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Abstract

This paper estimates the effects on Greek trade balance due to the EU accession. The analytical and the residuals approach were implemented. A full trade model was used, since Greece relies on imported inputs for export production and a standard model of trade may not be appropriate for the country. After the accession, the country had to liberalize its trade by abolishing all barriers, such as tariffs, quotas, financial stringencies, indirect taxes on imports and export subsidies. The gradual abolition of trade protection and promotion, which took place during the 1981 - 1992 period, had a substantial negative effect on Greece's trade balance and led to a large increase of its deficit. This effect also implies trade creation and thus, improvement in terms of static welfare and resource allocation. The above impact is mainly based on the large increase of imports, as the accession's negative effects on Greek exports were quite small.

JEL Classification: C30, F13, F15
Keywords: EU accession, trade barriers, analytical/residuals approach, trade balance, trade creation.

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1. Introduction

Greece entered the EU as a full member in 1981. Even though tariff protection had been gradually reduced[1] as the country was an associate member of the EU since 1963, protection by other means, such as quotas, financial stringencies and indirect taxes on imports, was very large. The gradual abolition of the above measures harmed the country's trade balance considerably. On the other hand, Greece had to abolish export subsidies that were used as a mean of export promotion, especially in the sector of manufactures. Note also that since 1968, all barriers that were imposed by the six EC members on imports from Greece were totally abolished. The above developments partly explain the troubles that the Greek economy faced, over the first 15 years of accession during which import protection and export promotion were gradually faced out, despite the large amount of net resources the country received from the European budget over this period.

A number of studies have considered the implications of accession on Greek trade, using the analytical or the residuals approach (see for example Arghyrou, 2000, Georgakopoulos, 1993, Plummer, 1990, Giannitsis, 1988, Mitsos 1983, Tsoukalis, 1979). These studies have however used either elasticity estimates coming out of single equation import demand and export supply models or ex-post indices (growth rates, income elasticities, shares in apparent consumption etc). The former approach treats imports and exports as being independent of each other. For developing countries that face foreign exchange constraints, such as Greece at that period of time and rely on imported inputs for export production, these single equation trade models are not appropriate. The latter approach can provide only crude estimates of the accession effects.

[1] By 1981, imports of manufactures not produced domestically were totally liberated, while tariffs on imports of products produced domestically had fallen by 60%.

The present study estimates the effects of accession on Greek trade flows, using a full trade model that is based on previous works by Khan and Knight (1988), Tansel and Togan (1987) and Goldstein and Khan (1985). This model is more suitable for countries that base their export production on imported inputs. Import compression, as a result of trade barriers or currency depreciation for the purpose of servicing external debt, affects the export performance of such countries negatively. A dynamic specification of the model was used. Further in this paper the analytical and the residuals approaches have been implemented in order to estimate the accession effects.

By using the analytical approach, which can be implemented either ex-ante or ex-post, it is found that the overall substitution effect on the Greek trade balance due to the EU accession was an increase of its deficit by 10.1% in terms of the 1980 GDP. The estimation of income effects is quite difficult because we have to estimate not only the direct effects on income but also the induced effects due to the accession. Note also that the effects that come out of the use of the analytical approach refer to the GDP level of the last year before the accession. By using the residuals approach, which can be implemented only ex-post, it is found that if Greece had not entered the EU, the country's trade deficit in 1999 would have been at about 53% lower than the actual one. The overall impact of the EU accession amounts to 17.2% in terms of the Greek GDP, in constant prices. This estimation includes both income and substitution effects of the accession. Thus, we can argue that the results that come out using the residuals approach are much closer to the real effects on Greek trade due to the EU membership.

The rest of the paper is as follows. In Section 2 the model is outlined. Data description and the empirical results are presented in Section 3. The effects on Greek trade flows due to the EU accession by using of the analytical and the residuals approach are presented in Section 4. Finally, some concluding remarks are drawn.

