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Implications of EU Enlargement for the New Member States' Agri-food Trade

Dásă Bartošová (Comenius University Bratislava, Slovakia), ***Lubica Bartová*** (JRC-IPTS, EC, Sevilla, Spain and Slovak Agricultural University in Nitra) *and* ***Jarko Fidrmuc*** (University of Munich and Comenius University Bratislava, Slovakia)

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Implications of EU Enlargement for the New Member States' Agri-food Trade*

Dáša Bartošová[I]

Ľubica Bartová[II]

Jarko Fidrmuc[III]

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Abstract

We estimated dynamic panel models for the agri-food trade of six new Member States (the Czech Republic, Latvia, Lithuania, Romania, Slovakia, and Slovenia) with selected countries and trade groupings between 1996 and 2005. In general, we found low income elasticities and high price elasticities of import demand for agricultural commodities. The lagged values for trade are highly significant. We also show that accession to the EU increased the new Member States' exports, but had less impact on their imports. The new Member States have gained significantly from liberalised access to the EU agri-food market.

Keywords: agri-food trade, EU enlargement, dynamic panel data models.

JEL classification: C23, F15, F14.

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[I] Comenius University Bratislava, Faculty of Mathematics, Physics and Informatics, Slovakia, e-mail: ygiah.dasa@gmail.com.

[II] Joint Research Centre - Institute for Prospective Technological Studies, European Commission, Sevilla, Spain, e-mail: lubica.bartova@ec.europa.eu; Slovak Agricultural University in Nitra, Slovakia.

[III] Department of Economics, University of Munich; CESifo; and Comenius University Bratislava, Faculty of Mathematics, Physics and Informatics, Slovakia. e-mail: jarko.fidrmuc@lrz.uni-muenchen.de.

Introduction

The Central and Eastern European countries (CEECs) received preferential trade treatment even before accession to the European Union (EU) as a result of bilateral agreements (especially Europe Agreements) with the EU. However, the extent of liberalisation of agri-food trade in these agreements was limited. The asymmetric preferences granted by association agreements – preferential quotas for the CEECs – did not expand these countries' exports to the EU as expected. By contrast, exports of agricultural and food commodities from the EU-15 to the CEECs increased. As further factors in the CEECs' low performance in agricultural exports, Frohberg and Hartmann (1997) point to the unsatisfactory quality of exports, insufficient sanitary and phytosanitary arrangements, an uncompetitive food processing industry, insufficient marketing, and the revaluation of the real exchange rate of individual CEEC currencies against the German mark. Other serious barriers to CEEC exports to the EU, according to the authors, were the way in which the Commission issued import licences under preferential quotas, the lack of transparency of quota utilisation, and the distribution of market power, which probably conferred preferential advantages on importers.

The Eastern enlargement of the EU has completely changed these conditions. All new member states have gained full access to the common market in agricultural commodities. Under these conditions, the distortions in the agricultural market should be replaced by efficient allocation of resources. However, the outcome of this development is difficult to assess on the basis of previous developments. In particular, the previous weakness of the agricultural sector in the CEECs raises the question whether their agricultural products are competitive enough to gain from the liberalisation of trade in agricultural commodities.

In the paper we analyse Czech, Latvian, and Lithuanian, Romanian, Slovak, and Slovene imports and exports of selected agri-food commodities with selected countries and regions between 1996 and 2005. Moreover, the coverage of our study is broader because the partner countries analysed in the study include the EU-15, ten new Member States including Romania and Bulgaria, the Commonwealth of Independent States (CIS), the USA and the rest of world (ROW).

We show that dynamic panel data models are appropriate tools for modelling agricultural trade flows. Past levels of the agricultural trade are a significant determinant of the current trade level, which underlines the importance of history in this market. In general, we found low income but high price elasticities of demand for agricultural imports. Thus, the agricultural market is already saturated and highly sensitive to price changes.

We found positive and significant EU enlargement effects especially for exports from the new Member States, which vary strongly between agricultural commodities. Furthermore, the long-run effects are much higher (in general two to three times higher). On the other hand, the agri-food imports of the new Member States showed lower growth after the Eastern enlargement of the EU. As a result, it seems that the new Member States gained significantly from the liberalisation of the agricultural trade, although the effects remained moderate.

