MÄLARDALENS HÖGSKOLA

SCHOOL OF SUSTAINABLE DEVEPMENT OF SOCIETY AND TECHNOLOGY

Bachelor Thesis in Economics

The Impact of Openness on the Swedish Economy

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ABSTRACT

Subject / term: Economics (Nationalekonomi) / VT2008
Title: The Impact of Openness on the Swedish Economy
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Introduction:

Over the decades there has been continues debate amongst economist on the relation between openness and economic performance. From the comparative advantage theory of Heckscher-Ohlin, Openness can be an influencing factor in improving the economic performance of a country. Based on Heckscher-Ohlin theory, a country will export products it has comparative advantage in to improve its overall economic performance.

Problem:

The purpose of this thesis work is to determine empirically, the type of economic growth that occurs as a result of the Openness of the Swedish Economy.

Method: We will perform traditional Ordinary Least Square regression analysis on the variables listed in the theoretical part of this thesis. We will also plot stationary and Unstationary time series graphs in relation with GDP, Exports and Imports.

Results: The regression results shows that export has been more than import in Sweden and that the type of growth experienced in Sweden was Pro-trade biased.

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1. Statement of the Problem

1.1 Introduction

Over the decades there has been continues debate amongst economist on the relation between openness and economic performance. From the comparative advantage theory of Heckscher-Ohlin, Openness can be an influencing factor in improving the economic performance of a country. Based on Heckscher-Ohlin theory, a country will export products having comparative advantage and import goods having no comparative advantage and this will lead to increase efficiency thus will support national economic growth.

The growth in the average level of openness has become important for the world economy. The question now arises, what has caused this explosion of world trade since the 1980s.One factor that has certainly played an important role has been the reduction in barriers to international trade that has occurred during this period. With improvements in technology in these areas, such as container ships, supermarkets, and satellite telecommunications networks, it is now much easier for sellers in one country to contact consumers in another and to deliver goods to them in a timely fashion. Barriers to trade include government- imposed limits on trade, including tariffs and quotas on imports, (Steven Husted and Michael Melvin, 2001).

For instance, the formation of the European Union is to ease the flow of factors of production and trade among member nations. One of the secrets behind the formation of the European Union is enjoy the idea of a single market. Sometimes, single market is differentiated as a more advanced form of common market targeted towards the removal of physical, technical and barriers among member states. In 1951, the European Union began as the European coal and Steel Community (http://en.wikipedia.org/wiki/Single_market). All these years, Sweden never joined the EU until 1995. For us, we feel that one of the reasons why a country might be interested in joining such big body of countries could be to increase their trade volume and hopefully its welfare. Some economists have a skeptical attitude towards the impact of openness to a country. Krugman (1994) and Rodrik (1995) are economists with skeptical attitude towards the impact of openness to a country. The question regarding the benefit of openness to a country's economy has been raised again since the economic crisis occurred in Asian countries in 1997/1998. Openness may cause a country to be more liable to succumb towards shock coming from outside country. The growth in international trade flows and

international ownership is not specific to Sweden, it is a global phenomenon (Par Hansson, Patrik Karpaty, Markus Lindvert, Lars Lundberg, Andreas Poldahl and Lihong Yun, A2007:004). For instance in the European Union, Sweden benefits from trade in one way or the other. No country in the world is an island. Whatever that is not sufficient in a particular country must be imported from other countries to make the citizens better off. In a small open economy like Sweden, internationalization can stimulate spread of knowledge across borders in many different ways. This may be through import of input and capital goods or export or from direct investment from abroad. To examine the impact of openness on the Swedish Economy, we are going to consider gross domestic product of Sweden, export of goods and services and import of goods and services. Trade openness through export import transaction has succeeded in supporting economic growth.

1.2 Aim of the Study

The aim of this thesis work is to determine by empirical means, the type of economic growth that occurs as a result of the Openness of the Swedish Economy.

1.3 Limitations

(a) Between 1981 to 2007, there might have been significant changes in the growth level of the world economy.

(b) Big depreciation of the SEK in the early 1990´s

(c) Exchange rate is neglected

(d) The data used comprises of total export and import (inclusive EU countries)

(e) The measure of import elasticity is calculated as the change in GDP divided by the change in import and export elasticity is computed as change in GDP divided by change in export. Between 1981 to 2007, there might have been significant changes in the growth level of the economy.

(f) The presence of shocks in the economy during the period understudy could make our findings inconclusive.

(g) Trade is limited to goods and services.

1.4 Method

The theoretical part of this study will consists of concepts that will give the reader a clear understanding of the focus of this thesis. There is also a short history of the economic development in Sweden over the past 28 years.

In the empirical part of this study we will perform statistical tests on historical data from the Sweden economy. We will use linear regression analysis with Ordinary Least Square estimators to determine whether the datasets for Sweden fit the regression model and

Test to determine autocorrelation and determine the significance of results to arrive at a conclusion.

A detailed description of the empirical methods and information about the data can be found in section 4.

Finally a conclusion will be drawn about from our results of this analysis.

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2. Theoretical Framework

2.1 Openness and Economic Performance

The International trade theory provides little guideline as to the effects of international trade on growth and technical progress of a country. On the contrary, the new trade theory makes it clear that the gains from trade can arise from several fundamental sources: differences in comparative advantage and economy-wide increasing returns. This probably explains why a growing body of empirical and theoretical research has shifted towards examining the relationship between trade liberalization and the economic performance of countries since the late 1970s.

However, the most serious problem facing researchers today is the lack of a clear definition of what is meant by ‘‘openness’’. On the one hand, Krueger (1978) discussed how trade liberalization can be achieved by employing policies that lower the biases against the export sector. It is even more striking that according to her definition one country can have an open economy by employing a favourable exchange rate policy towards its export sector and at the same time can use trade barriers to protect its importing sector. A highly export oriented economy may not be neutral in this sense, particularly if it shifts incentives in favour of export production through instruments such as export subsidies. It is also possible for a regime to be neutral on average, and yet intervene in specific sectors. A good measure of trade policy would capture differences between neutral, inward oriented, and export-promoting regimes. Therefore, it is crucial to understand this definition problem because various openness measures have different theoretical implications for growth and different linkages with growth. “It is difficult measuring the type of trade orientation followed by a particular country. A large number of empirical studies have made use of a variety of cross-country growth regressions to test endogenous growth theory and the importance of trade policies”, (Edwards, 1993)

Probably due to the difficulty in measuring openness, different researchers have used different measures to examine the effects of trade openness on economic growth.

“The most basic measure of openness is the simple trade shares, which is exports plus imports divided by GDP”. (Sachs and Warner, 1995). New trade theories propose that the inclusion of export and import shares in the growth regressions has been an important step

towards understanding of the relationship between international trade and growth unlike the neoclassical economic theories which places emphasis on export.

The neoclassical economic theory treats growth in the endogenous growth models like Solow (1956), views economic growth as dependent on the growth of factors on the supply side of the economy (labour, capital).The neoclassical models do not explicitly point out the reason for growth on the supply side of the economy and do not justify why demand should follow and adjust to supply. However, the opposite question is just as valid. Considering from the point of view of our thesis, more demand for import from the rest of the world means less supply of exportable. This in turn affects the volume of aggregate output in an economy. In Keynesian theory, it is aggregate demand that drives the economic system and aggregate supply adjusts to it. The Rybcyznski theorem states "at constant world prices, if a country experiences an increase in the supply of one factor, it will produce more of the product whose production is intensive in that factor and less of the other product" (Husted and Melvin, (2007).

2.2 Exports and Imports in the Simple Keynesian Model

Advances in communications technology and increase in trade have created a large amount of global interdependence among the economies of individual nations. Economic events in other members of the European Union, for example, have economic repercussions for the Swedish economy. We examine model of macro economy to see how the macroeconomic outcomes of other countries affect Sweden, how the Swedish economy affects other countries, and the implications of global interdependence.

Recall that in an open economy (an economy with international trade),

Y = C + I + G + X - IM

Imports are what is known as a **leakage**. This means that imports, like savings and taxes, DO NOT represent spending on domestic output. So, for any increase in any increase in income:

- some of it goes to taxes
- some of it is saved by consumers
- and some of it is spent on imported goods and services

Where:

C - is the total consumption of domestic and foreign goods and services,

I - is the total investment on domestic and foreign goods and services

G - is the total government purchases of domestic & foreign goods & services

$X - IM$ - is the aggregate demand

X - is the exports of domestic goods and services

IM - is the import of goods and services

We call the fraction of additional income spent on imported goods and services (NOT made in the Sweden) **the marginal propensity to import (MPM)**. The MPM is important because it reduces the size of the multiplier, and therefore the power of fiscal policy.

