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Competitiveness and the External Trade of Greece in the 1990s:
A Cross-Sectoral Investigation

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Abstract

The paper examines Greek external trade following accession to the EU, placing emphasis on the 1990s. Using original disaggregated data we find: (i) Mutually offsetting, stable trade creation/trade diversion in imports from EU and third countries respectively. (ii) No EU effect on exports. These experienced a negative structural shift in the 1990s. (iii) Competitiveness losses, more pronounced in the 1990s, especially in sectors where Greece holds a comparative advantage (i.e. trade surplus). The widening of Greek trade deficit is mainly due to stagnating exports, which we attribute to unfavourable external conditions and the strong-drachma policy. Overall, our findings indicate that real convergence has not kept at pace with nominal.

- **JEL Classification:** F02, F10, F15
- **Keywords:** Competitiveness, trade, Greece, EU

I. Introduction

This paper examines the external trade of Greece since the latter's accession to the European Union (EU), effective since January 1981, placing emphasis on the 1990s. We address two inter-related issues. First, we examine whether EU participation has affected the degree of integration of the Greek economy with the rest of its EU partners, further than the degree that would have been observed in its absence. Economic integration is a wide concept, embracing trade flows,

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foreign direct investment, increasing interdependence in the goods', labour and financial markets as well as co-ordination or even joint definition of macroeconomic policies (see Krugman, 1989). We focus upon the effect of accession on the degree of openness of the Greek economy. More specifically, we examine whether and in what way EU participation has affected the level and composition of Greek imports and exports.

Second, we examine developments in the field of Greek competitiveness. We define competitiveness as the ability of domestic producers to maintain and increase existing comparative advantages, and develop new ones. Increased competitiveness implies that domestic firms would maintain or increase their market shares in home and foreign markets; achieve export penetration in foreign markets higher than the import penetration foreign competitors achieve in the home one; and achieve production efficiency gains against foreign producers. We employ two suitable competitiveness indicators and link the analysis with that on trade effects.

A key aspect of our analysis is that it makes use of original, disaggregated data sets, constructed by the authors themselves, based on material provided by the National Statistical Service of Greece (ESYE). These present trade flows disaggregated by the 21 categories of the Greek Tariff Schedule (GTS) for the period 1970-2000. Disaggregated analysis bears two considerable advantages: First, it identifies the individual trade sectors responsible for, and the extent of their contribution to, aggregate trade effects. In this way, we provide an anatomy 2 of the changes in Greece's external trade and obtain a platform upon which the relative performance of each individual sector may be assessed. Second, it allows an assessment of the current state and future prospects of individual sectors that are vital for Greek production and employment. This is useful for determining long-term corporate strategies and for purposes of policy-making.

The workhorse of analysis in this field of economic literature is the theory of Custom Unions. Initially formulated by economists like Viner (1950), Meade (1955) and Lipsey (1960), this theory was subsequently enriched by numerous contributions, surveys of which can be found in Mayes (1978), Molle (1997), Moore (2001a), and El-Agraa (1999, 2001). The main tools of analysis in this area, also used in this paper, are the concepts of trade creation (TC) and trade diversion (TD). The former is observed when the abolition of trade impediments following accession to a Customs Union results in replacement of expensive domestic production by cheaper imports, originating either from a partner (internal

TC) or from a third country (external TC). Trade diversion occurs when integration results in substitution of cheap imports from third countries by expensive imports from partners.

Empirical research in this area has mainly focused upon the experience of the countries that initially formed, or joined at a later stage, the EU. The surveys quoted above suggest that individual EU members have experienced varying degrees of internal trade creation and external trade diversion. For the case of Greece, these effects have been studied by Giannitsis (1988), Hassid and Katsos (1992), Baltas (1999) and Arghyrou, (2000a). All four studies examine the first decade of Greece's participation in the EU and find that in the 1980s, in spite of the long transition period that accompanied accession[1], Greece experienced significant import penetration (mainly from EU countries); no export gains; and a marked decline in competitiveness. The Greek experience, appears to be more similar, though not identical, to that of the UK (see Winters, 1987). One way by which our work relates to the existing studies on Greece is that it tests the robustness of their findings for the 1980s. In addition, our original disaggregated data allow us to expand that analysis to the sectoral level.

The negative trade effects identified for Greece in the 1980s were consistent with the generally deteriorating macroeconomic performance of the country during the period 1974-1990[2]. In the 1990s Greek authorities implemented a stabilisation policy aiming at gaining accession to the European Monetary Union (EMU), established since 1999. This took the form of three convergence programmes, namely the three-year Medium Term Adjustment Programme 1991-93; the Convergence Programme 1993-98; and the Revised Convergence Programme 1994-99. The main targets set by all three were a reduction in inflation and public debt; and the restructuring of the supply side of the Greek economy. Inflation reduction was mainly pursued by means of the strong-drachma policy. Introduced in 1988, this involved a rate of depreciation of the drachma against the ECU increasingly smaller than the positive inflation differential that existed between Greece and the EU average throughout the 1990s. In 1998, the drachma joined the Exchange Rate Mechanism (ERM), a decision accompanied by a

[1]When Greece joined the EU in 1981 it negotiated and achieved an immediate abolition of all barriers imposed on Greek exports in the EU market; and the right to abolish trade barriers protecting domestic producers against EU competitors in the Greek market only gradually. This transition period ended in 1989.

[2]See, for example, Alogoskoufis (1995).

devaluation against the ECU by fourteen percentage points[3]. Fiscal consolidation was primarily pursued through an increase in public revenue rather than a reduction in spending. The restructuring of the Greek economy was mainly attempted through a higher level of public investment in public infrastructure, largely financed by funds received in the context of EU transfers. In the 1990s Greek authorities proceeded to institutional changes, including granting of independence to the Bank of Greece (BOG) and full financial liberalisation. Greece also proceeded to a number of privatisations of small- and medium-sized state-controlled industrial firms, and in the second part of the 1990s, the partial opening of the hitherto state-monopolised transportation, energy and telecommunications sectors. However, a number of observers (see Halikias 1996 and Bank of Greece, 2002, section 7.3), have suggested that these steps, as well as the fiscal consolidation effort, were rather hesitant, leaving substantial room for further progress in these areas. Finally, no specific measures were taken in the field of external trade, as Greece is bound by the EU's common trade policy[4], to abstain from unilateral measures affecting its external trade relations[5].

The convergence programmes of the 1990s did achieve significant progress in the field of nominal convergence so that Greece finally secured its accession to the EMU in 2001. This positive development raises a number of questions additional to the two main issues around which the paper evolves. First, has there been a discontinuation of the import penetration from EU countries observed in the 1980s? Second, have Greek exporters managed to reap the potential benefits of EU participation in the 1990s? Third, have the competitiveness losses sustained in the 1980s been recovered in the 1990s? These are questions that have not been addressed by the existing studies on Greece. This is another way through which our work is related to previous research. We use the results of our analysis to shed some empirical light on these topics, which, by focusing on the 1980s, previous studies have left unanswered.

Overall, the contribution of this paper is fivefold: First, we determine the nature of the aggregate trade effects caused by Greece's accession to the EU for the

[3]This was later partly offset, as drachma's central rate against the Euro was revalued in 2000 by 3.5%, from 352 drachmas per Euro down to 340.75. The latter was the rate at which Greece entered the EMU on 1/1/2001.

[4]A thorough discussion on the EU's internal and external trade policy can be found in Moore (2001b).

[5]For a detailed discussion and assessment of the three convergence programmes implemented in the 1990s, see Arghyrou (2000b).

whole of the postaccession accession era (1981-2000). Second, using our original disaggregated data sets, we apply cointegration techniques to identify the specific commodity categories responsible for the trade effects observed in the aggregate level. To the best of our knowledge, this is the first time that disaggregated analysis of this nature is undertaken. Third, we estimate sector-bysector competitiveness indexes and link the findings of this part of the analysis to that referring to trade effects. Fourth, we examine the stability of the identified trade and competitiveness effects and determine in this way whether the macroeconomic improvement recorded in the 1990s is reflected in the external sector as a whole, and in which individual sectors in particular. Finally, we use our findings to provide a tentative answer as to whether Greece has achieved any progress in the field of real convergence.