Data Description

We used a unique database collected for the TRADEAG project of bilateral agri-food trade flows of the Czech Republic, Latvia, Lithuania, Romania, Slovakia, and Slovenia with the EU-15, the new member states in Central and Eastern Europe (Bulgaria, Czech Republic, Poland, Hungary, Latvia, Lithuania, Estonia, Romania, Slovakia, Slovenia), the Commonwealth of Independent States as a whole (CIS), the USA, and the rest of the world (all other countries).

Our database included quarterly data (1996-2005) for exports and imports of the following agri-food commodities: Meat of bovine animals (HS 0201-0202), Meat of swine (HS 0203), Meat of poultry (HS 0207), Meat total (HS 0201-0210), Milk and cream (HS 0401-0402), Cheese and curd (HS 0406), Milk and diary total (HS 0401-0406), Cereals other than rice (HS 1001-1005+1007-1008), Oilseeds (HS 1201-1207), Sugar (HS 1701-1702), and, finally, total agricultural imports and exports. All trade flows were available both in nominal value (EUR or national currencies) and physical units (kilograms). This allows us to compute trade prices and terms of trade for all commodities and partner countries.

The data set for the reporting countries also includes annual trade flow data for Hungary, Estonia, and Poland, which were not used for the estimations. Nevertheless, we used these data to compare the overall development, which shows that the pattern for these three countries does not deviate significantly from the pattern of countries for which quarterly data was available.

In addition, we used income data for the individual reporting and partner countries. The time series for gross domestic product (GDP) was subject to seasonal influence, so we worked with seasonally adjusted data using the US Census Bureau's X12 ARIMA procedure. In our sensitivity analysis, we also controlled for outliers. Following Burgstaller and Landesmann (1997), we left out all observations that deviated by more than a specific margin from the long-term trend. Since the results did not change, we present only non-adjusted results here.

Dynamic Panel Models

In general, two approaches dominate applied trade analysis. First, aggregate or more or less disaggregate trade flows of individual countries are related to income from export markets and price (competitiveness). Baldwin, Francois and Portes (1997) presented a computable general equilibrium model (CGEM) analysing the eastern enlargement of the EU. The advantage of the CGEM approach is that it includes relatively detailed sectoral information for the economies analysed. Except in a few models of the world economy (see e.g. Neck, Haber and MacKibbin, 2000), foreign trade development enters the model as a set of assumptions.

Second, gravity models are often used to estimate trade flows for several countries in a specific period as a function of supply and demand in partner countries, transport and transaction costs and integration effects (e.g. membership of the EU). These models were used in analyses of Eastern European countries' trade. Hamilton and Winters (1992) and Baldwin (1994) presented the first applications of this approach. Bussière, Fidrmuc, and Schnatz (2005) reviewed the literature and analysed the accession of the new Member States to the EU. In fact, the CGEM use often the results of gravity models as inputs on the external developments.

The disadvantage of gravity models, however, is that while the geographic structure is usually detailed (with a high number of reporting and partner countries) the trade flows analysed are only aggregates of all commodities. Thus, these analyses do not provide information on integration effects by economic sector. Nevertheless, some authors also use these models to analyse the effects of integration in selected sectors, usually using a shorter cross-country dimension. Brenton and Di Mauro (1998) and Fidrmuc, Huber and Michalek (2001) use gravity models for sensitive commodities including several agri-food products. Olper and Raimondi (2005) estimate gravity models for the agri-food trade.

Reflecting the properties of our data set, we combined both approaches used in the literature. We considered both country and product-specific variables and overall macroeconomic data in our estimations. Following the standard demand equation, we considered overall income and relative prices (product price related to the overall price level) as the major determinants of trade in specific commodities with selected countries. Because we had only short time series, we also used the cross-sectional dimension, which is, however, smaller than in typical gravity models. This approach can be expressed as

$$m_{it} = \alpha_i + \theta_t + \rho m_{it-1} + \beta_1 y_t^{home} - \beta_2 (e_t p_{it}^m - cpi_t^{home}) + \gamma EU + \varepsilon_{it}^m \quad (1)$$

$$x_{it} = \alpha_i + \theta_t + \rho x_{it-1} + \beta_1 y_{it} - \beta_2 (p_{it}^x - cpi_{it}) + \gamma EU + \varepsilon_{it}^x \quad (2)$$

where α denotes fixed effects, θ time effects, m import and x export of a particular commodity for countries i at the time t, y denotes income – GDP in home country (y_{home}) and in partner countries (y_i), p denotes the price of a product – calculated by dividing agri-food trade (by value in EUR) by the quantity in kg, e stands for the exchange rate (home currency per EUR 1), and *cpi* denotes the consumer price index either in the home or in the partner countries.

