

# Analysis of the Effect of 1980 Transformation on the Foreign Trade of Turkey with Chow Test

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**Abstract**—While import-substituting industrialization policy constitute the basis for the industrialization strategies of the 1960s and 1970s in Turkey, this policy was no longer sustainable by the 1980s. For this reason, export-oriented industrialization policy was adopted with the decisions taken on January 24, 1980. In other words, the post-1980 period, Turkey's economy has adopted outward-oriented industrialization strategy.

In this study, it is aimed to analyze the effect of the change in economic structure on foreign trade with the transformation of foreign trade and industrialization policies in the post-1980 period. In this respect, in order to analyze the relationship between import, export and economic growth by using variables of the 1960-2011 period, Chow test was applied. In the analysis the reason for using Chow test is whether there is any difference in economic terms between import-substituting industrialization policy applied in the 1960-1980 period and the 1981-2011 period during which export-oriented industrialization policy was applied as a result of the structural transformation.

**Keywords**—Chow Test, Export-Oriented Industrialization Policy, Import-Substituting Industrialization Policy, Turkey.

## I. INTRODUCTION

THE main objectives of the developing countries in their applications of economic policies are to accelerate the economic development. In this direction, one of the most important sub-policies of economic policies is foreign trade policy. Today, many countries determine their development strategies within the framework of foreign trade policy.

In the period between the foundation of the republic and 1950s, foreign trade policies mostly constituted from the self-enclosed, statist, and conservative policies. On the other hand, after 1950s, the policies toward liberalizing foreign trade and making import liberalized were applied. In this change of policy, the effect of Great Depression experienced in 1929, Second World War, and Bretton Woods System is large. In 1960s, Turkish economy enters the period of planned development and adopted import based growth strategy.

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However, oil crises experienced after 1970s, low interest rates, high custom tariffs, quota and restrictions toward import, and overvalued exchange rates caused foreign trade rates of the country to deteriorate. In this period, it was seen that import substitution based policies could not be sustained economically and the decisions of January 24, 1980 were made. In the direction of decision made, leaving the import substitutive industrialization policy, export oriented industrialization policy was taken place. In economy, a transformation was experienced from statist structure to liberal economic structure. In 1989, liberalization of financial system was realized and thus international integration of economy was completed. However, due to the fact that macroeconomic stability could not be provided in economy financial crises were emerged in 1994, 2000, 2001, and 2008.

In this study, in post-1980 period, along with the transformation in foreign trade and industrialization policies, the effect of change occurring in economic on trade was attempted to be analyzed. Firstly, as a result of policies applied from the past to present, the developments in foreign trade volume will be considered. Then, between 1960–1980, in which import substitutive industrialization policy is applied, and between 1981–2011, in which export oriented industrialization, a result of structural transformation, was applied, it will be tested whether or not there is a distinction from economic point of view by Chow test.

## II. FOREIGN POLICY OF TURKEY BEFORE 1980

In the period before 1980, Turkey followed the policies that are self-enclosed and satisfying the internal demand. In foreign trade policies applied in the early years of republic, a development model, which is based on statist and intervening principles and private enterprise was followed [1]. Especially, after 1929 world depression, intervening policies are more remarkable. In statist policies applied until Second World War, the primary aim was to give foreign trade surplus, limiting the import [2]. After Second World War, along with Breton Woods based on international economic cooperation, some changes were made in foreign trade policies in Turkey. In 1946, Turkish Lira was devalued and import was largely liberated. However, when reached to 1960s, as a result of liberal policies applied, in return to increase in import, export did not increase in the same amount and foreign trade deficits occurred [3].

TABLE I

DEVELOPMENT OF EXPORTS AND IMPORTS BETWEEN 1923-1960 (MILLION \$)

Year	Export	Import	Balance of Trade	Ratio of Exports to Imports %
1923	50 790	86 872	-36 082	58,5
1930	71 380	69 540	1 840	102,6
1935	76 232	70 635	5 597	107,9
1940	80 904	50 035	30 869	161,7
1945	168264	96 969	71 295	173,5
1950	263 424	285 664	- 22 240	92,2
1955	313 346	497 637	- 184 291	63,0
1960	320 731	468 186	- 147 455	68,5

Resource: TUIK

While in 1923, the export of Turkey was \$50,790 million, import was \$86,872 million. As a result of that the government followed protective policies in the progressing years; there is a decrease in the import. As also seen from the table, between 1930-1950, foreign trade surplus was given. However, beginning from 1950s, as a result of abolition of the limitations in import, the import developed more than the export and foreign deficits occurred.

