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INFORMAL BARRIERS, AGRICULTURAL TRADE AND THE EURO

AREA

MARILYNE HUCHET-BOURDON* and ANGELA CHEPTEA**

ABSTRACT

The EU enlargement revives the debate around the participation to the EMU. The accession to a monetary union can affect trade through several channels. In this paper we study the link between the membership to a monetary union and informal barriers to trade. The question we ask is whether the participation to the Euro Area reduces the impact of informal barriers on new members' agricultural trade. In particular, we compare institutional and informational costs on Greek agricultural imports before and after the introduction of the Euro using a gravity model. A first result we find is that the country's accession to the Euro zone has reduced the effect of information flows on its imports of agricultural products from EMU partners. Lower trade costs due to the use of a common currency compensate for the imperfect and incomplete information on foreign markets and partners available to economic agents. Secondly, institutional aspects have become a less important determinant of Greek imports from all countries. Still, this outcome concerns first of all non-EMU suppliers, who – despite their great diversity – are viewed by Greek partners as more homogeneous in terms of institutions' quality after 2001.

Keywords: agricultural trade, informal barriers, monetary union, gravity model.

1 INTRODUCTION

On January 1st 2007, six years after the entry of Greece, the European Economic and Monetary Union (EMU) has enlarged for a second time by accepting Slovenia. If the accession of Greece in January 2001 hasn't drawn a lot of attention, the entry of a new member country from Central and Eastern Europe (CEE) awakens the debate around the participation to the monetary union.

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In May 2004 ten countries from CEE became New Member States (NMS) of the European Union (EU): Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia; two more joined the Union this year: Bulgaria and Romania. These accessions became possible in particular due to the progress recorded by these countries during a still unfinished transition and convergence process. For newcomers EU membership implies as well the accession to the EMU and the introduction of the Euro, once they fulfil the Maastricht convergence criteria. Unlike for Denmark and the United Kingdom in 1999, there is no opt-out clause for NMS. Therefore, the participation to the Euroland and its effects are a key issue for the latter.

The economic effects of currency unions have long been a center of interest for policy makers and scholars. The literature shows that monetary unions involve both costs and benefits for member countries. The most commonly identified cost is the loss of monetary policy as national stabilization tool. Theoretical work in this direction gave birth to the theory on optimal currency areas. Empirical studies, aimed to measure the costs of monetary unions, and to test theoretical predictions.¹ The most commonly identified benefit of monetary unions is the increase in trade and investment they might foster. The relationship between monetary unions and trade has been largely explored in the literature.² Theoretical and empirical works show that the use of a common currency not only eliminates the risks and costs linked to exchange rate fluctuations, but also promotes the convergence of production cycles of the participating countries; both aspects positively affect mutual trade.

Nevertheless, individual sectors are seldom considered in this literature. In this paper we address the link between monetary union and agricultural trade. We choose to focus on trade in agricultural products for several reasons. First, this sector represents a large share of the economy of the NMS. Secondly, trade barriers are considerably larger in the agriculture compared to the industrial sector. Finally, in most current EMU countries this sector has already benefited from specific government policies aimed at reducing the burden of exchange rate fluctuations many years prior to the creation of the EMU.

Moreover, the accession to a monetary union can affect trade also through other, not less important, channels. In this paper we study the link between the membership of a monetary union and informal barriers to trade. By informal barriers we mean poor governance, poor

¹ Mundell (1961), McKinnon (1963), Kenen (1969), De Grauwe (1999), Huchet-Bourdon and Pentecôte (2007).

² Rose (2000), Rose and van Wincoop (2001), Bun and Klaassen (2007), Micco et al. (2003), De Sousa and Lochard (2006), Gomes et al. (2004), Rose and Stanley (2005).

functioning national institutions, heterogeneity of norms, procedures, and behaviours from one country to another, unfamiliarity with the foreign environment, the lack of information on foreign partners, preferences, and practices, etc. The planned accession to a monetary union obviously determines the country to undertake some important changes in its policies and institutions, which may translate at the end of the day into less penalising informal barriers. Thus, a country aiming to join the EMU may find itself trading at considerably lower costs with other EMU members without making any specific efforts in this direction. The question we ask in this paper is whether the participation to the Euro Area will reduce the effect of informal barriers on new countries' agricultural trade. To answer it, we analyse the effect of three types of variables – the quality of exporter and importer institutions, their similarity, and cross-border information flows – on foreign trade before and after accession.

We base our analysis on Greek imports of agricultural products from partners in the Euro area and third countries between 1996 and 2005. The choice of Greece is motivated by three things: (i) latter accession to the Euro area, (ii) similarity in terms of economic development, geographic location, and share of agriculture in domestic production and employment to the new EU members, and (iii) data availability³. We use a gravity model similar to Anderson and van Wincoop (2003, 2004) to measure the effects of informal barriers on agricultural trade before and after the adoption of the Euro.

The literature and the practice suggest that the participation to a currency union usually induces a convergence of economic policies and an intensification of mutual exchange among the participating countries. In line with these expectations, we find evidence of a reduction of institutional and information costs for agricultural imports of Greece after its participation to the EMU. The country's accession to the Euro zone is followed by a drop in the impact of information flows on its imports from EMU partners, and of institutional aspects on trade with third countries. Lower trade costs due to the use of a common currency compensate for costs induced by imperfect and incomplete information on foreign markets and partners available to economic agents. At the same time, the country's participation to a currency union introduces a supplementary differentiation among source countries, reducing thereby the importance of other aspects, such as the quality of partner's institutions. Obtained results represent an additional element to consider by new member states from Central and Eastern Europe in their decision to participate or not to the monetary union.