Furthermore, we included seasonal variables (*seas*2, *seas*3, *seas*4) and a dummy variable for membership of the EU (which equals 1 if the both reporting and partner countries are member states of the EU and 0 otherwise). In our data set, this variable mainly shows the effects of the EU enlargement in May 2004, because we do not have any earlier accessions.

Thus, the model stated by equations (1) and (2) is a dynamic version of gravity models, where the domestic supply factors are fully covered by the time effects θ. In addition, this model includes the elements of a standard demand function (relative price effects). The comparison of effects for particular agri-food commodities is also a new contribution to trade models. We present the estimates for ten broad agri-food commodities and for the aggregate of the agri-food trade.

Equations (1) and (2) present a model with fixed effects α_i, which we use as our basic specification. The least square method of model estimation can be biased, because fixed effects, which are part of the dependent variable (m_{it} and x_{it}), and of the lagged dependent variable ($m_{it\text{-}1}$ and $x_{it\text{-}1}$) on the right side of the equation, cause autocorrelation of the dependent variable. Baltagi (2001) finds that bias is strong if the cross-sectional dimension (number of countries) is relatively high and the time dimension (number of observations for individual countries) is low. Because in our database the cross-sectional dimension is relatively small (11 countries or groups) and the time dimension is relatively long (40 observations), the bias range should be limited.

Arrelano and Bond (1991) and Arrelano and Bover (1995) propose an alternative approach. Differentiation of equations (1) and (2) eliminates fixed effects from the estimated equation. The resulting equation can be expressed as

$$\Delta m_{it} = \rho \Delta m_{it-1} + \beta_1 \Delta y_t^{home} - \beta_2 (\Delta p_{it}^m - \Delta cpi_t^{home}) + \gamma EU + \Delta \varepsilon_{it}^m \quad (3)$$

$$\Delta x_{it} = \rho \Delta x_{it-1} + \beta_1 \Delta y_{it} - \beta_2 (\Delta p_{it}^x - \Delta cpi_{it}) + \gamma EU + \Delta \varepsilon_{it}^x \quad (4)$$

However, this data transformation causes autocorrelation of transformed errors. Therefore, Arrelano and Bond propose an estimation method based on the generalised method of moments (GMM), where the lagged dependent and independent variables are used as instrumental variables. This method is recommended for data with a relatively large cross-sectional dimension and a relatively small number of observations. This method is however, less applicable for our data set and is mainly used to analyse the stability of the results.

We compared both estimation methods for the dynamic panel model. The inclusion of dynamic effects in trade flows is discussed by Bun and Klaassen (2002). The dynamic effects allow us to distinguish between short-run and long-run integration effects. The structure of the autoregressive part of the model was selected on the basis of information criteria (Akaike information criterion). In most models the optimal lag structure includes only one lag. To make the estimations comparable, we present the first-order autoregressive model for all commodities.

Estimation Results

Few export commodities from the new Member States actually depend on the income development of their trading partners (see Table 1), which implies that the developed import markets are already saturated. The GDP of the importing country is a significant determinant only for poultry, cheese, and sugar exports. The latter two commodities possibly have a luxury component, which is then consistent with the other results. Somewhat surprisingly, exports of milk and cream depend negatively on income. On the one hand, this may denote a consumer preference in the wealthier countries for light (low-fat) milk products. On the other hand, it may also denote non-tariff barriers and preferences for local products in the relatively wealthy countries.