We find that the problems identified for the 1980s became even more acute in the 1990s. The import-penetration from EU partners observed in the 1980s has continued in the 1990s. Exports have not been positively influenced at any stage by Greece's participation to the EU. By contrast, they experienced a negative structural shift in the 1990s. During the same period, Greece recorded significant competitiveness losses, especially in those sectors where it traditionally possesses a comparative advantage (mainly agricultural products and products of labour intensive industries). We attribute these developments to the negative side effects of the strong drachma policy and unfavourable external conditions. Our findings suggest that the Greek economy has not yet closed the gap dividing it from the EMU's hard core.

The remainder of the paper is structured as follows: Section 2 describes our methodology. Section 3 discusses the data. Sections 4 and 5 examine the aggregate imports' and exports' effects caused by accession to the EU and the individual commodity sectors that caused them. Section 6 uses two indexes of competitiveness to assess developments in that area. Finally, Section 7 summarises and offers concluding remarks.

II. Methodology

Our analysis of the impact of Greece's accession to the EU on trade is based on Balassa's (1974) methodology of ex-post income elasticities. The author compares the movements of the elasticity of imports to changes in national income, defined as the rate of change of real imports (*M*) over the rate of change of national income

(Y), $\eta = (\Delta M/M)/(\Delta Y/Y)$, prior to and following accession. A post-accession increase in η implies that the abolition of trade impediments has resulted in a reduction in the relative price of foreign products against domestic ones, which causes imports to rise faster than income. Such an increase (reduction) defines a trade creation (diversion) effect. As Dayal and Dayal (1977, p. 133) suggest, Balassa's methodology is equivalent to running a regression of the form:

$$\log(M_t) = \alpha + \beta\log(Y_t) + \gamma D + \delta\log(Y_t)D + u_t \quad (1)$$

where, M_t and Y_t respectively denote real imports and real income in the importing country, D is a dummy variable taking the value of zero (unity) for the pre- (post-) accession years, and u_t is a white-noise, random error term. An accession effect is present if, in accordance to Balassa's hypothesis, the income elasticity of imports changes, that is if the coefficient of the slope dummy variable δ, is statistically significant. The size of the effect is then given by $\gamma D + \delta \log(Y_t)D$, with γ being a shift parameter, reflecting any EU effect on the level of imports additional to the one described by δ. In a similar fashion, the effect of EU accession on exports is given by $\gamma D + \beta \log(Y_t^*)D$ in an exports' demand equation like

$$\log(X_t) = \alpha + \beta\log(Y_t^*) + \gamma D + \delta\log(Y_t^*)D + u_t \quad (2)$$

where, X_t and Y_t^* respectively denote real exports and real foreign income.

However, movements of imports and exports may be a function of factors other than income, e.g. relative prices, and there may exist trade changes unrelated to EU participation, due to, for example, global trade liberalisation (see El-Agraa, 1999). Finally, the real monetary value of total trade flows may be influenced by swings in the real price of commodities like oil. Hence, a more robust specification for equations (1) and (2) may respectively be (3) and (4) below:

$$\log(M_t) = \alpha + \beta_1\log(Y_t) + \beta_2\log(Q_t) + \beta_3\log(G_t) + \beta_4\log(O_t) + \gamma D + \delta D\log(Y_t) + \zeta \log(Q_t)D + u_t \quad (3)$$

$$\log(X_t) = \alpha + \beta_1\log(Y_t^*) + \beta_2\log(Q_t) + \beta_3\log(G_t) + \beta_4\log(O_t) + \gamma D + \delta D\log(Y_t^*) + \zeta\log(Q_t)D + u_t \quad (4)$$

where Q_t is the real exchange rate between the home currency and the currency of the trading partner[6]; O_t denotes the real price of oil; and G_t is a variable capturing

[6] Q_t is defined as the product of the nominal exchange rate times the ratio of foreign to domestic producer prices. An increase (reduction) in Q_t denotes a real depreciation (appreciation), i.e. an increase in the relative price of foreign products. Hence, the theoretically expected sign of Q_t is negative for equation (3) but positive for (4).

the effect of trade liberalisation occurring independently of EU accession. Equations (3) and (4) may be used to test the hypothesis that accession to the EU has had no effect on imports and exports respectively, in which case all dummy variables would have a zero coefficient (H0: $\gamma = \delta = \zeta = 0$). The alternative is that accession to the EU has caused a trade effect, in which case at least one of the three dummies involved in (3) and (4) would present a non-zero coefficient. The nature of the effect can then be determined on the basis of the sign of the nonzero dummy variable(s).

The specification of (3) and (4) would have been more robust in case the real effective exchange rate of each individual supplier against a basket of currencies was included to account for competitiveness gains or losses against competing suppliers. However, both the IMF and the OECD data series available in Datastream provide data on real effective exchange rate against a basket of currencies for the post-1978 period only. Alternatively, one could add a number of bilateral exchange rate terms, representing the real exchange rates between various foreign suppliers. However, with a maximum sample period of 41 annual observations (covering 1960-2000 or 1970-2000 according to the application), this would reduce the degrees of freedom in the estimations which follow substantially. When estimating (3) and (4), O_t was calculated using data from the UK Brent market (Datastream code UKI76AAZA), expressed in 1995 US dollars calculated using the USA CPI index. On the other hand, G_t was approximated by the volume of real aggregate imports and exports respectively of both developing and industrialised countries, as they are provided by the IMF databank. For equation (3), the theoretically expected sign of the G_t coefficient is positive, as the volume of world trade over the last forty years has increased considerably. For equation (4), there is no a priori expectation, as G_t may reflect not only the influence of trade liberalisation on Greek exports (whose effect is expected to be positive) but also the exporting performance of countries with products competitive to those of Greece (making a case for a negative sign).

Equations (3) and (4) include a number of possibly endogenous variables calling for a Vector Autoregression (VAR) estimation method. However, our relatively small sample periods suggest that the number of parameters to be estimated by a VAR rises significantly compared to the number of observations. On the other hand, Campbell and Perron (1991, p. 153) argue that “a data set containing fewer annual data over a long time period will lead to (cointegration) tests having higher power than data sets containing more observations over a short

period of time". Hence, our data sets are, in our view, sufficient to capture the long-run relationship between the variables in (3) and (4) because they extend over a span of time exceeding four decades.

To tackle the estimation issue, we adopt the single-equation modelling framework favoured by Inder (1993). This methodology consists of estimating an unrestricted Autoregressive Distributed Lag (ADL) model of the form $A(L)y_t = B(L)x_t + u_t$, where $A(L)$ is the polynomial lag operator $1 - \alpha_1 L - \alpha_2 L^2 - \ldots - \alpha_p L^p$, $B(L)$ is the polynomial lag operator $\gamma_0 + \gamma_1 L + \gamma_2 L^2 + \ldots + \gamma_q L^q$; and $L^r = x_{t-r}$, and then re-parametrising with respect to the long-run static solution. Since the sum of the estimated α_i coefficients ($i = 1, \ldots, p$) in the ADL model must be less than one for the model to converge to a long-run solution, by dividing $(1 - \Sigma\alpha_t)$ by the sum of their estimated standard errors one arrives at a *t*-type test statistic which can then be compared against the critical values provided by Banerjee, Dolado and Mestre (1993) in order to test the null hypothesis of no-cointegration (see also Hendry and Doornik 1996, p. 140 and pp. 234-236). This testing procedure may be superior to the standard Engle and Granger cointegration methodology as the latter implies an arbitrary distinction between endogenous and exogenous variables; it is based on a low-power Augmented Dickey-Fuller (ADF) test; and imposes implicitly a possibly invalid common factor restriction[7]. The methodology described above address both problems (see Harris, 1995, pp. 55-56) and, as Inder (1993) suggests (p. 68), produces precise estimates of long-run parameters and valid t-statistics, even in the presence of endogenous explanatory variables.

Our estimation strategy is a general-to-specific one involving the following steps: First, we estimate an ADL equation where all variables in equations (3) and (4) enter with their contemporaneous value and their first two lags[8]. Following

[7]Namely a short-run reaction of the dependent variable to changes in the right hand-side terms identical to the long-run effect that would occur if the model were in equilibrium.

