In His Name, the Most High

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Trade and Poverty:
The case of Iran

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Abstract: Using the vector error correction model, the relationship between trade and poverty is examined in this thesis. We have run eight models for two measures of poverty and mean per capita expenditure for six groups of expenditure in Iran from 1984 to 2005. The independent variables used in the models are: non-oil GDP, inflation, export share of GDP and import Share of GDP. Also, we have used three dummy variables to cover the war period, changes in exchange regimes, and the presence of a pro-trade government. The findings suggest that exports increase the means per capita expenditure and indices of poverty of the poor in the long-run, while in the short-run they simply reduce the depth of poverty. Conversely, results show that imports decrease the mean per capita expenditure and increase the poverty measures indicators of all groups in the long-run, while reducing the headcount index by 10% in the short-run. In addition the aggregate measures of trade increase poverty indicator in the long-run, while it reduces the mean per capita expenditure of the wealthier groups, more than poorer groups.

Keywords: Import, Export, Welfare, Poverty, Johansen cointegration test and vector error correction model.

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Table of Contents:

Chapter1: Introduction 8

Chapter 2: Literature review 10

Chapter 3: Theory 14

3-1Definitions 14

3-2 Theoretical Linkages between poverty and trade openness 15

3-2-1 Is Stolper–Samuelson theorem always true? 17

3-2-2The implications of Heckscher–Ohlin model and Stolper–Samuelson theorem 18

Chapter 4: Data and Method 21

4-1-Data 21

4-2- Methodology 22

4-2-1ADF unit root and Johansen cointegration tests 23

4-2-3Vector Error Correction Model 25

4-2-3-1Robustness tests 25

Chapter 5: Empirical Result 26

5-1Poverty, mean per capita expenditure and Trade in Iran 26

5-2 Correlation and Covariance between trade and poverty 29

5-3 Econometrics Result 30

5-3-1 ADF Unit-Root and Johansen's cointegration 30

5-3-2 Result of Vector Error Correction Model 33

Long-run relationships results 34

Adjustment Rates and Short-Run Relationships 35

Robustness 37

5-3-2-1 Aggregate measures of trade openness vs exports and imports 37

Conclusion 40

References 43

Appendix 1 46

Appendix 2 48

List of figures and tables:

Figure 3-1: The impact of Heckscher–Ohlin model on welfare of consumers..... 15

Figure 3-2: Stolper–Samuelson theorem..... 17

Figure5-1: Headcount index and poverty gap during 1984-2005 in Iran..... 25

Figure5-2: Mean per capita expenditures of ten deciles of expenditure during 1984-2005 in Iran 28

Figure5-3: Changes in import and export during 1984-2005 in Iran 29

Figure5-4: Correlation between the first differences of trade, mean per capita expenditure and poverty 29

Figure5-5: Covariance between the first differences of trade, mean per capita expenditure and poverty 30

Figure 5-6: Changes in trade, exports and imports share of GDP during 1984-2005……39

Table 2-1: The relationship between trade and poverty in former studies 10

Table 5-1: ADF test Results..... 31

Table 5-2: VAR and VECM Lag Order Selection Criteria 32

Table 5-3: Number of cointegration relationships in 1% level 33

Table 5-4: the long-run relationships 34

Table 5-5: Adjustment Rates and short run parameters 37

Table 5-6: The long-run relationships with the aggregate measure of trade..... 38

Table 5-7: the comparison between the impact of aggregate trade, exports and imports on poverty and mean per capita expenditure..... 39

List of abbreviations

ADF: augmented Dicky-Fuller

FDI: foreign direct investment

Logd01: the logarithm of the first decile of expenditure of each decile of expenditure.

Logd02: the logarithm of the second decile of expenditure of each decile of expenditure.

Logd03: the logarithm of the third decile of expenditure of each decile of expenditure.

Logd07: the logarithm of the seventh decile of expenditure of each decile of expenditure.

Logd09: the logarithm of the eighth decile of expenditure of each decile of expenditure.

Logd09: the logarithm of the ninth decile of expenditure of each decile of expenditure.

Logd10: the logarithm of the ninth decile of expenditure of each decile of expenditure.

Logeimpo: the logarithm of imports flows.

Logexpo: the logarithm of exports flows.

Loghc: the logarithm of headcount index.

Loginf: the logarithm of inflation.

Logpg: the logarithm of poverty gap index.

Logrgdpr: the logarithm of non-oil GDP

VECM: vector error correction model

WTO: world trade organization

CHAPTER 1

Introduction

The relationship between trade and poverty is one of the most important issues which have been considered by researchers and economists in the trade area. Furthermore the relationship between trade and poverty is vital for governments because it affects their policies and performances. But the point is: according to the former studies, trade and poverty have no general relationship since the impact of trade on poverty depends on the structure of poverty within countries (Hertel et al, 2003), the structure of trade (Harrison, 2007), the policies in place (Aksoy and Beghin 2005, Anderson and Martin 2005; Bhagwati and Srinivasan 2002; Dollar and Kraay, 2001, Winters 2001) and finally the short-run and long-run influences of trade on poverty. Therefore to study the relationships between trade and poverty we have to take into account these points.

While Iran has experienced considerable poverty reduction after the Islamic Revolution in 1979 (Salehi, 2009), it has not been seriously considered in the trade and poverty area. Furthermore this country has tried to be a part of international markets in the same period of time. Therefore in this study we want to assess the short-run and long-run impacts of exports and imports on poverty and mean per capita expenditure in Iran during the time period of 1984 to 2005.

The impact of trade on poverty in Iran has been analyzed by a vector error correction model, which is able to estimate both the long-run and short run changes of dependent variables in relation to independent variables. In addition, we have decomposed trade into exports and imports flows, which is not common in related studies. We have also included a series of dummy variables in order to take into consideration the policies affecting trade, mean per capita expenditure and poverty in Iran. Finally we have not only used different measures of poverty as dependent variables, but we have also used mean per capita expenditure for six groups (decile) of expenditure as a rude measure of welfare for each decile. These six groups are the first, second and third deciles of expenditure, as the poorest deciles, and the seventh, eighth and ninth deciles of expenditures as the wealthiest deciles. The tenth decile is not included in the models because; the amount of expenditures for this decile is substantially higher than the ninth decile and naturally other deciles, which could affect the analyses. This situation will be shown in figure 5-2. Moreover we have run 8 other

models in which the aggregate measure of trade has been used instead of exports and imports. In fact "aggregate trade" is included to assess the general impact of trade on poverty and also it could show the accuracy of the results of the main models.

The most important conclusions of this thesis are as following: exports improve mean per capita expenditure of different deciles of expenditure and they mostly increase the mean per capita expenditure of the poorest groups. They also reduce poverty in the long run but not in the short-run. Moreover exports reduce depth of poverty more than the number of poor people both in the short-run and long-run.

Imports, on the other hand, are not related to poverty reduction as exports. Imports reduce mean per capita expenditure of different deciles of expenditure and they decrease the mean per capita expenditure of the poorest groups more than others. Furthermore, they increase depth of poverty and headcount index in the long-run considerably in comparison with exports and finally, in the short run they reduce the number of people who live below the poverty line in 10% level.

Although trade in general has no significant impact on the dependent variables of our models in short-run, it decreases mean per capita expenditure of different deciles and increases the poverty indicators in the long-run. It should be mentioned that the impact of trade on mean per capita expenditure of the poorer deciles is less than wealthier deciles.

The disposition of the thesis is as follows. In section one; we introduced the main points and result of the study. In section two we will review the most important studies, published recently. In section three we will discuss the theoretical aspects. In section four data and econometrics method will be presented. In section five the empirical result will be shown and finally we will present the conclusions in the last section.

CHAPTER 2

Literature review

Many studies have been done to examine the impacts of trade liberalization on poverty and they have used different methods for their aims. Moreover there are several reviews that categorize these literatures in different ways. In this chapter the recent and most important papers and ideas about the impact of trade liberalization on poverty will be reviewed.

We have categorized these studies in basis of the impact of trade on poverty. Also those studies that are qualitative are brought in a separate category. This categorization suggests that most of the studies conclude that trade reduces poverty, although these impacts are more conditional to some circumstances. The interesting point here is, the only study that is placed in the negative category regarding the effect of trade on poverty reduction, can also be regarded in the positive studies.

Table 2-1, shows the impact of trade on poverty in different studies. We have three main impacts, which are, positive, negative and finally neutral or unclear. The detailed table of literature review is presented in appendix 1.

Table 2-1: The relationship between trade and poverty in former studies.

Category	Study	Country	Methodology	TIme	Impact on poverty reduction
Positive	Nicita (2008)	Mexico	General equilibrium macro model	1989,1992, 1994, 1996, 1998, 2 000	Positive geographically
	Cockburn, Corong and Cororaton (2008)	Philippine	Computable general equilibrium micro-simulation model	1994	Positive for headcount index and negative for poverty gap and severity of poverty
	Bussolo and Nimi (2008)	Nicaragua	General equilibrium macro model	2001	Positive
	Tsai and Huang (2007)	Taiwan	Time-series (VECM)	1964–2003	Positive
	Huang and Jun (2007)	China	Partial equilibrium model	2005	Positive geographically
	Akmal et al (2007)	Pakistan	Time series (VECM)	1973-2003	Positive in long-run, unclear in short-run.
	Dung and Mitsuo (2005)	Vietnam	Computable general equilibrium mode	2001	Positive
	Hertel et al(2004)	Indonesia	Cross-section	1997	Positive in short-run and long-run
	Bhagwati and Srinivasan (2002)	Developing countries	Qualitative	-	Positive
	Dollar and Krray (2001)	Several countries	Cross-section	different periods	Positive
Neutral and unclear	Ravallion (2006)	China	Time series (OLS)	1980-2000	Neutral
	Hertel et al (2003)	14 developing countries	General equilibrium	different periods	Unclear
Qualitative	Bardhan (2006)	Developing countries	-	-	Qualitative
	Bird (2004)	-	Qualitative	-	Qualitative
	Hertel and Reimer (2004)	-	Survey of literatures	-	Qualitative
	Winters (2002)	-	Qualitative	-	Qualitative

Positive Impacts

Nicita (2008) studies the impacts of tariff liberalization taken place in 1990s in Mexico. He shows that, wealthier households in the whole country or residents of geographical regions that are closer to borders of the United States, benefit more than other households.

Bussolo and Nimi (2008) study the impact of DR-CAFTA (Dominican Republic – Central America Free Trade Agreement) on Nicaragua's poverty and income distribution. Although the paper concludes that the DR-CAFTA may reduce poverty, this impact on Nicaragua's poverty "is not too large in the short to medium run" (Bussolo and Nimi, 2008).

Tsai and Huang (2007) study the impacts of economic growth, openness and government's interventions in poverty reduction of Taiwan. Using time series data, they firstly conclude that sustained economic growth is the most important factor for poverty alleviation. Secondly, openness has brought substantial economic growth, more income and better income distribution to Taiwan. Thirdly there is no significant effect of inward foreign direct investment (FDI) on poverty, but outward FDI is problematic for poor in the long-run and short-run.

Huang and Jun (2007) try to examine the impact of trade liberalization on China's poverty (Huang and Jun, 2007). The study concludes that by trade liberalization, farmers generally will benefit from world trade organization (WTO) accession at national level, but this impact is not the same in different provinces.