Relative price level is an important determinant of exports of nearly all agri-food commodities from the new Member States. Examples are cereals and meat products in general. The trade pattern for cereals may be possibly explained by the homogeneity of the products traded. Thus, prices may be an indication of different product quality, and may not enter the demand function directly. The trade pattern for meat products may be a result of various factors, including BSE effects and the recent trend towards fresh and local products. For other products, price elasticities are relatively large, ranging between one half and three quarters.

Agri-food exports are significantly influenced by past export performance. The autoregressive coefficients are usually between 0.3 and 0.6. Finally, we can see that membership of the EU has large and positive effects on the majority of export commodities. The estimated coefficients are between 0.5 (poultry) and 1.3 (sugar). After we reflect that the estimation equation is defined in logs,[1] we get EU effects of between 60% and 200%.

Furthermore, the long-run effects are much larger because we also have to reflect the autoregressive parameter.[2] On average, they are higher by a factor of 1.5, but some commodities,

[1] The EU effects are computed as $\exp(\gamma)$.

[2] We obtain the long-run effects from the sum of a geometric row, $\gamma/(1-\rho)$. This expression is then transformed, exactly as for the short-run effects, in order to discuss their absolute size.

especially those with already high short-run effects (sugar) increase by three times the short-run effects.

We also report the results for total agri-food exports. These results however, are subject to possible aggregation bias, given the large differences between the parameters estimated for individual agri-food commodities. Nevertheless, we can see that income elasticity is low but significant on average, while price elasticities remain relatively large. The EU effects are again large and statistically significant for the individual agro-food commodities.

The core part of demand for agri-food imports in the new Member States behaves slightly differently from that for agricultural exports (see Table 2). Income elasticities are significant only for a few products. However, it seems that mainly meat and milk products depend heavily on income development in these countries. Similarly, price elasticities are larger (up to 1.4 for sugar) than those found on the export side. Price elasticities for meat products are again insignificant, but those for cereals are large now. By contrast, the autoregressive parameters are of similar size to those estimated for exports.

Finally, the EU effects on imports are substantially different. We can see that only imports of sensitive products (milk products, oilseeds, and sugar) show significant EU effects, which are only slightly larger than those on the export side. This means that with the exception of sugar and oilseeds, the eastern enlargement of the EU has largely had positive effects on the new Member States with positive net effects. This confirms the early analysis of EU accession effects on the agricultural sector in the new Member States by e.g. Lukas and Mládek (2006). However, the effects remain moderate.

We compare these estimations with the Arellano and Bond dynamic panel data estimator (see Tables 3 and 4). In general, the results are similar to the previous results, although fewer coefficients are significant. This is especially true for the EU dummy, which is significant only for imports of swine meat. The autoregressive coefficient is also lower than in the corresponding estimations by fixed effect models with lagged variables. Furthermore, the Sargan test of over-identifying restrictions in the homoscedastic version of the estimations (not reported here) rejects the null hypothesis that the over-identifying restrictions are valid. However, this is likely to be due to heteroscedasticity because the Sargan test over-rejects under this condition. As heteroscedasticity is likely in our set of countries, we use only robust estimators. The Arellano-Bond test rejects the null hypothesis of no second-order autocovariance of residuals for nearly all specifications (exceptions include exports of various kinds of meat and total agri-food exports), while the presence of first-order autocovariance does not pose any problems for the estimations.

Our analysis could be significantly biased by important country-specific effects. Therefore, we estimate all specifications for the individual reporting countries. While we can find some slight differences between these results, the overall picture remains the same.[3]

Conclusions

In May 2004, eight countries in Central and Eastern Europe joined the EU and thus gained full access to the single market. This has also liberalised trade in sensitive products. The effects on the agri-food trade have been a particular source of concern for policy makers and agricultural producers because of wage and land cost differentials (see Neven, 1992). The productivity of agricultural enterprises, however, has remained low during the economic reforms, because this sector did not enjoy budget transfers similar to those available in the EU.

We analyse trade flows of agri-food commodities between selected countries (the Czech Republic, Latvia, Lithuania, Romania, Slovakia, and Slovenia) and a broad group of trading partners (the EU-15, the new Member States in Central and Eastern Europe, the CIS, the USA and the rest of the world). Our analysis does not directly include Hungary or Poland for data reasons. While Hungary, with a relatively competitive agricultural sector, is likely to fare better than the states covered here, our results may provide an illustration of possible developments in Poland.