[8]Before doing so, one should first test for the order of integration of the variables involved in (3) and (4). The estimated Augmented Dickey-Fuller (ADF) statistics (not reported here due to space constraints) showed that all series subsequently involved in our analysis are integrated of order 1. The results are available upon request. Given the controversy regarding the mean-reverting behaviour of real exchange rates, we acknowledge that our findings related to the real exchange rate terms may reflect a sample rather than a population property (i.e. we do not claim that Purchasing Power Parity is invalid in the case of Greece). However, even if the *Q* terms were shown to be I(0), the non-stationary nature of variables like imports and income, imply that one has to undertake cointegration tests on the residuals of equations (3) and (4) to draw inference regarding the existence of long-run relationships among the variables.

elimination of insignificant terms, the parsimonious ADL model is subjected to mispecification and three recursive structural stability tests (1-step Chow, Break point Chow and Forecast Chow). The well-specified and structurally stable ADL equations are reparametrized to yield the long-run equations described by (3) and (4). For those equations where mispecification of some form is present, the most frequently encountered one was a non-normally distributed error term. In such cases, we identify outliers using the 1-step residuals plus/minus two standard errors diagramme and re-estimate the ADL model, including dummy variables taking the value of one for identified outlier(s), zero otherwise. If the underlying ADL model continues to present structural instability, we conclude that structural breaks exist in our equation. In that case, we add further dummies to account for them. The periods for which these dummies are defined are identified by the timing of any structural breaks as determined by the recursively estimated Break-point and Forecast Chow tests[9].

To address the second issue examined by the paper, we make use of two of competitiveness indexes, namely the Balassa (1974) and Adjusted Grubel-Lloyd (see Neven, 1990) ones, which we calculate for each of the categories of the GTS. Apart from being reliable indicators used extensively in the empirical literature (see El-Agraa 1999), including the previously mentioned existing studies on Greece, they are also preferred over alternative indicators, e.g. Truman's (1972) index of shares in apparent consumption), for one practical reason. Their estimation presupposes data availability only on trade flows (imports and exports) and not on domestic production, which, in our case is not available either by the Greek National Statistical Service or by any other data source[10]. In effect, they are the only tool available at our disposal to examine competitiveness developments. The Balassa index is defined as the ratio of a sector's trade surplus over the sum of the sector's trade flows (imports and exports):

$$B = \frac{X_{kt} - M_{kt}}{X_{kt} + M_{kt}} \tag{5}$$

[9]Here it is worthy to clarify that the structural stability tests employed do not appear in Tables 2, 3 and 4 below because the econometric package used to estimate equations (3) and (4) (PcGive 10.0) presents the tests' recursively estimated values in a diagrammatic way only. Space constraints do not allow us to present four diagrammes for each of the equations reported in these tables.

[10]ESYE reports production indexes for 20 industrial sectors non-directly comparable to the 21 categories of the GTS. It does not provide disaggregated data for the domestic production of agricultural products.

In (5), X_{kt} and M_{kt} denote exports and imports of commodity k in time t respectively with $-1 \leq B \leq 1$. A positive (negative) value of B indicates a trade surplus (deficit), that is a comparative advantage (disadvantage) of the home country in the trade of commodity k. An increasingly positive (negative) B value indicates increasing (decreasing) exporting penetration of the home country in foreign markets relative to the penetration of foreign suppliers in the domestic one, that is an increase (reduction) in comparative advantage, and a higher (lower) level of competitiveness for the domestic country. On the other hand, the Adjusted Grubel-Lloyd Index is given by:

$$AGL_{ijk} = 1 - \frac{\left|\frac{X_{ijk}}{X_{ij}} - \frac{M_{ijk}}{M_{ij}}\right|}{\frac{X_{ijk}}{X_{ij}} + \frac{M_{ijk}}{M_{ij}}} \tag{6}$$

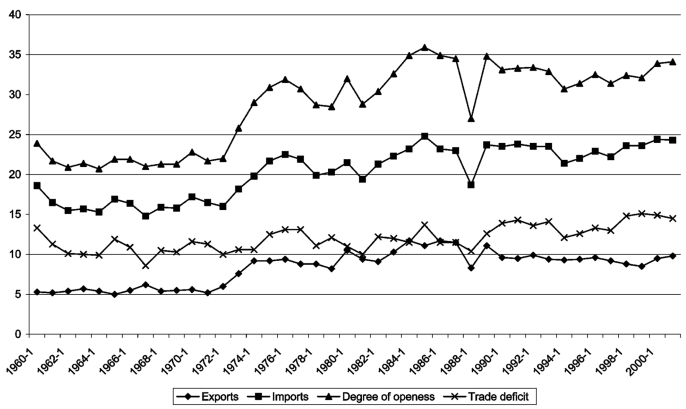
where X_{ijk} and M_{ijk} respectively denote exports and imports of country i to/from country j for commodity k; X_{ij} and M_{ij} respectively denote total exports and imports of country i to/from country j and $0 \leq AGL_{ijk} \leq 1$. If AGL_{ijk} equals unity (zero), exports and imports of country i to and from country j for commodity k, expressed as percentage of total exports to and imports from country i, are equal (non-existent), in which case trade between the two countries is entirely intra-(inter)-industry. Whether a shift from inter- to intra-industry trade (and viceversa) represents a positive or a negative development for a country's competitiveness depends on whether the trade balance for the particular sector is in surplus or deficit. An increase (reduction) in AGL_{ijk} in the case of a surplus-creating category indicates that the domestic country achieves relative efficiency gains (suffers relative efficiency losses) by increasing (reducing) the degree of export penetration in the partner's market relative to the import penetration the partner achieves in the domestic one. This indicates competitiveness gains (losses) for the domestic economy. Efficiency and competitiveness gains (losses) for the home country are also present when AGL_{ijk} declines (increases) in the case of a deficitcreating category. Apart from providing us information with regards to the direction and size of competitiveness changes of individual sectors over time, the movements of the Balassa and AGL indexes also operate as a robustness check for the findings of our imports- and exports-demand functions analysis. For example, a positive EU effect restricted to the imports' side of trade flows, would imply that EU participation contributed to an increase of foreign exports to Greece but not to

a similar increase of Greek exports to foreign markets. Such an effect is expected to be associated with competitiveness losses.

III. DATA DESCRIPTION

Our data on aggregate imports and exports cover the period 1960-2000. Our disaggregated series on individual commodity groups, spans between 1970 and 2000. The latter are original data sets and have been constructed by the authors themselves, using the annual publication *The External Trade of Greece* published by the National Statistical Service of Greece[11]. Data on aggregate imports and exports have been taken from various versions of ESYE's publication *The*

Figure 1. Merchandise imports, exports, economic openness and trade deficit in Greece, 1960-2000 (% in GDP)



Source: European Economy, Annual Economic Report 2001 (Statistical Appendix)

[11]Various publications of ESYE and the Bank of Greece provide summary tables for the level of total aggregate imports and exports over time; as well as total imports from and total exports to individual countries. There exists, however, no publication providing summary tables for the level of imports and exports for each of the twenty one individual commodity categories of the Greek Tariff Schedule. There is also no publication presenting summary tables for the imports and exports of the GTS individual commodity categories disaggregated by individual countries. We have constructed these summary tables using ESYE's publication *The External Trade of Greece*. Each publication of this journal, which first appeared in 1970 and exists only in printed form (not electronic), provides the market value of imports and exports of each of the 21 categories of the GTS for the year it refers to. Each publication also includes data for the level of imports from and exports to individual countries for each of the 21 categories of the GTS, again only for the year the publication refers to. To construct the previously non-existing summary tables, we had to find the individual annual publications of *The External Trade of Greece* in physical form; record each individual number of interest manually, and then transfer the manually recorded data into a computer spreadsheet. It is worthy to mention that at the time of gathering our data, *The External Trade of Greece* had not been published since 1997. Hence, for the period 1998-2000, we used unpublished data, which the ESYE officials were kind to provide us.