2. The model

In the present study an imperfect substitution model is used. The basic assumption is that neither imported nor exported goods are perfect substitutes with the domestic ones. The structure of the model, which is expressed in a log-linear form, is the following:

$$\ln X_t^s = \alpha_0 + \alpha_1 \ln\left(PX/P\right)_t + \alpha_2 \ln Y_t^* + \alpha_3 \ln S_t + \alpha_4 \ln M_t \quad (1)$$

$$\ln X_t^d = \beta_0 + \beta_1 \ln\left(PX/PXW\right)_t + \beta_2 \ln YW_t \quad (2)$$

$$\ln M_t^d = \gamma_0 + \gamma_1 \ln\left[PM(1+T)/P\right]_t + \gamma_2 \ln Y_t + \gamma_3 \ln\left(R/PM\right)_t + \gamma_4 L_1 + \gamma_5 L_2 \quad (3)$$

$$TB_t = \left(PX \cdot X\right)_t - \left(PM \cdot M\right)_t \quad (4)$$

$$B_t = \Delta R_t = TB_t + DK_t \quad (5)$$

Equation (1) is the export supply function, where X^s is the volume of Greek exports supplied, PX is the price of Greek exports, P is the Greek consumer price index, Y* is a trend of the Greek productive capacity and S represents export subsidies[2]. In equation (1) the volume of imported inputs also determines export supply. To make the model empirically more tractable, it is assumed – due to data limitations – that the price elasticity of the demand for imported inputs is the same as that for total import volume (M). This is a quite plausible assumption, as the share of intermediate and capital goods in total imports has remained rather stable in the period covered, averaging at about 75%.

Equation (2) is the export demand function, where X^d is the volume of Greek exports demanded, PXW is the price of world exports and YW represents real world output.

[2] Note that export subsidies are a separate variable in the model and not embodied in export prices. The reason is that it is also examined if the effects on export volume due to subsidies´ changes are similar with the ones that come out due to changes on export prices.

Equation (3) is the import demand function. M^d is the volume of Greek imports, PM is the price of imports, T is the tariff rate, P is the Greek consumer price index, Y represents real Greek GDP and R is the nominal value of official reserves. The variable (R/PM) stands for the stock of real international reserves and is a measure of reserve stringency. Equation (3) includes two index variables. L_1 captures the gradual abolition of quotas and other measures that had equivalent effects with tariffs. These trade barriers were totally faced out by 1984. L_2 captures the gradual abolition of the regulatory levy[3] that took place in the 1984-1989 period. The initial value of these variables is unity and they gradually reduced until they become zero. It is also assumed that world supply of imports is infinitely elastic, so that an equation does not need to be specified[4].

The model is closing with two identities. Equation (4) is the trade balance, while equation (5) stands for the balance of payments, which is equal to the change in international reserves. DK includes all financial inflows. All variables are expressed in U.S. dollars. Note also that talking about trade flows, it is expected that the estimation of a static form will face some problems, as these variables need some time to adjust to their long-run levels. Therefore, a dynamic form has been developed.

In the case of export supply, it is assumed that the volume of exports adjusts to the equilibrium level according to a partial adjustment process. Therefore, we have:

$$\Delta \ln X_t = \lambda_1 \left(\ln X_t^s - \ln X_{t-1} \right) \Rightarrow$$

$$\ln X_t = \lambda_1 \alpha_0 + \lambda_1 \alpha_1 \ln \left(\frac{PX}{P} \right)_t + \lambda_1 \alpha_2 \ln Y_t^* + \lambda_1 \alpha_3 \ln S_t + \lambda_1 \alpha_4 \ln M_t + (1 - \lambda_1) \ln X_{t-1} \Rightarrow$$

[3] Protection was provided via both fictitious increases in the taxable base of imports and nominal rate differentiations. In 1984, this protection was embodied in a special levy, called the regulatory levy, which was gradually faced out between 1984 and 1989.

