The Import Price and Volume Effects of Integration among Developing Countries: The Case of the North Africa AMU*

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ملخص

آثار التكامل الاقتصادى فى الدول النامية
"دراسة حالة اتحاد المغرب العربى"

يهتم هذا البحث بتحليل وتقدير آثار التكامل الاقتصادى فى الـــدول الناميـــة، باتخاذ المغرب العربى كحالة خاصة. فقد تم تحليل نتائج هذا البحث وشرحها مـــن وجهة نظر عضو واحد فى الاتحاد المغربى هو الجزائر.

ويمكن تلخيص النتائج الأساسية للبحث فيما يلى:

رغم أن الاتحاد له آثار إيجابية على الاقتصاد الجزائرى، فإن هـــذه الآثـــار، لسوء الحظ، صغيرة فى الحجم.

ومن ناحية أخرى، لم يأخذ هذا البحث فى الحقيقة بعين الاعتبار كـــل الآثـــار الممكنة. كتأثير حركة الأموال واليد العاملة بين الدول المغاربيـــة رغـــم أن هـــذه التأثيرات فى النهاية يمكن أن تكون أكثر أهمية من الآثار التى تم تقديرها فى هـــذا البحث.

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I- Introduction

The Arab Maghreb Union (AMU) of 1989 comprising Algeria, Morocco, Tunisia, Libya and Mauritania aimed to attain several economic and non-economic objectives (Testas, 1996). One of the most important of these is to increase intra-regional trade and foster economic development. Article 2 of the AMU founding treaty states clearly that one of the main objectives of this regional trading arrangement is to 'work gradually towards the realisation of the freedom of movements of goods and services. (1)

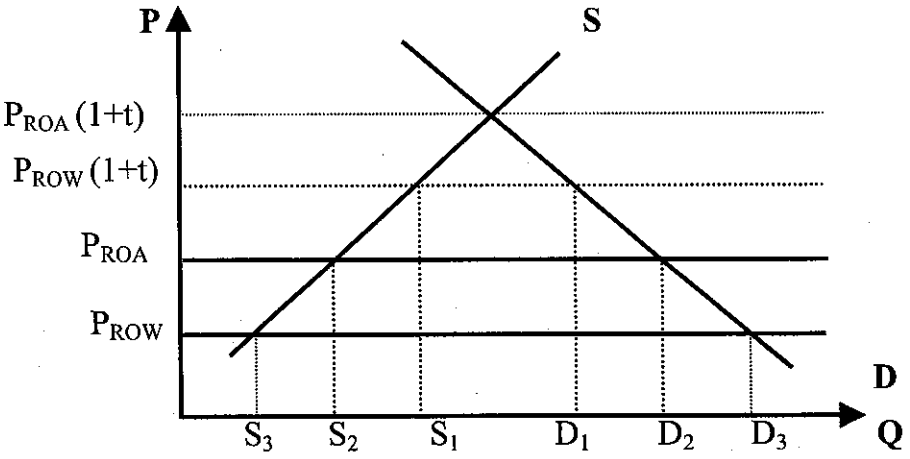
This article assesses the economic significance of the AMU in terms of intra-Maghreb (North African) trade. While the literature on economic integration is vast (2), this regional trading arrangement has largely been forgotten (3). Despite the fact that integration has exercised the minds and imagination of the North African leaders and economic experts long before the 1989 agreement, no serious studies seem to have been published on the subject, apart from some rather general analyses. These have restricted themselves to a more often political discussion of the general principles that should guide the planning of integration in the Maghreb region rather than investigating empirically the problems such integration may give rise to: in particular the effects on trade.

To fill in this gap, to some extent, this article estimates the import price and volume effects of the AMU as judged from the perspective of one member country Algeria. To achieve this, the article has been organised as follows. Section 2 provides some theoretical background for the analysis and outlines the model to be used. In Section 3, the results are presented and their interpretations discussed. A final section provides some conclusions and policy implications.