So, for example if we get a 1000 kronor raise.

- perhaps 40% of that goes to taxes (400kr)
- if the MPC = .8, we will save 20% of it (200kr)
- and 20% (200kr) is spent on imported goods.

That leaves only 1000kr – 400kr – 200kr – 200kr = 200kr for spending on domestic goods and services. If there were no imports, we would spend 400kr on domestic goods and services.

In general, the open economy multiplier is

$$\frac{1}{1-MPC+MPM}$$

In an open economy with a MPM = .1, the multiplier is

$$\frac{1}{1-MPC+MPM} = \frac{1}{1-0.9+0.1} = \frac{1}{0.2} = 5$$

So if government spending increases by $100 billion, then Aggregate Demand will increase by 5 x 100kr billion, or 500kr billion.

Note how spending on imports significantly reduces the power of government spending. So should we have a closed economy? Well, we are forgetting half of the picture. An open economy also means that we export are goods and services to the rest of the world. Exports are an **injection** of spending on domestic output. Changes in export demand have a multiplier effect as well, and shift the AD curve.

The 1981 economic crisis in Sweden was a cause of great concern in the Sweden because the decrease in the demand for exports decreased aggregate supply for exports in Sweden. As it turned out, the crisis was offset by increase in exports in 1984 and 1985 and a booming Sweden, so in Sweden as a whole was a significant progress had been on Swedish export trade until 2007(see chart below). So what really counts here is the net effect: the difference between exports (injections) and imports (leakages). This is also known as the balance of trade: If the value of exports is greater than the value of imports, then there is a trade surplus. If the value of exports is less than the value of imports, then there is a trade deficit. The value of net exports since 1981 is shown below.

Figure. 1: Exports and imports of goods and services

Source: Statistics Sweden

Official Statistics of Sweden

The extent to which an economy is open to trade, and sometimes also to inflows and outflows of international investment. Thus, the open economy multiplier is very sensitive to the marginal propensity to import ((http://www.econ.iastate.edu/classes/econ355/choi/mac.htm). From the expressions it can be seen that "the more open an economy is to foreign trade (the higher is marginal propensity to import), the lower the autonomous expenditure multiplier." An increase in the demand for exports will lead to an increase in aggregate demand which in turn will lead to an increase in equilibrium income. An increase in imports causes a decline in equilibrium income while an increase in the demand for exports that has expansionary effect on equilibrium whereas an autonomous increase in imports has a contradictionary effect on equilibrium income (Froyen T. Richard, 1999).

2.3 Economic Growth

An economy is said to grow when the amount of output produced in the economy rises. Economic growth is of fundamental importance to all economies. Growth in GDP is required to maintain current standard of living. This growth could be achieved through international trade. International trade plays a vital role in the nature of economic growth that occurs in any country. An increase in export sales lead to an overall expansion in production. International trade also allows for the purchase of capital goods from foreign countries and exposes an economy to technological advances achieved around the world. On the other hand economic growth affects the type of goods a country is able to trade.

Neutral Economic Growth

"A proportionate increase in all factors and consumption so that trade expands proportionally to the growth of the economy", (Husted & Melvin, 2007). Assuming in an economy, growth occurs, there will be the formation of a new production and consumption line which lies to the right of the old lines and shows that there is a continous production and consumption of the two variables. This is a situation where, after growth has taken place, the new production and consumption points lie farther to the right along the original production and consumption lines, respectively. In other words, after growth the economy continues to produce and consume the two goods in the same ratios as existed before growth. This is a sign of outward shift in the production and consumption lines. As it turns out, in this case exports and imports will both rise by amounts proportional to the increase in production. The economic circumstances necessary for economic growth to be neutral are as follows: Firstly it must be the case that the new production possibility curve must look exactly like the old production possibility curve, but bigger. If output prices remain constant, so will input prices. Constant input prices, in turn , imply that after growth each industry will want to use capital and labor in the same mixes that were used prior to growth. The second condition for neutral growth is that the consumption of the two goods rises along the consumption line. For consumption of each good to rise in the same proportion, as is required to remain on the consumption line, the two income elasticities must be equal.

However, **Protrade biased growth** is when an economy grows because of a relative expansion in the supply of the factor used intensively in the production of exportables, there will be a tendency for the output of exportables to rise relatively to the output of importables

and for international trade to rise in percentage terms by an amount greater than the percentage of GDP. This growth is called protrade biased growth. The implication of this type of growth is if the amount that a country trades is growing over time at a rate that exceeds that country's growth in GDP, then the relative importance of trade to that economy is also growing (Husted Stephen L. and Michael Melvin, (2001)). The implication of this type of growth is if the amount that a country trades is growing over time at a rate that exceeds that country's growth in GDP, then the relative importance of trade to that economy is also growing

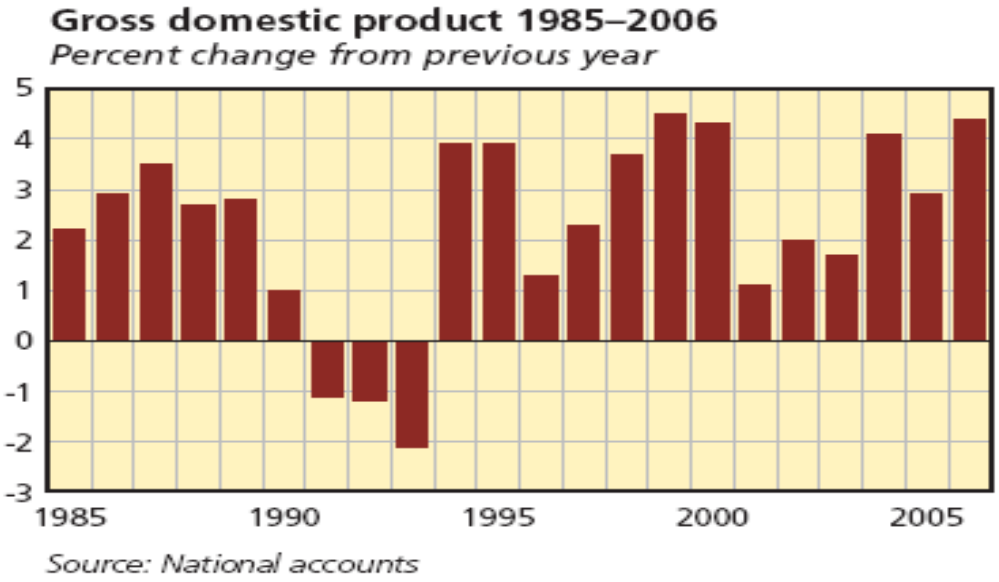
Specifically if the elasticity of the substitution between imports and exports exceeds unity, it is possible to attain an **anti-trade biased growth**. Assuming the imports and the exports sector to be entirely symmetric in all respects including production technology, factor endowments and expenditure patterns and the world price differ from unity, the specific factor model is characterized by anti-trade biased or pro-trade biased as the elasticity of substitution is larger or smaller than unity. Supposing there is complete symmetry across sectors in terms of production functions, If the world´s price is unity, the government has no incentive to intervene in either export or import competing interests."(Nuno L. and Arvid P. 2004 , pages. 12-13,volume 3 issue 1,article 14:Anti trade biased in trade policy and general equilibrium).

3. Swedish Economy

Sweden is one of the largest countries in Europe but in terms of population, the people are only nine million. The country is quite small and is characterized by high internationalization. This began with commodity exports, but due to the small size of the domestic market, industrial companies generally established operations abroad early. Even before World War I, for example, Ericsson had more than half of its employees abroad. Internationalization regained momentum after World War II as trade was liberalized, while demand for Swedish goods rose sharply as Europe was being rebuilt. The wave of internationalizations occurred in the 1970s and 1980s, when Swedish industrial companies made very extensive direct investments, first in the U.S. and later the European Union (EU). Another wave of internationalizations began somewhat later when a number of service industries (primarily in financial and business services) as well as the construction sector established operations abroad. On the whole, the Swedish business sector became among the most internationalized in the world. Due to the combination of low growth during two decades and the severe economic crisis, Sweden fell from third place in the prosperity league (measured as GDP per capita adjusted for purchasing power) in 1970 to ninth place in 1990. During its crisis, Sweden slid further to 16th place but later bounced back a bit in the rankings and stood at 13th place by 2004.The prospects for the next couple of years still look bright.(http://www.konj.se/sidhuvud/inenglish/archives/theswedisheconomy/swedisheconomy/theswedisheconomymarch2006stronglabourmarketliftingswedenseconomy.5.7d810b7d109c0650979800031473.html, The Swedish Economy, 2006).