Statistical Journal of Greece. Data for the rest of the variables was taken from the IMF databank. Figure 1 presents the basic trade indicators of Greece. Since 1981 the degree of openness of the Greek economy (the sum of imports and exports to GDP) has increased, mainly as a result of an increase in the imports to GDP ratio. However, no difference appears to exist between the pre- and post-1981 rates of increase. In the 1990s, the ratio of exports to GDP stagnated, while Greece's trade deficit entered an ascending long-term path. Table 1, presents the commodity and geographical composition of the external trade of Greece. Part (a) suggests that excluding mineral products, the commodity composition of imports has been relatively stable, with C16 (machinery, mechanical appliances and electrical equipment) and C17 (vehicles, vessels and aircraft) accounting for one third of total imports. In recent years, exports have become less reliant on agricultural and food products (mainly C2 and C4) and base metals (C15), and more reliant on textiles (C11). When combined, these categories represent more than half of total exports. Part (b) reveals that since 1981 Greek imports have been re-oriented

Table 1. Commodity and geographical composition of the external trade of Greece, 1970-2000

(a) Commodity composition (% in total)

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21
Imports																					
1970-80	5.0	3.1	0.3	2.3	17.4	6.7	3.1	1.3	2.0	2.6	5.2	0.1	1.1	0.2	8.2	16.4	22.9	1.7	0.1	0.4	0.0
1981-89	8.2	2.9	0.4	3.5	20.5	7.5	3.8	3.2	1.5	2.7	6.8	0.4	1.3	0.4	7.7	13.2	13.0	2.1	0.1	0.7	0.3
1990-2000	6.4	2.9	0.4	5.1	9.4	9.6	4.3	1.4	1.4	3.2	7.6	0.9	1.8	0.4	7.3	17.9	15.1	2.7	0.1	2.0	0.1
Exports																					
1970-80	1.2	13.6	1.2	18.4	16.0	5.1	1.4	4.7	0.5	0.6	16.9	1.8	1.0	0.2	13.7	2.2	0.9	0.2	0.0	0.3	0.0
1981-89	1.0	12.3	3.0	13.3	15.2	3.9	1.5	5.9	0.4	1.0	23.0	1.3	1.5	0.4	11.0	2.7	0.7	0.2	0.5	0.2	1.0
1990-2000	3.0	8.4	4.0	13.3	13.0	5.3	2.4	3.3	0.5	1.2	22.9	0.5	1.7	0.3	10.2	7.1	1.3	0.5	0.1	0.8	0.3

(b) Geographical composition: share of EU11 countries in Greek imports and exports (% in total)

	Total	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21
Imports																						
1970-80	47.0	34.4	10.3	69.9	57.4	11.8	74.3	80.0	53.7	5.5	34.5	53.4	45.5	78.4	71.3	60.1	75.2	45.1	59.1	72.6	69.9	n.a.
1981-89	54.0	84.0	47.4	89.5	77.8	6.0	75.3	81.1	78.9	10.8	42.0	69.8	55.8	80.4	39.2	66.9	72.7	46.4	59.4	74.7	73.2	n.a.
1990-2000	61.6	85.1	57.4	75.7	83.4	7.3	76.2	75.5	66.2	25.1	55.7	73.0	57.6	75.1	71.8	55.0	70.0	52.5	63.1	64.7	66.7	n.a
Exports																						
1970-80	52.3	52.7	54.4	59.6	46.5	45.8	51.7	33.7	55.2	37.4	14.5	72.0	40.3	16.5	47.0	50.9	37.3	19.7	9.8	36.6	48.5	n.a.
1981-89	56.9	65.6	71.9	74.6	51.3	33.4	41.4	37.2	67.9	26.2	15.4	80.9	46.0	20.2	38.7	46.4	46.4	22.2	34.6	37.4	36.2	n.a.
1990-2000	54.1	75.5	68.9	84.8	49.3	25.3	38.0	43.6	48.9	35.8	18.8	73.4	26.9	32.4	42.8	50.5	41.2	26.2	44.7	50.4	40.2	n.a

Note: The definition of each of the reported categories is presented in the Appendix

[12]The EU11 area includes the countries constituting the EU before its latest enlargement, i.e. all current EU members minus Austria, Finland and Sweden.

towards the EU11 area[12]. In the case of exports, with the exception of food and agricultural products (C1, C2, C3 ,C4), no major reorientation has taken place.

IV. IMPORT DEMAND FUNCTIONS

A. Partner-based analysis

We start by estimating imports' demand functions in a partner-based context. Equation (3) is estimated defining *Mt* to be real aggregate imports from a particular supplier country. We estimate imports-demand equations for each of the six founding EU members (accounting for 80% of imports from the EU11 area)[13] and the two most important non-mineral extra-EU suppliers, USA and Japan. These countries, when combined, account for approximately 55% of total Greek imports. We also present estimates of import demand equations for the EU11 area as a whole, the Rest of the World (ROW) and total aggregate imports. The sample period covers 1960-2000. The results appear in Table 2. In all cases, domestic income is statistically significant, presenting the theoretically expected positive sign. With one exception, the real exchange rate is statistically insignificant for all individual EU trading partners, the EU11 area as a whole and total imports which, as Table 1 suggests, are dominated by imports from the EU[14]. In the cases of Belgium-Luxembourg, Japan and the ROW, the real exchange rate is significant with the expected negative sign. The relative unimportance of the real exchange rate for total imports and imports from European countries may be interpreted as a sign that for a significant part of imports, there is no-worth mentioning domestic production to compete with foreign suppliers. This does not seem to have changed over time, as the dummy variables referring to the real exchange rate were in all cases insignificant. Both variables used for approximating G_t (imports of developing and industrialised countries) were everywhere statistically insignificant. Not surprisingly, the price of oil is significant in the case of the ROW (the supplier of the overwhelming majority of Greek imports of oil

[13]Greek Trade Statistics publications treat Belgium and Luxembourg as a single country.

[14]The real exchange rate term used in the equations for EU11, ROW and total imports is the drachma's real exchange rate against the German mark. We would prefer the real effective exchange of the drachma against a basket of currencies but such a series was not available for the whole of the 1960-2000 period.

Table 2. Import demand functions - Partner-based analysis (sample period: 1960-2000)

	Long-run equation					Other Dummies				Mispecification tests on underlying ADL model (p-values)					
	constant	log(Y)$_t$	log(Q)$_t$	log(O)$_t$	D log(Y)$_t$					unit-root t-test[1]	AR	ARCH	Normality	X_i^2	RESET
Belgium-Lux.	-2.210	1.188	-0.814		0.0167					-5.197**	0.97	0.95	0.21	0.34	0.44
	0.388	*0.122*	*0.338*		*0.010*										
France						D1963	D1965	D1986	D1987	-7.308**	0.99	0.46	0.27	0.72	0.53
	-1.965	1.217	-0.436		0.0095	-0.113	0.162	0.106	0.1023						
	0.330	*0.047*	*0.188*		*0.0040*	*0.043*	*0.041*	*0.035*	*0.036*						
Germany						D1985-87	D1988	D1993-00	D1998	-9.737**	0.85	0.98	0.44	0.92	0.29
	-2.135	1.172			0.0181	0.1072	-0.153	-0.172	0.148						
	0.176	*0.043*			*0.004*	*0.022*	*0.040*	*0.018*	*0.035*						
Italy	-3.205	1.374			0.0234					-3.230+	0.51	0.80	0.44	0.89	0.93
	0.595	*0.140*			*0.010*										
Netherlands						D1999									
	-2.546	1.122			0.0584	-0.502				-4.252*	0.46	0.86	0.10	0.40	0.49
	0.535	*0.137*			*0.013*	*0.167*									
USA						D1994									
	0.459	0.444			-0.0250	-0.794				-4.314*	0.90	0.54	0.31	0.70	0.65
	0.509	*0.122*			*0.014*	*0.244*									
Japan	-12.660	3.657	-1.908		-0.0724					-4.935*	0.20	0.30	0.32	0.77	0.31
	2.738	*0.671*	*0.873*		*0.041*										
EU11						D1985-87	D1988	D1993-00	D1998						
	-1.734	1.184			0.0203	0.080	-0.102	-0.028	0.058	-7.820**	0.53	0.38	0.78	0.57	0.18
	0.147	*0.035*			*0.003*	*0.017*	*0.031*	*0.015*	*0.030*						
ROW	0.295	1.310	-1.403	0.365	-0.0225					-5.677**	0.11	0.30	0.66	0.54	0.89
	0.805	*0.133*	*0.474*	*0.053*	*0.010*										
Imports						D1985-87	D1988								
	-1.639	1.170		0.196	-0.0004	0.011	-0.205			-6.371	0.87	0.12	0.80	0.71	0.24
	0.180	*0.045*		*0.027*	*0.004*	*0.020*	*0.004*								

standard errors in italics.