Even though in the period of 1950-1960 Turkey, adopted liberal trade policies; in planned development period of 1960-1980, it applied import substitutive industrialization policy. While this strategy was implemented, some positive effects were aimed to appear like accelerating industrialization and saving foreign currency [4]. However, in contrast to what is expected, oil shocks of 1973-1974, inflation experienced in West, problem of Cyprus, and increase in defense expenditures led to foreign trade rates to get out of order, current deficit to increase, and important foreign currency bottlenecks to be experienced [5]. As a result of exchange rate policies, TL overvalued. At the end of these events, in 1978, Turkey economy entered a heavy economic crisis. Depending on congestions in import, industrial sector faced to serious production bottlenecks and fall in production resulted in abrupt and rapid increases. As a consequence of devaluations performed, because import becomes more expensive, costs rise, and high inflation are experienced, growth came to a regression [6].

TABLE II

DEVELOPMENT OF EXPORTS AND IMPORTS BETWEEN 1960-1980 (MILLION \$)

Year	Export	Import	Balance of Trade	Ratio of Exports to Imports %
1960	320 731	468 186	- 147 455	68,5
1965	463 738	571 953	- 108 215	81,1
1970	588 476	974 604	- 359 128	62,1
1975	1 401 075	4 738 558	-3 337 483	29,6
1980	2 910 122	7 909 364	-4 999 242	36,8

Resource: TUIK

In the period 1960-1980, the meeting rate of export the import gradually decreased. Especially, oil shocks experienced after 1970 negatively affected Turkey. When 1980 came, the amount of import almost covers three fold of amount of export. In this period, as a result of inflation phenomenon, whose severity gradually increases together with current deficits, the decisions of January 24<sup>th</sup> were made.

### III. STRUCTURAL CHANGE IN FOREIGN TRADE POLICY OF TURKEY AFTER 1980

The January 1980 decisions are accepted as a milestone of the structural change in Turkey economy, they also created important effects and charges on foreign trade. During these changes, implementation of flexible exchange rate; foreign exchange policy whose degree of freedom is increased; and the export, supported with the incentives and subventions such as an import regime that is liberated over time, low interest credit, and return of tax took place [7].

Along with the decisions made on January 24, leaving import substitutive industrialization strategy applied till 1980s in which import was substituted with domestic production, and domestic production was protected by high rate custom tariffs, and quotas, export oriented industrialization strategy was passed and the foundation of free market economy were laid [8]. Together with the January 24 decisions, if it is necessary to mention about the results taken in foreign trade, economy model, open to foreign competition was built; comparative advantages were reviewed; export increased; the share of industrial goods in export rose; and depending on the export demand that increases, trade deficits grew [9]. Export developed in the axis of locomotive sectors such as textile, building, and light industry [10].

With decisions of the January 24, Turkey entered a structural transformation process, but a fully achievement could not be provided and new measures were taken in 1988. However, Gulf crises experienced in 1990 and local elections in 1991 led to loosen in monetary policy; decrease of interests at the end of the year 1998 led the balance "interest-exchange rate" to break down; and economy to go into crisis [11]. In the period of 1980-1993, export increased from \$2.9 billion to \$15.3 billion. In return to this, import increased from \$7.9 billion to \$23.2 billion, and foreign trade deficits increased.

After 1994 crisis, while devaluation of Turkish Lira was increasing the export, reduced the import and thus foreign trade deficit also regressed. However, these conditions changed in the year 1995. With the increasing internal demand and that TL revalued, import began to increase again [12]. As a result of Custom Union Agreement signed in 1996, import accelerated. In 1997, during and after Asian crisis, as a result of the crisis experienced in Russia and earthquake experienced in our country in August 1999, some declines were occurred in import, export, and economic growth [13].

After 2000, one of the leading elements affecting the foreign trade was the crisis arising in November 2000 and February 2001. While these crises caused Turkish Lira to lose value and internal demand to decline, it enabled the export to increase in the rate of 12.8%. Beginning from 2003, while TL began to gain value, economy also continued to grow. In the period of 2005-2008, some increases were experienced in export and import. Depending on this, foreign trade deficits increased. However, the crisis started in the US at the end of 2007 and became global by spreading to the other countries, penetrated Turkish economy as well. In this period, the short termed capital inputs, impairments in current balance, and credit expansions were among the major risks that the

economy of country faced. Especially after crisis, the decreases in foreign trade are so high level that the pre-crisis foreign trade amount was hardly reached at the end of 2011.