The economy grew stronger in 2006 and GDP growth was at one of its highest level since the 1970s. GDP grew by 4.4 percent. Exports and Imports also contributed 1.2 per cent to the gross domestic product. The method for calculating contribution growth in the gross domestic product, where demand components are import adjusted shows that in 2006, export is most important for gross domestic product growth rate. It recorded 2.5 per cent to the gross domestic product (http://www.scb.se/Grupp/ekonomi/_Dokument/econreportq4-06eng.pdf, Swedish Economy Statistical perspective, No.1 2007).

Figure 2: Gross domestic product 1985 – 2006 percentage change from the previous year



Strong foreign demand continues to positively affect Swedish exports. A global growth rate of approximately 5 percent and growth in the Euro area of close to 3 percent gave a continued demand for Swedish goods and services. The manufacturing industry showed strong developments in 2006, but retail and trade were equally strong during the many years in the late 1990s and early 2000s. During the year, the production of goods and services had grown at approximately the same rate. Services were stronger during the spring while goods production increased during the latter part of the year. Around 1987, developments were more than 1985 and 1986 figures (see the chart 1986-2006). Highest level growth was recorded in 2007. The contribution of both export and imports in 2005 was 1.1 percentage points, while it was marginal for the previous year. Net trade of goods improved more than services. The contribution from net trade of services was a comparatively modest 0.3 percentage points, in spite of a larger contribution from merchanting than for any previous year. In the last two quarters in 2006, the growth rate for exports of both goods and services accelerated, compared to the preceding quarter, in seasonally-adjusted figures. Especially remarkable during the last quarter was the increasing growth rate for imports of goods. A possible reason for this was the comparatively fast increase in retail trade sales at the end of the year, but also growing production in manufacturing as well as increasing investment activity.

Figure 3: Exports and Imports of goods and services in 2006.

Exports and imports of goods and services

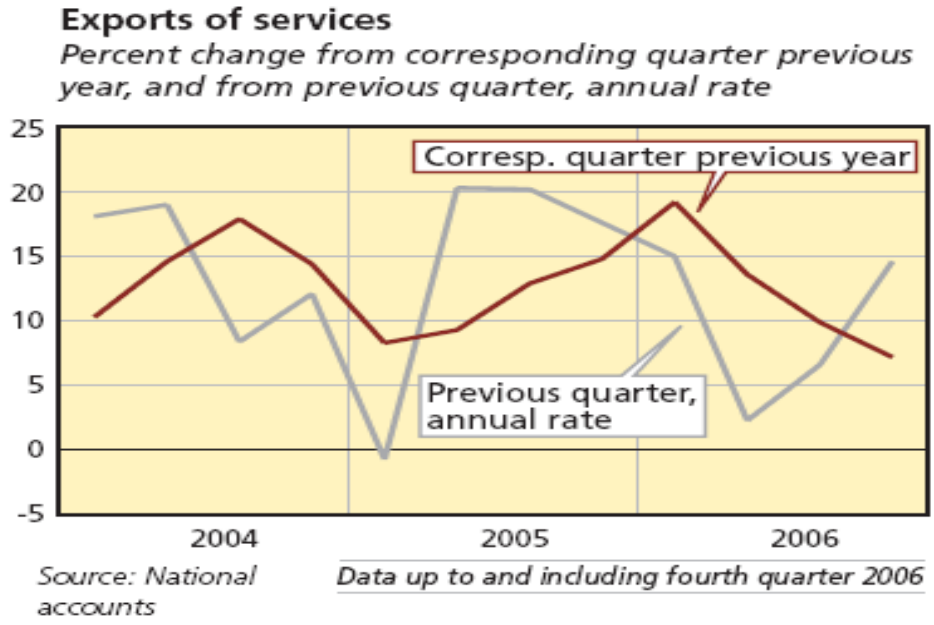
	Fourth quarter 2006			*All year 2006*	
	Billion SEK. current prices	*Percentage change. volume Compared to Q 3/2006[1]*	*Compared to Q 4/2005[2]*	*Billion SEK. current prices*	*Percentage change volume Compare to 2005*
Exports					
Goods and services	389.6	2.4	9.3	1 455.9	9.1
Goods	288.9	2.6	10.0	1 083.8	8.0
Services	100.7	3.5	7.2	372.1	12.0
Imports					
Goods and services	331.2	3.0	8.2	1 223.7	7.8
Goods	251.0	3.5	8.8	927.1	7.6
Services	80.2	1.6	6.4	296.5	8.5

Source: National accounts

The growth rate for exports of services has also risen in the last two quarters, compared to previous quarter. The growth rate measured over four quarters has, on the contrary, decreased for three quarters. Different choices of comparison periods give quite different pictures of the development. This is partially a consequence of strong development for several quarters during 2005.[1]

[1] *The growth rates for exports from previous quarter are not consistent. This is due to "direct seasonal adjustment". Each time series has been adjusted separately, which can imply, as seen in the table, that the figures for development of all exports show a more positive (or negative) development than each separate component.*

Figure 4: Export of Services (&change from corresponding quarter year, annual rate)



The contribution from net exports to GDP growth was considerably larger for the fourth quarter than for the preceding one. The contribution was 1.1 percentage points (compared to the fourth quarter of 2005) of the actual GDP growth of 4.2 percent. The primary reason for this was a marked upturn in the net trade of goods, while the contribution from trade in services was more moderate than during the preceding quarters of the year. It should be noted that the calculation is based on change over four quarters. For the third quarter, the contribution was revised downwards from0.5 percentage points to a marginal 0.1 percentage point.

Figure 5: Contributions to GDP growth from net exports 2006

Contributions to GDP growth from net exports 2006
By goods and different services

Contribution to GDP growth	*Q 1*	*Q 2*	*Q 3*	*Q 4*	*Year*
Total	2.5	1.0	0.1	1.1	1.2
Goods	1.7	0.4	–0.6	0.8	0.6
Services	0.9	0.6	0.7	0.3	0.6
- merchanting	0.3	0.3	0.2	0.7	0.4
- net travel	0.3	0.3	0.3	0.2	0.3

Source: National accounts

Merchanting was more significant than previously and contributed 0.7 percentage points to GDP growth, more than half of the contribution from net exports. The conclusion can be drawn from this that the trade in services, merchanting payments were holding back GDP growth. When assessing these figures, it must be observed that the deflation in the trade in services, especially for merchanting, is connected to a rather large degree of uncertainty.

4. Empirical Results

In this chapter, we have presented our results and done our econometric tests. At the later part of the chapter, we analyzed the thesis work.

4.1 Specification of the model

The simple Keynesian macroeconomic model is as follows:

GDP = f (Export, Import)

We regressed export against GDP first and secondly regressed LNGDP against LNexport. With this result, we were able to get the marginal propensities to export and export elasticity. We have these models:

$GDP = \beta_0 + \beta_1 Export$..... (1)

$GDP = \beta_0 + \beta_1 LNExport$..... (2)

In equation (1), β_1 stands for marginal propensity to export while in equation (2) it stands for export elasticity.

$GDP = \beta_0 - \beta_1 Import$..... (3)

$GDP = \beta_0 - \beta_1 LNImport$..... (4)

In equations (3), β_1 stands for marginal propensity to import while in equation (4), it is import elasticity.

At the later part of the regression exercise, we introduced Time and Dummies into equations (2) and (4). Then we have:

$GDP = \beta_0 + \beta_1 LNExport + \beta_2 TIME + \beta_3 DUM$..... (5)

$GDP = \beta_0 - \beta_1 LNImport + \beta_2 TIME + \beta_3 DUM$..... (6)

We shall assume that the effects of trade are insignificant and irrelevant. The above models above will us to determine the type of economic growth that Sweden is experiencing.
The following approaches will be useful:

1. Non-linear regression using the Ordinary Least Squares (OLS) method

   In $Y_t = \beta\ In\ X_t\ +\ \varepsilon_t$ and $\ln Y_t = \alpha + \beta\ In\ X_t\ +\ \varepsilon_t$

2. Check the series for autocorrelation using the Breusch-Godfrey Serial Correlation LMTest
3. Test for normality using the Jarque-Bera test of Normality to compute the skewness and Kurtosis measuring the OLS residuals
4. Test for Multi-collinearity
5. Test for white heteroskedasiticity
6. Test for statistical Significance
7. Show stationary and unstationary series in our model

4.2 The Data

The datasets used for empirical testing consist of historical annual data for the levels of real Gross Domestic Product, Exports, Imports, real GDP growth, for the period 1981 to 2007. This information has been collected from Statistical Centralbyran (Swedish Statistical Agency).