Akmal, Masood Ahmad and Hussein Ahmad (2007) study the impact of trade liberalization on poverty of Pakistan both in the long-run and short-run. The results show that trade liberalization is impressive in reducing poverty in the long-run but not in the short-run and FDI is effective in poverty reduction of the short-run period. On the other hand public intervention has negative effect on poverty reduction and finally GDP per capita and trade openness are not effective in the short run.

Dung and Mitsuo (2005) study the effect of regional economic integration agreements of Vietnam on its growth, poverty, and equality. They used computable general equilibrium model and living standard surveys of Vietnam (Dung and Mitsuo, 2005). They conclude that integration agreements improved well-being and equality of Vietnam.

Bhagwati and Srinivasan (2002) study the impact of trade on poverty in poor countries by using empirical and theoretical evidences. They believe that trade affects growth by accumulation of knowledge and innovation. This impact improves the productivity of

resources. On the other hand in the relationship between growth and poverty they believe that elasticity of labor supply can be important for poverty. In general they assume that trade in developing countries "should be pro-poor"

Dollar and Kraay (2001) in their well-known study, try to examine how general the positive effects of globalization on growth and poverty reduction are around the world. They conclude that the higher amount of trade volume leads to growth and poverty alleviation in poor countries.

Combining a set of cross-section data from consumption and earning, Hertel and his colleagues (2004) analyze the impact of multilateral trade openness on poverty of Indonesia. They show that by current trade globalization, the amount of headcount poverty measures of Indonesia has been reduced slightly in the short-run and it has been declined significantly in the long-run. (Hertel et al, 2004)

Cockburn, Corong and Cororaton (2008) study the linkages between tariffs reductions on poverty level of Philippine through a computable general equilibrium micro-simulation model. Using headcount index they have showed that poverty decreased marginally in Philippine. Whereas by using two other indices which were poverty gap and severity of poverty they conclude that the poorest of the poor have become even poorer.

Negative Impact

Although we brought the study of Cockburn et al (2008) in the section above, the results of this study show that the impact of trade on depth of poverty and severe poverty is negative.

Neutral or unclear

Ravallion (2006) compares three different methods that estimate the impact of trade on poverty, which belong to macro and micro methods. In general he concludes that a higher amount of trade to GDP is not a key factor in poverty reduction at least in an econometric framework. He has mentions that "for all three poverty measures, there is no sign of any significant effect of current or lagged trade volume on poverty in China" (Ravallion, 2006).

Hertel and his colleagues (2003) study the likely impacts of global trade liberalization on national poverty level of 14 developing countries in Asia, Africa and Latin America (Hertel et al, 2003). In general they conclude that the effects of trade on poverty in the short run heavily depend on the structure of poverty in each country.

Qualitative

Harrison (2007) summarizes the articles of different writers of the book named "globalization and poverty". She also tries to describe the direct relationship between poverty

and globalization (Harrison 2007). Regarding the studies of the book, she concludes firstly, that the relationships between poverty and globalization are complex because the impact of globalization on poverty depends on many other factors and policies that are in place. Secondly, she believes that export expanding globalization and foreign direct investments have positive impacts on poverty reduction but the important point is that there are winners and losers in globalization process. Thirdly losers of globalization are more "among the poor" that are in "import-competing sectors" (Harrison, 2007). Her fourth conclusion is that Hechker-Ohlin model is not always true, because this model has a series of assumptions that are not consistent with reality. For instance, all countries cannot produce all goods at the same time or developing countries have had policies that affect the implication of Hechker-Ohlin model for the impact of trade on poverty (Harrison, 2007).

Bardhan (2006) tries to map a mechanism by which globalization affects rural poverty. He concludes that not only globalization can worsen rural poor situations but also it can provide some opportunities for poor of rural areas in developing countries.

Bird (2004) provides a framework through which she studies the effect of trade on poverty (Bird, 2004). The impact of trade on poverty in Bird's point of view are implemented through "changes in economic growth, changes in foreign direct investment, specialization, income and differentiation, consumption pattern, well-being, trade and market access and household and community assets (Bird, 2004).

Hertel and Reimer (2004) present a survey of recent literatures on the impacts of trade policies on poverty in developing and developed countries. They distinguish between four categories of studies. The first category is "partial-equilibrium and/or cost of living method, the second category is some sort of "general equilibrium". The third category is "general equilibrium simulation coupled with incidence analysis" (Hertel and Reimer, 2004) and the last category studies the effect of trade on poverty through two dimensions which are economic growth and time.

Winters (2002) provides a conceptual framework that is about the impact of trade liberalization of a developing country on its poverty. According to the framework, Winters does not believe in a universal conclusion about the effect of trade liberalization on poverty reduction.

CHAPTER 3

Theory

The relationships between poverty and trade openness have been studied with several methods, mentioned in the second chapter. These methods can be used depending on the availability of data and also geographical regions of the studies. Therefore times series method has been used in this study for the country of Iran. But before that we want to define the most important components of our models that are trade openness and poverty. At the second step we will discuss those theoretical points explaining linkages between trade and poverty.

3-1.Definition

Trade openness has different definitions, but three of them have been used abundantly in several studies that are: proportion of exports and/or imports to gross domestic products, average tariff and finally foreign direct investment, the latter is more used to show the financial aspect of trade openness. (Dollar and Krray, 2001, Harisson, 2007 and Winters, 2002). In this thesis we have used the share of exports and imports to gross domestic product separately as the proxy of trade openness. It has an important advantage indicating how different parts of the trade openness affect poverty in Iran, which has been shown to be important in other studies. In addition we have used the aggregate measure of trade (GDP share of exports plus imports) in 8 different models to see whether trade reduces poverty in general or not.

There are different definitions of poverty that the most famous ones are:

a- Headcount index which is the proportion of the population which lives below a specific poverty line (Ravallion, 2004).
b- Poverty gap index which measures the "mean distance below the specific poverty line as a proportion of the poverty line" (Ravallion, 2004).
c- "The squared poverty gap, in which the individual poverty gaps are weighted by the gaps themselves, so as to reflect inequality amongst the poor" (Ravallion, 2004).

As we know poverty gap can be an indicator of poverty depth and also it tells us "how poor the poor are" (Blackorb. and Donlandson, 1980).

In this thesis we not only use headcount index and poverty gap but also we use a rude measure of welfare stemming from welfarists definitions of poverty, defined by mean per capita expenditure of each decile of expenditure. In fact welfare can be measured by several methods that two of them are more important than others. The first definition belongs to welfarsits (Sen 1979) and the second one to non-welfarists. Welfarists' approach tries to measure utility of households estimated by income or expenditure of household and non-welfarists method would be measured by concentration on access to minimum levels of nutrition or health (Jones and Haslett, 2004).

3-2. Theoretical linkages between poverty and trade openness

Heckscher–Ohlin model and Stolper–Samuelson theorem have been using in most of the studies to explain how trade affects poverty. To show the Heckscher–Ohlin model we have to consider some assumptions. At the first step we assume we have two countries (1,2) producing two goods (Y1,Y2) by two production factor of labor (L) and capital (K). Furthermore we assume that:

1. 1 and 2 have the same technology.
2. Their consumers have the same tastes.
3. They have different factor endowments such that 1 is endowed in labor and 2 is endowed in capital.
4. 1 and 2 can trade their products but they cannot trade their factors.
5. The factor prices in 1 and 2 are equalized.
6. Good 1 is labor-intensive and good 2 is capital-intensive.
7. The value of imports is equal to value of exports in 1 and 2.

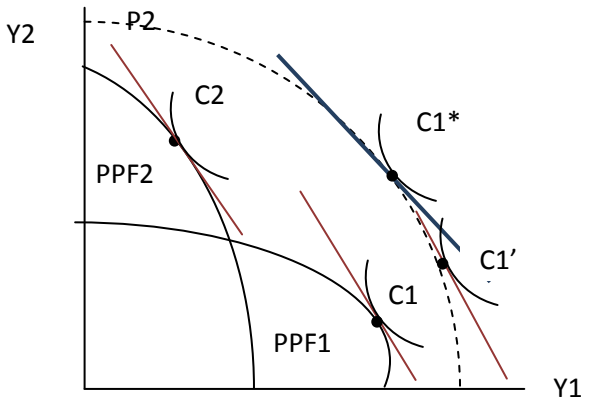


Figure 3-1: The impact of Heckscher–Ohlin model on welfare of consumers.

If we assume Heckscher–Ohlin model is hold, figure 3-1 shows how consumers of each country gain as a result of exports. In autarky, consumers in 1 choose C1 and in 2 choose C2.

In this situation, consumers in 1 have to pay more for buying capital-intensive product (Y2) and in 2 consumers have to pay more for labor-intensive product (Y1).

Now we assume Heckscher–Ohlin theorem is hold, therefore if 1 and 2 open up to trade, 1 will export Y1 and 2 will export Y2. As a result the older production possibility frontier (PPF1 and PPF2) for these two countries will be transformed to the dash curve.

To see how Heckscher–Ohlin model works, we can assume that the relative prices do not change as a result of exports, then the consumers in 1 will get to new equilibrium in C1' and they can consume in higher indifference curve while they have to pay the same prices for Y1 and Y2. It means that in this situation we have not got to an optimal point. But if we assume Heckscher–Ohlin model works as a result of trade, the price of Y1 will increase in 1 and the price of Y2 will decrease in 1. So the consumer of 1 can now consume in C1* where they can buy more Y2 with lower prices and also they have better situation in consumption of Y1. So the consumers of 1 will have more welfare as a result of trade.

In addition trade can better off the consumers in 1 by a mechanism called Stolper–Samuelson theorem. Stolper-Samuelson theorem is used to explain the linkages between poverty and trade. It simply says that an abundant factor of production will gain from trade since trade will lead to a specialization towards products using this factor intensively. Hence the returns to this factor increases as the demand for this factor increases. An important implication for Stolper–Samuelson theorem is: trade may be an appropriate way for poverty alleviation (Harrison, 2007) as long as the country is abundant with unskilled labors.

Since the developing country, called 1, has abundant amount of unskilled labor, it produces more unskilled-labor-intensive goods called Y1. By opening up to trade the demand for Y1 goes up. It increases the price of Y1. This increase in the price of Y1 leads to increase in the wage of the unskilled-labors of 1. Therefore their welfares increase and finally the poverty in these countries will be alleviated.

In addition we should consider an important point about Stolper-Samuelson theorem which is: any increase in the price of Y1 leads to "magnified effect on the factor price" of Y1 (Stolper-Samuelso 1941). So every change in the prices of goods and services made by imports and exports is substantially important. This point is shown in figure 3-2. In this figure, point A is the initial equilibrium of factor prices of Y1. Now if 1 starts to export Y1, the price of Y1 increases and iso-cost curve will shift to P3, so the new equilibrium goes to point A3. It means that wage increases from W1 to W3, while rental decreases from R1 to R3 in 1. This occurs because 1 specializes in the production of labor-intensive product so it will produce in the new iso-cost curve which benefits labor more than capital.