³ Slovenia has entered the Euro zone in 2007 and data on its foreign trade is not yet available.

The remainder of the paper is as follows. The next section reviews the relations between monetary union, trade, and informal barriers. Section 3 details the methodology. We report our main results and conclusions in sections 4 and 5, respectively.

2 THE LITERATURE

2.1 Monetary union and trade

The relationship between monetary (currency) unions and trade has been largely investigated in the economic literature, particularly because of its important policy implications. The issue gained in interest on the eve of the EMU creation, as both policy makers and scholars questioned themselves on the effects of a common European currency. The debate was initiated by Rose (2000), who found that establishing a common currency significantly increases trade among union members: member countries trade three times more than similar countries with separate currencies. Several studies, built on the same framework, provided support of a very substantial effect of currency unions on trade flows. (Rose and van Wincoop (2001), Rose and Engel (2002), Glick and Rose (2002), etc.) This finding proved to be robust to many adjustments in the data and the use of different estimation techniques (panel, cross-section, controls for multilateral resistance, volatility, etc.). However, authors caution against the applicability of this result to the EMU. Most countries within a currency union prior to 1999 – the ones on which were based all the above studies, despite variations in the country samples employed – are small, poor or both, colonial countries, unlike most of the EMU nations. Baldwin et al. (2005) point out that the currency dummy in the above studies measures, therefore, only “whether the abolition of a common currency reduces trade”, and that nothing can be inferred about the effect of the creation of a monetary union, such as the EMU.

As a result, more recent studies, including Bun and Klaassen (2007), Micco, et al. (2003), Gomes et al. (2004), Baldwin et al. (2005), Rose and Stanley (2005), De Sousa and Lochard (2006), focus on the specific case of EMU. The trade effect of the Euro is estimated by comparing the trade of EMU members to that of similar third countries, to their own trade before they have joined the union, or both. Again, estimates suggest that the EMU has had a sizable impact on member countries’ international trade patterns, although figures are seldom considerably lower than in the previous studies. For instance, Micco, et al. (2003) find that trade has increased by about 4% to 16% for country pairs that have adopted the Euro. Using a

meta-analysis, Rose (2004a) finds that the EMU increases bilateral trade by between 30% and 90%.

But even if the effect of a common currency on trade is well established, the reasons of it are not completely clear. A first and main explanation provided by the literature is lower transaction costs between members of a currency union. The use of a common currency eliminates the risks and costs linked to the conversion of collateral monetary flows and the exchange rate volatility. But this is only a small part of the story. Berger and Nitsch (2005) analyse the impact of the Euro on trade from a historical perspective, using longitudinal data on 22 industrial countries from 1948 to 2003. Taking a long-run view on European integration, they find that the introduction of the Euro has almost no effect on trade once other elements of European economic integration are taken into account. Moreover, they conclude that a significant part of the trend in European trade integration is explained by measurable policy changes. Bun and Klaassen (2007) also note a positive association between the sample period and the estimated impact of Euro on trade. De Sousa and Lochard (2006) argue that part of the effect of currency unions on trade is indirect, coming from additional foreign direct investments promoting trade.

2.2 Informal barriers and trade

Recent works have shown that trade costs are much larger than previously thought, and so even between highly integrated countries (McCallum (1995), Wolf (2000), Anderson and van Wincoop (2003, 2004)). These results generated an increasing interest among economists for the study of less formal trade barriers, such as the lack of reliable information and contacts, uncertainty, unfamiliarity, regulatory, search, contract enforcement costs, etc. We shall refer to the latter throughout the paper as informal barriers to trade. Gould (1994), Rauch and Trindade (2002), Combes et al. (2005) explore the role of cross-border business and social networks in reducing transaction costs between countries and regions. Anderson and Marcouiller (2002), Jansen and Nordas (2004), and Koukhartchouk and Maurel (2003) illustrate the pro-trade effect of sound institutions. De Groot et al. (2004) and Chepcea (2007) show that not only the poor quality of institutions, but also their dissimilarity between countries act as relevant obstacles to trade. Francois and Manchin (2006) identify institutional quality as a significant determinant of export levels, and of the likelihood exports that will take place at all. Turrini and van Ypersele (2006) demonstrate the relevance of legal costs in displacing trade at both inter-national and intra-national level. Guiso, Sapienza and Zingales

(2004) argue that cultural distance or trust is a robust explainer of the volume of international trade. Noland (2005) shows that popular attitudes toward foreign countries convey information about trust, risk, and transaction costs in international trade beyond what can be explained via standard economic models. Nicita and Olarreaga (2000, 2007) and Portes and Rey (2005) insist on the role of information flows in shaping international capital and trade patterns.

All these papers show that informal barriers are an important burden to trade within, but in particular across national borders. The present paper focuses on two types of informal barriers: (i) institutions' quality and similarity across trade partners, and (ii) cross-border information flows.

There is a handful of studies on the role of informal aspects in the particular case of agricultural products. Porto (2005) shows on the case of Moldova - a country heavily depending on agricultural production and exports - that improving export practices, such as cumbersome practices, costly regulations, and bribes, has a large poverty alleviation impact. Boussard et al. (2004) find that imperfect information in the agricultural sector removes the global gains associated with trade liberalization. Ruijs et al. (2004) illustrate that the reform of market institutions is essential for achieving a substantial improvement of food trade in Burkina Faso. Swinnen et al. (2001) show that changes in Belgium's political institutions during the 20th century have affected the country's level agricultural protection.