4.3 Presentation of Ordinary Least Square regression results

Table 1: Summary of Regression Analysis for GDP = F(X, C)

Variable	Coefficient	t-statistic	R^2	DW	AKaike	Schwarz
EXPORT	- 2.068	- 1.388	0.893785	2.01	23.86713	24.77902
C	**-24452.32**	**-0.773787**				

The interpretation for the summary of regression result in Table 1 is straight forward: Overtime, the index of gross domestic product in Sweden (twenty seven years ago) had

decreased by 2.068 units on average when export for goods and services increased by one percent. Considering from economic apriori, we could also see that export has a positive relationship with GDP. This implies that our result is not consistent with the prediction of economic theory. This inconsistency could be as a result of the fact that autocorrelation was removed at lag 17. 89.4 Percentage variation in GDP is explained by export. The t- statistic and their associated p-values for the coefficient of export variable unlogged show that their p-variables are more than our significance level of 5 per cent, we cannot reject the null hypothesis implying statistically insignificant (see Appendix 1).

At lag 1 to 16, we found autocorrelation not until lag 17 that autocorrelation was removed. The Durbin Watson statistic shows that d is equal to 2.01, which is considerably more than 2 and likely indicates the presence of no autocorrelation.

Table 2: Summary of Regression Analysis for LNGDP = F (LNEXPORT, TIME)

Variable	**Coefficient**	**t-statistic**	**R^2**	**DW**	**AKaike**	**Schwarz**
LNEXPORT	-2.219	- 0.911	0.936318	2.055679	-5.261172	-4.349287
TIME	**0.001203**	**0.661081**				

In table 2, we logged export. We also saw that coefficient of export is not also consistent with economic theory and there was no autocorrelation at lag 17. The respective t-values were also statistically insignificant. The remarkable difference was in R squared coefficient where the logged export explained 94.3 % variation in GDP. In table 2, we could also find out that the R squared coefficient in table 2 is more than R squared coefficient in table 1.

Table 3: Summary of Regression Analysis for GDP = F (M, C)

Variable	**Coefficient**	**t-statistic**	**R^2**	**DW**	**AKaike**	**Schwarz**
IMPORT	-2.860	-2.989	0.943134	2.586333	23.15161	24.20748
C	**-47339.00**	**-1.559783**				

In table 3, we saw a sign of consistency in economic theory. This is because Keynes simple macroeconomic model states that import has an inverse relationship with gross domestic product. From our result in table 3, the import propensity is negative. This implies that a unit

increase in import causes GDP to decline by 28.6 % on average. 94.3 % variation in GDP is caused by import of goods and services. The t- statistic and their associated p-values for the coefficient of import variable unlogged show that their p-variables are less than our significance level of 5 per cent, we reject the null hypothesis implying statistically significant. Our Durbin Watson statistic is more than 2. This is an indication of no autocorrelation.

Table 4: Summary of Regression Analysis for LNGDP = F (LNIMPORT, TIME)

Variable	**Coefficient**	**t-statistic**	**R^2**	**DW**	**AKaike**	**Schwarz**
LNIMPORT	- 0.586	-0.879	0.941787	2.236937	-3.465656	-2.265808
C	**-0.015964**	**-2.784640**				

This is also a sign of consistency considering from the point of economic apriori. 94. 2 % variation in GDP was caused by the logged import (see table 4). Autocorrelation was also removed at lag 23. The t-value for import (logged) is statistically significant. This implies that the null hypothesis was rejected.

Table 5: Summary of Regression Analysis for LGDP = F (LNEXPORT, TIME, DUM)

Variable	**Coefficient**	**t-statistic**	**R^2**	**DW**	**AKaike**	**Schwarz**
LNEXPORT	-0.190	-0.505	0.819391	2.034522	-4.688703	-4.064782
TIME	-0.000715	-0.352586				
DUM	**0.007493**	**0.150795**				

In table 5, we introduced dummies and Time to the model. After this, the elasticity coefficient for export was also not consistent with the prediction of economic theory. From the result in table 5, a unit increase in export caused GDP to decline by 1.9 %. 81.9 % variation in GDP was caused by export, Dummies and the Time variables. At lag 10, autocorrelation was

removed from the model. T-values for time and dummies are insignificant while t-value for export at lag 10 is also insignificant.

Table 6: Summary of Regression Analysis for LNGDP = F (LNIMPORT, TIME, DUM)

Variable	Coefficient	t-statistic	R^2	DW	AKaike	Schwarz
LNIMPORT	-0.134	-0.170	0.978363	2.036267	-4.470595	-3.222753
TIME	-0.013893	-0.929342				
DUM	**-0.117838**	**-0.270927**				

A unit increase in import caused GDP to decline by 1.34 % on average. 97.8 % variation in GDP was caused by the independent variables. T-values were also statistically insignificant because their respective p-values were more than our 5 per cent level of significance. That is why we cannot reject the null hypothesis. At lag 23, autocorrelation was also removed. This is because DW t-value is more than 2 following the rule of thumb.

4.4 Normality test for Exports and Imports

Figure 6: Normality test for Exports

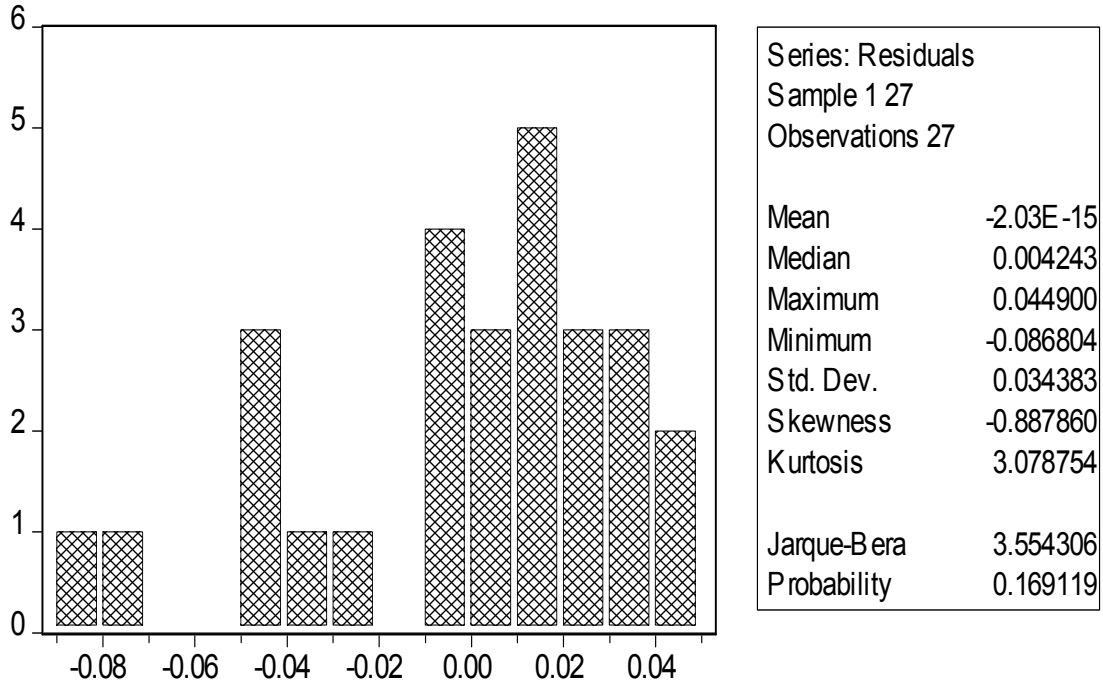
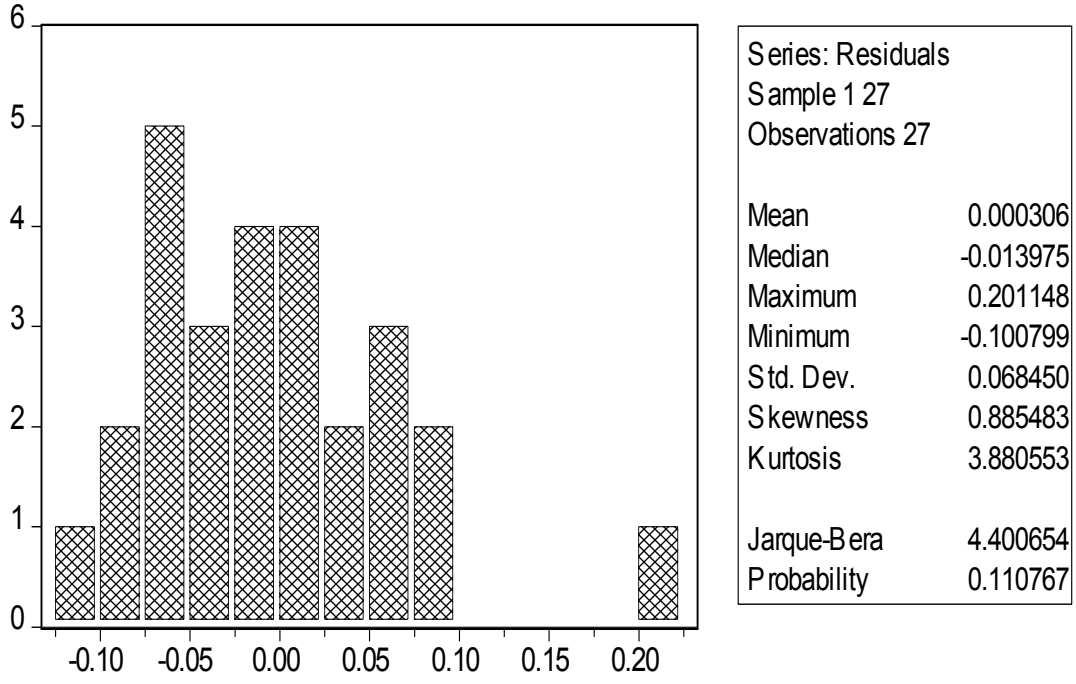