Now we draw a line from the origin which crosses point A1, according to the assumption of unit-cost-function it can be seen that if we move along the blue line, we will get to higher prices A2 which increases the factor prices (W2-W1) as same as increase in product prices (A2-A1), but regarding the fact that labor is abundant in country 1 and Y1 is produced cheaper there, the iso-cost curve does not shift as P2 and it will shift as P3 and we will get to A3, where (W3 – W1) is greater than (W2 – W1). It means that unskilled labors that are mostly poor gain from trade which increases their wages, even more than increases in the price of Y1. (Feenstra, 2003)

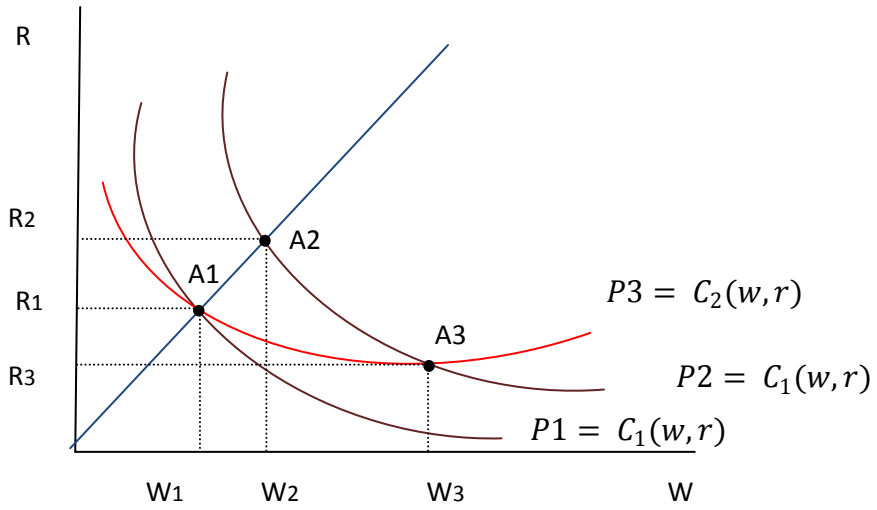


Figure 3-2: Stolper–Samuelson theorem.

3-2-1. Is Stolper–Samuelson theorem always true?

Despite the fact that Stolper–Samuelson theorem has good implication to explain the impact of trade on poverty, some economists such as Winters (2002), Harrison (2007) and Davis and Mishra (2007) question whether the Stolper-Samuelson theorem is valid or not. In particular Davis and Mishra (2007) refuse the validity of Stolper-Samuelson theorem. They say that "Stolper-Samuelson theorem only holds if all countries produce all goods, if the goods imported from abroad and produced domestically are close substitutes, or if comparative advantage can be fixed vis-à-vis all trading partners". (Davis and Mishra, 2007).

They expand their discussion with an example. In this example Mexico and the US open up to trade and Mexico exports unskilled-labor-intensive goods to the US, so it is beneficial for labors in Mexico. Now when China that has specialization in unskilled-labor intensive goods start to export the same products to the US with lower prices, Mexico's labor will lose in this situation.

Furthermore Wintes (2002) believes that Stolper-Samuelson theorem is “elegant” to explain the relationships between trade and poverty, but it is not sufficient because the real world has some complications that are not consistent with this theorem.

3-2-2.The implications of Heckscher–Ohlin model and Stolper–Samuelson theorem

The first important implication of Heckscher–Ohlin model and Stolper–Samuelson theorem can be seen in the impact of prices in the relationship between trade and poverty. Trade has different effects on a national economy and one of them is price changes and exposure to international price fluctuations. It stems from the fact that in a liberalized economy, international prices can be transferred easier and faster. Even Winters (2002, 2004) believes that trade is brought to an economy by price changes, so if there is no big shock in price borders, trade liberalization can not affect poverty directly.

If we take Stolper–Samuelson theorem in to consideration, we can see that the main impact of trade on the price of the unskilled-labor in developing counties comes from the change in the price of products produced by the poor. It means that we have to have a model which could explain the changes in poverty occurred by prices in Iran. Therefore in this thesis inflation is used for examination of the impact of price fluctuations on poverty and mean per capita expenditure.

Another important implication of Heckscher–Ohlin model and Stolper–Samuelson theorem is: trade can be pro-poor when it reduces the prices of those goods that poor consume and it can be harmful for poor when it reduces the prices of those good that they produce. It means that the impact of trade on poverty not only depends on prices but also on imports and exports.

If we take into consideration the Heckscher–Ohlin model and Stolper–Samuelson theorem for a developing country, endowed by labor, exports in this situation are pro-poor, because the poor people are net-producer of the exported goods. In addition imports of capital-intensive goods are pro-poor as well, because poor people are net-consumers of these goods and imports will decrease the prices of these goods in the developing country.

But if for any reason such as high rate of inflation, the developing country in the trade situation has to import those goods that poor people are net-producer of them, imports will harm the poor.

On the other hand we should answer to an important question which is whether exports are more important than imports in a theoretical point of view or not? And if they are, whether the impact of aggregate trade is positive or negative?

To answer this question we could take into account Stolper–Samuelson theorem. The main point in Stolper–Samuelson theorem is that exports are more important for the developing countries. So the answer for the developing countries is "yes", because given Stolper–Samuelson theorem; the developing country has no way but to export. In other words, exports are the only way for them to increase their poor's income. In addition we have to mention to an important point which affects the "yes answer" to some extent. In fact the gains of the poor as a result of specialization could be achieved in the long-run, because the process of specialization cannot be obtained in the short-run. It means that in the short-run the developing country has to import some goods to meet its consumers' needs. Therefore in this country imports may affect poverty reduction positively in the short-run.

On the other hand even in the long-run the imports of capital-intensive productions are not necessarily harmful for the poor. For instance Davis and Mishara (2007) showed that if "imports and those goods produced by the poor in the home country are non-competing; therefore trade will increase the income of the poor" (Davis and Mishara, 2007). It means that the structures of imports and exports are important as well.

Considering these two circumstances, imports and exports should be considered separately when we are assessing the impact of trade on poverty as we will do it in our main models. In addition at the end of the chapter 5 we will estimate a series of new models with aggregate measure of trade (the GDP share of exports plus imports) to see whether the impact of exports are more than imports in Iran or not? On the other hand it will show us the general impact of trade on poverty and mean per capita expenditure of each decile of expenditure.

Government expenditures in the linkages between poverty and trade are important as well. If we consider the role of government in basis of Stolper–Samuelson theorem and Heckscher–Ohlin model, we can see that it affects the impact of trade on poverty. For instance, government can manipulate the impact of Heckscher–Ohlin model and Stolper–Samuelson theorem by changing the tariffs; also it could encourage a sector which imports or exports by government expenditures, such that government expenditures might shape the specialization of that sector. Therefore we can use government expenditures to study this effect. But the point is that several studies emphasize on the direct and positive impact of government expenditures on GDP in Iran (Komeijani and Nazari, 2009 and Ansari, 2002) so the model can be jeopardized in presence of government expenditures because of the co-linearity between government expenditure and GDP. Instead we have used three dummy variables reflecting different situations and government's policies of Iran during the period of study.

The first dummy is WAR, which simply is the dummy of war imposed to Iran in 1980 and lasted until 1988. The second dummy is EXCH2000 which is the dummy of change in Iran's exchange regime in 2000 after which exports and imports share of GDP faced some fluctuations. It should be mentioned that Iran had another change in its exchange regime, occurred in 1990. This change had a lot of bad impacts on Iran's economy. The worst one was increase in inflation rates, such that this rate reached up to 49% in1993. But because we have used inflation in the models, we do not include the dummy of 1990. Finally the third dummy is KHATAMI showing the presence of a government between 1996 to 2004 which had proper performance both in poverty reduction and trade expansion. In fact we have used this dummy to illustrate the importance of good policies in the models.

Taking in to consideration the above points, our hypotheses are:

1. Exports are good for poverty and mean per capita expenditure of poor groups in the long-run and short-run.
2. Imports are bad for poverty and mean per capita expenditure of the poor people in the long-run but not in the short-run, maybe because imports can be used to reduce the price levels in the short-run and it can help poor people to access to goods with lower prices, but in the long-run imports can jeopardizes job creation and gains of poor people as the net producer of imported goods. Although it should be mentioned that this impact depends on the structure of import.
3. Good polices in trade can be beneficial for poor people.

CHAPTER 4

Data and Method

4-1.Data

The data in the thesis have been collected from different sources. The poverty measures and mean per capita expenditure of six deciles of expenditures have been gathered form a valuable article written by Salehi-Isfahani in 2009. The mean per capita expenditures are in Rial (Iran national currency) per day in constant price of 1997. The trade, exports and imports shares of growth domestic products (GDP) have been extracted from the world development indicator provided by World Bank. The non-oil real GDP is in Iran national currency and constant price of 1997. The inflation rates have been extracted from central bank of Iran. All data are for the period of 1984 to 2005 and for solving the problem of having different units of measurements we have used their logarithm form.

It should be mentioned that we have used the first three deciles of mean per capita expenditure as the poorest groups and the seventh, the eighth and ninth deciles of expenditure as the wealthiest groups of expenditure. The tenth decile has not been included because its values are substantially higher than the other deciles and it may make problem for our comparisons. In addition the results of VECM for the first and the ninth deciles haven't been illustrated for those models that include exports and imports separately, because their VECMs severely suffer from autocorrelation.

Regarding the structure of our data we will try to study the short-run and long-run impacts of trade on poverty in Iran. One of the best times series methods for this aim is vector error correction model (VECM), which could explain the short-run and long-run impacts of variables on poverty. But one may ask why we have chosen vector error correction model without knowing something about the cointegration relationships between the main variables of our models. The answer can be found in Kennedy (1992), who said, some variables such as "the short-and long-run interest rates, prices and wages, household income and expenditures, imports and exports, spot and future prices of a commodity, and exchange rates etc" (Kennedy, 1992) are going to be cointegrated. Therefore considering the above points we hypothetically specify a model in which variables are cointegrated. Furthermore using two

time series study of Pakistan and Taiwan that have been estimated by VECM model, we can hypothesize that VECM could be used here.

4-2. Methodology

The thesis follows three models introduced by Ravallion (2006), Tsai and Huang (2006) and Akmal et al (2007). All of these models have used time series data, although their models are different with each other to some extent. In addition we specify our model regarding theoretical issues mentioned in chapter 3, and the characteristics of Iran.

We have four different types of models. For the first two models independent variables are the same and the dependent variables are different with each other. On the other hand for assessing the general impact of trade on poverty we have specified two different models in which we have used the aggregate measures of trade.

$$LOGD_{tj\ (j=1,2,3,7,8,9)} = \beta_0 + \beta_1 LOGRGDPR_t + \beta_2 LOGEXPO_t + \beta_3 LOGIMPO_t + \beta_4 LOG.INF_t + WAR + EXCH2000 + KHATAMI + \varepsilon_{tj}$$

$$LOGPoverty_{\ ti} = \beta_0 + \beta_1 LOGRGDPR_t + \beta_2 LOGEXPO_t + \beta_3 LOGIMPO_t + \beta_4 LOG.INF_t + WAR + EXCH2000 + KHATAMI + \varepsilon_{ti}$$

$$LOGD_{tj\ (j=1,2,3,7,8,9)} = \beta_0 + \beta_1 LOGRGDPR_t + \beta_2 LOGEXPIMP_t + \beta_4 LOG.INF_t + WAR + EXCH2000 + KHATAMI + \varepsilon_{tj}$$

$$LOGPoverty_{\ ti} = \beta_0 + \beta_1 LOGRGDPR_t + \beta_2 LOGEXPIMP_t + \beta_3 LOGIMPO_t + \beta_4 LOG.INF_t + WAR + EXCH2000 + KHATAMI + \varepsilon_{ti}$$

Where $LOGD_{(j=1,2,3,7,8,9)}$ is the logarithm of mean per capita expenditures of each decile of expenditure, $LOGPoverty_{\ ti}$ represents the logarithm of two measures of poverty that are headcount index and poverty gap, LOGEXPO is the logarithm of the share of exports to GDP, LOGIMPO is the logarithm of the share of imports to GDP, LOGEXPIMP is the share of exports plus imports to GDP, LOGRGDPR is logarithm of real non-oil gross domestic products in national currency of Iran, β_0 is constant term, WAR, is the dummy of war imposed to Iran in 1980 which lasted until 1988. EXCH2000 is the dummy of change in Iran's exchanges regime in 2000, KHATAMI is dummy for presence of a pro-trade government and

finally ε_{ti} and ε_{tj} are serially uncorrelated error terms for each model. These models are estimated by VECM.