Similarly, there are very few studies of agricultural trade employing a gravity approach. Koo et al. (1994) develop a product-level gravity model to determine factors affecting trade flows of meat. Otsuki et al. (2001, 2004) use a gravity equation to study the effect of food safety standards and environmental protection on South-North agricultural trade. Paiva (2005) applies the gravity approach to the issue of protectionism and subsidies in agriculture. Kim, et al. (2003) use a dynamic gravity equation and show that the national product differentiation model explains food and agricultural trade more properly. Huchet-Bourdon and Pishbahar (2007) use a gravity model to measure the impact of the Regional Trade Agreements on European agricultural imports.

In this paper we argue that the participation of a country to a currency union is likely to reduce the importance of informal barriers for its foreign trade. Our idea is simple. Economic agents from a country with its own currency treat equally all partners in terms of membership

to a currency union. A conversion of payment from foreign to national currency or vice versa is required in all cases. The preference for one currency or another is largely driven by the exchange rate uncertainty, revealed to great extent by the volatility of the exchange rate. When the country joins a currency union, however, the fact whether the trade partner is also a member of the union or not becomes important. The presence of this previously inexistent differentiation among foreign partners reduces the weight of other characteristics, including information, unfamiliarity, regulatory, search costs, etc. Moreover, the participation to a currency union is usually accompanied by a convergence of economic policies and institutions of the participating countries, and leads to more transparent information. This translates by a reduction of informal barriers for trade with partners within the currency union.

3 METHODOLOGY AND DATA

3.1 Model

We use a theory-based conditional general equilibrium model similar to Anderson and van Wincoop (2003, 2004). We assume that each country is specialized in one agricultural good, and that the bilateral allocation of trade across countries is separable from the allocation of each country's production and consumption levels. Consumers maximize a CES demand structure under the budget constraint. Trade costs are assumed proportional to trade, and are broadly defined to include all costs incurred with getting a good to a final user, other than the production cost of the good itself :

$$t_{ij} = d_{ij}^{\gamma_1} \cdot \exp(\text{land}_{ij}^{\gamma_2}) \cdot \exp(\text{RTA}_{ij}^{\gamma_3}) \cdot \exp(\text{MU}_{ij}^{\gamma_4}) \cdot \exp(\text{vol}_{ij}^{\gamma_5}) \cdot \exp(\text{institqlt}_i^{\gamma_6}) \cdot \exp(\text{institqlt}_j^{\gamma_7}) \cdot \exp(\text{instsim}_{ij}^{\gamma_8}) \cdot \text{info}_{ij}^{\gamma_9} \quad (1)$$

d_{ij} stands for the bilateral distance between i and j , land_{ij} , RTA_{ij} , and MU_{ij} are dummy variables accounting respectively for a common land border, the existence of a regional trade agreement between the two countries, or the membership to the same monetary union. vol_{ij} is the volatility of the official exchange rate between the two countries' currencies, and the last three variables of (1) capture the effects of informal trade barriers. instqlt_i and instqlt_j stand for the quality of institutions in country i , respectively j , instsim_{ij} accounts for the similarity of institutions in the two countries, and info_{ij} represents the information flows between i and j . Thus, a supplier from country i receives p_i monetary units for a unit of agricultural good sold

to consumers in country j , while the latter pay $p_{ij} = p_i \cdot t_{ij}$ for the same good. Imposing market-clearing, the model predicts the following value for imports of agricultural products of country j from source country i :

$$T_{ij} = \frac{Y_i \cdot E_j}{Y^w} \cdot \left(\frac{t_{ij}}{P_j \cdot \Pi_i} \right)^{1-\sigma} \quad (2)$$

where Y_i is the agricultural production of country i , E_j is the total expenditure of country j on agricultural products, Y^w is the world agricultural income, σ is the elasticity of substitution between any two import sources, P_j is a non-linear price index specific to source country j :

$$P_j = \left[\sum_i (p_{ij})^{1-\sigma} \right]^{\frac{1}{1-\sigma}} = \left[\sum_i (p_i \cdot t_{ij})^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \quad (3)$$

and Π_i is a weighted average import price – across trade partners – of agricultural goods from country i :

$$\Pi_i = \left[\sum_j \frac{E_j}{Y^w} \cdot \left(\frac{t_{ij}}{P_j} \right)^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \quad (4)$$

As in traditional gravity models, equation (2) establishes a positive dependence between the economic size of each country and the value of goods traded between them, and a negative one with respect to the bilateral trade cost or barrier. However, what actually counts are relative trade barriers – relative to the average price of imports of country j from all sources, and to the average price of goods exported by source country i to all partners. This aspect is reflected by the inclusion of the multilateral resistance terms P_j and Π_i at the denominator in equation (2).

Integrating the trade costs function (1) in equation (2) and taking the logarithm, we obtain the final trade equation:

$$\begin{aligned} \ln T_{ij} = & \ln Y_i + \ln E_j - \ln Y^w + (\sigma - 1) \ln P_j + (\sigma - 1) \ln \Pi_i - (\sigma - 1) \gamma_1 \ln d_{ij} - (\sigma - 1) \gamma_2 \ln land_{ij} \\ & - (\sigma - 1) \gamma_3 \ln RTA_{ij} - (\sigma - 1) \gamma_4 \ln MU_{ij} - (\sigma - 1) \gamma_5 \ln vol_{ij} - (\sigma - 1) \gamma_6 \ln instqlt_i - (\sigma - 1) \gamma_7 \ln instqlt_j \\ & - (\sigma - 1) \gamma_8 \ln instsim_{ij} - (\sigma - 1) \gamma_9 \ln info_{ij} \end{aligned} \quad (5)$$

that we shall use for estimations in section 4.