Figure 7: Normality Test for Imports



From the descriptive statistics above we could see that in figures 1 and 2, the mean values for imports were more than that of exports. The standard deviation in import is greater than that of exports. By inspecting the p- values for figures 1 and 2, 0.169 and 0.111 are greater than our chosen level of significance, 0.05, we fail to reject the null hypothesis of normality.

4.5 Test for Multicollinearity

In the following results, our R Squared in table 1 is 89.4 %, table 2 has R squared as 94.6 %, Table 3 is 94.3 %, Table 4 is 94.2 %, Table is 81.9% while in table 6, and R squared is 97.8%. Our K (number of variables in the model) in tables 1 to 4 is 2 while our N (sample size) is 27. The R –squared coefficients in all the tables are more than 80 %. This implies that we reject the null hypothesis that partial slopes are simultaneous equal to zero and the t-values except in table 3 are statistically insignificant. This proves a high degree of multicollinearity but is higher in table 3.

4.6 Test for Heteroskedasticity

Table 7 (Appendix 8A and 8B)

U^2	Coefficients	LNImport	TIME	DUM	$LNImport^2$	$TIME^2$	R^2
Import residual	8.295749	-1.241140	0.007088	0.003406	0.046072	-0.000200	50.5%
Export residual	-0.001250		0.000450	0.-003224		-0.00000918	36.1%

Table 7 shows a summary of residuals obtained from regression (see Appendix 8A and 8B).

$$N \times R^2 = 50.5 \times 27 = 1363.5$$
$$= 36.1 \times 27 = 974.7$$

These have, asymptotically, a chi squared distribution with 6 degree of freedom. The 5 % critical value obtained is less than the values at the chosen level of significance; we conclude there is no heteroskedasticity. The residual coefficients for export could not appear on the table because the result showed an indication of near singular matrix.