Despite the many limitations of our analysis, our results show slightly positive implications for the new Member States. In general, the effects of EU accession are more greater on exports from the new Member States than on their imports. The gains remain moderate in the long run. Given the potential of the new Member States, their exports could increase up to fourfold for milk products and eightfold for sugar. However, the net effects (exports less imports) are much smaller, especially in these products.

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Table 1: Dynamic Fixed Effect Models for Exports of Selected Agri-Food Commodities

Variable	Cheese and Curd	Milk and Cream	Milk and Dairy	Meat of bovine	Meat of Poultry	Meat of Swine	Meat Total
HS Codes	**0406**	**0401-0402**	**0401-0406**	**0201-0202**	**0207**	**0203**	**0201-0210**
y_{it}	0.846***	-0.524**	0.231	-0.528	0.538**	-0.195	0.103
	(5.61)	(-2.24)	(1.76)	(-1.32)	(2.11)	(-0.66)	(0.54)
EU	0.216*	0.837***	0.412***	0.809***	0.530***	0.194	0.576***
	(1.69)	(4.17)	(3.88)	(3.21)	(3.31)	(0.89)	(4.07)
x_{it-1}	0.403***	0.408***	0.441***	0.387***	0.488***	0.581***	0.549***
	(14.66)	(12.94)	(19.02)	(8.39)	(10.38)	(13.54)	(17.42)
$p_{it}^{x} - cpi_{it}$	0.443***	-0.288**	-0.221***	-0.346*	-0.403***	0.094	-0.023
	(4.01)	(-2.16)	(-3.11)	(-1.65)	(-3.33)	(0.55)	(-0.23)
No of obs.	720	798	1134	301	403	356	679
R^2	0.287	0.151	0.725	0.185	0.425	0.656	0.695

Variable	Cereals other than rice	Oilseeds	Sugar	Agri-food Exports	Agri-Food Exports	Agri-food Exports
HS Codes	**1001-1005, 1007-1008**	**1201-1207**	**1701-1702**	**01-24**	**01-14**	**15-24**
y_{it}	1.602	0.534*	2.201***	0.330***	0.244**	0.260***
	(1.60)	(1.89)	(4.66)	(3.93)	(2.00)	(3.05)
EU	0.024	0.338	1.252***	0.236***	0.283***	0.201***
	(0.04)	(1.42)	(3.39)	(4.78)	(3.11)	(3.28)
x_{it-1}	0.458***	0.294***	0.423***	0.385***	0.294***	0.440***
	(5.25)	(7.41)	(9.40)	(18.72)	(13.04)	(22.72)
$p_{it}^{x} - cpi_{it}$	-0.548	-0.694***	-0.764***	-0.566***	-0.580***	-0.770
	(-1.55)	(-4.36)	(-3.84)	(-12.28)	(-9.28)	(-15.68)
No. of obs.	139	546	311	1498	1122	1624
R^2	0.364	0.506	0.282	0.801	0.725	0.802

Notes: *t*-statistics are in parentheses. *, **, *** denote significance at the 10, 5 and 1 per cent level, respectively.

Table 2: Dynamic Fixed Effect Models for Imports of Selected Agri-Food Commodities

Variable	Cheese and Curd	Milk and Cream	Milk and Dairy	Meat of bovine	Meat of Poultry	Meat of Swine	Meat Total
HS Codes	**0406**	**0401-0402**	**0401-0406**	**0201-0202**	**0207**	**0203**	**0201-0210**
y_{it}	1.160***	-0.033	0.442***	0.582*	0.728***	1.098***	0.842***
	(6.96)	(-0.12)	(2.97)	(1.72)	(3.88)	(4.40)	(5.58)
EU	0.346***	-0.072	0.245**	0.131	0.189*	0.031	0.062
	(2.96)	(-0.39)	(2.39)	(0.59)	(1.67)	(0.20)	(0.63)
$m_{it\text{-}1}$	0.302***	0.421***	0.392***	0.451***	0.501***	0.606***	0.532***
	(10.59)	(11.60)	(14.80)	(11.53)	(17.31)	(18.40)	(21.59)
$p_{it}^{m} - cp_{t}^{home}$	-0.074	-0.647***	-0.367***	-0.560***	-0.136	-0.201	-0.156**
	(-0.69)	(-5.43)	(-5.31)	(-3.70)	(-1.61)	(-1.60)	(-2.19)
No of obs.	291	519	951	527	807	633	1050
R^2	0.021	0.605	0.704	0.472	0.598	0.618	0.679