4-2-1. Unit Root and Cointegration Test

Regarding our dependent and independent variables at the first step we have to consider an important question, which is whether our data are stationary or not. If they are not stationary, we will get spurious results in our econometric models. It means that the independent variables do not explain the exact changes of the dependent variables, since variation in times has affected them. Therefore the results of our econometric models will be unrealistic. To solve this problem, we have to use stationary series. But firstly we should examine the stationarity or non-stationarity of our data which can be done by unit root tests. One of the most desirable unit root tests is augmented Dickey-Fuller test (ADF) introduced by Dickey and Fuller (1979). This test is as following:

$$\Delta Y_t = \alpha_\circ + \eta Y_{t-1} + \alpha_2 t + \sum \beta_i \Delta Y_{t-i} + \varepsilon_t \qquad (4\text{-}1)$$

Where $\alpha_\circ$ is drift, t is trend and ε_t is the white noise term. Also Δy_{t-1} is equal $to\ y_{t-1} - y_{t-2}$ and Δy_{t-2} is equal $to\ y_{t-2} - y_{t-3}$ and so on. In this test we are interested in η to test the existence of unit root in the series. In other words the null hypothesis here is η=0 meaning that the variable has unit root. The critical values for examination of the significance of η extracted through Montcarlo method by Dickey and Fuller known as τ distribution.

Moreover as it mentioned in the regression equation of ADF, sometimes we have to introduce intercept or trend in the equation. There are some methods for including the drift or trend in the model, for instance we can figurethe series and their differences in relation to the time variable to see whether we have trend and intercept in the series or not. Moreover we can run a set of models where they have or they do not have drift or trend and after that regarding the significance or insignificance of each component's coefficient we can specify the ADF test with or without drift or trend. It means that if the coefficient of trend (α_2) is significant we have to include trend in the test and the same method is used for drift of the test.

Another important component of the ADF test is the lagged difference. If we do not include a proper number of lags in ADF test we may face misspecified model and biasness in the result of the test models. Thus the number of lagged differences can be determined by a set of information criteria such as Akaike Information Criterion, modified Akaike Information

Criterion, Schwarz Information Criterion etc. In this thesis we have used Schwarz Information Criterion for determining the number of lags.

When a series of variables in a model are nostationary we have to take their differences as far as we get to the stationary series but the point is that by taking differences we will lose substantial amount of information. In particular in the case of our data we need to avoid taking the differences because the numbers of our observations are limited and this limitation binds us in some econometric areas.

Engel and Granger (1987) introduced an important concept, so called cointegration. They mention that two or more non-stationary series that are integrated of order one (I(1)) in a linear system may have some stationary relationships. These stationary relationships are integrated of order zero (I(0)), known as the long-run or equilibrium relationships (Engel and Granger, 1987), so in the case of our models if we get to non-stationary series we can test the I(1) level of our data to see whether they are cointegrated or not.

There are several methods for testing the presence of cointegration relationships between variables. One of the most famous is Johansen's cointegration test introduced by him and Juselius (1990) and Johansen (1991). This test uses three methods to determine the number of cointegration relations so called "r", which are "trace statistic", "maximum eigenvalue" and finally "the minimum of an information criterion". In this thesis we use "eigenvalue" to determine the number of cointegration relationships. But before testing the cointegration relationships we have to pass an important step in which we have to determine the number of lags in the underlying vector autoregression. When the number of lags is determined we must reduce one order of the lag orders obtained by VAR for cointegration test and vector error correction model (STATA Manual, 2007). For instance if the test shows that we have three lag in the underlying VAR model we have to introduce two lags in cointegration test and VECM as well.

Using Verbeek's description to get Johansen cointegration equation, we can rewrite the VAR as following:

$$\Delta \boldsymbol{Y}_t = \delta + \Pi \boldsymbol{Y}_{t-1} + \Gamma_1 \Delta \boldsymbol{Y}_{\boldsymbol{t-1}} \dots + \Gamma_{p-1} \Delta \boldsymbol{Y}_{t-p+1} + \boldsymbol{\varepsilon}_t \quad (4\text{-}2)$$

Where Y_t is a (K × 1) vector of I(1) variables, $\boldsymbol{\Gamma}_1$ to $\boldsymbol{\Gamma}_{p-1}$ are (K×K) matrices of parameters, $\Pi = \gamma\beta'$ and $\gamma \; and \; \beta$ have (K×r) dimensions and $\boldsymbol{\varepsilon}_t$ is a vector of normally distributed errors.

Cointegration relationships says that we may have r linear relationships between these I(1) variables that are I(0). For showing these relationships we can consider the following matrix.

$\Pi = \gamma\beta^{/}$ (4-2-1)

Where β is the matrix of cointegrating vectors and γ is the "matrix of weights with which each cointegrating vector enters each of the $\Delta \boldsymbol{Y}_t$ equations" (Verbeek, 2000). In fact using maximum likelihood Johansen's method estimates the equation (4-2) with the restriction of $(4-2-1)$ for a specific value of cointegration relationships. In other words Johansen's method tests the number of cointegration relationships started from zero where the null hypothesis for maximum eigenvalue is "we have r cointegration relationships in comparison with H1 says that we have r+1 relationships. For trace statistic null hypothesis says there are "r" cointegration relationships in comparison with H1 saying there are k cointegration relationships.

4-2-3.Vector Error Correction Model

According to the Granger representation theorem if there are r cointegration relationships data can be represented in error-correction form. (Engle and Granger, 1987) A vector of error correction model can be written as follow:

$\Delta \boldsymbol{Y}_t = \delta + \gamma\beta^{/}\boldsymbol{Y}_{t-1} + \Gamma_1 \Delta \boldsymbol{Y}_{\boldsymbol{t-1}} \ldots + \Gamma_{p-1}\Delta \boldsymbol{Y}_{t-p+1} + \boldsymbol{\varepsilon}_t$ (3)

Where $\beta^{/}\boldsymbol{Y}_{t-1}$ shows the long-run relationships with their coefficients that is β, and γ which separately represents the adjustment rates of short-run relationships obtained by$\Delta\mathbf{Y}$. It should be mentioned that equation (3) can be specified by drift and trend and it depends on the type of data and model that we have.

Robustness tests

After running a VECM we have to run a series of test that examine, the specification of the number of cointegration relationships, specification of the model regarding the presence of autocorrelation in the lags (LM test) and finally a test for presence of normality. The following tests will be applied:

Stability of VECM

This test helps us to understand whether we have specified true number of cointegration relationships or not. If it is so the tests will show we have k-r number of unit-roots in the model.

VEC Residual Serial Correlation LM Tests

This test is run after VECM to see whether we have autocorrelation in the residual or not. The null hypothesis here is there is no autocorrelation in the j^{th} lag.

Normality test

Using Jarque–Bera statistic after VECM we can see whether the disturbances are normally distributed or not. In fact the null hypothesis here is the disturbances are normally distributed.

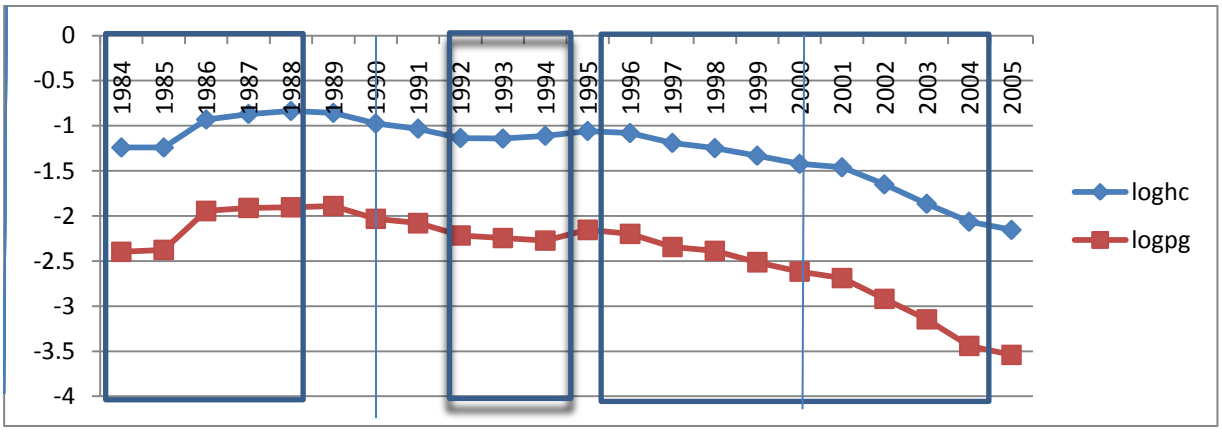
CHAPTER 5

Empirical Result

5-1.Poverty, mean per capita expenditure and Trade in Iran

Although Iran had some good conditions such as presence of a pro-trade government during 1996–2004, this country has had difficult circumstances between the 1984 and 2005 period. Some of the most important ones are: an imposed War with Iraq (1980–1988), changes in exchanges regime both in 1990 and 2000, high amount of inflation rates (1992–1994) and international sanctions to name but a few.

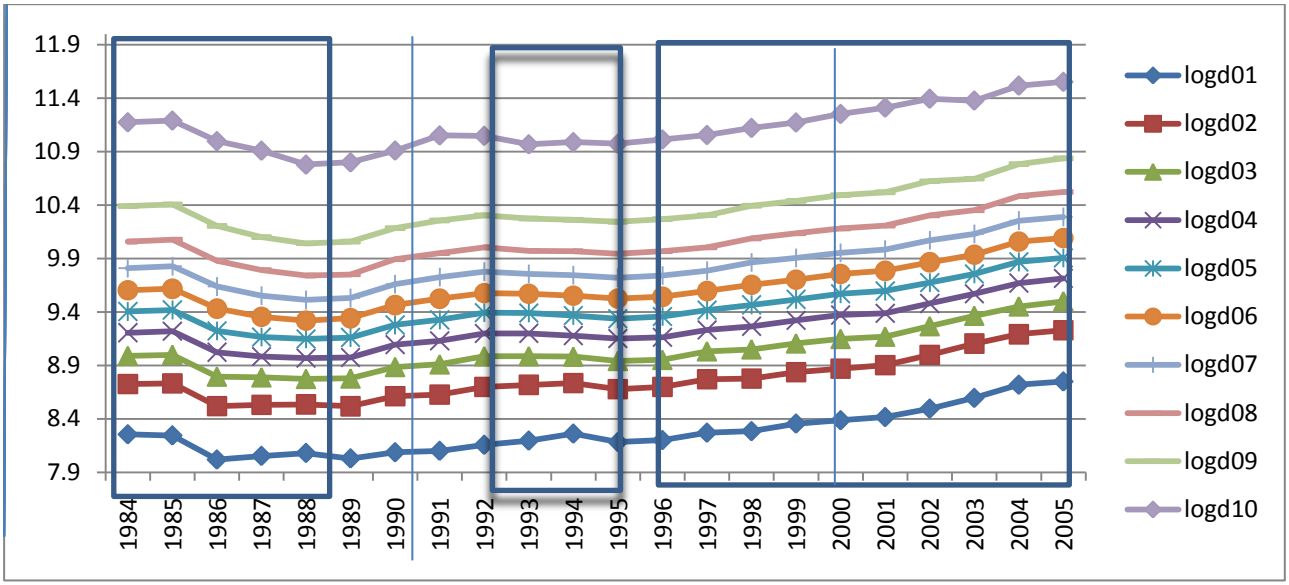
Figure 5-1: Headcount index and poverty gap during 1984-2005 in Iran.