[4] See also Khan and Knight (1988).

$$\ln X_t = g_0 + g_1 \ln\left(\frac{PX}{P}\right)_t + g_2 \ln Y_t^* + g_3 \ln S_t + g_4 \ln M_t + g_5 \ln X_{t-1} \quad (6)$$

λ_1 stands for the coefficient of adjustment and lies between zero and one. This means that $0<g_5<1$. According to economic theory, we expect that $\alpha_1>0$, $\alpha_2>0$, $\alpha_3>0$ and $\alpha_4>0$ and consequently, that $g_1>0$, $g_2>0$, $g_3>0$ and $g_4>0$.

Since the volume of exports is specified as adjusting to excess supply, the price of exports adjusts to conditions of excess demand. By using the likelihood ratio test it is found that there are two time lags in the adjustment. Therefore, this function is a polynomial of first degree. (Almon, 1965). The adjustment process is the following:

$$X_t^d - X_t = f\left(PX_t, PX_{t-1}, PX_{t-2}\right) \Rightarrow \ln X_t^d - \ln X_t = b_0 \ln PX_t + b_1 \ln PX_{t-1} + b_2 \ln PX_{t-2}$$

Homogeneity condition requires that

$$\sum_{i=0}^{2} b_i = 0 \quad (7)$$

The polynomial is the following: $b_m = k(m) = q_0 + q_1 m$

Consequently:

$$\begin{aligned} &m = 0 \Rightarrow b_0 = k(0) = q_0 \\ &m = 1 \Rightarrow b_1 = k(1) = q_0 + q_1 \\ &m = 2 \Rightarrow b_2 = k(2) = q_0 + 2q_1 \Rightarrow k(2) = -2q_0 - q_1 \end{aligned}$$

Therefore, we have:

$$\begin{aligned} \beta_0 + \beta_1 \ln\left(\frac{PX}{PXW}\right)_t + \beta_2 \ln YW_t = q_0 \ln PX_t + (q_0 + q_1)\ln PX_{t-1} + \\ + (-2q_0 - q_1)\ln PX_{t-2} + \ln X_t \Rightarrow \end{aligned}$$

$$\ln PX_t = \left(-\frac{\beta_0}{\beta_1 - q_0}\right) + \left(\frac{1}{\beta_1 - q_0}\right)\ln X_t + \left(-\frac{\beta_2}{\beta_1 - q_0}\right)\ln YW_t + \left(\frac{\beta_1}{\beta_1 - q_0}\right)\ln PXW_t +$$
$$+\left(\frac{q_0 + q_1}{\beta_1 - q_0}\right)\ln PX_{t-1} + \left(\frac{-2q_0 - q_1}{\beta_1 - q_0}\right)\ln PX_{t-2} \Rightarrow$$

$$\ln PX_t = d_0 + d_1 \ln X_t + d_2 \ln YW_t + d_3 \ln PXW_t + d_4 \ln PX_{t-1} + d_5 \ln PX_{t-2} \qquad (8)$$

According to economic theory, we expect that $\beta_1>0$ and $\beta_2<0$. Consequently, we expect that $d_1<0$, $d_2>0$, $d_3>0$ and $d_4>0$, while the sign of the parameter d_5 depends on the size of the parameters d_3 and d_4, due to the homogeneity constraint that requires $d_3+d_4+d_5=1$.

The partial adjustment process has also been followed for import demand. We assume that the adjustment to the equilibrium level is related with the volume of imports demanded. Therefore, we have:

$$\Delta \ln M_t = \lambda_2\left(\ln M_t^d - \ln M_{t-1}\right) \Rightarrow$$
$$\ln M_t = \lambda_2\gamma_0 + \lambda_2\gamma_1 \ln\left[\frac{PM(1+T)}{P}\right]_t + \lambda_2\gamma_2 \ln Y_t + \lambda_2\gamma_3 \ln\left(\frac{R}{PM}\right)_t + \lambda_2\gamma_4 L_1 + \lambda_2\gamma_5 L_2 +$$
$$+\left(1-\lambda_2\right)\ln M_{t-1} \Rightarrow$$

$$\ln M_t = h_0 + h_1 \ln\left[\frac{PM(1+T)}{P}\right]_t + h_2 \ln Y_t + h_3 \ln\left(\frac{R}{PM}\right)_t + h_4 L_1 + h_5 L_2 + h_6 \ln M_{t-1} \qquad (9)$$

λ_2 is the coefficient of adjustment and also lies between zero and unity. Consequently $0<h_6<1$. According to economic theory, we expect that $\gamma_1<0$, $\gamma_2>0$, $\gamma_3>0$, $\gamma_4<0$ and $\gamma_5<0$. This means that $h_1<0$, $h_2>0$, $h_3>0$, $h_4<0$ and $h_5<0$.