3.2 Measuring the multilateral resistance terms

A key insight of the theory is that bilateral trade depends not only on bilateral trade costs t_{ij} , but also on importer and exporter multilateral resistance (or remoteness) P_j and Π_i .⁴ The latter have only been recently introduced in empirical studies, and few methods exist to proxy these variables. Wei (1996) computed country-specific remoteness indices as the average distance of a country to its partners, weighted by the partners' share in world GDP, and introduced them in a trade equation in order to control for the absence of other trading partners close to hand (the famous case of Australia and New Zealand). Similar measures of multilateral resistance were used later by Helliwell (1997), Frankel (1997), Deardorff (1998), Soloaga and Winters (2001), Clark and van Wincoop (2001), Rose (2004b), Wagner (2003) and others. In all these studies the remoteness refers to a country's distance from world markets, and has a positive impact on trade: the more remote a country is, the more it will trade with a partner of a given distance, because it has less trade diverted away to closer countries.

Anderson and van Wincoop (2003) point out the lack of theoretical foundations of these measures, and suggest replacing the multilateral resistance indices with country-fixed effects. Harrigan (1996), Hummels (1999), Hillberry and Hummels (2002) also estimate gravity trade equations with country fixed effects. Baldwin and Taglioni (2006), Subramanian and Wei (2007) work with panel data and use time-varying importer and exporter effects.

In this paper we use a data panel covering Greek imports from all its partners during a ten-year time period. The use of exporter-specific fixed effects is not a satisfactory solution in this case. Time-varying fixed effects cover the entire dimension of the data and can alone explain all trade flows. The use of fixed effects constant across time is also constraining as they capture a lot of the variance of the explanatory variables (distance, institutional variables). Therefore, we choose to compute resistance terms according to the predictions of the theoretical model. Since in this paper we focus on Greek imports only, there is no need to compute importer's (inward) remoteness. It varies very little across the period and is quite accurately captured by the constant term.

First, we calculate the average trade-weighted price of imports of goods from i to all partners as an approximation for the outward resistance Π_i :

⁴ Wei (1996), Deardorff (1998), and Anderson and van Wincoop (2003) emphasize that the standard gravity model might have been misspecified in ignoring a multilateral resistance or remoteness term.

$$\Pi_i = \sum_k \left(\frac{\sum_j p_{ij}^k IMP_{ij}^k}{\sum_j IMP_{ij}^k} \right) \left(\frac{\sum_{i,j} IMP_{ij}^k}{\sum_{i,j,k} IMP_{ij}^k} \right) \quad (6)$$

IMP_{ij}^k is the value of imports of j to i of product k ; bilateral prices p_{ij}^k are unit values obtained as the ratio of imports expressed in value terms and imports for the same trade flow in volume terms. This method is consistent with the definition of multilateral terms: the outward resistance term Π_i captures the average trade resistance faced by exporting country's goods.

Secondly, we compute the term Π_i according to equations (3) and (4), using an elasticity of substitution $\sigma = 3$, in line with the literature on agricultural trade:

$$\Pi_i = \sum_k \left(\sum_j \left(\frac{p_{ij}^k}{p_i^k p_j^k} \right)^{1-\sigma} \frac{Y_j}{Y^W} \right)^{\frac{1}{1-\sigma}} \left(\frac{\sum_{i,j} IMP_{ij}^k}{\sum_{i,j,k} IMP_{ij}^k} \right) \quad (7)$$

p_i^k is the production price of good k in the exporting country I , computed as the average export price of good k by country i to all its partners:

$$p_i^k = \frac{\sum_j \hat{p}_{ij}^k EXP_{ij}^k}{\sum_j EXP_{ij}^k} \quad (8)$$

with \hat{p}_{ij}^k standing for the unit value of exports of product k of country i to partner j , and EXP_{ij}^k is the value of exports from i to j .

Multilateral remoteness is computed for each country and each year within the considered period. We compute the two multilateral resistance terms at product (k) level, and then aggregate these measures across all agricultural goods to obtain country-level remoteness terms. Average global trade across the period in each product k is used as weights for this aggregation. We expect to obtain positive estimates of the coefficients of multilateral resistance terms in the trade equation (2).

3.3 Data

The empirical analysis in this paper is based on Greek imports from 132 source countries, including the 11 EMU members, between 1996 and 2005. The data employed is from a number of sources. Agricultural trade is obtained from COMTRADE by summing up 6-digit

data according to the HS1992 classification for all agricultural and food products. Agricultural production and bilateral exchange rates for EMU countries (the first sample) are from the EUROSTAT database. Agricultural expenditure is computed as domestic production less exports and plus imports from all partners. For estimations using the larger sample, countries' GDPs and annual exchange rates are obtained from World Bank's WDI database. Trade and production data is deflated using the HCPI for the EMU sample, and by countries' CPIs in the case of the second panel of countries. In doing so, we also adjust for changes in the exchange rate. First we convert USD trade flows in local currency. Then we deflate the obtained series by country-specific (H)CPI. Finally, we apply the base-year (2000) exchange rate to obtain the real value of trade flows expressed in USD. Data on bilateral distance and common land border are from the Cepii database. The variable on the membership to a regional trade agreement is constructed according to the WTO's list of declared agreements. It takes the value one for all years and partners who were granted preferential access to the EU market, and zero otherwise. Institutional variables are from a variety of sources. We use the rule of law estimate from Kaufmann et al. (2006)'s dataset on governance indicators for institutional quality. The similarity of institutions of the importing and the exporting country is reflected by the same origin of the company law or commercial code, according to La Porta et al. (1999) data. Bilateral information flows for a given pair of countries correspond to the average trade in both directions of newspapers and are obtained from the COMTRADE database, code 4902 in the HS1996 classification. The exchange rate volatility is computed as the standard deviation of the average monthly official exchange rate between the partner's local currency and the Greek drachma prior to 2001, and the Euro afterwards. We use EUROSTAT data for the first (EMU) panel of countries, and IFS data for the second sample to compute these exchange rates.