TABLE III

DEVELOPMENT OF EXPORTS AND IMPORTS BETWEEN 1980-2011 (MILLION \$)

Year	Export	Import	Balance of Trade	Ratio of Exports to Imports %
1980	2 910 122	7 909 364	-4 999 242	36,8
1985	7 958 010	11 343 376	-3 385 367	70,2
1990	12 959 288	22 302 126	-9 342 838	58,1
1995	21 637 041	35 709 011	-14 071 970	60,6
2000	27 774 906	54 502 821	-26 727 914	51,0
2005	73 476 408	116 774 151	-43 297 743	62,9
2008	132 027 196	201 963 574	-69 936 378	65,4
2009	102 142 613	140 928 421	-38 785 809	72,5
2010	113 883 219	185 544 332	-71 661 113	61,4
2011	134 906 869	240 841 676	-105 934 807	56,0

Resource: TUIK

In the period of 1980–2011, there were a huge increase in the figures of export and import. Depending on this, trade deficits increasingly continued over years. However, only in the period of global crisis experienced in the world and also penetrating Turkey, there is a decrease in the figures of foreign trade. The meeting rate of export the import, as seen from the Table III, is not in sufficient level.

#### IV. LITERATURE

In this study, the effect of 1980 transformation on foreign trade was analyzed via Chow test. While some of the studies carried out in literature considered in theoretical level how the policies experienced in transformation process affected the foreign trade, some of them examined it via econometric analyses.

Demirbaş examined the export and import policies followed after 1980 and changes in foreign currency regime. As a result of economy policies applied in the post-1980 period, in the export and import of Turkey, important developments/changes were experienced. However, for Turkey to make export in the desired level and able to maintain the level of interest, it was concluded that it should take certain measures in the stage of production. That is, in the increase of export, it is necessary to search for the solution in the production stage [14].

Bayrakdar examined the change in economic structure together with the change of economic policies after 1980, and the effect of this change on the import and export channels and foreign trade rates. In this study, two separate econometric models were established. While in the first model, export was assigned as dependent variable, and import and exchange rate as independent variable, in the second model, import was assigned as dependent variable, GDP and exchange rate as independent variables. According to the results of analysis, any relationship could not be found between the variations of real exchange rate and foreign trade rates [15].

Gerniet et al, moving from annual data 1980-2006 and utilizing the methodology of Fisher, attempted to introduce the relationship between export and economic growth in Turkey. According to the prediction results of growth equation, while the significant and positive effects of export on economic

growth were met, with including the growth of import in the model, export lost its statistical significance. This situation was interpreted in the way that the export based growth processes in Turkey economies were resulted from import [16].

Hepaktan, considered the foreign trade policies of Turkey in 1980 transformation process. In order for Turkey to be able to realize the sustainable export increase, it is necessary to eliminate the dependency of export on a few markets and sectors; to produce and export the products with high value added; and to go toward the markets whose purchasing power is high. The achievement of export based industrialization strategy depends on the developments of industries producing capital and intermediate goods [17].

Değer analyzed the relationship between product diversity in export and economic growth in the period of 1980–2006. In the study, correlation coefficients, Granger causality tests, regression analyses, and Johansen co-integration test were given. According to the results of correlation analysis, the product diversity of export has important effects on economic growth. In the same way, Granger causality tests also gave similar results. However, in short period, regression analyses were also resulted in the insignificant coefficients between economic growth and export diversity. According to Johansen co-integration test, in long period, there is a significant relationship between economic growth and export diversity [18].

#### V. ECONOMETRIC METHOD

In this study, the effect of 1980 structural transformation in Turkey on foreign trade, using the annual values of period 1960-2011, was analyzed via Chow test. In the analysis, two separate periods was considered; 1960–1980 and 1981–2011. Economic data on the variables of export, import, and economic growth were drawn from the database of World Bank, titled “World Development Indicators” [19].

Chow test tests the equality of equality of regression equations on the different periods with the same variables. To be able to carry out Chow test, in a certain period of a variable in time, a structural change should be under consideration. The stages of making Chow test are as follows [20]:

**First stage:** establishment of model for the entire period

$$Y_G = \beta_{0G} + \beta_{1G}X_{1G} + \beta_{2G}X_{2G} + \dots + \beta_{kG}X_{kG} + \varepsilon_G \quad (1)$$

**Second stage:** establishment of model for the period before break

$$Y_1 = \beta_{01} + \beta_{11}X_{11} + \beta_{21}X_{21} + \dots + \beta_{k1}X_{k1} + \varepsilon_1 \quad (2)$$

**Third stage:** establishment of model for the period after break

$$Y_2 = \beta_{02} + \beta_{12}X_{12} + \beta_{22}X_{22} + \dots + \beta_{k2}X_{k2} + \varepsilon_2 \quad (3)$$

**Fourth stage:** hypothesis

Ho: regression coefficients are not different from the economic point of view.

H1: regression coefficients are different from the economic point of view.