3. Data and empirical results

Most of the data for the present study were obtained from the CD-ROM of the International Financial Statistics (IFS) of the International Monetary Fund (IMF), 2003.

Other sources needed to complete the data set will be indicated below. Due to lack of quarterly data especially in the case of tariffs and subsidies, annual data were used. The time span is 1962 to 1999. All variables are expressed in US dollars. Price of world exports and real world output were obtained from the world tables in the IFS. Unit value indices of Greek imports and exports were taken from lines 75 and 74 of the IFS, respectively. For the years 1998-1999 the time series were completed from the publication of External Trade Statistics of the National Statistical Service of Greece. Volumes of Greek imports and exports were constructed by deflating the values of Greek imports and exports (lines 71d and 70d in the IFS, respectively) with the respective unit values. The real Greek GDP was obtained from the line 99bp of the IFS, the nominal value of official reserves was taken from the line 1ld of the IFS and the consumer price index for Greece was obtained from the line 64 of the IFS.

The tariff rates for Greek imports were taken from the publication of Public Finance Statistics of the National Statistical Service of Greece and the export subsidies were obtained from unpublished data of the Central Bank of Greece. In order to construct the trend of the Greek productive capacity, the following formula has been used: $Y_t^* = Y_0 e^{gt}$, where Y_0 is the initial value of domestic production's volume and g the average growth rate for the 1962-1999 period. The structure of the two index variables is presented analytically in Table 1. The country's trade balance is the difference between the values of Greek exports and Greek imports. The balance of payments is the sum of the country's trade balance and the financial inflows, where financial inflows have been calculated as the difference between the change in official reserves and the trade balance.

The equations of the model are overidentified. Therefore, they were estimated simultaneously by using 3SLS. The exogenous variables of the model are used as instruments. Empirical results for the structural and the reduced-form parameters are

presented in Tables 2 and 3, respectively. The signs of the structural parameters are consistent with economic theory and most of them are statistically significant. The Durbin – Watson statistic and h-statistic, which is used in partial adjustment models, indicate no presence of serial correlation. The multiple coefficients of determination are above 98%. The coefficient of quotas is statistically significant at a 1% level, while the coefficient of export subsidies is statistically significant at a 5% level. As shown in Table 2, the effect on export volume due to export subsidies´ changes is different than the effect that comes out due to changes on export prices. On the contrary, the coefficient of the regulatory levy is not significant even at a 10% level. The above results indicate that the abolition of quotas and other non-tariff measures led to an increase of Greek imports, while the abolition of export subsidies led to a negative effect on the country's export performance. The coefficient of productive capacity is statistically significant at a 10% level. Note also that according to Table 3, the signs of the reduced-form parameters are consistent with economic theory.

From the structural parameters of the model we can determine the long run behavior of the Greek trade, by estimating the long run trade functions. Thus, we have:

$$\ln X_t^s = -9.40 + 0.46 \ln\left(\frac{PX}{P}\right)_t + 0.79 \ln Y_t^* + 0.07 \ln S_t + 1.03 M_t \qquad (10)$$
$$\lambda_1 = 0.61$$

$$\ln X_t^d = -30.75 - 4.33 \ln\left(\frac{PX}{PXW}\right)_t + 8.79 \ln YW_t \qquad (11)$$
$$q_0 = 21.28,\ q_1 = -52.33$$

$$\ln M_t^d = 1.16 - 0.34 \ln \left[\frac{PM(1+T)}{P} \right]_t + 0.76 \ln Y_t + 0.17 \ln \left(\frac{R}{PM} \right)_t - 0.52 L_1 - 0.18 L_2 \qquad (12)$$
$$\lambda_2 = 0.66$$

The Greek export supply is price inelastic in the long run. As can be seen in equation (10), the volume of exports supplied is mainly affected in a positive way by changes in the ratio of domestic export prices over world export prices, the productive capacity of the Greek economy and the imported inputs. There is also a small positive response on Greek export supply due to changes in export subsidies. The coefficient of adjustment indicates that 61% of the change of export volume towards its equilibrium level, is taking place in one year. The mean adjustment period of Greek export supply to a relative price change, equals 1.6 years.

