DLOG(M)			
Excluded	Chi-sq	df	Prob.	Excluded	Chi-sq	df	Prob.
TFP	7.192955	2	0.0274	TFP	0.688926	2	0.7086
DLOG(M)	7.945709	2	0.0188	DLOG(X)	0.127729	2	0.9381
DLOG(GC)	0.586694	2	0.7458	DLOG(GI)	8.061525	2	0.0108
All	14.26721	6	0.0268	All	10.35739	6	0.1104
Dependent variable: DLOG(GC)				Dependent variable: DLOG(GI)			
Excluded	Chi-sq	df	Prob.	Excluded	Chi-sq	df	Prob.
TFP	3.109669	2	0.2112	TFP	2.671598	2	0.2629
DLOG(M)	0.887522	2	0.6416	DLOG(X)	0.996066	2	0.6077
DLOG(X)	0.077548	2	0.9620	DLOG(M)	0.076335	2	0.9626
All	4.404850	6	0.6221	All	3.430758	6	0.7532

There are oil exports.

There are on-oil exports.

VAR Granger Causality/Block Exogeneity Wald Tests			
Date: 09/12/10 Time: 22:33			
Sample: 1356 1386			
Included observations: 27			
Dependent variable: TFP			
Excluded	Chi-sq	df	Prob.
DLOG(M)	5.306635	2	0.0704
DLOG(XOIL)	0.727413	2	0.6951
DLOG(GOV)	1.668040	2	0.4343
All	12.99875	6	0.0431
Dependent variable: DLOG(M)			
Excluded	Chi-sq	df	Prob.
TFP	2.511573	2	0.2849
DLOG(XOIL)	3.194399	2	0.2025
DLOG(GOV)	17.52480	2	0.0002
All	24.40682	6	0.0004
Dependent variable: DLOG(XOIL)			
Excluded	Chi-sq	df	Prob.
TFP	2.632709	2	0.2681
DLOG(M)	3.298022	2	0.1922
DLOG(GOV)	0.199658	2	0.9050
All	5.920266	6	0.4322
Dependent variable: DLOG(GOV)			
Excluded	Chi-sq	df	Prob.
TFP	10.64864	2	0.0049
DLOG(M)	2.128400	2	0.3450
DLOG(XOIL)	1.821095	2	0.4023
All	21.20301	6	0.0017

VAR Granger Causality/Block Exogeneity Wald Tests			
Date: 09/12/10 Time: 22:31			
Sample: 1356 1386			
Included observations: 27			
Dependent variable: TFP			
Excluded	Chi-sq	df	Prob.
DLOG(M)	9.141963	2	0.0103
DLOG(XBOP)	8.463459	2	0.0145
DLOG(GOV)	1.003895	2	0.6054
All	26.08987	6	0.0002
Dependent variable: DLOG(M)			
Excluded	Chi-sq	df	Prob.
TFP	2.557298	2	0.2784
DLOG(XBOP)	2.289140	2	0.3184
DLOG(GOV)	14.18271	2	0.0008
All	22.55066	6	0.0010
Dependent variable: DLOG(XBOP)			
Excluded	Chi-sq	df	Prob.
TFP	9.508898	2	0.0086
DLOG(M)	3.649502	2	0.1613
DLOG(GOV)	1.194318	2	0.5504
All	15.82958	6	0.0147
Dependent variable: DLOG(GOV)			
Excluded	Chi-sq	df	Prob.
TFP	19.96537	2	0.0000
DLOG(M)	1.459556	2	0.4820
DLOG(XBOP)	3.845623	2	0.1462
All	25.31239	6	0.0003

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