AR = Lagrange Multiplier F-test for autocorrelation, ARCH = LM F-test for Autoregressive Conditional Heteroscedasticity.

Normality = Chi^2 test for the normal distribution of the residuals, X_i^2 = White test for heteroscedasticity.

RESET= Reset F-test for functional form

+ , * , ** indicates significance at the 10%, 5% and 1% level respectively 1: Critical values provided by PC-Give. They can also be found at Banerjee, Dolado and Mestre (1992), reprinted in Harris (1995), pp. 160-161.

products). Finally, in nine out of ten cases, the reported unit-root tests reject the hypothesis of no cointegration at the 5% level of statistical significance, suggesting the existence of a long-run relationship between imports and the vector of explanatory variables, while the remaining ADF test is significant at the 10% level. All equations in Table 2 pass the reported mispecification tests.

Turning now to the imports' effect caused by EU participation, this is captured by the income dummy variable ($D \log Y_t$), the only significant one out of the three dummies included in equation (3). The EU effect is positive for all individual EU countries and the EU11 as a whole, and negative for all non-EU suppliers examined. This finding is consistent with the one identified by previous studies on Greece. What is novel in our findings is that our structural stability tests suggest that these effects are stable throughout the post-integration period for Belgium-Luxembourg, France, Italy, the Netherlands, Japan, the USA, and the ROW equation. In the case of Germany, we identify two structural breaks, not captured by previous papers, one in the mid-1980s and another in the early 1990s. These are represented by two intercept dummies, valued at unity for 1985-87 and 1993-2000 respectively, zero otherwise. Their inclusion resulted in the structurally stable equation reported in Table 2. For Germany, trade-creating effects exist for the whole of the post-1981 period, being particularly pronounced between 1985 and 1987, but seem to have been partially reversed after 1993. This may be related to the opening of the economies of the transition countries that took place in the 1990s, countries with which Germany has fostered very substantial economic ties. Also, the recent war conflicts in the Balkan peninsula, may have affected the land transportation routes of Greece's importing trade from Germany. With Germany being the most important individual supplier of Greek imports, these breaks are also reflected in the equation referring to the EU11 area for which, in consistence with the previous findings, trade creation is observed. Finally, Table 2 suggests that the trade creation effect observed for the EU area and the trade diversion one observed for extra-EU suppliers (ROW) cancel each other out, so that the net EU effect on total imports is statistically insignificant.

B. Commodity-based analysis

We now estimate equation (3) in a commodity-based context, i.e. *Mt* is defined as total imports of a particular commodity group, with an aim to identify the sources of the aggregate effects identified in Table 2. Due to space constraints, we only present equations referring to EU11 as a whole, the ROW, and total imports.

Table 3. Import demand functions - Commodity-based analysis (sample period: 1970-2000)

	Long-run equation					OtherDummies			Mispecification tests on underlying ADL model (p-values)					
	constant	$\log(Y)_t$	$\log(Q)_t$	$\log(Q)_t$	$D\log(Y)_t$				unit-roott-test1	AR	ARCH	Normality	X_i^2	RESET
Agricultural and food products (C1, C2, C3 and C4)														
							D1973	D1987	D1989					
EU11	-3.156	1.267			0.834		0.241	0.257	0.402	-5.88**				
	1.171	*0.275*			*0.1030*		*0.129*	*0.119*	*0.125*					
						D	D1989	D1993	D1994	-6.75**	0.39	0.19	0.84	0.17
ROW	0.080	0.560				-0.241	0.110	-0.118	-0.098					
	0.547	*0.130*				*0.029*	*0.056*	*0.056*	*0.053*					
							D1973	D1987	D1989					
Total	-0.749	0.801			0.354		0.362	0.223	0.309	-4.19*	0.37	0.74	0.15	0.79	0.74
	0.897	*0.212*			*0.084*		*0.138*	*0.088*	*0.108*					
Chemical, rubber and plastic products (C6 and C7)														
							D1982							
EU11	-2.548	1.207			0.120		-0.297			-3.37+	0.32	0.40	0.61	0.65	0.96
	0.845	*0.195*			*0.068*		*0.122*							
ROW	-4.194	1.469			0.053					-2.87	0.30	0.13	0.46	0.62	0.58
	0.607	*0.143*			*0.056*									
							D1982							
Total	-2.640	1.257			0.107		-0.263			-3.03	0.18	0.18	0.14	0.47	0.90
	0.805	*0.187*			*0.067*		*0.121*							
Products of labour intensive and low-tech industries (C8, C9, C10, C11, C12, C13, C14 and C20)														
EU11	-7.395	1.154		-2.263	0.474					-5.595**	0.56	0.62	0.86	0.33	0.62
	1.088	*0.179*		*0.520*	*0.065*										
							D1993							
ROW	-1.651	0.972			-0.015		-0.136			-3.61+	0.47	0.51	0.90	0.85	0.91
	0.537	*0.127*			*0.048*		*0.070*								
							D1993							
Total	-4.742	1.013		-1.474	0.278		-0.161			-4.25*	0.68	0.48	0.72	0.55	0.90
	0.969	*0.155*		*0.480*	*0.056*		*0.078*								

standard errors in italics.

AR = Lagrange Multiplier F-test for autocorrelation, ARCH = LM F-test for Autoregressive Conditional Heteroscedasticity.

Normality = Chi^2 test for the normal distribution of the residuals, X_i^2 = White test for heteroscedasticity.

RESET= Reset F-test for functional form

+,*,** indicates significance at the 10%, 5% and 1% level respectively 1: Critical values provided by PC-Give. They can also be found at Banerjee, Dolado and Mestre (1992), reprinted in Harris (1995), pp. 160-161.

Table 3. Continued

	Long-run equation					OtherDummies			Mispecification tests on underlying ADL model (p-values)					
	constant	log(Y)$_t$	log(Q)$_t$	log(Q)$_t$	Dlog(Y)$_t$				unit-rootT-test1	AR	ARCH	Normality	X_i^2	RESET
Base metals (C15)														
							D1998							
EU11	0.255	0.482			0.139		-0.457		-3.95*	0.63	0.77	0.58	0.78	0.65
	0.925	*0.217*			*0.078*		*0.149*							
						D1992-94			-7.4**	0.38	0.47	0.30	0.89	0.92
ROW	-4.263	1.514			-0.162	-0.187								
	0.515	*0.122*			*0.044*	*0.038*								
						D1990s	D1998							
Total	-1.671	0.995		0.0001		-0.013	-0.196		-5.16**	0.61	0.60	0.83	0.54	0.22
	0.619	*0.147*		*0.050*		*0.045*	*0.079*							
Machinery, mechanical appliances and electrical equipment (C16)														
								D1998	-10.63**	0.60	0.92	0.67	0.80	0.27
EU11	-0.458	0.827		-0.257	0.037			0.114						
	0.232	*0.509*		*0.021*	*0.018*			*0.022*						
						D1978	D1994							
ROW	-5.082	1.790		-0.153	-0.180	-0.220	-0.267		-4.60*	0.88	0.62	0.81	0.95	0.30
	0.728	*0.167*		*0.074*	*0.061*	*0.082*	*0.098*							
						D1978		D1998						
Total	-1.738	1.139		-0.171	-0.079	-0.086		0.125	-4.71*	0.64	0.38	0.18	0.88	0.88
	0.483	*0.107*		*0.047*	*0.036*	*0.047*		*0.056*						

standard errors in italics.