4 RESULTS

In this paper, we question whether and how EMU membership affects the impact of informal barriers on a country's agricultural trade. We use data on Greek imports pooled over time – from 1996 to 2005 – for our empirical analysis. Estimations are conducted separately on two data panels, and the set of explanatory variables is adjusted to the sample of countries considered each time.

First, we focus on intra-EMU agricultural trade. For that, we consider a restrained panel of the agricultural imports by Greece from the other eleven EMU partners. Note, that in this case

there are no trade policy barriers, and none of the countries in the sample shares a common land border with Greece. Therefore, we can drop these variables from trade equation (5). Variables specific to Greece are also dropped from the model due to their non significant variation during the considered period. Hence, we estimate the following equation for the imports of Greece from other EMU partners:

$$\ln IMP_{iGRC,t} = \hat{\alpha}_0 + \hat{\alpha}_1 \ln Y_{i,t} + \hat{\alpha}_2 \ln \Pi_{i,t} + \hat{\alpha}_3 \ln d_{iGRC} + \hat{\alpha}_4 MU_t + \hat{\alpha}_5 vol_{iGRC,t} + \hat{\alpha}_6 instqlt_{i,t} + \hat{\alpha}_7 instsim_{iGRC,t} + \hat{\alpha}_8 info_{iGRC,t} + \hat{\epsilon}_{i,t} \quad (9)$$

Secondly, we look at the agricultural imports of Greece from 132 partners for which data is available (both EMU members and third countries). In this case all right hand side variables from the trade costs equation (1) are included:

$$\ln IMP_{iGRC,t} = \hat{a}_0 + \hat{a}_1 \ln GDP_{i,t} + \hat{a}_2 \ln \Pi_{i,t} + \hat{a}_3 \ln d_{iGRC} + \hat{a}_4 land_{iGRC} + \hat{a}_5 RTA_{iGRC,t} + \hat{a}_6 MU_{iGRC,t} + \hat{a}_7 vol_{iGRC,t} + \hat{a}_8 instqlt_{i,t} + \hat{a}_9 instsim_{iGRC,t} + \hat{a}_{10} info_{iGRC,t} + \hat{u}_{iGRC,t} \quad (10)$$

Note, that in the latter case country agricultural production is replaced by country GDP due to the lack of internationally comparable data for a large number of world countries.

Table 1 shows results for agricultural imports of Greece from EMU partners. We obtain coefficient estimates on production and distance in line with findings in the literature, both in terms of value and significance. We also find that multilateral resistance, computed as the average import price, has a positive and highly significant effect on trade, as implied by the theoretical model. Using non-linear price indexes instead yields lower and less significant values, but leaves unchanged the coefficients of the other explanatory variables. Institutional variables are always significant and with the expected sign, confirming previous results in the literature that better and similar institutions promote trade. The use of cross-border information flows as explanatory variable introduces a significant multicollinearity bias. Therefore, we estimate first average bilateral trade with newspapers on countries' GDP, bilateral distance, institutional quality and similarity, and then use the obtained residuals as a measure of the intensity of informational flows between the two countries (columns 4 and 7). The coefficient on this variable represents the increase in trade generated by the part of information flows and which can not be explained by the other variables of the model. Results show that the quality of institutions is the most important informal barrier which affects Greek imports from EMU partners during the studied period. EMU membership and exchange rate volatility have a significant impact on trade only when informal barriers are included in the

Table 1: Greek imports from EMU partners, 1996-2005

	Explained variable : Ln import						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ln production	1.286 (0.123)***	1.499 (0.127)***	1.380 (0.126)***	1.362 (0.123)***	1.477 (0.125)***	1.376 (0.126)***	1.361 (0.125)***
Ln outward remoteness	0.802 (0.079)***	0.907 (0.078)***	0.903 (0.075)***	0.850 (0.076)***	0.845 (0.063)***	0.823 (0.062)***	0.767 (0.066)***
Ln distance	-0.882 (0.413)**	-1.009 (0.386)**	-1.407 (0.387)***	-1.438 (0.380)***	-0.954 (0.380)**	-1.238 (0.382)***	-1.227 (0.378)***
Greece and partner in EMU	0.072 (0.303)	0.388 (0.293)	0.531 (0.283)*	0.600 (0.277)**			
Exchange rate volatility	0.089 (0.074)	0.073 (0.069)	0.132 (0.068)*	0.160 (0.067)**			
Rule of Law		1.454 (0.369)***	2.310 (0.439)***	2.279 (0.428)***	1.360 (0.348)***	2.068 (0.424)***	2.014 (0.419)***
Common legal origin			1.054 (0.324)***	1.146 (0.317)***		0.871 (0.317)***	0.921 (0.313)***
Ln information flows (res)				0.103 (0.038)***			0.089 (0.039)**
Constant	8.826 (3.748)**	4.750 (3.639)	6.878 (3.526)*	-11.277 (4.767)**	5.312 (3.512)	6.966 (3.450)**	-11.407 (4.732)**
Observations	100	100	100	100	100	100	100
R-squared	0.76	0.79	0.83	0.92	0.79	0.81	0.81

Note: Standard errors in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%.

model. Our data shows that currency union membership has a 82% [= $\exp(0.6) - 1$] trade-creation effect in the case of Greece. This result is almost twice the estimate of Baldwin et al. (2005) for the same sector (agriculture) using a panel of 19 industrialized countries. The quite puzzling positive coefficient on exchange rate volatility in Table 1 may actually reflect a general time trend in the data.⁵ Thus, one may affirm that the positive effect of EMU can be partially attributed to the increasing intra-EU economic integration across time, too. Unfortunately, we cannot use year dummies to control for this effect, as it would cause the non-identification of the parameter on country's membership to the EMU. Therefore, in order to shed more light on this matter, we analyse the effect of the Euro on Greek imports using a larger sample of countries.