Source: Salehi Isfahani, 2009

Regarding figure 5-1 we can see that poverty has been declined relatively during 1984–2005 in most of the times, but in some years, especially during war and high inflation periods, poverty has increased. Furthermore we can see that after 1996 and in the presence of a pro-trade government with positive diplomatic relations with other countries poverty is reduced.

Figure 5-2: Mean per capita expenditures of ten deciles of expenditure during 1984-2005 in Iran.

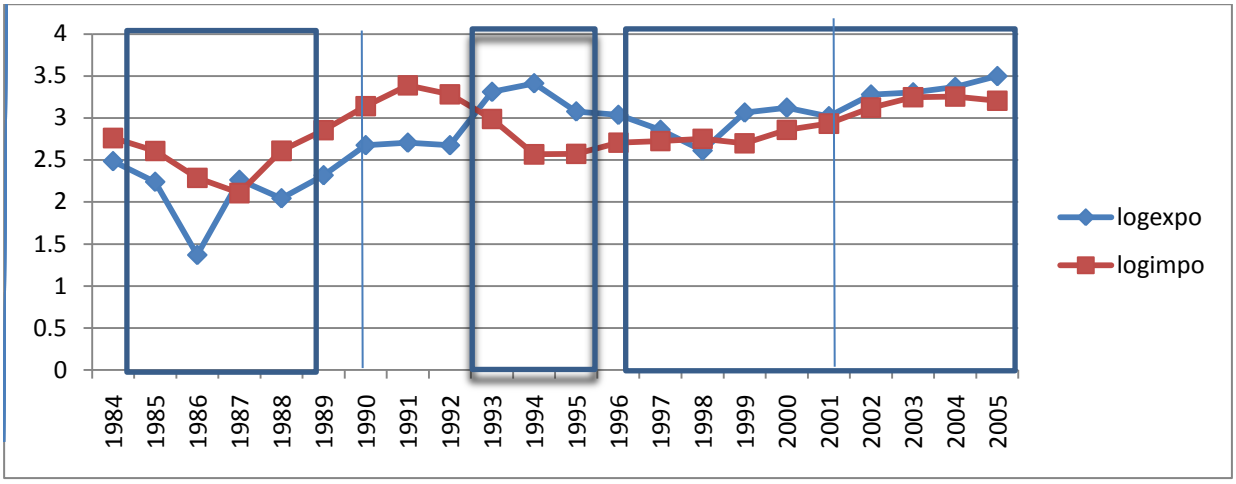


Source: Salehi Isfahani, 2009

Regarding figure 5-2, mean per capita expenditure generally increased between the period of 1984 and 2005. Although war and high amount of inflation had negative impacts on mean per capita expenditures. Furthermore we can see that Khatami's government had positive impact on the mean per capita expenditure of different deciles.

Figure 5-3 shows that imports and exports have fluctuated during the period of 1984–2005. In this period of time, war and high inflation had negative impact on imports and exports. In addition we can see that Khatami's government has positive influence on exports and imports shares of GDP. Although after the changes in exchange regime of Iran in 2000, upward trends of imports and exports changed. Another important point here is that before 1990 imports were more than exports while after this period we can see that exports are almost more than imports.

Figure 5-3: Changes in import and export during 1984-2005 in Iran.

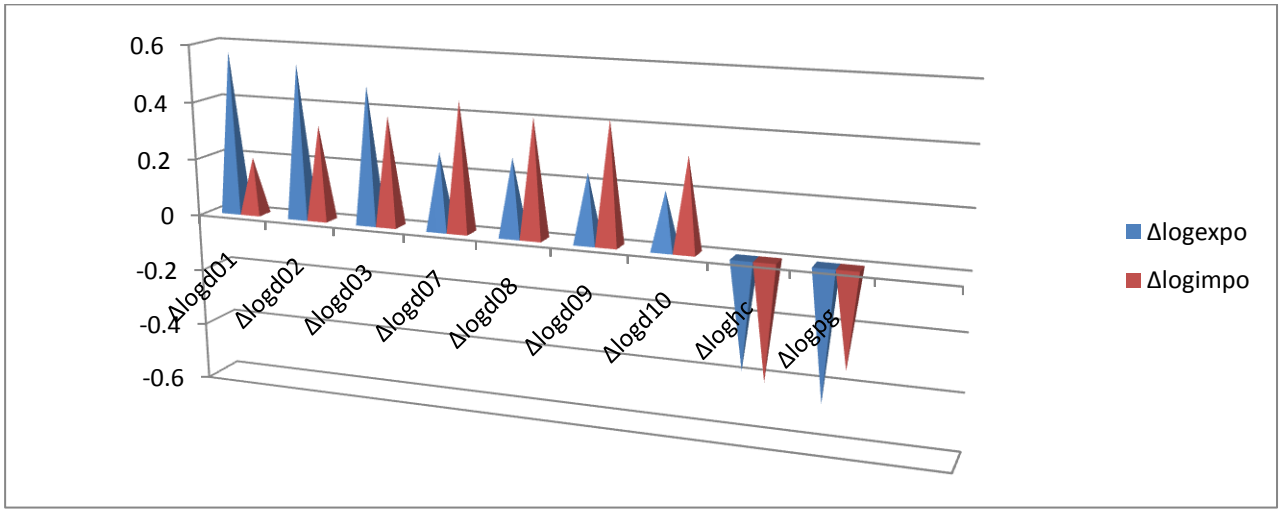


Source: World Bank

5-2. Correlation and Covariance between trade and poverty

Before estimating the models in the basis of VECM, we will compute the correlation and covariance between trade and poverty parts of our variables, indicated in figures 5-4 and 5-5. But we should mention an important point which is we will take the correlation and covariance of the first differences of our variables to exclude spurious results.

Figure 5-4: Correlation between the first differences of trade, mean per capita expenditure and poverty.



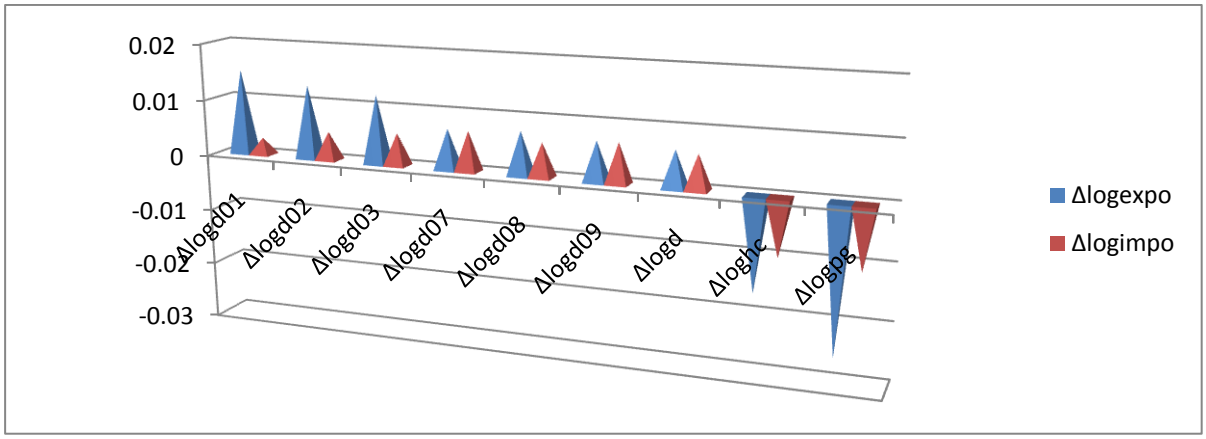
Sources: Salehi (2009) and World Bank

In figure 5-4, Δ means the first difference and it shows that there are positive correlations between the mean per capita expenditure of each decile of expenditure and exports and imports. In addition, as we can see mostly those deciles that have higher amount of mean per capita expenditures, have lower correlations with export, while this relationship is inverse for

imports. Moreover we can see that poverty measures have negative correlation with exports and imports.

Since we are interested in the long–run and short–run impact of trade openness on poverty, covariance would be used to shed light on the drawbacks of correlation. Here again we will use the first difference of our data. As figure 5-5 illustrates, covariance between trade and poverty parts of our data is the same as the correlation of these variables. But the point is: we can follow an upward trend for the covariance of exports with mean per capita expenditure of the poorer groups and a downward trend with imports for these groups.

Figure 5-5: Covariance between the first differences of trade, mean per capita expenditure and poverty.



Source: Salehi–Isfahani and World Bank

5-3. Econometrics Result

Using vector error correction model we achieve three types of information, the first one shows the long-run relationships, the second one illustrates the adjustment rates and the last one indicates the short-run relationships.

5-3-1. ADF Unit-Root and Johansen cointegration test

To estimate a time series model at the first step we have to take unit-root test to find out whether we have unit-root in the level and differences of our variables or not. Using Schwarz information criterion we found out the number of lags of ADF test. Here the results of ADF test are presented in the table 3-1. According to ADF test, all variables are I(1) in the their level and I(0) in their first differences. It means that in the level of our data, they are varied by variations in time and at their first differences they are stationary. It is consistent with the nature of our data, in particular for trade, poverty and growth parts of our model. It should be

mentioned that the critical values in presence of trend and drift for 1% is -4.57, for 5% is -3.69 and for 10% level is -3.28. Moreover the critical values in absence of trend and drift for 1% is -2.68, for 5% is -1.96 and for 10% is -1.61.

Table 5-1: ADF test Results.

Variable	Stat	MacKinnon probability	Trend and intercept	Unit root
logd01	-2.142	0.4944	both	Yes
Δlogd01	-5.456	0.0015	both	No
logd02	-2.03	0.5512	both	Yes
Δlogd02	-4.957	0.0040	both	No
logd03	-1.93	0.6031	both	Yes
Δlogd03	-4.209	0.0207	both	No
logd07	0.194	0.9954	both	Yes
Δlogd07	-6.504	0.0004	both	No
logd08	0.197	0.9955	both	Yes
Δlogd08	-6.475	0.0004	both	No
logd09	0.7592	0.9991	both	Yes
Δlogd09	-6.601	0.0003	both	No
Loghc	-2.45	0.3416	both	Yes
Δloghc	-3.80	0.0382	both	No
Logpg	-1.50	0.7952	both	Yes
Δlogpg	-4.475	0.0105	both	No
logrgdpr	1.109	0.9958	both	Yes
Δlogrgdpr	-4.714	0.0077	both	No
Loginf	-2.81	0.2083	both	Yes
Δloginf	-4.925	0	none	No
Logexpo	-3.107	0.1299	both	Yes
Δlogexpo	-5.949	0.0007	both	No
Logimpo	-3.473	0.0699	both	Yes
Δlogimpo	-2.704	0.0096	none	No
Logexpimp	-2.006	0.5642	Both	Yes
ΔLogexpimp	-3.520467	0.0013	none	No

In the next step we take Johansen test, but before doing Johansen's cointegration test we have to determine the number of lag orders in the underling VAR model. This can be determined by different information criteria. Although all information criteria are reported in table 5-2, Schwarz information criterion is used in this study. Table 5-2, shows the number of lag order in VAR and VECM and the main results are presented in appendix 2. The independent endogenous variables for obtaining lag order in underling VAR model are

LOGRGDPR, LOGEXPO, LOGIMPO and LOGINF. Moreover we have exogenous variables that are C, WAR, KHATAMI and EXCH2000.