On the other hand, the Greek export demand is price elastic in the long run. This implies a large response on export demand due to changes in relative prices. It is an expected result for Greece, since the country is a small open economy and has no market power in world trade. Thus, it is inevitable for the Greek export demand to be quite sensitive in relative price changes. A significant positive effect of world income is also observed.

The Greek import demand is price inelastic in the long run. The main reason for this result is that inputs not produced domestically, constitute a large part of Greek imports. Imports of the public sector also contribute to the low sensitivity of import demand to relative price changes. Import demand is also affected in a positive way by domestic income and reserve stringency. There are also substantial negative effects on Greek imports due to changes in trade barriers and especially in the case of quotas and other measures that have equivalent effects with tariffs. The coefficient of adjustment indicates that 66% of the change of import volume towards its equilibrium level, is taking place in

one year. The mean adjustment period of the Greek import demand to a relative price change equals 1.5 years.

4. The effects of the EU accession on Greek trade

4.1. The analytical approach

The basic assumption in this section is that if Greece had not entered the EU in 1981, the protection would have remained unchanged at the 1980 level. The structural parameter estimates of the model have been used in this approach. We also concern on the time schedule of gradual abolition of trade barriers after the accession. Multiplying estimated coefficients with the changes of the respective measures, we find the percentage changes in trade flows. The percentages are multiplied with the volume of the respective trade flow (imports or exports) of the last year before the accession. We estimate only substitution effects, as the estimation of income effects due to the EU accession, is quite difficult. The reason is that we have to estimate not only the direct effects on income due to the accession, but also the induced effects.

The cumulative effects on Greek trade due to the EU accession are presented in Table 4 as percentages of the 1980 trade deficit and the 1980 GDP. They are also presented in Figure 1. As can be seen, the overall effect on the Greek trade balance due to the EU accession was an increase of its deficit by 10.1% of the 1980 GDP and 93.5% of the 1980 trade deficit. Imports from all sources substituted for domestic production, a result that implies trade creation and thus, improvement in terms of static welfare. On the other hand, this result indicates deterioration of the country's trade balance.

More analytically, the effects on imports due to the abolition of all protective measures are presented in the first three columns of Table 5, as percentages of the 1980

GDP. Columns four and five show annually and cumulative effects on import volume, respectively. Note also the significant effect on imports due to the abolition of quotas and other non-tariff measures in the first year of the EU membership. On the other hand, the annual and cumulative effects on export volume due to the abolition of export subsidies are presented in the sixth and seventh column of Table 5 respectively, as percentages of the 1980 GDP. The overall cumulative effects on the Greek trade balance due to the EU accession are presented in the last column of this table.

4.2. The residuals approach

This approach estimates the effects of an economic union as the residual between an actual and an estimated variable. The estimated variable represents anti-monde (i.e. what would happen to the variable if the country had not entered the economic union). In the case of Greece, anti-monde begins in 1981 with the assumption that if Greece had not entered the EU in 1981, the protection would have remained at the 1980 level. The actual Greek trade balance represents the actual variable and the Greek trade balance under the above assumption is the estimated variable. Therefore, the difference between the two variables (i.e. the residual) is the effect of the accession. Both income and substitution effects are estimated using this approach, which means that the results that come out are much closer to the actual effects on the Greek trade balance due to the EU accession.