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Normality = Chi^2 test for the normal distribution of the residuals, X_i^2 = White test for heteroscedasticity.

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Table 3. Continued

	Long-run equation					OtherDummies			Mispecification tests on underlying ADL model (p-values)					
	constant	$\log(Y)_t$	$\log(Q)$	$\log(Q)_t$	$D\log(Y)_t$				unit-rootT-test1	AR	ARCH	Normality	X_i^2	RESET
Vehicles, aircrafts and vessels (C17)														
						D1974	D1988							
EU11	-4.178	1.482		0.353	-0.338	-0.223	-0.326		-7.32**	0.34	0.57	0.30	0.43	0.08
	0.961	*0.207*		*0.083*	*0.066*	*0.088*	*0.078*							
						D1988	D1994-97							
ROW	-5.21	1.766		0.367	-0.574	-0.341	-0.257		-5.53**	0.64	0.73	0.35	0.86	0.82
	1.654	*0.372*		*0.144*	*0.147*	*0.158*	*0.092*							
Total						D1974	D1988	D1994-97						
	-4.066	1.522		0.398	-0.378	-0.267	-0.279	-0.119	-9.77**	0.83	0.37	0.76	0.89	0.34
	0.850	*0.185*		*0.071*	*0.057*	*0.075*	*0.065*	*0.038*						
Various electronic products (C18)														
						D1985-87	D1988							
EU11	-7.187	2.084			-0.066	0.278	-0.163		-6.99**	0.89	0.59	0.73	0.94	0.33
	0.414	*0.097*			*0.037*	*0.031*	*0.057*							
						D1985-87	D1988	D1998						
ROW	-5.133	1.558			0.035	0.149	-0.129	0.086	-7.85**	0.54	0.85	0.39	0.76	0.65
	0.310	*0.072*			*0.026*	*0.021*	*0.041*	*0.037*						
						D1985-87	D1988	D1998						
Total	-5.939	1.842			-0.021	0.227	-1.437	0.096	-9.45**	0.28	0.86	0.11	0.65	0.60
	0.277	*0.065*			*0.023*	*0.019*	*0.037*	*0.033*						

standard errors in italics.

AR = Lagrange Multiplier F-test for autocorrelation, ARCH = LM F-test for Autoregressive Conditional Heteroscedasticity.

Normality = Chi^2 test for the normal distribution of the residuals, X_i^2 = White test for heteroscedasticity.

RESET= Reset F-test for functional form

+,*,** indicates significance at the 10%, 5% and 1% level respectively 1: Critical values provided by PC-Give. They can also be found at Banerjee, Dolado and Mestre (1992), reprinted in Harris (1995), pp. 160-161.

We distinguish between seven categories of non-mineral imports. Our sample covers the period 1970-2000. The results are reported in Table 3. Once again, the income variable Y_t presents a statistically significant, positive coefficient. In consistence with the findings of the previous section, in all but one case, the real exchange rates terms were insignificant. The only exception is products of labour intensive and low technology industries, where the real exchange rate is significant with the theoretically expected negative sign. This is not surprising as the bulk of Greek industrial production is concentrated there, so there exists substantial domestic production to compete with foreign suppliers.

Table 3 suggests that the trade creating effect identified for the EU11 area is explained by very substantial trade creation in agricultural and food products, and products of labourintensive industries. To a lesser extend, trade creation also took place in base metals and machinery, mechanical appliances and electrical equipment, and possibly chemicals and rubber products. Gross trade diversion exists only in the case of vehicles, vessels and aircraft. For extra-EU (ROW) suppliers, there exists substantial trade diversion in agricultural and food products[15], vehicles, aircraft and vessels, and, to a lesser extend, base metals, machinery, mechanical appliances and electrical equipment. Overall, the equations referring to total imports reveal substantial net trade creation in agricultural and food products and products of the labour intensive/low technology industries. Note that these are sectors where Greece has considerable domestic production. Net trade creation may also exist for plastic and rubber products for which the EU income dummy is marginally insignificant. Net trade diversion is observed for machinery, mechanical appliances and electrical equipment; and vehicles, aircraft and vessels[16]. Finally, neutral trade effects are identified for base metals and various electronic products.

V. EXPORT DEMAND FUNCTIONS

We now estimate export demand functions in a partner-based context. Equation

[15]Following some problems with the RESET functional form test, we concluded that the trade diverting effects for imports of agricultural products from the ROW are best represented by the intercept integration dummy (*D*) rather than the slope one (*D log Y*).

[16]Regarding C17, following some structural instability problems in the ADL equation initially estimated for total imports and imports from the ROW, we added a dummy variable covering the period 1994-97. This proved statistically significant with a negative sign.

(4) is estimated defining X_t to be real aggregate exports to a particular country. We present equations referring to the six founding members of the EU (accounting for 80% of exports to the EU11 area) plus the USA. When combined, these countries account for more than half of total Greek exports[17]. Our sample covers the period 1960-2000 (1960-1999 for Germany).

The results appear in Table 4. In all cases, income is statistically significant, presenting the theoretically expected positive sign. All real exchange rate terms are now significant with the expected positive sign and assume rather high values. In all but one equations, G_t in both its definitions (volume of exports of developing and industrialised countries), was insignificant. The price of oil enters three equations with a positive sign, a fact not too surprising, given that exports of mineral products account for approximately 15% of total Greek exports[18]. Finally, all equations in Table 4 pass all mispecification tests.

Focusing on the EU effect on exports, Table 4 offers no evidence of any positive influence. For all countries, the dummy variable with the highest t-score of all three entering equation (4) was $D \log(Y^*)_t$, but this was everywhere statistically insignificant, with the only exception being the Netherlands, where it actually takes a negative sign. Given that there is no aggregate effect to decompose, and also due to space constraints, we do not undertake exports' analysis in a commodity basis framework. The finding of no positive EU effect on exports is consistent with the findings of the existing studies referring to the 1980s. Our recursively estimated stability tests showed that the equations referring to Belgium-Luxembourg, France, Italy and the USA are structurally stable. By contrast, the equations referring to Germany and the Netherlands, pass the stability tests only after adding an intercept dummy taking the value of unity for the period 1990-2000, zero otherwise. For both countries, this is significant with a negative sign. This structural shift has not been captured by previous studies. All in all, EU participation does not appear to have had any positive impact on Greek exports at any point in time. Furthermore, we find that in the 1990s, a previously undetected negative structural break has taken place in two markets, one of which (Germany) absorbs approximately a quarter of total Greek exports.

[17]For Belgium, France and the Netherlands, the real GDP series provided by the IFS covers the post-1978 period only. To estimate equation (4) for these countries, we use the volume of industrial production as a proxy for Y^*.

[18]A large part of Greece's production of mineral products are directed to USA military forces serving in Europe and in particular the Mediterranean sea. These sales are recorded as exports to the USA.

Table 4. Export demand functions (sample period: 1960-2000)

	Long-run equation						Other Dummies			Mispecification tests on underlying ADL model (p-values)					
	constant	log(Y^*)$_t$	log(Q)$_t$	log(DCX)t	log(O)t	Dlog(Y*)t				unit-root t-test1	AR	ARCH	Normality	Xi2	RESET
							D1988								
Belgium-Lux.	-6.889	4.929	3.339	-1.348		0.0300	-0.484			-3.89+	0.52	0.39	0.34	0.41	0.18
	1.377	*1.174*	*1.079*	*0.466*		*0.067*	*0.286*								
France	-7.946	1.818	3.869			0.0400				-3.97*	0.58	0.49	0.18	0.74	0.25
	1.173	*0.331*	*0.765*			*0.0370*									
							D1979	D1988	D1990s						
Germany2	-6.871	2.831	2.048			-0.015	-0.411	-0.682	-0.602	-3.87+	0.82	0.66	0.68	0.63	0.32
	1.565	*0.458*	*0.866*			*0.045*	*0.195*	*0.244*	*0.114*						
Italy	-3.062	1.250	2.146		0.446	-0.0110				-3.32+	0.21	0.10	0.32	0.31	0.22
	0.987	*0.283*	*0.862*		*0.182*	*0.050*									
							D1988	D1995	D1990-2000						
Nether-lands	-4.397	2.527	0.619		0.219	-0.048	-0.239	-1.008	-0.296	-14.40**	0.58	0.58	0.75	0.97	0.52
	0.676	*0.138*	*0.346*		*0.059*	*0.020*	*0.084*	*0.100*	*0.043*						
USA	-5.149	1.007	2.009		0.371	-0.0120				-6.36**	0.37	0.77	0.11	0.50	0.24
	1.464	*0.275*	*0.465*		*0.064*	*0.042*									

standard errors in italics.