4.7 Plot of the Series

Figure 8: Plot of the time series in relation with export

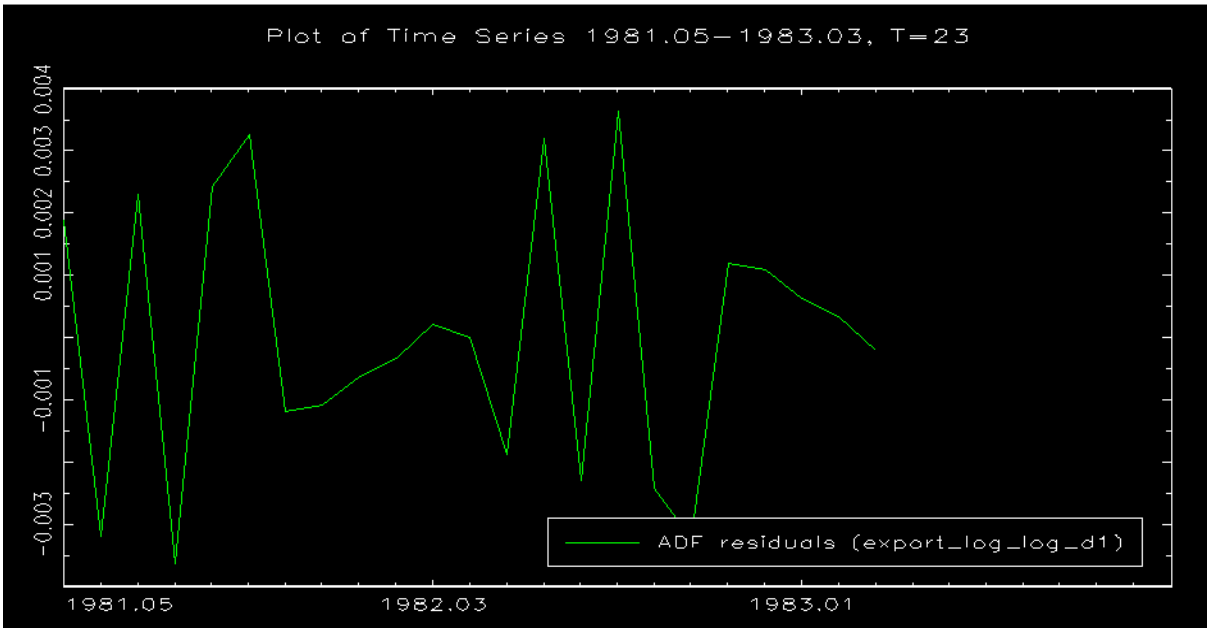


Figure 9: Plot of the time series in relation with GDP

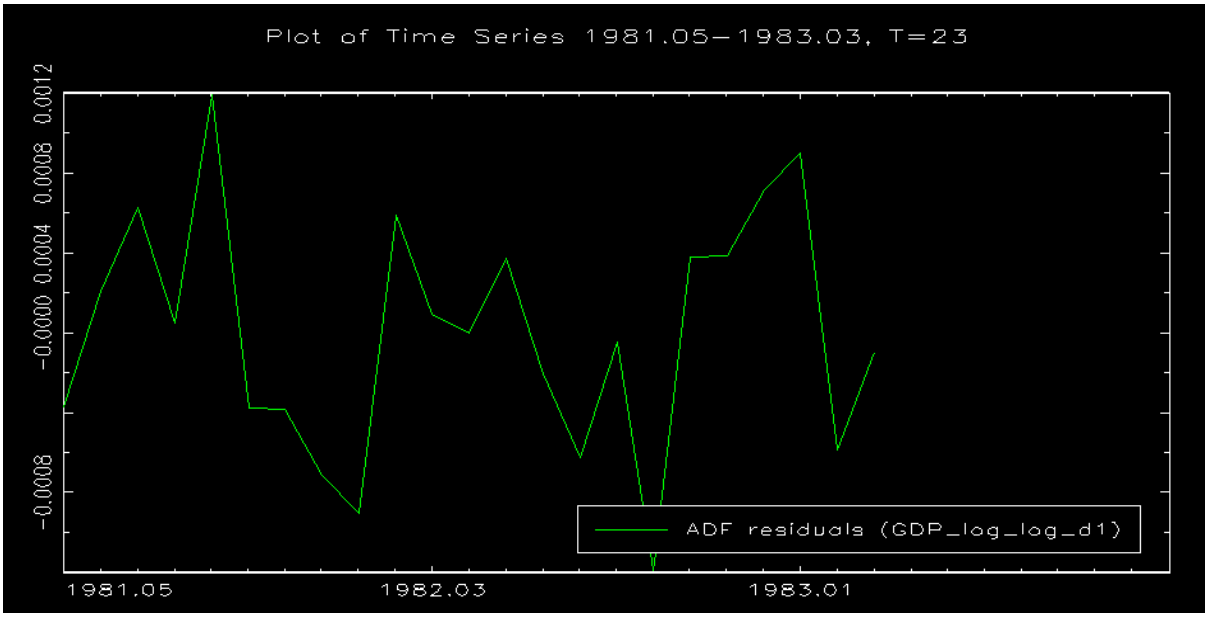
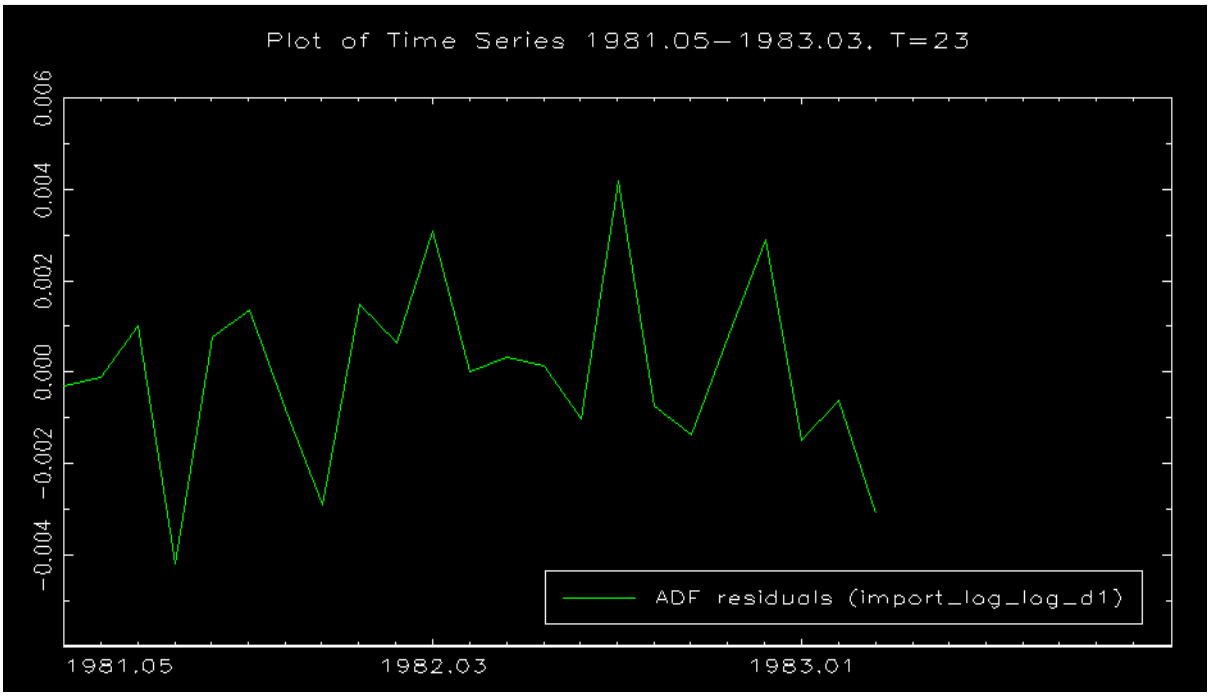


Figure 10: Plot of the time series in relation with Import



Figures 8, 9 and 10 are unstationary series. They were derived by investigating the difference between the present values of the series and their past values.

5. Analysis

We have summarized our findings from the empirical tests in chapter four. Here, we linked our result with the open economy multiplier and the types of growth discussed in the theoretical chapter.

The ordinary least square regression analysis in tables 1, 2, 3, 4, 5, and 6 showed high R – squared coefficients and statistically insignificant parameters except in table 3 where the t-values were statistically significant. In the models estimated above, there were incidence autocorrelation and they were removed with the introduction of lags. By plotting the series, we found out that all the series are nonstationary. The sign of export parameters in the tables above were inconsistent with economic apriori and it was only import that was consistent. There result shows an inverse relationship between gross domestic product (income) and export. This was supposed to be the case for import. This is because import is a leakage from the nation's economy while export acts as an injection to an economy. There was high degree of linear relationship existing among the explanatory variables in our models (see our multicollinearity test). There was also a case of constant variance (see heteroskedasticity test).

From the theoretical chapter, the open economy multiplier is 1/ (1-mpc+mpm). Our marginal propensity to import (MPM) is -2.860. It means that marginal propensity to consume (mpc) is -3.860. It means that our multiplier is 0.5. Relating this multiplier to appendix 1, we could see that multiplying the multiplier with the amount the Swedish government spent on import in 1981 (183 080 000 000 SEK), we have a result of 91540 SEK. In 1985, we could also see that the amount spent in import more than doubled the figure of 1981. This implied that aggregate demand also increased by more than 183,080 SEK billion. We also see a sign of increase in import and export volume in Sweden. Even though export volume had been more than import for than two decades now (see figure 1).

In determining the type of growth available in Sweden, we check the elasticity coefficients for imports and exports in tables 5 and 6, the elasticity coefficients were -2.219 and -0.586. The elasticities for export and imports sectors defer from unity. We therefore consider the results under pro trade and anti trade biased growth. we could see that the elasticities are less than unity and we also have no fear to conclude that Sweden within the last twenty seven years had been experiencing pro trade biased growth(see Nuno L. and Arvind P, 2004,

pp.12-13). For them, if their elasticities are more than unity, the industry could consider anti trade biased growth. Edward (1993) also used regression analysis to interpret his own openness. Different researchers in the past had used different approaches to explain openness. In the neoclassical synthesis, emphasis is more on export (Sachs and Warner, 1995). Considering the two approaches, export elasticity is also less than unity.

6. Conclusions

We have been able to show that if two sectors are entirely symmetrical in both exports and import. Elasticities of substitution between factors are less than unity and trade results from being different from autarky. The empirical investigation suggested that our export elasticity was not consistent with economic theory while the reverse was the case for import elasticity. Our null hypothesis for t-values for tables 1, 2, 4, 5 and 6 were all accepted except for table 3 that t-values were rejected.

Based on our open economy multiplier, we confirmed that in 1985, economic crises of 1981 was offset in 1985 and from then henceforth; export had always been more than import in Sweden and that the type of growth experienced in Sweden was Pro-trade biased.

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Appendix

Appendix 1: GDP = F(X, C)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.959948	Probability	0.026807
Obs*R-squared	24.13220	Probability	0.115887

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/08/08 Time: 13:45
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXPORT	0.037006	0.051490	0.718711	0.4928
C	-24452.32	31600.85	-0.773787	0.4613
RESID(-1)	0.769299	0.343808	2.237584	0.0556
RESID(-2)	-0.026581	0.595472	-0.044638	0.9655
RESID(-3)	-0.400730	0.808332	-0.495750	0.6334
RESID(-4)	0.166988	0.895979	0.186374	0.8568
RESID(-5)	-1.017087	0.811624	-1.253151	0.2455
RESID(-6)	0.065153	0.873906	0.074554	0.9424
RESID(-7)	0.975136	0.920629	1.059206	0.3204
RESID(-8)	-1.520690	0.907737	-1.675255	0.1324
RESID(-9)	0.129826	1.083139	0.119861	0.9075
RESID(-10)	0.410668	1.185341	0.346456	0.7379
RESID(-11)	-2.078447	1.232923	-1.685789	0.1303
RESID(-12)	1.516381	1.446915	1.048010	0.3253
RESID(-13)	0.441214	1.580324	0.279192	0.7872
RESID(-14)	-2.896677	1.582977	-1.829892	0.1047
RESID(-15)	1.198314	2.165906	0.553262	0.5952
RESID(-16)	1.243783	2.260538	0.550216	0.5972
RESID(-17)	-2.068106	1.490524	-1.387502	0.2027
R-squared	0.893785	Mean dependent var		-1.56E-10
Adjusted R-squared	0.654802	S.D. dependent var		57007.64
S.E. of regression	33494.01	Akaike info criterion		23.86713
Sum squared resid	8.97E+09	Schwarz criterion		24.77902
Log likelihood	-303.2063	F-statistic		3.739951
Durbin-Watson stat	2.014244	Prob(F-statistic)		0.031286

Appendix 2: Data Showing GDP, Export and Import of Goods &Services

YEARS	GDP constant PRICES(,000 ,000 SEK)	EXPORT OF GOODS AND SERVICES (,000,000 SEK)	IMPORTOF GOODS AND SERVICES (,000,000 SEK)
1981	1,482,839	186,095	183,080
1982	1,500,531	220,328	219,328
1983	1,527,687	271,778	251,399
1984	1,592,939	311,010	275,283
1985	1,627,819	327,812	307,591
1986	1,674,392	333,863	297,039
1987	1,732,278	357,296	331,402
1988	1,778,468	385,906	360,394
1989	1,827,894	425,091	411,821
1990	1,846,361	442,115	430,881
1991	1,825,658	441,640	412,741
1992	1,803,686	438,827	409,289
1993	1,766,570	516,564	456,561
1994	1,836,294	607,386	531,044
1995	1,909,251	720,590	595,773
1996	1,937,136	714,737	591,453
1997	1,984,795	811,663	666,990
1998	2,060,494	867,920	734,003
1999	2,155,182	916,788	779,905
2000	2,249,987	1,047,940	906,984
2001	2,273,786	1,082,402	925,214
2002	2,328,614	1,078,847	914,732
2003	2,373,151	1,101,132	929,922
2004	2,471,092	1,215,759	1,001,831
2005	2,552,597	1,333,379	1,120,891
2006	2,656,965	1,490,865	1,252,987
2007	2,725,487	1,609,440	1,373,043

Source: Statistics Sweden

After this stage we run LNGDP against LNEXPORT and Constant, the result showed near singular matrix. As a result of this, we removed constant and introduced Time to the model. We had this result below.