The overall effects on Greek trade balance are presented in Table 6 as percentages of GDP, and in Figure 2. As can be seen, if Greece had not entered the EU, the country's trade deficit in 1999 would have been about 53% lower than the actual one. This effect amounts to 17.2% of the Greek GDP, in constant prices. The abolition of quotas, non-tariff measures and the regulatory levy contributed the most on that result. On the contrary, the abolition of export subsidies had quite small effects on the country's trade balance.

A basic issue that arises from the above analysis is that the variables are not stationary in level but in first difference. Based on cointegration theory, this problem can be faced if the estimated residuals are I(0). This means that the difference between dependent and independent variables is I(0) and thus, the parameter estimates are not spurious. We test for the existence of a unit root by performing the augmented Dickey-Fuller test, without trend and intercept. In order to select the appropriate lag length, the Akaike's information criterion has been used. The t-statistic for the coefficient γ is –3.92 for the export supply function, –4.67 for the export demand function and –4.47 for the import demand function. The critical value of the Dickey-Fuller test at a 1% significance level, is –2.63. Therefore the null hypothesis for the existence of a unit root is rejected, which means that the estimated residuals are I(0).

5. Conclusions

The purpose of this paper is to analyze the Greek trade functions and to estimate the effects on the country's trade balance due to the EU accession. As a small open economy, the country faces a price elastic export demand in the long run. On the contrary, export supply is price inelastic and is mainly determined by changes in the productive capacity of the Greek economy and imported inputs. Import demand is also price inelastic in the long run. The reason is that the country is not autarchic and imports inputs that are necessary for production. Likewise, a lot of imports are used by the public sector. Thus, import demand has low sensitivity to relative price changes.

The gradual abolition of all protective and promoted measures on trade after the EU accession increased the trade deficit. These results come out either by the analytical or by the residuals approach. The overall income and substitution effects on the Greek trade balance, was an increase of its deficit by twice. This impact amounts to 17.2% of the Greek

GDP. After the EU accession, imports substituted for a large part of the country's domestic production, an effect that implies trade creation and improvement in terms of static welfare. On export side, the effects due to the abolition of export subsidies were quite small. But the above trade effects increased the deficit of the balance of payments and harmed the Greek economy, despite the large amount of net resources the country received from the European budget over the first 15 years of the accession.

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Table 1
Index variables L_1 and L_2

Year	L_1	Year	L_2
1962	1	1962-1983	1
1963-1964	0.98	1984	0.90
1965-1967	0.96	1985	0.80
1968-1969	0.94	1986	0.65
1970	0.92	1987	0.45
1971-1972	0.90	1988	0.25
1973-1975	0.86	1989-1999	0
1976	0.82		
1977	0.80		
1978	0.77		
1979	0.74		
1980	0.72		
1981	0.11		
1982	0.09		
1983	0.04		
1984-1999	0		

Table 2
Structural parameters

Explanatory variables	Export supply ($\ln X_t$)	Export demand ($\ln PX_t$)	Import demand ($\ln M_t$)
$\ln(PX/P)_t$	0.2819 (2.16)**		
$\ln Y_t$*	0.4891 (1.83)*		
$\ln S_t$	0.0435 (2.28)**		
$\ln M_t$	0.6368 (4.22)***		
$\ln X_{t-1}$	0.3850 (3.61)**		
$\ln X_t$		-0.0391 (-0.33)	
$\ln PXW_t$		0.1690 (3.76)***	
$\ln YW_t$		0.3435 (1.15)	
$\ln PX_{t-1}$		1.2130 (9.00)***	
$\ln PX_{t-2}$		-0.3820 (-2.98)***	
$\ln[PM(1+T)/P]_t$			-0.2224 (-1.45)
$\ln Y_t$			0.5004 (2.32)**
$\ln(R/PM)_t$			0.1104 (2.17)**
L_1			-0.3449 (-2.81)***
L_2			-0.1193 (-1.54)
$\ln M_{t-1}$			0.3426 (2.55)**
Intercept	-5.7780 (-3.35)**	-1.2008 (-2.67)***	0.7626 (0.55)
R^2	0.990	0.997	0.984
Adjusted R^2	0.988	0.996	0.980
Durbin – Watson	2.36	1.78	1.96
h-statistic (Durbin)	-1.40	-	0.19

t-statistics are shown in parentheses, *** denotes statistical significance at a 1% level, ** denotes statistical significance at a 5% level, * denotes statistical significance at a 10% level.