II- Basic Methodology

Figure (1)[4] can be used to illustrate the situation for a (small) country, Algeria, which forms a (small) Customs Union (CU)[5], the AMU, with the above four neighbouring Arab Maghreb Countries (AMCs) which, for the purpose of analysis, will be taken as a group to be termed the Rest-Of-the-AMU (ROA). P_{ROW} denotes the price of the product as exported from the Rest-of-the-World (ROW), P_{ROA} the export price of other AMU member countries. The country operates a non-discriminatory tariff so that the post tariff prices are $P_{ROW}(1+t)$ and $P_{ROA}(1+t)$, respectively. In this situation, the country will import D_1-S_1 of the product from the ROW. Suppose the tariffs against the AMU goods are eliminated, while the tariffs against the ROW goods remain unchanged. In this case, trade creation is equal to $D_2-D_1+S_1-S_2$. However, imports from the AMU rise by D_2-S_2, since D_1-S_1 of trade is diverted away from the ROW.[6]

Figure (1) The Import Expansion Effects of the North Africa Arab Maghreb Union (AMU)



There are two broad ways to apply the theory of CU. The first, which has been exploited relatively recently in the context of the European Union (EU), the North American Free Trade Association (NAFTA) and the Asia-Pacific Economic Co-operation (APEC), is the (computable) general equilibrium model including many commodities (e.g. Miller and Spencer, 1977; Boyd et al., 1993; Cheong, 1995; APEC, 1997a, 1997b). This is impossible in the case of Algeria-AMU economic integration because of data limitations.

The second approach, which has been widely used, is to apply the basic framework of many commodities in which each single commodity is analysed in a partial equilibrium framework. There are different ways of doing this. One is the import-demand model, which differentiates between imports and home-produced competitive goods. This traditional model, as described by Leamer and Stern (1970) and used by Plummer (1991), Lord (1991) and Testas (1996), expresses the quantity of imports demanded for good X as a function of its price and the price of all other goods, in addition to income. In other words, the quantity of imports demanded, M, will depend on income, Y, the price of imports, P_m, and the price of domestic supplies, P_y. Assuming log-linearity, one may write import demand as:

$$M = \alpha Y^{\beta} (P_m/P_y)^{\eta} \qquad (1)$$

where M, Y, P_m and P_y are as defined above; α is a constant, and β and η are the income and price elasticities, respectively.

This, when applied to economic integration, is usually termed the 'Price Wedge Model' (See Lord, 1991). The price wedge terminology derives from the fact that expenditure-switching policies, in the form of tariffs, create a price wedge between the domestic price to the consumer and the world market price of the commodity. These policies effectively

impose a tax on the consumer, which raises the price of the commodity in the home market compared to its international price.

Hence, starting from the general model (1), where the demand function for a traded commodity is determined by the income level and the ratio of commodity import prices to prices of domestic supplies, the constant elasticity demand function for the traded commodity inclusive of tariffs will be of the form:

$$M = \alpha Y^{\beta}[(1+t)P_m/P_y)]^{\eta} \qquad (2)$$

so that the incidence on the consumer of the effective price rise of the commodity by $[(1+t)P_m - P_m]$ would be to reduce the quantity of the commodity demanded. Equation (2), therefore, shows that the effect of economic integration will depend on the price elasticity of import demand, η, and the rate of protection, t, in the importing country.

III- Empirical Results

The price wedge model, as outlined above, has been applied to Algeria-AMU data for the pre-integration period 1968-88[(7)] to generate the import demand equation necessary for the computation of the import expansion effects of the AMU (further elaboration is given below). The model has generally behaved well, with the estimated income and price elasticities acquiring the appropriate sign (i.e. positive and negative, respectively). These were, respectively, 0.32 and –1.68. Both elasticities had t-ratios absolutely larger than 3 (hence significant at the usual 1% level) and R^2 was clustering around 70%.