Table 5-2: VAR and VECM Lag Order Selection Criteria.

Dependent variables	Lag order of VAR	Lag order of VECM
logd01	2	1
logd02	2	1
logd03	2	1
logd07	2	1
logd08	2	1
logd09	2	1
Loghc	2	1
Logpg	2	1
Logspg	2	1

In basis of all three information criteria the number of lag-order for all models is equal to 2 and for Johansen's cointegration test and VECM we have to reduce one order from the obtained order in VAR (Stata Manual, 2007) which is equal to 1

After obtaining the number of lag order in VECM we can test the number of cointegration relationships by Johansen's cointegration test. We have used maximum eigenvalue in 1% level to obtain the number of cointegration relationship. These results for our first 8 models with exports and imports indicate that for the first and the ninth deciles of mean per capita expenditure, there are two cointegration relationships. In addition, for the rest of the models there is one equilibrium relationship. These results are consistent with Kennedy (1992). The results are presented in table 5-3 and detailed results of the Johansen's test are presented in appendix 2.

Table 5-3: number of cointegration relationships in 1% level.

Dependet variables	Number of cointegration equation
logd01	2
logd02	1
logd03	1
logd07	1
logd08	1
logd09	2
Loghc	1
Logpg	1

5-3-2.Result of Vector Error Correction Model

Having I(1) variables, the number of cointegration relationships and the number of lag order of VECM, we can run this model. The first output of VECM is the long-run relationships, showing equilibrium relationships between variables. The second output is the short-run relationships that are about the short-run changes of dependent variables in relation to independent variables. The final output is the adjustment rates, showing how fast the short-run relationships will be adjusted toward the long-run relationships.

Table 5-4 illustrates the long-run relationships and the table 5-7 indicates the adjustment rates and short run parameters. The complete versions of these two tables with t-values and significance levels are presented in appendix 2.

Long-run relationships results

Table 5-4: the long-run relationships.

Dependent / Independent	LOGd02	LOGd03	LOGd07	LOGd08	LOGHC	LOGPG
$\mathbf{LOGRGDPR_{t-1}}$	-1.136***	-1.0007***	-0.968***	-1.010***	2.360***	3.716***
$\mathbf{LOGINF_{t-1}}$	-0.279***	-0.114***	0.0363	0.0566***	0.482***	0.9005***
$\mathbf{LOGEXPO_{t-1}}$	0.2015***	0.105***	0.030*	0.029	-0.407***	-0.81***
$\mathbf{LOGIMPO_{t-1}}$	-0.856***	-0.584***	-0.410***	-0.414***	1.719***	3.00***
C	7.898537	4.983999	3.075733	3.323252	-32.9457	-52.2153
Autocorrelation problem at the 1st lag	No	Yes	No	No	No	No
Autocorrelation problem at the 2nd lag	No	No	No	No	No	No

***, **, * are the significance level at 1%, 5%, 10% respectively

According to the coefficients of the first independent variables (the non-oil real GDP) we can see that mean per capita expenditures of all deciles are affected negatively by that variable in the long-run. In addition it increases headcount index and poverty gap in the same period. These results are not consistent with famous expression of Dollar and Karry (2000), saying growth is good for poor. This negative effect may stem from the structure of Iran's economy that depends substantially on oil incomes. Thus when we eliminate the impact of oil from Iran's GDP we can see that non-oil GDP has no positive impact on the expenditure of different deciles of expenditures. in addition although the above interpretation can be an explanation of the signs and magnitude of RGDPR coefficients, we should emphasize that we are talking about an equilibrium relationship between our variables. It means that it may not report the reality as good as possible.

The second independent variable is inflation. The results show that inflation affects the second decile (the second poorest one in our models) more than others. Also inflation affects the second and the third deciles negatively. On the other hand inflation has positive impact on mean per capita expenditure of the wealthiest groups of expenditures. Furthermore as we expected it increase headcount index and poverty gap. Therefore we can say that inflation has increased the depth of poverty in long-run and also it has increased the number of poor

people. Another important point is that the impact of inflation on poverty gap is almost 2 times more than headcount index.

Exports are another independent variable that we have in our model. As we can see exports increase mean per capita expenditure of the poorest groups more than the wealthiest one. Furthermore they affect the third groups of expenditure almost half of the second one and their impact on mean per capita expenditure of the seventh and the eighth deciles are not substantial and significant at least in 5% level. As we expected again exports decrease the number of people below poverty line and it also decreases the depth of poverty in Iran. The influences of exports are such that the depth of poverty decreases about 0.8 percent as a result of one percent increase in the share of exports to GDP in the long-run. This result is consistent with the theories and our hypothesis and shows that the exports part of Iran's trade has improved the mean per capita expenditure of poor peoples. In other words exports are more pro-poor factor in Iran than import.

As the results indicate, imports have negative impact on mean per capita expenditure of all groups. Moreover imports reduce mean per capita expenditure of the second decile of expenditure more than other groups. On the other hand we can see that the negative impact of imports in the long-run for the second decile is two times more than the eighth decile. Another important point is: the impact of imports is considerable on the number of people below poverty line and the depth of poverty in Iran. In fact by one percent increase in the imports headcount index increases more than 1.7 percent and poverty gap increases about 3 percent in the long-run. These results are consistent with Harrison (2007) and our hypothesis. In general it seems that imports share of GDP not only worsen the mean per capita expenditure of poor people but also it is not good even for mean per capita expenditure of wealthy people in the long-run.

Adjustment Rates and Short-Run Relationships

The second part of VECM output represents adjustment rates and short-run impact of the independent variables on the dependent variables. Table 5-5, shows these parameters for those models that do not suffer badly from autocorrelation.

The short-run result

The results for the impact of the mean per capita expenditure of each decile in the short-run show that only the poorest decile of the models is affected by its mean per capita expenditure

in the short-run. The same impacts exist for the poverty measures on themselves in the short-run.

Non-oil real GDP does not have significant impact on the mean per capita expenditure of poorest deciles and poverty in the short-run. But it affects the mean per capita expenditure of the wealthiest deciles at 10% level negatively. It means that the mean per capita expenditure of these deciles are more sensitive to growth at the short-run, while the mean per capita expenditure of poorest one are more sensitive to growth in long-run in comparison with wealthier groups.

Although the impact of the exports on the mean per capita expenditure of the poorest deciles of the models in the short-run is significant, its magnitude is not considerable. Moreover its impact on the number of poor people is not significant, while it reduces the depth of poverty in 10% level. It means that exports are not only good for poor people in the short-run but also it is an appropriate way for reduction of the depth of poverty in the long-run.

Another interesting result is that imports can only reduce the number of people who live below the poverty line in the short-run, while it does not affect the depth of poverty or the mean per capita expenditure of the poorest groups at this period of time.

If we consider the impacts of KHATMI as a dummy for the presence of a pro-trade government, we can see that it has significant and considerable impacts on the mean per capita expenditure of the poorest deciles. In addition its impact on both depth of poverty and head count index is substantial. These results are consistent with Harrison (2007) and our hypothesis saying the presence of good polices can be pro-poor.

Adjustment rates' results

The results of adjustment rates for different deciles of expenditures show that there is an upward trend in the pace of adjustments from the poorest deciles to wealthiest deciles. For instance for the second decile of expenditure the short-run fluctuations will be approached to the long-run amounts with pace of 17%. While for the eighth decile of expenditure this pace is more than 58%. Moreover we can see that the rates of adjustment for the measures of poverty are low as well. The important result here is that those people who are wealthier are able to return to their equilibrium conditions better than poorer ones.

Table 5-5: Adjustment Rates and short run parameters.

	$LOGD02$	$LOGD03$	$LOGD07$	$LOGD08$	$LOGHC$	$LOGPG$
Adjustment rate	-0.17348**	-0.30659**	-0.51482**	-0.588**	-0.103*	-0.108**
$\Delta LOGD0i_{t-1}$	-0.68406**	-0.34925	0.055222	0.005186	-0.19157	-0.56696**
$\Delta LOGRGDPR_{t-1}$	-0.05545	-0.37724	-0.86683*	-1.04344*	0.274726	0.250757
$\Delta LOGINF_{t-1}$	-0.00055	0.006916	0.016096	0.018936	-0.03049	-0.00541
$\Delta LOGEXPO_{t-1}$	0.0877**	0.047313	-0.00899	-0.01495	-0.05336	-0.1439*
$\Delta LOGIMPO_{t-1}$	0.0697	0.080021	0.058014	0.053054	-0.1566*	-0.13913
C	0.012504	0.024336	0.0507**	0.0626**	-0.01939	-0.0312
Exch2000	0.03123	0.010365	-0.02829	-0.0411	-0.04763	-0.08004
WAR	-0.04627	-0.0323	-0.0587	-0.05935	0.076694	0.115452
KHATAMI	0.05311**	0.04337*	0.026390	0.020772	-0.0805**	-0.116***

***, **, * are the significance level at 1%, 5%, 10% respectively

5-3-2-3. Robustness

After VECM we have to run a series of tests. These tests are as following:

1- |Test for misspecification of the number of cointegration relationships.

2- Test for misspecification of the models by taking into consideration the presence of autocorrelation (LM test).

3- Test for presence of normality.

Regarding the tests' results we only reported the results of those models that do not suffer from autocorrelation badly. So we eliminated two models whose dependent variables are logd01 and logd09. On the other hand all models satisfy the normality and stability conditions of VECM. The results of the tests are presented in appendix 2.

5-3-2-1. Aggregate measures of trade openness vs. exports and imports

Although we have run our models with exports and imports separately, but it would be helpful to see whether exports effects are larger than the imports effects. That is, whether trade in large is positive or not. To answer this question we have estimated a series of models that are the same with the main models of our study except we have included the aggregate measure of trade instead of exports and imports in the independents variables.

Since we are interested in the impact of aggregate measure of trade on poverty we have only reported the long-run coefficients of aggregate trade for different dependent variables on one hand and on the other hand we have not indicated the short-run results. These results and the robustness tests of their models are presented in the table 5-6. The readers can find the results of unit root test and cointegration in appendix 2 as well.

Table 5-6: The long-run relationships with the aggregate measure of trade.