Estimation results for the second panel of observations are presented in Table 2. Note, that in this case we have a larger set of explanatory variables than before. We add a dummy variable

⁵ Indeed, within the considered panel this variable does not vary across countries from 2001 on, when Greece adopted the common European currency. Still, the literature shows that exchange rate uncertainty, proxied by volatility variables, may have a positive effect on bilateral trade under certain conditions, such as trade hysteresis.

for a common land border, and another for regional trade agreements, in line with equation (10). An OLS estimation technique correcting for the correlation of residuals of the same trade partner is employed. As previously, the coefficient estimates of standard gravity variables are highly significant and very close to values found in most empirical studies. We also find the expected negative effect of exchange rate volatility on trade. The common land border and RTA variables have a positive and significant effect on trade, however significantly larger in magnitude than suggested by the literature. Thus, according to Table 2, Greece imports on average between $7[\approx \exp(1.926) - 1]$ and $14.5[\approx \exp(2.678) - 1]$ times more of agricultural products from the four countries with which it shares a land border than from other similar partners, while a preferential access to the European market more than doubles a country's exports to the Greek market. The positive effect of Greece's accession to the Euro area on its trade with EMU partners is more prominent in this case, and appears even when no control of informal barriers is included (column 1). Estimated coefficients, when significant, remain unchanged when the two currency cost variables are excluded from the estimation (columns 5 to 7). Joining these findings with those from Table 1, we conclude that Greece has increased its imports from EMU partners not only after, but also due to having joined the Euro zone. However, even in this case it is important to control informal barriers, since EMU members possess on average better institutions.

Still, the pro-trade effect of the EMU in Table 2 is well above the values usually found in the literature⁶. This is due to the fact that our EMU dummy captures a large part of the EU membership effect. The data panel employed does not permit a good separation of the two effects due to the high correlation of explanatory variables. Eleven of the fourteen EU partners of Greece are also in the Euroland, and the average quality of national institutions of the latter is significantly higher than that of Greece's non-EU trade partners. Therefore, a binary variable controlling for EU membership captures a large share of the variance in the data on institutional and currency costs. Adding it on the right hand side of equation (10) produces non-significant estimates of coefficients on main variables of interest (column 8 of Table 2). According to our estimates, Greek imports from EU partners are $9[\approx \exp(2.185) - 1]$ times larger than imports from third countries. The non-significant value of the coefficient on

⁶ Despite the large effect of currency unions on trade found by Rose and his co-authors, results are much smaller for the EMU. Empirical studies predict a trade creation effect of the Euro between 5% and 30%. See Baldwin et al. (2005) for an ample discussion.

Table 2: Greek imports from world partners, 1996-2005

	Explained variable : Ln import									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ln GDP	0.724 (0.110)***	0.639 (0.110)***	0.639 (0.110)***	0.612 (0.085)***	0.65 (0.110)***	0.648 (0.110)***	0.625 (0.086)***	0.576 (0.085)***	0.613 (0.084)***	0.625 (0.085)***
Ln outward remoteness	0.619 (0.147)***	0.523 (0.160)***	0.522 (0.154)***	0.413 (0.114)***	0.486 (0.152)***	0.48 (0.145)***	0.366 (0.106)***	0.346 (0.102)***	0.411 (0.112)***	0.365 (0.104)***
Ln distance	-0.698 (0.245)***	-0.567 (0.241)**	-0.569 (0.247)**	-0.453 (0.215)**	-0.624 (0.241)**	-0.635 (0.248)**	-0.531 (0.216)**	-0.291 (0.224)	-0.454 (0.214)**	-0.532 (0.215)**
Greece and partner in EMU	2.124 (0.508)***	1.481 (0.522)***	1.477 (0.525)***	1.689 (0.414)***				0.421 (0.369)	1.677 (0.443)***	
Exchange rate volatility	-0.004 (0.002)*	-0.004 (0.002)*	-0.004 (0.002)*	-0.003 (0.002)*				-0.002 (0.001)*	-0.003 (0.002)*	
Common land border	1.926 (0.648)***	2.59 (0.687)***	2.587 (0.699)***	2.678 (0.705)***	2.369 (0.766)***	2.339 (0.787)***	2.463 (0.767)***	2.643 (0.658)***	2.683 (0.703)***	2.467 (0.765)***
Regional trade agreement	0.379 (0.497)	0.901 (0.484)*	0.897 (0.508)*	0.859 (0.432)**	1.113 (0.465)**	1.067 (0.495)**	1.057 (0.439)**	0.275 (0.461)	0.872 (0.403)***	1.068 (0.408)***
Rule of Law		0.59 (0.271)**	0.592 (0.270)**	0.562 (0.220)**	0.694 (0.266)**	0.702 (0.264)***	0.687 (0.224)***	0.246 (0.238)	0.567 (0.204)**	0.691 (0.206)***
Common legal origin			0.012 (0.409)	-0.038 (0.366)		0.107 (0.422)	0.073 (0.375)	-0.057 (0.362)	-0.047 (0.361)	-0.064 (0.366)
Ln information flows (res)				0.223 (0.039)***			0.219 (0.043)***	0.176 (0.030)***	0.222 (0.033)***	0.218 (0.036)***
EU partner								2.185 (0.560)***		
EU membership probability of the partner									4.105 (0.818)***	4.126 (1.083)***
Constant	-1.416 (3.560)	-0.375 (3.455)	-0.357 (3.450)	-0.023 (2.756)	-0.079 (3.472)	0.089 (3.489)	0.421 (2.819)		-0.034 (2.735)	0.41 (2.793)
Observations	996	975	975	975	975	975	975	975	975	975
R-squared	0.47	0.49	0.49	0.56	0.48	0.48	0.55	0.58	0.57	0.56