The price and volume effects

The price and volume effects for Algerian imports from the AMU are presented in Table 1 for the post integration period 1989-92. As stated above, the effect of integration is determined by the amount of the reduction in the price wedge and by the price elasticity of import demand. The elimination of this price wedge would lower the domestic price from $(1+t)P_m$ to P_m, where, as before, t is the tariff rate of protection and P_m is the import price of the commodity. This reduction leads to an increase in the quantity demanded of imports and to a reduction in the quantity of the good supplied by domestic producers.

The most striking result is the small effect economic integration has had on the price of imports. The average impact is only about 1% for the period 1989-92.

Turning to the volume effects, these were measured by residual imputation: projecting the (tariff-inclusive) pre-integration equation into the (relatively free trade) post-integration period. The former refers to 1968-88, while the latter to 1989-92, for which the most recent data were available. The impact of the AMU is then derived as the difference between actual imports over the post-integration period (1989-92) and those predicted by applying the estimate of Eq. (2) to the actual values of the independent variables over that period. To generate the estimates of Table 1, the estimated parameters of Eq. (2) were therefore used.

Table (1)

Algeria-AMU Import Expansion Effects,

(1989-92, 1987) Prices

	Actual imports (US$mn)	Estimated imports (US$mn)	Due to integration (US$mn)	Import volume effect (%)	Import price effect (%)
1989	85.4	41.5	43.9	51.4	-1.04
1990	73.0	35.2	37.8	51.8	-0.90
1991	87.6	18.0	69.6	79.5	-1.00
1992	107.8	17.5	90.3	83.8	-1.04

Source: Testas (1996).

Table (1) gives the difference between the actual and estimated imports from the AMU (at constant prices) for the period 1989-92. The main observation to be made from the table is the high percentage increase in imports induced by economic integration. Thus, if the pre-integration equations are projected into the post-integration period, the country's estimated imports from the AMU will increase, on average, by up to 68%.

This seems reasonable for a small country like Algeria, which has had a high dependency ratio on international trade. In principle, the smaller the country, the higher its dependence on trade. However, this conclusion is misleading when it comes to imports from the AMU. In absolute terms, the increase in imports is not significant. If the pre-integration equations are projected into the post-integration period, intra-regional imports induced by economic integration amount to only about US$ 242 million for the period 1989-92, which represents 0.09% of total

imports or 0.02% of the country's Gross Domestic Product (GDP).

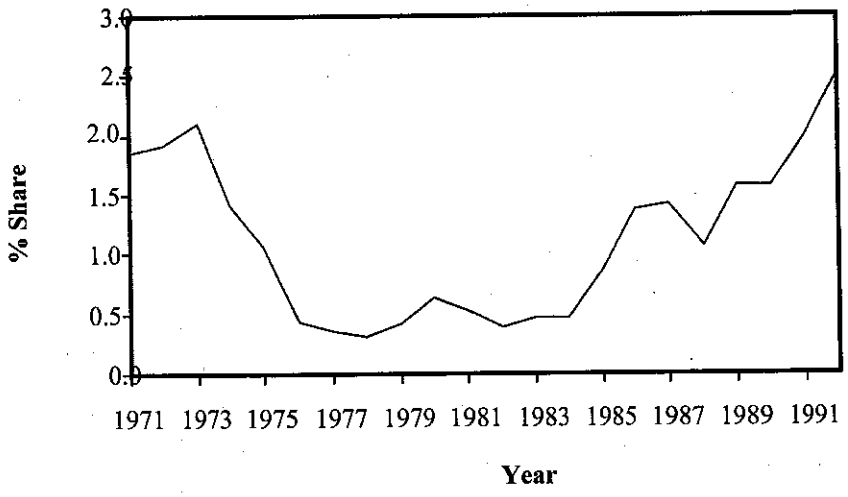
The results, on the whole, do not seem surprising, given the literature on developing countries' economic integration. A number of studies (e.g. Edwards and Savastano, 1989; Langhammer and Hiemenz, 1990; Robson, 1993; DeMelo and Panagariya, 1993; Edwards, 1993) have documented the limited success of integration among developing countries. Although the causes may not be the same in all cases, most studies agree on certain sets of reasons including: (a) the size of the integrated market, (b) the initial level of intra-regional trade, and (c) the type of products for which tariff concessions are usually granted.