Variable	Cereals other than rice	Oilseeds	Sugar	Agri-food Imports	Agri-Food Imports	Agri-food Imports
HS Codes	**1001-1005, 1007-1008**	**1201-1207**	**1701-1702**	**01-24**	**01-14**	**15-24**
y_{it}	-0.322	0.265	-0.255	0.113	0.117	0.234***
	(-0.71)	(1.34)	(-0.57)	(1.57)	(1.13)	(2.96)
EU	0.281	0.639***	2.556***	0.144***	0.288***	0.059
	(0.73)	(4.00)	(7.81)	(2.96)	(3.98)	(1.14)
$m_{it\text{-}1}$	0.008	0.273***	0.235***	0.274***	0.242***	0.331***
	(0.17)	(8.73)	(5.94)	(16.13)	(13.06)	(17.54)
$p_{it}^{m} - cp_{t}^{home}$	-0.734***	-0.337***	-1.390***	-0.685***	-0.700***	-0.564***
	(-3.66)	(-3.42)	(-6.62)	(-17.62)	(-13.06)	(-13.00)
No of obs.	694	790	375	1731	1232	1786
R^2	0.417	0.553	0.520	0.823	0.802	0.832

Notes: *t*-statistics are in parentheses. *, **, *** denote significance at the 10, 5 and 1 per cent level, respectively.

Table 3: Dynamic GMM Models for Exports of Selected Agri-Food Commodities

Variable	Cheese and Curd	Milk and Cream	Milk and Dairy	Meat of Bovine	Meat of Poultry	Meat of Swine	Meat Total
HS Codes	**0406**	**0401-0402**	**0401-0406**	**0201-0202**	**0207**	**0203**	**0201-0210**
$\Delta\, y_{it}$	1.832***	-0.040	1.093**	2.220	-0.021	2.585***	1.197***
	(3.33)	(-0.0)	(2.32)	(0.91)	(-0.03)	(3.03)	(2.58)
EU	0.084	0.163	0.090	0.161*	0.042	0.149	0.086
	(1.27)	(1.51)	(1.38)	(1.83)	(0.70)	(1.27)	(1.43)
$\Delta\, x_{it\text{-}1}$	0.124	0.087	0.319**	0.0002	0.130*	0.235**	0.294***
	(1.51)	(0.88)	(2.22)	(0)	(1.72)	(2.05)	(3.79)
$\Delta\, p_{it}^{x} - \Delta\, cp_{t}^{home}$	0.193	-0.340	-0.547**	0.318	-1.325***	-1.221**	-0.742*
	(1.16)	(-0.75)	(-2.53)	(0.58)	(-3.50)	(-2.00)	(-1.93)
No. of obs.	614	659	991	207	355	276	549
ARM1	-3.014***	-2.681***	-2.681***	-2.814***	-2.160**	-2.794***	-2.582***
ARM2	-1.735*	-2.129**	-0.441	1.381	-2.352**	0.288	-1.721*

Variable	Cereals other than rice	Oilseeds	Sugar	Agri-food Exports	Agri-Food Exports	Agri-food Exports
HS Codes	**1001-1005, 1007-1008**	**1201-1207**	**1701-1702**	**01-24**	**01-14**	**15-24**
$\Delta\, y_{it}$	5.281	0.091	3.375***	-0.710	0.487*	-0.239
	(1.28)	(0.17)	(7.58)	(-1.36)	(1.90)	(-0.69)
EU	-1.313*	0.003	-0.235	0.048	0.078*	0.013
	(-1.76)	(0.03)	(-1.56)	(1.34)	(1.65)	(0.35)
$\Delta\, x_{it\text{-}1}$	0.208	0.069	0.095	0.083	0.019	0.208**
	(1.25)	(1.14)	(1.29)	(1.13)	(0.33)	(2.41)
$\Delta\, p_{it}^{x} - \Delta\, cp_{t}^{home}$	0.434	-0.800**	-1.676***	-1.002***	-0.809***	-1.172***
	(0.46)	(-2.40)	(-4.69)	(-8.16)	(-5.45)	(-9.99)
No. of obs.	59	389	180	1247	858	1391
ARM1	-0.912	-2.404**	-0.094	-3.319***	-2.120**	-2.507**
ARM2	-0.852	-1.349	-0.116	-1.997**	-2.767***	-1.809*