Note: Standard errors in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%.

the EMU variable, however, does not necessarily mean that trade between EMU partners is not even larger.⁷ One can still separate the impact of EU membership on Greek imports using partial estimates as in the case of information flows. The procedure is, however, slightly different in this case, since we deal with a dichotomic variable. Instead of residuals, the probability of a country to be a EU member that can not be explained by the independent variables in equation (10) is used as additional explanatory variable. We compute it as the difference between the EU dummy and the probability of a country to be in the EU, estimated with a Probit model and all explanatory variables of agricultural trade discussed above.⁸ Results are shown in column 9 of Table 2. The value of estimated coefficients is not statistically different from the first seven columns. Again, we find a large positive and highly significant effect of EU membership on Greek imports, showing that Greece trades more with all EU partners, even after controlling for the same currency, the quality and similarity of institutions, and information flows. Nevertheless, we are not able to identify the pure effect of EMU on trade. The coefficient of the EMU variable captures the joint EU and currency union effect for partners in the Euro zone.

Note, that the pro-trade effect of well-functioning institutions of the partner is considerably smaller when the large sample is used. Contrary to the first panel of observations, the coefficient on common legal origin is always non-significant. This suggests that institutional similarity increases trade only for a high level of economic integration among partners, or in the presence of well-functioning institutions. The difference in the value of coefficients on information flows between Tables 1 and 2 indicates that the latter are more likely to generate supplementary or larger trade flows from non-EMU partners.

Finally, in order to answer the central question of this paper, i.e. how EMU membership has affected the impact of informal barriers on trade, we add separately six interaction terms to the set of explanatory variables considered above. We choose the most complete specification – given by column 4 from Table 2⁹ – and display estimation results in Table 3. The first three columns show coefficient estimates obtained with the interaction terms between the MU_{iGRC} dummy and each of the three indirect measures of informal trade barriers. Estimated values

⁷ The correlation coefficient between the EMU and EU dummies is equal to 0.59.

⁸ Note that the inverse operation, i.e. the use of partial estimates of EMU membership and institutions' quality as a function of EU membership, is not possible since the non-EU membership predicts perfectly the non-participation to the Euro area.

⁹ The specification (9) from Table 2 is not used as the reference because one needs to correct also for the correlation between interaction terms and the EU variable. This task requires a lot of additional information, since informal barriers also lower for trade with EU countries.

are almost unchanged with respect to the trade specification without interaction terms. As for the latter, a statistically significant value is obtained only for the coefficient of the MU_{iGRC} variable interacted with information flows. We find that once both partners share a common currency, information flows are a less important determinant of mutual trade. Indeed, a 1% increase in bilateral information flows generates a 13% [$\approx (\exp(0.232 \cdot 0.543) - 1)$] growth of Greek agricultural imports from a non-EMU partner, while only half as much for its imports from a EMU member [$7\% \approx (\exp((0.232 - 0.109) \cdot 0.543) - 1)$].¹⁰ Almost half of the value of newspapers exchanged between Greece and EMU countries are with Germany. On average, during the studied period bilateral trade in newspapers between the two countries amounted to 5.2 million euros. Using estimated values of coefficients from Table 2, we find that before Greece has joined the EMU, these information flows explained 19% [$\approx 1 - 1/(5.2^{(0.232 \cdot 0.543)})$] of Greek imports of German agricultural products, but only 10% [$\approx 1 - 1/(5.2^{(0.232 - 0.109) \cdot 0.543})$] in the following years. Non-significant estimates of the interaction terms in columns 1 and 2 are due to their high correlation with the EMU membership.

Coefficient estimates with interaction terms between institutional and informational variables and Greece EMU membership are reported in the last three columns of Table 3. As Baldwin et al. (2005), we find evidence of a positive effect of the Euro also on trade with third countries. Greece has increased its imports from all partners on average by 60% [$= \exp(0.471) - 1$] after it has joined the EMU. The negative significant effect of the interaction term with the institutional quality (column 4) reveals a decrease of its impact on Greek agricultural imports after 2001. The joint result of the two effects for the average partner is positive – its exports to Greece increase – but the preference of Greek importing firms for suppliers from countries with good institutions drops. For example, the improvement in the functioning of national institutions achieved by Turkey from 2001 to 2005 led to a 4.6% [$= \exp(0.07)^{(0.844 - 0.596)} / \exp(-0.11)^{(0.844 - 0.596)} - 1$] increase in its exports of agricultural products to Greece. An equal change would have produced a 16.5% [$= \exp(0.07)^{0.844} / \exp(-0.11)^{0.844} - 1$] growth of Turkish exports before 2001. Similarly, in 2000 Greece imported on average 2.2 [$= \exp(0.52)^{0.844} / \exp(-0.42)^{0.844}$] times more from a country with institutions of the same quality as South Korean institutions than from a country with the quality of institutions equal to those of China. After Greece has adopted the Euro this

¹⁰ Computations take into account the explanatory power of informational flows residuals. A 1% change in information (newspaper) flows translates by 0.543% change in residuals.