This is typically the case with the AMU. As regards the size of the market, this is small as it comprises only five small countries with a combined total GDP of about US$100 billion per year. This is less than 2% that of a large country like the US or Japan, which has two main implications. The first is that the AMU member countries may have little to gain from scale economies. The second is that the union is economically too small to affect the rest of the world; hence the terms-of-trade effect is likely to be insignificant [7]. But these impacts have not been estimated here.

As far as the initial level of intra-regional trade is concerned, as can be seen from Figure 2, the proportion of Algeria's imports from the AMU to its total imports never reached 3% in any year for the period 1970-92. Further, it showed signs of decreasing at least in the period 1974-85.

Figure (2)

Percentage Share of Algeria's Imports fro m AMU in Total Imports, 1970-92



As for the nature of trade between Algeria and the rest of the AMU, this, as Testas (1996) has demonstrated, is mainly of the primary-commodity type, which has inhibited growth along the lines of Intra-Industry Trade (IIT) and product differentiation. s Havrylyshyn and Civan (1985) have shown, (IIT) is important in that it increases bilateral trade through product differentiation: 'as an economy develops, its product lines diversify and consequently it engages in more and more intra-industry trade' (Ibid., p. 263). Intra-industry trade is, therefore, a sign of advanced industrialisation.

Fei (1992) has suggested that there tends to exist a negative correlation between trade performance of a country and its reservoir of natural resources. This is because natural-resource-abundant countries can resort to import substitution strategy for a prolonged period and, therefore, strengthen the anti-export bias impact. This is typical of a country, like Algeria, which has followed this strategy since its independence from France in 1962, and whose economic development depends heavily on the exports of raw materials, namely crude oil and natural gas. With the AMU member countries specialising in the exports of standardised commodities, the scope for the growth of (IIT) is limited.

IV- Conclusions and Policy Implications

This article has attempted to estimate the impact of the AMU on Algerian imports. An import demand model was used to achieve this aim. The findings show that this effect is reasonably high in terms of percentage increases, but very small in absolute terms. Summing over the post-integration period (1989-92), the AMU's trade expansion effect is US$242 million, or less than 1% of Algeria's total actual imports. This translates to less than 1% of the country's gross domestic product.

There is, of course, a need for more research in this area to investigate the other possible impacts of economic integration. The impact on mobility of factors of production (labour and capital), for example, has not been estimated. Article 2 of the founding treaty states that one of the main aims of the union is to 'work gradually towards the realisation of the freedom of movement of people, goods and services as well as the movement of capital'.

In principle, the creation of the AMU would have major effects on the pattern of labour movement within the region. This is because of the absence of natural barriers (linguistic and

cultural), which usually constitute the main obstacles to labour movement between countries.

As far as the impact on the free movement of capital is concerned, integration within the AMU, as demonstrated by Testas (1996), can be worthwhile because it attracts multinational corporations. Economic research shows that these have usually been firm supporters of integration schemes in developing countries since they enable them to rationalise their production planning.

There are two main reasons why foreign direct investment is needed for Algeria and the AMU as a whole. First, the heavy emphasis on import-substitution strategies that the North African countries have followed since their independence had viewed this investment as a source of additional domestic production rather than providing access to international best practice; a strategy that had little impact on economic growth. Second, foreign direct investment was poorly allocated, as it was restricted almost exclusively to the primary sector. The manufacturing sector relied more heavily on internal innovations, which did not generate high-productivity growth.

Notes:

(1) Text of the AMU treaty can be found in Testas (1996).

(2) See Mayes (1978), Winters (1987), Baldwin and Venables (1995) and Testas (1996) for surveys.

(3) Indeed, even such comprehensive studies as in DeMelo and Panagariya (1993), which consider most integration schemes in developing countries, did not study the AMU.