Table 3
Reduced-form parameters

Exogenous variables	Endogenous variables				
	$\ln X_t$ (Export supply)	$\ln PX_t$ (Export demand)	$\ln M_t$ (Import demand)	$\ln TB_t$	$\ln R_t$
$\ln P_t$	-0.1625	0.0063	0.1848	-0.3409	-0.3409
$\ln Y^*$	0.5147	-0.0201	0.0492	0.4454	0.4454
$\ln S_t$	0.0458	-0.0018	0.0044	0.0396	0.0396
$\ln X_{t-1}$	0.4052	-0.0158	0.0387	0.3507	0.3507
$\ln YW_t$	0.1248	0.3385	0.0461	0.4172	0.4172
$\ln PXW_t$	0.0614	0.1666	0.0227	0.2054	0.2054
$\ln PX_{t-1}$	0.4408	1.1958	0.1627	1.4738	1.4738
$\ln PX_{t-2}$	-0.1388	-0.3766	-0.0513	-0.4641	-0.4641
$\ln Y_t$	0.3021	-0.0118	0.4795	-0.1893	-0.1893
$\ln PM_t$	-0.2676	0.0105	-0.4248	-0.8323	-0.8323
$\ln T_t$	-0.1343	0.0052	-0.2131	0.0841	0.0841
L_1	-0.2082	0.0081	-0.3305	0.1305	0.1305
L_2	-0.0720	0.0028	-0.1143	0.0451	0.0451
$\ln M_{t-1}$	0.2068	-0.0081	0.3283	-0.1296	-0.1296
$\ln DK_t$	0.0666	-0.0026	0.1058	-0.0418	0.9582
$\ln R_{t-1}$	0.0666	-0.0026	0.1058	-0.0418	0.9582
1	-6.0592	-0.9642	-0.0116	-7.0118	-7.0118

Table 4
Cumulative effects on Greek trade balance due to the EU accession

Year	% of the 1980 trade deficit	% of the 1980 GDP
1981	48.60	5.27
1982	50.47	5.47
1983	55.26	5.99
1984	61.76	6.70
1985	65.26	7.08
1986	70.13	7.61
1987	78.40	8.51
1988	84.67	9.18
1989	92.29	10.01
1990	93.08	10.10
1991	93.31	10.12
1992	93.53	10.14

Table 5
Effects on Greek trade flows due to the EU accession (% of the 1980 GDP)

Year	Imports					Exports		Total cumulative effects on trade balance
	Annual effects				Cumulative effects	Annual effects	Cumulative effects	
	Tariffs	Quotas and other non-tariff measures	Regulatory levy	Total		Export subsidies		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)=(7)-(5)
1981	0.04	5.23	-	5.27	5.27	-	-	-5.27
1982	0.04	0.16	-	0.20	5.47	-	-	-5.47
1983	0.08	0.44	-	0.52	5.99	-	-	-5.99
1984	0.08	0.33	0.30	0.70	6.70	-	-	-6.70
1985	0.08	-	0.30	0.38	7.08	-	-	-7.08
1986	0.08	-	0.44	0.53	7.61	-	-	-7.61
1987	-	-	0.59	0.59	8.20	-0.31	-0.31	-8.50
1988	-	-	0.59	0.59	8.79	-0.09	-0.39	-9.18
1989	-	-	0.74	0.74	9.53	-0.09	-0.48	-10.01
1990	-	-	-	-	9.53	-0.09	-0.56	-10.10
1991	-	-	-	-	9.53	-0.02	-0.59	-10.12
1992	-	-	-	-	9.53	-0.02	-0.61	-10.14

Table 6
Cumulative effects on Greek trade balance due to the EU accession (as percentages of GDP)