AR = Lagrange Multiplier F-test for autocorrelation.

Normality = Chi^2 test for the normal distribution of the residuals.

RESET= Reset F-test for functional form.

ARCH = LM F-test for Autoregressive Conditional Heteroscedasticity.

X_i^2 = White test for heteroscedasticity.

+,*,** indicates significance at the 10%, 5% and 1% level respectively.

1: Critical values provided by PC-Give. They can also be found at Banerjee, Dolado and Mestre (1992), reprinted in Harris (1995), pp. 160-161.

2: Sample period: 1960-1999.

Note: DCX stands for Exports of Developing Economies. The results are not affected if Exports of Industrialised Countries are used.

Apart from the war conflicts in the Balkans, which may have affected land transportation routes, two main explanations may be offered for Greece's stagnating, exporting performance in the 1990s. First, the unfavourable external conditions which prevailed in the past decade. Table 4 suggests that, as we would theoretically expect, Greek exports depend upon the level of foreign income, and from that point of view, are vulnerable to cyclical fluctuations abroad. In the 1990s two periods of economic slowdown were observed in Europe. These have almost certainly affected Greek exports in a negative way.

The second explanation is the negative side effects caused by the strong drachma policy. There is little doubt that this policy has had a significant contribution in terms of reducing inflation and stabilising the Greek economy throughout the 1990s. However, as economic theory suggests (see De Grauwe, 1996 and Persson and Tabellini, 1996), in the face of substantial structural, inflation, and productivity differences among the countries participating in such a quasi-fixed exchange rate system, a strong currency policy, if held for too long, may lead to currency overvaluation, damage the international competitiveness of the economy and put pressure on the current account, all of which eventually contribute to the policy's eventual collapse. The relevance of these theoretical arguments was demonstrated by the collapse of a number of fixed or quasi-fixed exchange rate regimes in recent years, including the devaluations of the Italian and Spanish currencies during the EMS crisis of 1992-93, the exchange rate crises in Spain, Portugal, Mexico in 1995 and, more recently, the series of devaluations of the Czech, Hungarian and Polish currencies, as well as those in Brazil in 1999 and in Argentina in 2001-02. In all these cases, the currency in question was devalued following a marked deterioration of the current account.

It would appear that the Greek experience is consistent with the scenario described above. Greek exports have traditionally been concentrated in agricultural and food products and products of labour-intensive industries, and remained so in the 1990s (see Table 1). Given the low added value of these products, Greek exporters face strong competition by the destination's country internal (and, in all probability, other external) suppliers, with relative prices being a major determinant of export's demand. This is clearly confirmed by the estimated high values of the real exchange rate elasticities reported in Table 4 and the lack of statistical significance for the real exchange rate dummy variable, $\zeta \log(Q_t)D$. In the 1990s, the degree of competition faced by Greek exporters was further increased as a result of the appearance of the products of the economies in

transition in the EU market. These products compete directly with the Greek ones and are produced at significantly lower unit labour costs.

Under such conditions, and given the declining, yet positive throughout the 1990s inflation differential against the EU average, the strong drachma policy raised the relative price of Greek exports. The limited only progress in the field of fiscal consolidation and structural changes achieved during the same period (see Halikias 1996, Bank of Greece 2002) seem to have been not enough to compensate for this overvaluation. As a result, Greece faced stagnation in exports, which resulted in a widening of its trade deficit and ultimately contributed to the drachma's devaluation of 1998. Since then, and up to the end of our sample period, the exports to GDP ratio marginally picked up and the trade deficit (as percentage in GDP) stabilised. This reaction is almost certainly related to the short-run competitiveness gains following a currency's nominal devaluation[19], however, whether it represents a temporary reprieve, or the beginning of the reversal of the negative trends established in the 1990s, remains to be seen.

VI. COMPETITIVENESS INDICATORS

A. Balassa Trade Index

We end our analysis by examining the movements of the two competitiveness indicators discussed in section 2, namely the Balassa Trade Index and the Adjusted Grubel-Lloyd Index. Part (a) of Table 5 reports the average values of the Balassa Trade index for each of the categories of the Greek Tariff Schedule[20] for each of the past three decades. In consistence with the findings of our previous analysis, it reveals that in the 1990s Greece sustained heavy competitiveness losses in its three major exporting categories namely C2 (vegetable products), C4 (prepared foodstuffs, spirit and tobacco), and C11 (textiles). These categories, when combined, account for almost half of total Greek exports.

In other sectors of significance for Greek exporting trade, Greece experienced moderate losses both in the 1980s and the 1990s for C6 (chemicals) and C15 (base metals) and recorded moderate gains in the case of C5 (mineral products). For the

[19]Indeed, our year-by-year estimates of the two competitiveness indexes used to estimate the values presented in Table 5 below suggest a partial recovery of competitiveness in 1999 and 2000.

[20]C19 and C21 are excluded as their contribution to Greek external trade is infinitesimal (see Table 1).

Table 5. Competitiveness developments, 1970-2000: Balassa and Adjusted Grubel-Loyed Index

	(a) Balassa Index					(b) Adjusted Grubel-Lloyd Index				
	Average observed values			Difference with previous		Average observed values			Difference with previous	
	1970-80	1981-89	1990-2000	1981-89	1990-2000	1970-80	1981-89	1990-2000	1981-89	1990-2000
C1	-0.83	-0.89	-0.68	-0.06	0.21	0.37	0.19	0.55	-0.18	0.35
C2	0.30	0.34	0.06	0.04	-0.27	0.37	0.35	0.51	-0.02	0.16
C3	0.18	0.53	0.52	0.35	-0.01	0.46	0.29	0.27	-0.17	-0.02
C4	0.53	0.30	0.02	-0.23	-0.28	0.22	0.35	0.55	0.13	0.20
C5	-0.45	-0.43	-0.28	0.03	0.14	0.92	0.84	0.83	-0.08	-0.01
C6	-0.53	-0.61	-0.64	-0.07	-0.04	0.86	0.73	0.68	-0.13	-0.06
C7	-0.69	-0.68	-0.64	0.01	0.05	0.61	0.60	0.64	-0.01	0.04
C8	0.19	-0.08	-0.04	-0.26	0.03	0.43	0.72	0.61	0.28	-0.11
C9	-0.80	-0.78	-0.76	0.02	0.02	0.41	0.41	0.51	0.01	0.09
C10	-0.81	-0.72	-0.73	0.09	-0.01	0.40	0.54	0.53	0.15	-0.01
C11	0.14	0.23	0.10	0.10	-0.14	0.47	0.44	0.49	-0.03	0.05
C12	0.80	0.23	-0.63	-0.57	-0.87	0.08	0.32	0.77	0.24	0.45
C13	-0.45	-0.27	-0.43	0.17	-0.16	0.79	0.90	0.93	0.11	0.03
C14	-0.46	-0.31	-0.60	0.15	-0.29	0.82	0.87	0.72	0.05	-0.15
C15	-0.19	-0.20	-0.28	-0.01	-0.08	0.75	0.81	0.84	0.07	0.02
C16	-0.89	-0.83	-0.73	0.06	0.10	0.25	0.35	0.49	0.10	0.14
C17	-0.97	-0.95	-0.93	0.02	0.02	0.08	0.11	0.14	0.04	0.02
C18	-0.90	-0.90	-0.86	0.01	0.03	0.22	0.23	0.27	0.01	0.04
C20	-0.47	-0.73	-0.72	-0.26	0.01	0.87	0.57	0.53	-0.30	-0.04

Note: The definition of each of the reported categories is presented in the Appendix

remaining two agricultural categories, there are gains for both C1 (live animals and animal products) and C3 (fats, oils and waxes). The 1990s saw moderate to heavy competitiveness losses for the majority of those categories classified as labour-intensive/low-technology industries. These include C12 (footware and other related products), C10 (paper products), C13 (ceramic and glass products) and C14 (jewellery and other related items), for which Greece' gains of the 1980s were partially or fully offset in the 1990s. Labour intensive categories recording gains in the 1990s are C8 (leather products) and C20 (miscellaneous manufactures), where Greece had suffered substantial losses in the 1980s, and C9 (wood products) where Greece has had gains in the 1980s. Finally for C7 (rubber products), C16 (machinery, mechanical appliances and electrical equipment), C17 (vehicles, vessels and aircraft) and C18 (electronic products) Greece recorded

modest competitiveness gains both in the 1980s and the 1990s.