Appendix 3: LNGDP = F (LNEXPORT, TIME)

Breusch-Godfrey Serial Correlation LM Test:

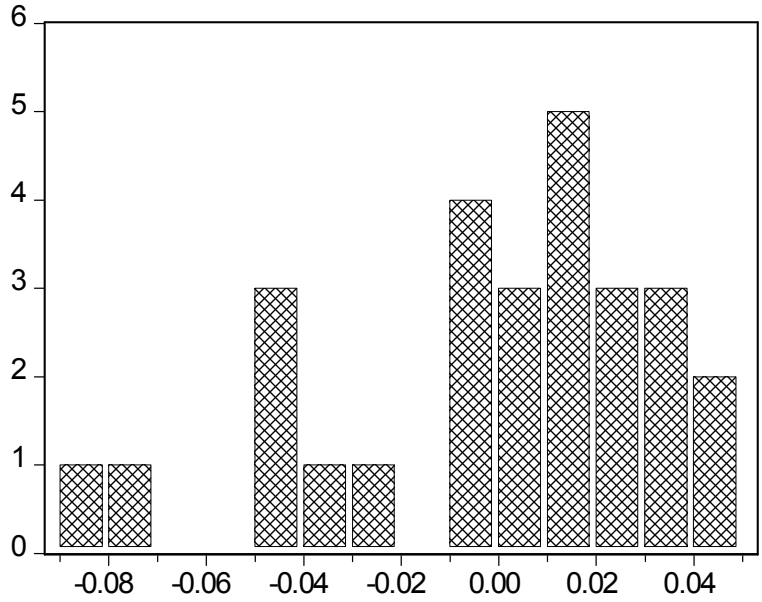
F-statistic	6.919024	Probability	0.004528
Obs*R-squared	25.28058	Probability	0.088603

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/08/08 Time: 14:40
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEXPORT	0.000833	0.001611	0.517239	0.6190
TIME	0.001203	0.001820	0.661081	0.5271
RESID(-1)	0.775135	0.477698	1.622645	0.1433
RESID(-2)	-0.071898	0.695878	-0.103320	0.9203
RESID(-3)	-0.172977	0.706993	-0.244666	0.8129
RESID(-4)	-0.435644	0.703977	-0.618833	0.5532
RESID(-5)	-0.064038	0.748942	-0.085504	0.9340
RESID(-6)	-0.133734	0.695647	-0.192244	0.8523
RESID(-7)	-0.382934	0.699499	-0.547440	0.5990
RESID(-8)	0.025392	0.868717	0.029230	0.9774
RESID(-9)	-0.802361	0.630144	-1.273296	0.2387
RESID(-10)	0.665898	0.776758	0.857278	0.4162
RESID(-11)	-1.130998	0.772903	-1.463313	0.1815
RESID(-12)	-0.481329	1.175803	-0.409362	0.6930
RESID(-13)	-1.066314	1.061618	-1.004423	0.3446
RESID(-14)	1.722780	1.222146	1.409635	0.1963
RESID(-15)	-1.643859	1.259626	-1.305038	0.2282
RESID(-16)	-0.961746	1.423678	-0.675536	0.5184
RESID(-17)	-2.218911	2.435380	-0.911115	0.3889

R-squared	0.936318	Mean dependent var	-1.77E-15
Adjusted R-squared	0.793032	S.D. dependent var	0.034824
S.E. of regression	0.015843	Akaike info criterion	-5.261172
Sum squared resid	0.002008	Schwarz criterion	-4.349287
Log likelihood	90.02582	Durbin-Watson stat	2.055679

Normality test



Series: Residuals	
Sample 1 27	
Observations 27	
Mean	-2.03E-15
Median	0.004243
Maximum	0.044900
Minimum	-0.086804
Std. Dev.	0.034383
Skewness	-0.887860
Kurtosis	3.078754
Jarque-Bera	3.554306
Probability	0.169119

Appendix 4: GDP = f (M, C)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	4.146284	Probability	0.060601
Obs*R-squared	25.46461	Probability	0.184231

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/08/08 Time: 14:49
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IMPORT	0.067057	0.052109	1.286851	0.2545
C	-47339.00	30349.74	-1.559783	0.1796
RESID(-1)	0.619650	0.358613	1.727908	0.1446
RESID(-2)	-0.196875	0.445116	-0.442300	0.6767
RESID(-3)	-0.518699	0.540563	-0.959554	0.3813
RESID(-4)	-0.095002	0.563856	-0.168487	0.8728
RESID(-5)	-0.042671	0.597158	-0.071457	0.9458
RESID(-6)	-0.827802	0.558161	-1.483089	0.1982

RESID(-7)	-0.396276	0.495546	-0.799676	0.4602
RESID(-8)	0.181525	0.545586	0.332715	0.7528
RESID(-9)	-1.204051	0.558105	-2.157391	0.0835
RESID(-10)	0.322441	0.671791	0.479972	0.6515
RESID(-11)	-1.057408	0.821605	-1.287003	0.2545
RESID(-12)	-0.245935	0.834762	-0.294616	0.7801
RESID(-13)	-0.713315	0.835975	-0.853273	0.4325
RESID(-14)	-0.577298	0.801249	-0.720498	0.5035
RESID(-15)	-0.037470	1.153484	-0.032484	0.9753
RESID(-16)	-0.959365	1.104491	-0.868604	0.4248
RESID(-17)	-0.923167	1.155966	-0.798611	0.4607
RESID(-18)	0.172327	1.115338	0.154507	0.8833
RESID(-19)	0.795560	1.111564	0.715712	0.5062
RESID(-20)	-2.859554	0.956534	-2.989494	0.0305

R-squared	0.943134	Mean dependent var	0.000000
Adjusted R-squared	0.704296	S.D. dependent var	48749.40
S.E. of regression	26509.29	Akaike info criterion	23.15161
Sum squared resid	3.51E+09	Schwarz criterion	24.20748
Log likelihood	-290.5467	F-statistic	3.948842
Durbin-Watson stat	2.586333	Prob(F-statistic)	0.066578

Appendix 5: LNGDP = F (LNIMPORT, TIME)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.406850	Probability	0.498276
Obs*R-squared	25.42826	Probability	0.328589

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/08/08 Time: 14:52
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNIMPORT	0.014868	0.005292	2.809393	0.1068
TIME	-0.015964	0.005733	-2.784640	0.1084
RESID(-1)	-0.602254	0.412081	-1.461494	0.2814
RESID(-2)	-0.758120	0.395851	-1.915165	0.1956
RESID(-3)	-0.892941	0.400637	-2.228801	0.1556
RESID(-4)	-0.925460	0.390299	-2.371160	0.1412
RESID(-5)	-0.670783	0.443596	-1.512149	0.2696
RESID(-6)	-0.880283	0.422173	-2.085125	0.1724
RESID(-7)	-0.763272	0.424330	-1.798769	0.2139
RESID(-8)	-0.829718	0.380721	-2.179331	0.1611
RESID(-9)	-1.030928	0.433503	-2.378135	0.1405
RESID(-10)	-0.671710	0.441624	-1.520999	0.2677
RESID(-11)	-0.236982	0.412958	-0.573865	0.6240
RESID(-12)	-0.316018	0.371659	-0.850290	0.4847
RESID(-13)	-0.138193	0.379560	-0.364087	0.7507
RESID(-14)	-0.193441	0.375728	-0.514844	0.6579
RESID(-15)	0.216997	0.460389	0.471335	0.6838
RESID(-16)	-0.356288	0.419832	-0.848643	0.4855