Year	Actual imports	Estimated imports	Actual exports	Estimated exports	Actual trade balance	Estimated trade balance	*Residual*
	(1)	(2)	(3)	(4)	(5)=(3)-(1)	(6)=(4)-(2)	(7)=(5)-(6)
1981	24.85	23.46	11.80	13.03	-13.05	-10.43	-2.61
1982	27.41	22.28	11.79	13.19	-15.62	-9.10	-6.53
1983	29.88	22.99	13.40	14.17	-16.47	-8.82	-7.66
1984	29.23	22.73	15.83	14.72	-13.39	-8.01	-5.39
1985	32.17	21.99	15.33	16.79	-16.85	-5.20	-11.65
1986	32.10	24.37	17.63	16.33	-14.47	-8.04	-6.43
1987	39.31	27.24	20.01	19.67	-19.29	-7.57	-11.73
1988	28.22	28.32	12.88	17.04	-15.34	-11.28	-4.06
1989	36.75	24.68	17.12	17.47	-19.63	-7.21	-12.42
1990	41.56	27.91	16.31	21.20	-25.25	-6.71	-18.54
1991	45.28	30.28	18.07	21.49	-27.21	-8.79	-18.42
1992	51.99	32.09	23.03	23.97	-28.95	-8.12	-20.83
1993	57.52	36.66	22.62	27.86	-34.90	-8.79	-26.11
1994	59.74	41.33	23.21	28.66	-36.53	-12.67	-23.86
1995	63.58	42.34	25.11	29.97	-38.46	-12.37	-26.09
1996	67.70	43.84	26.20	32.46	-41.50	-11.39	-30.11
1997	66.34	42.39	28.10	32.15	-38.24	-10.24	-28.00
1998	57.98	44.25	24.03	29.89	-33.95	-14.37	-19.59
1999	55.04	42.50	22.79	27.47	-32.25	-15.03	-17.21

Figure 1
Cumulative effects on Greek trade due to the EU accession
The analytical approach (1982 prices)

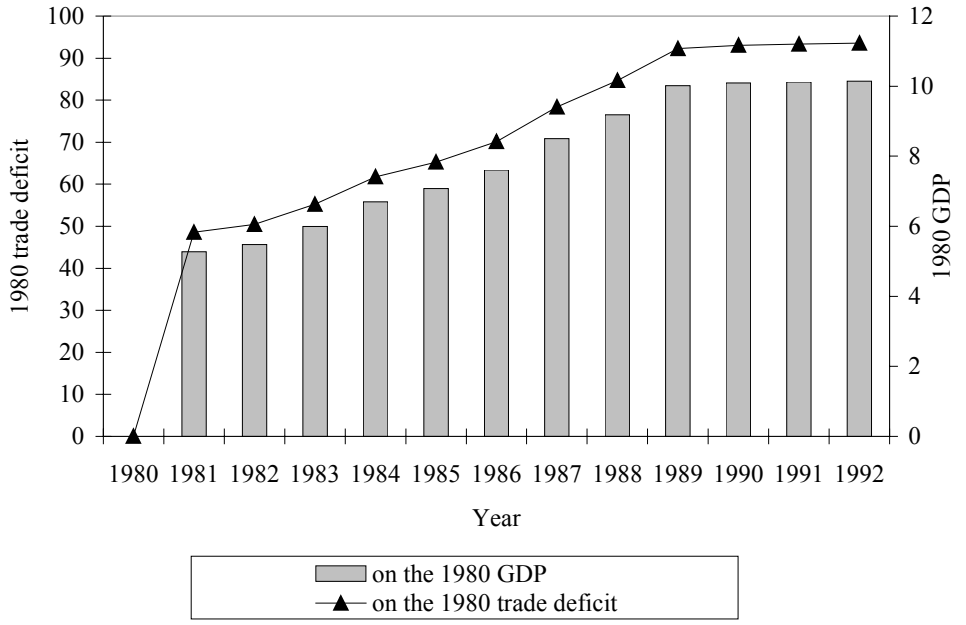

Figure 2
Cumulative effects on Greek trade balance due to the EU accession
The residuals approach (% of GDP in 1982 prices)