(4) This figure abstracts from the problems of evaluating welfare change in the other economies the rest of the Maghreb and the rest of the world by assuming that the home economy Algeria is 'small' relative to the two foreign economies, which are regarded as offering fixed, but different, terms of trade. As will become evident from the analysis, this assumption does not seem unrealistic.

(5) As it is customary in the literature, the case for Algeria-AMU economic integration is analysed within the framework of a Customs Union (CU). Since this is contrary to practice, it is done here only for the sake of illustration. The term 'preference' or 'economic integration' may also be used interchangeably.

(6) If, instead, tariff elimination is non-discriminatory, imports rise to D_3-S_3. In this case, Algeria-AMU trade does not change: there is no trade diversion, while trade creation is equal to $D_3-D_1+S_1-S_3$. But this is not the case to be analysed here.

(7) In 1992, the share of the AMU in world trade was only 1%.

References

(1) APEC (1997a), The Impact of Trade Liberalisation in APEC, APEC Secretariat, Singapore.

(2) APEC (1997b), Benefits of Open Regionalism: the Impact of APEC Trade Liberalisation Under Alternative Scenarios, APEC Secretariat, Singapore.

(3) Baldwin, R. E. and Venables, A. (1995), "Regional Economic Integration", in K. Rogoff and Grossman, G. (ed.), Handbook of International Economics 3, North-Holland, Amsterdam.

(4) Boyd, R. G. et al., (1993), "The Impact of Tariff Liberalisation between the United States and Mexico: An Empirical Analysis," Applied Economics 25, 81-9.

(5) Cheong, I. (1995), The Economic Effects of Asia-Pacific Economic Co-operation (APEC) and Asia-Based Free Trade Area: A Computational General Equilibrium Approach, Michigan State University (Unpublished Ph.D. Dissertation).

(6) DeMelo, J. and Panagariya, A. (1993), New Dimensions in Regional Integration, Cambridge University Press, Cambridge.

(7) Edwards, S. (1993), "Latin American Economic Integration: A New Perspective on an Old Dream," World Economy 16, 317-37.

(8) Edwards, S. and Savastano, M. (1989), "Latin America's Intra-Regional Trade: Evolution and Future Prospects," in Greenaway, D. et al. (ed.), Economic Aspects of Regional Trading Arrangements, Harvester Wheatsheaf, Brighton.

(9) Fei, J. C. H. (1992), "Taiwan's Economic Development and its Relation to the International Environment", in Wang, N. T. (ed.), Taiwan's Enterprises in Global Perspectives, Basil Blackwell, London.

(10) Havrylyshyn, O. and Civan, E. (1985), "Intra-Industry Trade among Developing Countries," Journal of Development Economics 18, 253-71.

(11) Langhammer, R. J. and Hiemenz, U. (1990), Regional Integration among Developing Countries: Opportunities, Obstacles and Options, Mohr,Tübingen.

(12) Leamer, E. E. and Stern, R. (1970), Quantitative International Economics, Allen and Bacon, Boston.

(13) Lord, M. J. (1991), Imperfect Competition and International Commodity Trade: Theory, Dynamics, and Policy Modelling, Clarendon Press, Oxford.

(14) Mayes, D. G. (1978), "The Effects of Economic Integration on Trade," Journal of Common Market Studies 17, 1-25.

(15) Miller, M. H. and Spencer, J. E. (1977), "The Static Economic Effects of the UK Joining the EEC: A General Equilibrium Approach," Review of Economic Studies 44, 71-93.

(16) Plummer, M. G. (1991), "Efficiency Effects of the Accession of Spain and Portugal to the EC," Journal of Common Market Studies 29, 317-25.

(17) Robson, P. (1993), "The New Regionalism and Developing Countries," Journal of Common Market Studies 31, 329-48.

(18) Testas, A. (1996) Problems and Prospects for Economic Co-operation and Integration in the Maghreb (North Africa), School of Business and Economic Studies, Leeds University (Unpublished Ph.D. Dissertation).

(19) Winters, L. A. (1987), "Britain in Europe: A Survey of Quantitative Trade Studies," Journal of Common Market Studies 27, 315-35.