Notes: *t*-statistics are in parentheses. ARM1 and ARM2 denote the Arrelano-Bond test that the average autocovariance in first and second-order residuals is 0 with H_0 of no autocorrelation. *, **, *** denote significance at the 10, 5 and 1 per cent level, respectively.

Table 4: Dynamic GMM Models for Imports of Selected Agri-Food Commodities

Variable	Cheese and Curd	Milk and Cream	Milk and Dairy	Meat of Bovine	Meat of Poultry	Meat of Swine	Meat Total
HS Codes	**0406**	**0401-0402**	**0401-0406**	**0201-0202**	**0207**	**0203**	**0201-0210**
$\Delta\, y_{it}$	0.571	0.732	0.973*	-0.156	0.183	0.475	0.512
	(0.70)	(0.66)	(1.66)	(-0.13)	(0.36)	(0.61)	(0.80)
EU	-0.005	-0.016	0.015	0.027	0.030	0.180***	0.012
	(-0.12)	(-0.15)	(0.27)	(0.28)	(0.47)	(2.72)	(0.23)
$\Delta\, m_{it\text{-}1}$	0.121*	-0.028	0.127	0.201***	0.132*	0.119	0.207***
	(1.86)	(-0.42)	(1.55)	(3.64)	(1.88)	(1.42)	(4.44)
$\Delta\, p_{it}^{m}$ - $\Delta\, cp_{t}^{home}$	0.153	-1.670***	-0.552*	-1.287**	-0.489*	-0.367	-0.039
	(0.53)	(-3.88)	(-1.89)	(-2.22)	(-1.94)	(-1.04)	(-0.13)
No. of obs.	147	420	835	435	726	550	953
ARM1	-3.191***	-2.789***	-2.764***	-2.209***	-3.030***	-3.465***	-3.247***
ARM2	-1.144	-1.045	-1.309	-1.424	-0.107	-0.595	-1.583

Variable	Cereals without Rise	Oilseeds	Sugar	Agri-food Imports	Agri-Food Imports	Agri-food Imports
HS Codes	**1001-1005, 1007-1008**	**1201-1207**	**1701-1702**	**01-24**	**01-14**	**15-24**
$\Delta\, y_{it}$	2.325	1.447*	3.224	0.174	0.119	0.002
	(0.84)	(1.82)	(1.60)	(0.91)	(0.32)	(0.01)
EU	-0.401	-0.101	-0.024	0.033	0.038	0.023
	(-1.15)	(-0.97)	(-0.12)	(1.21)	(0.91)	(0.84)
$\Delta\, m_{it\text{-}1}$	-0.127***	-0.033	-0.076	-0.068	0.030	0.028
	(-2.27)	(-0.66)	(-0.76)	(-1.36)	(0.51)	(0.45)
$\Delta\, p_{it}^{m}$ – $\Delta\, cp_{t}^{home}$	-0.7114***	-0.150	-1.394**	-0.924***	-0.824***	-0.945***
	(-2.91)	(-0.49)	(-2.06)	(-10.60)	(-5.76)	(-10.45)
No. of obs.	598	623	256	1476	920	1573
ARM1	-2.082**	-3.199**	-1.761*	-2.687***	-2.576***	-3.503***
ARM2	-1.309	-0.430	-0.847	-2.413**	-0.931	0.056

Notes: *t*-statistics are in parentheses. ARM1 and ARM2 denote the Arrelano-Bond test that the average autocovariance in first and second-order residuals is 0 with H_0 of no autocorrelation. *, **, *** denote significance at the 10, 5 and 1 per cent level, respectively.