Dependent	LOGd01	LOGd02	LOGd03	LOGd07	LOGd08	LOGd09	LOGHC	LOGPG
$LOGEXPIMP_{t-1}$	3.883	-0.293*	-0.324**	-0.395***	-0.432**	-0.40***	0.584*	0.685*
Autocorrelation problem at the 1st lag	No	No	No	No	No	No	No	No
Autocorrelation problem at the 2nd lag	Yes	No	No	No	No	No	No	No
Normality problem	No	No	No	No	No	No	No	No
Stability	3	3	3	3	3	3	3	3

***, **, * are the significance level at 1%, 5%, 10% respectively

Although trade does not have significant impact on the mean per capita expenditure of the first decile of the expenditure, the results show that trade decreases the mean per capita expenditure of other deciles of expenditure negatively in Iran. Therefore we can say that trade generally is bad for all groups, but the point is the negative impact becomes higher for the wealthier deciles. These results may be interpreted as the higher and positive impact of exports on the expenditure of poor people. Because we know that the positive impact of exports on the poorer deciles are more in comparing with the wealthier deciles. In addition we could see that the negative impact of imports also is higher on the poorer groups than wealthier groups. So it means that the impact of exports on mean per capita expenditure of the poorer deciles is higher than import in comparison with wealthier deciles in the long-run. Since the exports offset the negative impact of imports for the poorer groups.

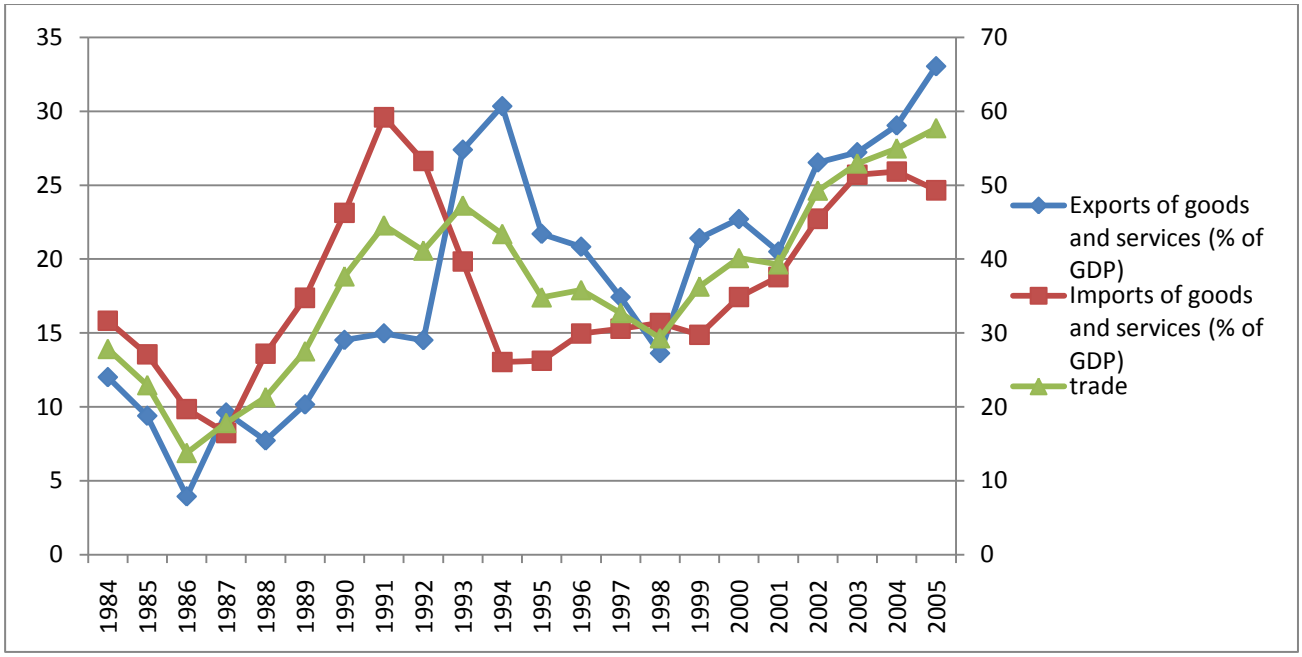
On the other hand we can see that the aggregate trade increases both headcount index and poverty gap at the long-run which is consistent with its impact on the second and the third deciles. These results confirm that the impact of exports on poverty is more than import as well, because the negative impact of imports is offset by the positive impact of exports. In other words the high and negative impact of imports is reduced as a result of exports impact. Table 5-7 indicates the impact of aggregate measure of trade, exports and imports.

Table 5-7: the comparison between the impact of aggregate trade, exports and imports on poverty and mean per capita expenditure.

Dependent	LOGd01	LOGd02	LOGd03	LOGd07	LOGd08	LOGd09	LOGHC	LOGPG
$LOGEXPIMP_{t-1}$	3.88	-0.293*	-0.324**	-0.395***	-0.432**	-0.40***	0.584*	0.685*
$LOGEXPO_{t-1}$	-	0.201***	0.105***	0.030*	0.029	-	-0.407***	-0.81***
$LOGIMPO_{t-1}$	-	-0.856***	-0.584***	-0.410***	-0.414***	-	1.719***	3.00***

In general we could conclude that these results have consistency with Stolper–Samuelson theorem and the negative impact of aggregate trade on poverty reduction could somehow be related to the higher values of imports in comparison with exports in half of the study period. Figure5-6 show these changes in trade, exports and imports share of GDP.

Figure 5-6: Changes in trade, exports and imports share of GDP during 1984-2005.



Sourc: World Bank

Conclusion

To study the linkages between trade and poverty, we have to consider the structure of poverty in each country (Hertel et al, 2003), the structure of trade, the policies that are in place (Aksoy and Beghin 2005, Anderson and Martin 2005; Bhagwati and Srinivasan 2002; Dollar and Kraay, 2004, Winters 2001) and finally the short-run and long-run influences of trade on poverty. Therefore in this thesis we studied the linkages between trade openness, mean per capita expenditure and poverty in Iran, by method and models that take into account the above points.

The results indicate that exports improve mean per capita expenditure of different deciles of expenditures and it mostly increases the mean per capita expenditure of the poorest groups. They also reduce headcount index and the depth of poverty in the long run. Moreover exports reduce the depth of poverty more than the number of poor people both in the short-run and long-run.

Imports reduce mean per capita expenditure of all deciles of expenditure and they decrease the mean per capita expenditure of the poorest group more than others in the long-run. Furthermore imports increase the depth of poverty and headcount index in the long-run considerably. Moreover imports reduce the number of people who live below the poverty line in the short run in 10% level. This reduction in the headcount index of Iran is consistent with the point, mentioned in the chapter 3, where we talked about the theories behind the long-run and the short-run impact of imports in the presence of Stolper–Samuelson theorem.

Non-oil GDP has negative impact on the expenditure of all groups but the point is that, its influences on the poorer deciles are more than wealthier deciles in the long-run, and in the short-run it only affects the wealthier groups. On the other hand inflation is bad for poorest decile and poverty, and its impact on the depth of poverty is substantial. Also it is worth saying that presence of a pro-trade government is important for reduction of poverty at least in the short-run. Furthermore the adjustment rates illustrate that, wealthier groups are capable to adjust the short-run variation more than poorer people.

In general we can say that the results of this study are consistent with theories of chapter 3, the results of NBER studies (2007) and Harrison (2007), saying exports and proper policies are good for poor and imports are mainly bad for poor people. In other words we can say that, these results are consistent with Heckscher–Ohlin model and Stolper–Samuelson theorem.

Since we can see that the increase in exports, reduces the poverty and increases the mean per capita expenditure of the poorest decile. It stems from the fact that Iran has endowment in labor so it will produce unskilled-labor intensive goods. When Iran opens up to trade according to Heckscher–Ohlin model it will export those goods that are produced by unskilled-labors, and import capital-intensive good, therefore mean per capita expenditure of the poorest deciles will increase. Moreover the positive impact of the exports on the mean per capita expenditure of the poorest deciles and poverty, suggest that, Stolper–Samuelson theorem is implicated in the relationships between trade and poverty in Iran.

On the other hand it should be mentioned that our results show that, import is generally harmful for all groups of expenditure in the long-run, which is inconsistent with the theories mentioned in chapter 3, since imports could have positive impact on the mean per capita expenditure of poor and wealthy groups and the poverty reduction in Iran. So we could say that this inconsistency might be occurred by the structure of imports in Iran. For instance if Iran imports the capital goods that could increase the efficiency of unskilled-labor, these imports cannot be harmful for them, but here we can see that imports affects the mean per capita expenditure and poverty reduction negatively. It may suggest that, Iran imports those goods that poor people are net-producer of them. In addition it is in line of Davis and Mishara (2007) model showing import of those goods that are non-rival with the products of poor increases the income of the poor. This trend in Iran's imports may stem from the fact that after Islamic revolution of 1979 Iran faced eight years war and sanction. These two important circumstances have affected Iran trade. Especially Iran could not import the capital-intensive goods normally.

Also we should mention to an important point which is: most of the studies in chapter 2 show positive impact of trade on poverty reduction. While the results of section 5-3-3, in general show that aggregate trade increases poverty in Iran. But by taking into accounts the lower impacts of the aggregate trade on the mean per capita expenditure of the poorer groups, we could say that exports offset the negative impacts of imports for the poorer groups. In other words we could say that although trade is bad for poverty generally, exports part of trade is pro-poor in Iran which is consistent with the theories in the section 3. In addition we could say that the negative impact of trade on poverty reduction and mean per capita expenditure of the poorer groups may stem from the fact that in the half of our study period, the amount of imports was more than exports.

Anyway since the focus of this study is about imports and exports flows and not their structures, in the future studies one may focus on the impact of imports and exports by taking into consideration the different types of goods, imported or exported.

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Appendix 1

Literature reviews

Study	Country	Methodology	Period	Results
Nicita (2008)	Mexico	general equilibrium macro model	1989,1992, 1994, 1996, 1998, 2 000	trade increases the mean per capita expenditure of those households that are close to border of the U.S more than others.
Cockburn, Corong and Cororaton (2008)	Philippine	computable general equilibrium micro-simulation model	1994	Using headcount index they have showed that poverty decreased marginally in Philippine. Whereas by using two other indices which were poverty gap and severity of poverty they concluded that the poorest of the poor have become even poorer
Bussolo and Nimi (2008)	Nicaragua	general equilibrium macro model	2001	DR-CAFTA agreement may reduce poverty, but this impact on Nicaragua's poverty "is not too large
Harrison (2007)	-	Qualitative	-	the relationships between poverty and globalization are complex because the impact of globalization on poverty depends on many other factors and policies that are in place. Secondly she believes that export expanding globalization and foreign direct investments have positive impacts on poverty reduction. Thirdly losers of globalization are more "among the poor" that are in "import-competing sectors". Fourth conclusion was that Hechker-Ohlin's model is not always true. And at last she concluded that inequality impact of globalization documented by cross-country studies offset the growth effect of globalization on poverty reduction. (Harrison, 2007).
Tsai and Huang (2007)	Taiwan	time-series (VECM)	1964–2003	They firstly concluded that sustained economic growth is the most important factor for poverty alleviation. Secondly openness has brought substantial economic growth, more income and better income distribution to Taiwan. Thirdly there is no significant effect of inward FDI on poverty, but outward FDI is problematic for poor in long-run and short-run.
Huang and Jun (2007)	China	partial equilibrium model	2005	The study concludes that by trade liberalization farmers generally will benefit from WTO accession at national level, but not for all provinces.
Akmal et al (2007)	Pakistan	time series (VECM)	1973-2003	the results show that trade liberalization is impressive in reducing poverty in long-run but not in short-run and FDI is effective in poverty reduction of short-run period. On the other hand public intervention has negative effects on poverty and finally GDP per capita and trade openness are not effective in short run.
Ravallion (2006)	China	time series (OLS)	1980-2000	In general he concludes that a higher amount of trade to GDP is not key factor in poverty reduction at least in an econometric framework. He has mentioned that "for all three poverty measures, there is no sign of any significant effect of current or lagged trade volume on poverty in China
Bardhan (2006)	developing countries	-	-	He concluded that not only globalization can worsen rural poor situations but also it can provide some opportunities for poor of rural areas of developing countries.
Dung and Mitsuo (2005)	Vietnam	computable	2001	Using these scenarios writers conclude