Table 3: Greek imports from world partners, 1996-2005: interaction terms

	Explained variable : Ln import					
	(1)	(2)	(3)	(4)	(5)	(6)
Ln GDP	0.611 (0.031)***	0.612 (0.031)***	0.615 (0.031)***	0.625 (0.031)***	0.622 (0.031)***	0.620 (0.031)***
Ln outward remoteness	0.413 (0.072)***	0.414 (0.072)***	0.406 (0.072)***	0.395 (0.071)***	0.414 (0.072)***	0.407 (0.072)***
Ln distance	-0.451 (0.089)***	-0.451 (0.089)***	-0.459 (0.089)***	-0.450 (0.088)***	-0.464 (0.089)***	-0.451 (0.089)***
Greece and partner in EMU	2.040 (1.286)	1.570 (0.511)***	1.680 (0.346)***	1.921 (0.374)***	1.428 (0.359)***	1.455 (0.358)***
Exchange rate volatility	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)
Common land border	2.684 (0.421)***	2.683 (0.421)***	2.661 (0.420)***	2.657 (0.415)***	2.645 (0.419)***	2.690 (0.420)***
Regional trade agreement	0.864 (0.212)***	0.866 (0.213)***	0.852 (0.211)***	0.801 (0.209)***	0.852 (0.211)***	0.844 (0.211)***
Rule of Law	0.564 (0.088)***	0.563 (0.087)***	0.556 (0.087)***	0.844 (0.108)***	0.577 (0.087)***	0.569 (0.087)***
Common legal origin	-0.046 (0.162)	-0.051 (0.165)	-0.019 (0.160)	-0.019 (0.158)	0.014 (0.218)	-0.012 (0.159)
Ln information flows (res)	0.222 (0.018)***	0.222 (0.018)***	0.232 (0.019)***	0.216 (0.018)***	0.224 (0.018)***	0.245 (0.025)***
Greece in EMU				0.471 (0.142)***	0.424 (0.180)**	0.409 (0.142)***
Greece and partner in EMU × Rule of Law	-0.237 (0.837)					
Greece and partner in EMU × Common legal origin		0.202 (0.638)				
Greece and partner in EMU × Ln information flows (res)			-0.109 (0.065)*			
Greece in EMU × Rule of Law				-0.596 (0.144)***		
Greece in EMU × Common legal origin					-0.038 (0.280)	
Greece in EMU × Ln information flows (res)						-0.046 (0.036)
Constant	-0.028 (1.072)	-0.035 (1.073)	-0.018 (1.071)	-0.497 (1.067)	-0.401 (1.077)	-0.419 (1.076)
Observations	975	975	975	975	975	975
R-squared	0.56	0.56	0.56	0.57	0.56	0.56

Note: Standard errors in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%.

factor reduced to $1.26 [= \exp(0.52)^{(0.844-0.596)} / \exp(-0.42)^{(0.844-0.596)}]$. Hence, although we find evidence of a trade-creation effect of the Euro with both EMU and third countries, the pro-trade effect of well functioning institutions has declined. Since EMU members have on

average better institutions than outside countries, the latter are mainly concerned by this result. In other words, once Greece has joined the EMU, suppliers from third countries have become more alike in the view of Greek importers. The participation of Greece to the EMU has introduced a common trait for all its partners outside the union, and has reduced the relative importance of the differentiation of partners according to the quality of their institutions.

5 CONCLUSION

The aim of this paper is to learn whether the participation to the Euro Area affects the impact of informal barriers on countries' agricultural trade. We use a gravity model to measure the effects of informal barriers on Greek agricultural trade from 1996 to 2005, i.e. before and after the adoption of the Euro. We consider three types of informal barriers: the quality of exporter and importer institutions, their similarity, and cross-border information flows. The idea behind is simple. The adoption of a common currency is often accompanied by the convergence of economic policies, and institutions of the participating countries, and leads in most cases to more transparent information on markets. This may result in a reduction of informal trade barriers such as institutional and information costs. We employ two datasets to address this issue: imports of Greece from EMU members and its imports from all trade partners.

Several conclusions emerge from this study. Using the small sample, we find that the introduction of the Euro has increased Greek agricultural imports from EMU countries by 82%, which remain sensitive to the quality and similarity of institutions and the availability of information on foreign partners. When all trade partners are taken into account, it is not possible to separate the EMU from the EU effect on trade. Institutional barriers are a smaller burden for bilateral imports in this case, while information flows are likely to increase the number and/or value of the international transactions by twice as much. We also find support for a decrease in informal barriers faced by Greek agricultural imports after the country's accession to the Euro area. More precisely, the introduction of the Euro coincides with the reduction of information costs for imports from EMU partners, as well as of costs linked to the ill-functioning or absence of relevant institutions in general. Thus, an equal increase in information flows between Greece and any of its foreign partners produces a smaller growth of Greek bilateral imports of agricultural products from that partner when both countries use the same currency. In other words, there is a substitution effect between currency and

information costs. The elimination of currency costs compensates for the poor or inaccurate information available to economic agents from EMU countries. Institutional aspects, meanwhile, have become a less important determinant of Greek imports regardless their origin. Since EMU members have on average better institutions than outside countries, the latter are mainly affected by this outcome. Similar to Baldwin et al. (2005), we find evidence of a trade-creation effect of the Euro with respect to both EMU and third countries. Joined with the previous result, this suggests that after 2001 improving domestic institutions has become less remunerating for non-EMU suppliers in terms of the value of Greek imports. The latter have increased after 2001, but the distinction between partners with good and poor institutions has dropped in importance.

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