RESID(-17)	-0.498375	0.466211	-1.068992	0.3970
RESID(-18)	-0.555654	0.488961	-1.136396	0.3736
RESID(-19)	-0.703718	0.564392	-1.246861	0.3387
RESID(-20)	-1.023702	0.469050	-2.182501	0.1608
RESID(-21)	-0.806626	0.558723	-1.443697	0.2856
RESID(-22)	-0.895823	0.576072	-1.555053	0.2602
RESID(-23)	-0.586078	0.666620	-0.879178	0.4720

R-squared	0.941787	Mean dependent var	0.000328
Adjusted R-squared	0.243236	S.D. dependent var	0.071576
S.E. of regression	0.062265	Akaike info criterion	-3.465656
Sum squared resid	0.007754	Schwarz criterion	-2.265808
Log likelihood	71.78636	Durbin-Watson stat	2.236937

Appendix 6: LGDP = F (LNEXPORT, TIME, DUM)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	6.351566	Probability	0.001043
Obs*R-squared	22.12357	Probability	0.014487

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/08/08 Time: 14:58
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEXPORT	0.000953	0.001865	0.511225	0.6172
TIME	-0.000715	0.002029	-0.352586	0.7297
DUM	0.007493	0.049688	0.150795	0.8823
RESID(-1)	1.254926	0.329239	3.811595	0.0019
RESID(-2)	-0.675267	0.596592	-1.131874	0.2767
RESID(-3)	0.343676	0.523422	0.656594	0.5221
RESID(-4)	-0.404541	0.631407	-0.640699	0.5321
RESID(-5)	0.505300	0.574741	0.879179	0.3941
RESID(-6)	-0.563736	0.601555	-0.937132	0.3646
RESID(-7)	0.265451	0.627169	0.423254	0.6785
RESID(-8)	-0.147277	0.658569	-0.223632	0.8263
RESID(-9)	0.105990	0.574377	0.184530	0.8562
RESID(-10)	-0.189680	0.375827	-0.504699	0.6216

R-squared	0.819391	Mean dependent var	-2.03E-15
Adjusted R-squared	0.664584	S.D. dependent var	0.034383
S.E. of regression	0.019913	Akaike info criterion	-4.688703
Sum squared resid	0.005551	Schwarz criterion	-4.064782
Log likelihood	76.29749	Durbin-Watson stat	2.034522

Appendix 7: LNGDP = F (LNIMPORT, TIME, DUM)

Breusch-Godfrey Serial Correlation LM Test:

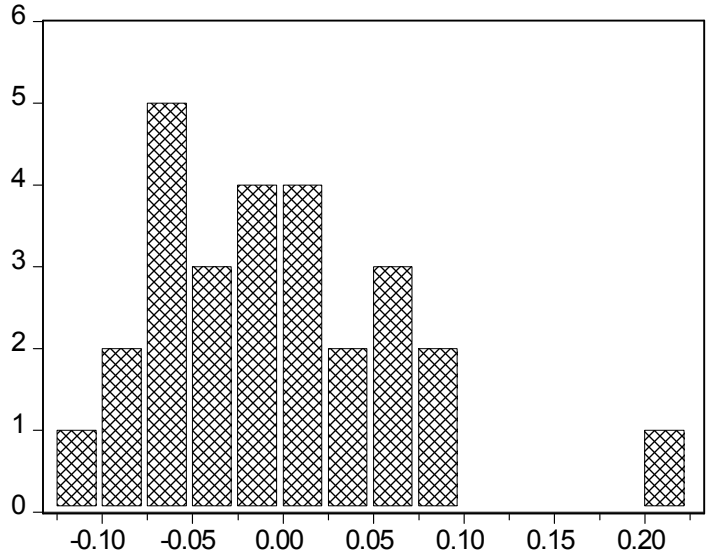
F-statistic	1.966030	Probability	0.517097
Obs*R-squared	26.41581	Probability	0.281632

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/08/08 Time: 15:03
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNIMPORT	0.017252	0.004879	3.536267	0.1754
TIME	-0.013893	0.014949	-0.929342	0.5233
DUM	-0.117838	0.434943	-0.270927	0.8316
RESID(-1)	-0.643860	0.334259	-1.926231	0.3048
RESID(-2)	-0.817210	0.344746	-2.370467	0.2541
RESID(-3)	-0.829841	0.319178	-2.599934	0.2338
RESID(-4)	-1.031407	0.411420	-2.506946	0.2416
RESID(-5)	-0.647145	0.370875	-1.744912	0.3313
RESID(-6)	-0.959535	0.596817	-1.607756	0.3542
RESID(-7)	-0.818079	0.485660	-1.684470	0.3411
RESID(-8)	-1.127509	0.712764	-1.581883	0.3589
RESID(-9)	-1.148975	0.574933	-1.998451	0.2954
RESID(-10)	-1.155953	1.050281	-1.100613	0.4695
RESID(-11)	-0.719023	0.817418	-0.879626	0.5407
RESID(-12)	-1.157275	1.217271	-0.950713	0.5161
RESID(-13)	-1.038541	0.995005	-1.043755	0.4864
RESID(-14)	-0.576017	0.675609	-0.852590	0.5505
RESID(-15)	-0.343749	0.456678	-0.752715	0.5892
RESID(-16)	-0.984953	0.325018	-3.030459	0.2029
RESID(-17)	-0.777426	0.743879	-1.045098	0.4860
RESID(-18)	-0.685189	0.723507	-0.947038	0.5173
RESID(-19)	-0.946753	0.467616	-2.024639	0.2921
RESID(-20)	-1.304867	0.370494	-3.521964	0.1761
RESID(-21)	-0.848245	0.575181	-1.474744	0.3793
RESID(-22)	-0.662896	0.596516	-1.111281	0.4665
RESID(-23)	-0.134339	0.789035	-0.170257	0.8926

R-squared	0.978363	Mean dependent var	0.000306
Adjusted R-squared	0.437445	S.D. dependent var	0.068450
S.E. of regression	0.051340	Akaike info criterion	-4.470595
Sum squared resid	0.002636	Schwarz criterion	-3.222753
Log likelihood	86.35304	Durbin-Watson stat	2.036267

Normality Test:



Series: Residuals	
Sample 1 27	
Observations 27	
Mean	0.000306
Median	-0.013975
Maximum	0.201148
Minimum	-0.100799
Std. Dev.	0.068450
Skewness	0.885483
Kurtosis	3.880553
Jarque-Bera	4.400654
Probability	0.110767

Appendix 8 A: Heteroskedasticity Test

White Heteroskedasticity Test:

F-statistic	4.286671	Probability	0.007633
Obs*R-squared	13.63787	Probability	0.018081

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/08/08 Time: 15:15
Sample: 1 27
Included observations: 27

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.295749	2.921320	2.839726	0.0098
LNIMPORT	-1.241140	0.450988	-2.752047	0.0119
LNIMPORT^2	0.046072	0.017359	2.654097	0.0148
TIME	0.007088	0.002622	2.703458	0.0133
TIME^2	-0.000200	9.25E-05	-2.158961	0.0426
DUM	0.003406	0.005023	0.678016	0.5052

R-squared	0.505106	Mean dependent var	0.004512
Adjusted R-squared	0.387274	S.D. dependent var	0.007826
S.E. of regression	0.006126	Akaike info criterion	-7.159564
Sum squared resid	0.000788	Schwarz criterion	-6.871600
Log likelihood	102.6541	F-statistic	4.286671
Durbin-Watson stat	1.752573	Prob(F-statistic)	0.007633

Appendix 8 B: White Heteroskedasticity Test

White Heteroskedasticity Test:

F-statistic	4.337410	Probability	0.014597
Obs*R-squared	9.755858	Probability	0.020760

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/08/08 Time: 15:38
Sample: 1 27
Included observations: 27

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001250	0.000925	-1.351655	0.1896
TIME	0.000450	0.000154	2.923886	0.0076
TIME^2	-9.18E-06	5.07E-06	-1.810613	0.0833
DUM	-0.003224	0.001099	-2.934392	0.0075

R-squared	0.361328	Mean dependent var	0.001138
Adjusted R-squared	0.278023	S.D. dependent var	0.001673
S.E. of regression	0.001421	Akaike info criterion	-10.13866
Sum squared resid	4.65E-05	Schwarz criterion	-9.946688
Log likelihood	140.8720	F-statistic	4.337410
Durbin-Watson stat	1.015531	Prob(F-statistic)	0.014597