B. Adjusted Grubel-Lloyd Index: Intra- and inter-industry specialisation

Part (b) of Table 5 presents the average values of the Adjusted Grubel-Lloyd Index over the past three decades. The main findings are the following: First, Greece's external trade acquires an increasingly intra-industry character. This describes a favourable development when it refers to deficit-creating sectors and a negative one for surplus-creating ones (see section 2 above). Second, since 1981, and in particular in the 1990s, the trend towards intraindustry trade is more pronounced in the case of the six traditionally surplus-creating categories i.e. C2, C3, C4, C8, C11 and C12. This finding is consistent with the previous ones, as it suggests that Greek producers suffered efficiency/productivity losses against foreign competitors in Greece's main exporting sectors. Third, for the three categories which traditionally account for 60 to 65% of Greece's total trade deficit, namely C1, C16 and C17, Greece in the 1990s achieved a higher degree of intra-industry trade. With the exception of C20 (miscellaneous manufactures), the same applies to the remaining non-mineral deficitcreating categories. This is a positive development, which, however, does not seem to have been enough to avert a widening of the Greek trade deficit.

Overall, both indexes used for analysing competitiveness developments, suggest that in recent years Greece has lost competitiveness and experienced production efficiency losses in those sectors where she traditionally has held a comparative advantage (i.e. a trade surplus). From that point of view, the findings of Sections 4 and 5, which suggested continued import penetration from EU partners and exports' stagnation, are confirmed to be robust. The problems of Greece in the field of trade balance seem to be coming from the exports' rather than the imports' side.

VII. CONCLUDING REMARKS

This paper examined the external trade of Greece since the latter's accession to the EU in 1981. Our main findings are: (i) There have been mutually offsetting, stable over time, trade creation and trade diversion in imports from the EU and third countries respectively. (ii) There exists no positive EU effect on exports. In the 1990s, a negative structural shift in exports to Germany (the most important buyer of Greek exports) and the Netherlands has taken place. (iii) Greece has

suffered competitiveness loses throughout the post-accession period, especially during the 1990s. Competitiveness losses are more pronounced in those sectors where Greece traditionally held a comparative advantage, (agricultural, food and labour intensive products). Our findings suggest that the widening of the Greek trade deficit in the 1990s is mainly due to the exports' rather than the imports' side of the trade balance. We attribute exports' stagnation to slow economic growth in Greece's main trading partners and the negative side effects of the strong drachma policy. Given that in the context of the EMU the "emergency exit" from a trade deficit crisis, i.e. currency devaluation, does not exist, our findings imply that if the trends established in the 1990s persist, Greece may face in the future serious tensions in its external sector without obvious escape options.

Our findings also have implications for the progress achieved in real convergence. The latter is a process related to institutional reforms in labour and financial markets, public-sector restructuring and improvement in human capital, whose importance in the Greek context has been highlighted by Asteriou and Agiomirgianakis (2001). No definite conclusions can be drawn without taking these into account. Nevertheless, the external sector, where the influence of real factors like productivity and competitiveness is dominant, may be a useful indicator. Our findings are consistent with those of Bosworth and Kollintzas (2001) who argue that despite achieving nominal convergence, Greece has yet not closed the gap dividing her real economy from the hard-core of the EMU. This view is also endorsed by the Bank of Greece (see Bank of Greece 2002, p. 56). Solutions to promote competitiveness and achieve real convergence are provided by Alogoskoufis (1995), Halikias (1996), Bosworth and Kollintzas (2001), Christodoulakis (2000), Asteriou and Agiomirgianakis (2001), and the Bank of Greece (2002). For example, authorities may accelerate the pace of reforms in labour market, the pension and taxation system, and promote competition in hitherto protected sectors (energy, telecommunications etc.). The completion of the public infrastructure projects of large scale currently under construction is also an important policy priority.

Finally, our findings may also be relevant to the countries that are set to join the EU in the near future. The Greek experience shows that EU accession may operate as a negative structural shock and that implementing macroeconomic policies aiming to achieve nominal convergence is not necessarily a cost-free enterprise. Rather, EU participation may be seen as a form of investment, where the bulk of

21 In 1990, when Greece initiated its convergence effort, the unemployment rate stood at 6.4 percent. By the time of Greece's accession to the EMU (1/1/2001), it had almost doubled, reaching 11.1 per cent.

the cost appears in the short-run, taking the form of an increase in unemployment[21] and a deterioration of the current account, whereas the benefits are accrued later and are less easy to quantify. The current EU candidates might benefit from following a more balanced policy mix than the one Greece followed during the run-up of its own accession to the EMU, placing a lower weight on monetary policy and higher emphasis in the fields of fiscal consolidation and structural reform[22]. The relevance of this argument and the similarities between these countries with Greece, were ably demonstrated by the series of devaluations that took place in the Czech Republic, Hungary and Poland in the second part of the 1990s. These occurred at periods when all three countries were implementing exchange rate targets and followed significant deterioration of the current account. In the Czech Republic and Poland, they finally resulted in the replacement of exchange rate targets by a less rigid monetary policy framework, namely inflation targets, combined with the introduction of fiscal and other structural reforms. Since then, both countries have achieved progress in the field of nominal convergence improving, at the same time, their current account position (see Masson, 1999 and Kutan and Brada, 2000).

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APPENDIX: DEFINITION OF THE CATEGORIES OF THE GREEK TARIFF SCHEDULE

C1 = Live animals and animal products

[22]See Halikias (1996). Also, chapter 7 in Mourmouras and Arghyrou (2000) presents a detailed discussion on the lessons EU candidates may obtain from the Greek experience.

C2 = Vegetable products
C3 = Animal and vegetable fats and oils and their cleavage products. Prepared edible fats. Animal and vegetable waxes.
C4 = Prepared foodstuffs. Beverages, spirits and vinegar. Tobacco
C5 = Mineral products
C6 = Products of the chemical and allied industries
C7 = Artifice resins and plastic materials, cellulose esters and ethers. Rubber, synthetic rubber, factice
C8 = Raw hides and skins, leather, furskins. Saddlery and harness. Travel goods, handbags. Articles of gut
C9 = Wood and articles of wood. Wood charcoal. Cork and articles of cork. Manufactures of straw, of esparto and of other plaiting materials. Basketware and wickerwork
C10 = Paper-making material. Paper and paperboard
C11 = Textiles and textile articles
C12 = Footwear, headgear, umbrellas, sunshades, whips, riding-crops Prepared feathers and articles made therewith. Artificial flowers. Articles of human hair. Fans.
C13 = Articles of stones, of plaster, of cement, of asbestos, of mica. Ceramic products. Glass and glassware.
C14 = Pearls, precious and semi-precious stones, precious metals, rolled precious metals. Imitation jewelry. Coins.
C15 = Base metals and articles of base metals.
C16 = Machinery and mechanical appliances. Electrical equipment.
C17 = Vehicles, aircraft and parts thereof. Vessels and certain associated transport equipment
C18 = Optical, photographic, cinematographic, measuring, checking, precision, medical and surgical instruments. Clocks and watches. Musical instruments, sound recorders and reproducers. Videos, video-cameras and TV sets.
C19 = Arms and ammunition
C20 = Miscellaneous manufactured articles
C21 = Works of art, collectors' pieces and antiques.

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