		general equilibrium mode		that Vietnam's integration agreements improve well-being and equality of this country.
Hertel et al(2004)	Indonesia	cross-section	1997	They showed that by current trade globalization, the amount of headcount poverty measures of Indonesia has been reduced slightly in short-run and it has been declined significantly in long-run.
Bird (2004)	-	Qualitative	-	The impact of trade on poverty in Bird's point of view are implemented through "changes in economic growth, changes in foreign direct investment, specialization, income and differentiation, consumption pattern, well-being, trade and market access and household and community assets
Hertel and Reimer (2004)	-	survey of literatures	-	They distinguish between four categories of studies. The first category is "partial-equilibrium and/or cost of living, the second category are some sort of "general equilibrium". The third category is "general equilibrium simulation coupled with incidence analysis" and the last category studies the effect of trade on poverty through two dimensions which are economic growth and time.
Hertel et al (2003)	14 developing countries	general equilibrium	different periods	In general they concluded that the effects of trade on poverty in short run heavily depend on the structure of poverty in each country
Winters (2002)	-	Qualitative	-	Winters does not believe in a universal conclusion about the effect of trade liberalization on poverty reduction.
Bhagwati and Srinivasan (2002)	developing countries	Qualitative	-	They believe that trade affects growth by accumulation and innovation that improve usage and productivity of resource. On the other hand in the relationship between growth and poverty they believe that elasticity of labor supply can be important for poverty, so inelastic labor supply might make growth harmful for poor.
Dollar and Krray (2001)	several countries	cross-section	different periods	They concluded that higher amount of trade volume leads to growth on one hand and poverty alleviation in poor countries on the other hand.

Appendix 2

The tables of empirical results and VECM tests

The number of lag-order in VAR and VECM

	lag	AIC	SC	HQ	Lag order of VAR	Lag order of VECM
logd01					2	1
	0	-2.549908	-1.554176	-2.355531		
	1	-7.652289	-5.411891	-7.21494		
	2	-11.22459*	-7.739530*	-10.54427*		
logd02					2	1
	0	-3.089646	-2.093914	-2.895269		
	1	-8.029139	-5.788742	-7.59179		
	2	-11.47097*	-7.985911*	-10.79065*		
logd03					2	1
	0	-3.298431	-2.302699	-3.104053		
	1	-7.948814	-5.708416	-7.511465		
	2	-10.26857*	-6.783511*	-9.588253*		
	1	-8.26908	-6.028683*	-7.831731		
	2	-9.409081*	-5.924018	-8.728760*		
logd07					2	1
	0	-3.670431	-2.674699	-3.476053		
	1	-7.960349	-5.719951	-7.523		
	2	-9.348247*	-5.863185*	-8.667927*		
logd08					2	1
	0	-3.480801	-2.485069	-3.286424		
	1	-7.68603	-5.445632	-7.248681		
	2	-9.360781*	-5.875718*	-8.680460*		
logd09					2	1
	0	-3.453238	-2.457506	-3.258861		
	1	-7.858548	-5.618151	-7.421199		
	2	-10.49442*	-7.009359*	-9.814101*		
logd10					2	1
	0	-3.076366	-2.080634	-2.881988		
	1	-7.702083	-5.461686	-7.264734		
	2	-9.848999*	-6.363937*	-9.168679*		
loghc					2	1
	0	-1.48688	-0.491147	-1.292502		
	1	-7.450589	-5.210191	-7.01324		
	2	-9.401581*	-5.916518*	-8.721260*		
logpg					2	1
	0	-0.949484	0.046249	-0.755106		
	1	-6.642505	-4.402108	-6.205156		
	2	-9.747812*	-6.262749*	-9.067491*		

Johansen's cointegration tests

Dependent variables	Number of CE(S)	Eigenvalue	Max-Eigen statistics	0.01 Critical Value	Prob At 0.01	number of cointegration equation
logd01						2
	None *	0.985106	84.13570	39.37013	0.0000	
	At most 1 *	0.872174	41.14174	32.71527	0.0005	
	At most 2	0.623982	19.56239	25.86121	0.0817	
logd02						1
	None *	0.994110	102.6888	39.37013	0.0000	
	At most 1	0.739968	26.93899	32.71527	0.0603	
	At most 2	0.604655	18.55995	25.86121	0.1103	
logd03						1
	None *	0.987195	87.15765	39.37013	0.0000	
	At most 1	0.707008	24.55222	32.71527	0.1166	
logd07						1
	None *	0.953606	61.41152	39.37013	0.0000	
	At most 1	0.783533	30.60632	32.71527	0.0198	
logd08						1
	None *	0.956137	62.53358	39.37013	0.0000	
	At most 1	0.804085	32.60150	32.71527	0.0104	
logd09						2
	None *	0.972076	71.56539	39.37013	0.0000	
	At most 1 *	0.898446	45.74330	32.71527	0.0001	
	At most 2	0.659162	21.52696	25.86121	0.0440	
loghc						1
	None *	0.984838	83.77912	39.37013	0.0000	
	At most 1	0.707129	24.56044	32.71527	0.1163	
	At most 2	0.662381	21.71673	25.86121	0.0414	
logpg						1
	None *	0.989529	91.18306	39.37013	0.0000	
	At most 1	0.745736	27.38762	32.71527	0.0529	

Long-run relationships

Dependent **independent**	LOGd02	LOGd03	LOGd07	LOGd08	LOGhc	LOGpg
$LOGRGDPR_{t-1}$	**-1.1361**	**-1.00071**	**-0.96828**	**-1.01052**	**2.360418**	**3.716921**
t value	-31.5621	-30.5272	-20.8833	-21.2602	19.3203	18.8978
Significant	***	***	***	***	***	***
$LOGINF_{t-1}$	**-0.27945**	**-0.11471**	0.036335	**0.056639**	**0.482552**	**0.900599**
t value	-19.6128	-8.76943	1.69547	2.60441	11.4269	13.3551
Significant	***	***	Non	***	***	***
$LOGEXPO_{t-1}$	**0.201530**	**0.105640**	**0.030082**	0.029190	**-0.40778**	**-0.8106**
t value	14.7319	8.55449	1.88665	1.73022	-10.1273	-12.6011
Significant	***	***	*	non	***	***
$LOGIMPO_{t-1}$	**-0.85654**	**-0.58409**	**-0.41007**	**-0.41451**	**1.719262**	**3.000452**
t value	-40.1718	-29.969	-15.1101	-15.178	24.2776	29.0184
Significant	***	***	***	***	***	***
C	7.898537	4.983999	3.075733	3.323252	-32.9457	-52.2153
Autocorrelation proplems at 1st lag	No	Yes	No	No	No	No
Autocorrelation proplems at 2nd lag	No	No	No	No	No	No

Adjustment rates and short-run relationships

	$LOGD02$	$LOGD03$	$LOGD07$	$LOGD08$	$LOGHC$	$LOGPG$
Adjustment rate	-0.17348	-0.30659	-0.51482	-0.58882	-0.10355	-0.1088
t value	-2.3275	-2.22953	-2.21168	-2.55857	-1.43889	-2.55259
Significance Level	**	**	**	**	*	**
$\Delta LOGD0i_{t-1}$	-0.68406	-0.34925	0.055222	0.005186	-0.19157	-0.56696
t value	-2.40283	-1.08432	0.19047	0.01895	-0.62325	-2.16559
Significance level	**	Non	non	non	non	**
$\Delta LOGRGDPR_{t-1}$	-0.05545	-0.37724	-0.86683	-1.04344	0.274726	0.250757
t value	-0.17775	-0.97721	-1.89914	-2.1266	0.52012	0.42793
Significance level	non	Non	*	*	non	non
$\Delta LOGINF_{t-1}$	-0.00055	0.006916	0.016096	0.018936	-0.03049	-0.00541
t value	-0.02457	0.28216	0.64471	0.71911	-0.75866	-0.11805
Significance Level	non	Non	non	non	non	non
$\Delta LOGEXPO_{t-1}$	0.087782	0.047313	-0.00899	-0.01495	-0.05336	-0.14393
t value	2.37885	1.17207	-0.23844	-0.36807	-0.83333	-2.03676
Significance Level	**	Non	non	non	non	*
$\Delta LOGIMPO_{t-1}$	0.069713	0.080021	0.058014	0.053054	-0.15663	-0.13913
t value	1.47292	1.45938	1.0022	0.87637	-1.91661	-1.51315
Significance Level	non	Non	non	non	*	non
C	0.012504	0.024336	0.050730	0.062622	-0.01939	-0.0312
t value	0.90064	1.47222	2.35496	2.58827	-0.75709	-1.06424
Significance Level	non	Non	**	**	non	non
Exch2000	0.031230	0.010365	-0.02829	-0.0411	-0.04763	-0.08004
t value	1.3541	0.39609	-0.89368	-1.14519	-1.07971	-1.54133
Significance Level	non	Non	non	non	non	non
WAR	-0.04627	-0.0323	-0.0587	-0.05935	0.076694	0.115452
t value	-0.83138	-0.53088	-0.93705	-0.89256	0.80045	1.1064
Significance Level	non	Non	non	non	non	non
KHATAMI	0.053111	0.043379	0.026390	0.020772	-0.08054	-0.11606
t value	2.74447	2.01866	1.11903	0.80701	-2.37643	-3.01086
Significance Level	**	*	non	non	**	***

VEC Tests

dependent variables	Jarque-Bera Normality Test	VEC Residual Serial Correlation LM Tests			VEC stability specification
		the ith lag	LM stat	probabilityty	
logd01	0.6670	1	NA	NA	3
		2	NA	NA	
logd02	0.54621	1	28.11942	0.3024	4
		2	11.83909	0.9878	
logd03	0.7546	1	46.35668	0.0058	4
		2	15.32599	0.9334	
logd07	0.9107	1	32.26285	0.1505	4
		2	24.38800	0.4971	
logd08	0.8999	1	29.46598	0.2449	4
		2	26.92269	0.3598	
logd09	0.96623	1	142.9952	0.0000	3
		2	NA	NA	
loghc	0.8674	1	19.21550	0.7867	4
		2	21.49027	0.6650	
logpg	0.8491	1	35.27066	0.0834	4
		2	13.11045	0.9751	

Lag order of var and VECM with aggregate measure of trade

Dependent variables	Lag order of VAR	Lag order of VECM
logd01	2	1
logd02	1	0
logd03	1	0
logd07	1	0
logd08	1	0
logd09	1	0
Loghc	1	0
Logpg	1	0
Logspg	1	0

Number of cointegration relationships in 1% level for models with the aggregate measure of trade

Dependet variables	Number of cointegration equation
logd01	1
logd02	1
logd03	1
logd07	1
logd08	1
logd09	1
Loghc	1
Logpg	1