**Fifth stage:** Calculation of F test statistic

$$F_{hes} = \frac{[\sum_{i=1}^N e_i^2 - \sum_{g=1}^G e_g^2] / k}{\sum_{g=1}^G e_g^2 / (N - Gk)} \quad (4)$$

G: Number of regression equation

$\sum_{i=1}^N e_i^2$  = residual sum of squares of all observations

$\sum_{g=1}^G e_g^2 = \sum e_1^2 + \sum e_2^2 + \dots + \sum e_G^2$  : residual sum of squares for G units regression equation

**Sixth stage:** Decision

If  $F_{hes} > F_{tab}$ , Ho hypothesis is rejected and it is reached the conclusion that regression coefficients are different economically from the period to period.

## VI. ANALYSIS RESULTS

Economic model created and the variables of this model are as follows:

$$GDP = \beta_{0G} + \beta_1 X_G + \beta_2 M_G + \varepsilon_G \quad (5)$$

GDP: Gross Domestic Product

X: Export

M: Import

Econometric tests were conducted at 5% significance level.

**First stage:** the creation of the regression equation for the period 1960-2011

TABLE IV

RESULTS OF FIRST STAGE			
Variables	Coefficient	t-Statistic	Prob.
LX	0.876352	7.037005	0.0000
LM	-0.171274	-1.461682	0.1502
C	8.766435	23.32860	0.0000
R-squared	0.979520	Sum squared resid	1.759759

$$LGDP = 8.766443 + 0.876352LX - 0.171273LM \quad (6)$$

(23.32)                      (7.03)                      (-1.46)

The values shown in parentheses are t statistics.

$\sum e_G^2 = 1.759759$

**Second stage:** the creation of the regression equation for the period Structural transformation in the pre-1980 (1960-1980)

TABLE V

RESULTS OF SECOND STAGE			
Variables	Coefficient	t-Statistic	Prob.
LX	0.201154	0.593384	0.5603
LM	-0.576895	-2.108805	0.0492
C	7.441791	4.228827	0.0005
R-squared	0.912273	Sum squared resid	0.950893

$$LGDP = 7.441790 + 0.201154LX - 0.576895LM \quad (7)$$

(4.22)                      (0.59)                      (-2.10)

The values shown in parentheses are t statistics.

$\sum e_1^2 = 0.950893$

**Third stage:** the creation of the regression equation for the period Structural transformation in the post-1980 (1981-2011)

TABLE VI

RESULTS OF THIRD STAGE			
Variables	Coefficient	t-Statistic	Prob.
LX	0.861115	5.554538	0.0000
LM	-0.055989	-0.370221	0.7140
C	6.306838	12.37825	0.0000
R-squared	0.982067	Sum squared resid	0.356532

$$LGDP = 6.306837 + 0.861115LX - 0.055988LM \quad (8)$$

(12.37)                      (5.54)                      (-0.37)

The values shown in parentheses are t statistics.

$\sum e_2^2 = 0.356532$

**Fourth stage:** hypothesis

Ho: 1980 transformation has no effect on the foreign trade.

H1: 1980 transformation has effect on the foreign trade.

**Fifth stage:** Calculation of F test statistic

$$F = \frac{(1.759759 - (0.950893 + 0.356532)) / 3}{(0.950893 + 0.356532) / 52 - 6} = \frac{0.150778}{0.028422} = 5.30 \quad (9)$$

**Sixth stage:** Decision

$F_{hes} = 5.30$   $F_t = 2.84$   $F_{hes} > F_t$

Ho hypothesis is rejected and it is reached the conclusion that regression coefficients are different and vary from the period to period. That is, the structural transformation in the year 1980 - export based economic growth - became effective on foreign trade positively or negatively.

## VII. CONCLUSION

Import substitution based industrialization strategy that foresees to produce in home the goods produced abroad forms the foundation of foreign trade policies applied before 1980. The reflection of decisions of January 24, 1980 on foreign trade policy became in the way of pass to export based growth model. In this period, liberalization of foreign trade was realized.

In this study, how structural volatility analyses of two regression equation will be able to apply was shown by an application on foreign trade on Turkey economy. As econometric method, Chow structural volatility test was selected. The reason for this, while import substitutive industrialization strategy was applied in Turkey in the period of 1960-1980 with the decisions of January 24, 1980, as a result of structural variation, export based industrialization strategy were begun to be applied. According to the results of Chow test, export based industrialization strategy became effective on foreign trade of Turkey. However, this analysis does not give any opinion to us about whether the effectiveness is positive or not. It says that only the periods of 1960-1980 and 1980-2011 generated the effects from each other on foreign trade.

When 1980-2011 foreign trade statistics, Turkey is examined, it is seen that foreign trade volume rapidly

increased. In the first years, when export based industrialization strategies was applied, depending on the increase in export, import also increased and foreign trade deficits in high levels formed. The major reason for this is dependence of export to import. In other words, as the import of intermediate goods, the foreign trade deficit also increases. As a result, if one wants to be successful in export based industrialization strategy, it is necessary to develop the industries producing capital and intermediate goods.

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