BANCA D'ITALIA

UNIVERSITÀ DEGLI STUDI DI ROMA LA SAPIENZA
DIPARTIMENTO DI SCIENZE ECONOMICHE

Il commercio con l'estero e la collocazione internazionale dell'economia italiana

Incontro di studio in memoria di Stefano Vona

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INDICE

RICORDO DI STEFANO VONA

Carlo Santini

Con questa conferenza dedicata ai temi che più lo appassionarono nel corso della sua vita professionale, vogliamo ricordare Stefano Vona, venuto a mancare nel novembre del 1990, da poco compiuti quarantuno anni.

Il percorso professionale che Stefano ha condiviso con noi inizia con la borsa di studio Stringher e il periodo passato all'Università di Cambridge nell'anno accademico 1975-76. Si era laureato nel 1974 alla Facoltà di Statistica della "Sapienza", con Paolo Sylos Labini, con una tesi dal titolo "Il fattore tecnologico negli scambi di manufatti tra paesi industriali". Entra al Servizio Studi nel 1976; i primi anni sono legati a studi e contributi su aspetti reali dell'economia. Il lavoro sul modello econometrico del conto corrente della bilancia dei pagamenti si intreccia con l'attività di studio sul mercato del lavoro e sulla produttività dell'industria italiana. Sul tema del commercio orizzontale, approfondito in un successivo soggiorno inglese, Stefano ritornerà alla fine degli anni ottanta per proporre contributi metodologici e scientifici che anche in questa conferenza verranno ricordati come particolarmente fecondi.

Dal 1980 Stefano Vona ha fatto parte del Settore internazionale del Servizio Studi, inizialmente con il compito di seguire il commercio internazionale e le bilance dei pagamenti; è in questa veste che contribuisce alla costruzione degli indici di cambio reale dell'Italia e dei principali paesi concorrenti, indici che sono rimasti per anni lo strumento di uso quotidiano nell'analisi della competitività.

Il Servizio Studi ha approfittato della notevole curiosità intellettuale di Stefano stimolandolo ad occuparsi di temi monetari e inducendolo a misurarsi anche con l'attività più prettamente istituzionale del Servizio. È il periodo in cui, a capo dell'ufficio Cambi e Commercio Internazionale, si occupa di temi di cambio e del Sistema Monetario Europeo, assumendo incarichi internazionali, partecipando a gruppi di lavoro e a comitati (dal 1988 è stato membro supplente del Comitato Monetario della CEE).

Di questo periodo sono le analisi sul Sistema Monetario Europeo in relazione alla competitività, al commercio e alle politiche; oggi diremmo in

relazione alle questioni che le asimmetrie tra i paesi membri pongono al coordinamento delle politiche economiche e alla convergenza.

Agli aspetti monetari degli squilibri e dei riequilibri dei paesi alla fine degli anni ottanta si affianca il filone del commercio internazionale, delle sue tendenze e delle politiche commerciali, un filone forse carsico negli interessi della Banca, di cui Stefano Vona è stato certamente uno dei cultori più assidui e appassionati. La sua discussione degli indicatori del commercio intraindustriale, della definizione rilevante di "industria", del livello appropriato di disaggregazione per l'analisi empirica rimane ancora viva e attuale; la ricerca su questi temi da lui coordinata in Banca d'Italia, e uscita in volume dopo la sua scomparsa, affronta il nodo della liberalizzazione degli scambi e, al fine di qualificare la validità teorica della libertà del commercio, richiama la necessità di una concertazione internazionale, che in qualche modo imponga e faccia rispettare universalmente il principio del libero scambio.

L'indicazione, tra i temi chiave del dibattito del tempo, del rafforzamento della negoziazione internazionale multilaterale, e della sua estensione alle barriere non tariffarie e ai servizi anticipa molto di quanto è cronaca di questi anni.

Il dolore per la perdita di Stefano non è sanabile. Ci conforta il suo lascito culturale; resta vivo il suo esempio e il suo stimolo a percorrere la strada della ricerca, della conoscenza.

MEASUREMENT OF INTRA-INDUSTRY TRADE: WHERE DO WE STAND? AN ANALYSIS OF ITALIAN TRADE DATA

Barbara Annicchiarico[•] *and Beniamino Quintieri*[*]

1. Introduction

In the analysis of international trade a key development has been the evaluation of the so-called intra-industry trade (IIT). In the early 1960s it was noticed that a large part of international trade did not consist in exchange flows of different products, but in exchange flows of different types of a given product. Many theoretical contributions tried explaining the circumstances in which IIT would arise. Scale economies, imperfect competition and product differentiation were considered as key factors.

Grubel and Lloyd (1975) documented the importance of the simultaneous exports and imports of products within the same industry, showing that IIT constitutes an important part of the total world trade. Later theoretical models able to explain IIT were constructed (Krugman, 1979 and 1980) and traditional trade models were generalized to incorporate the concepts of scale economies, imperfect competition and product differentiation (Dixit and Norman 1980, Helpman and Krugman 1985). The common feature of these theories is that they abandon the assumption of product homogeneity and of perfect competition.

Assessing the empirical relevance of IIT, however, has given rise to two main problems. The first is related to the level of data disaggregation at which IIT is observed. For a low level of data disaggregation, in fact, the observed IIT can just be a statistical artifact. Some authors remain of the opinion that data aggregation is the most important source of intra-industry trade[1]. The second problem refers to what Vona (1991) calls "the objective difficulty of finding a suitable quantitative measure of IIT" (p. 678). In this paper we focus on this second aspect which, during the last two decades, has given rise to extensive literature.

The measurement of intra-industry trade has been considered for a long time to be an unresolved issue. Several measures of intra-industry

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[1] On this topic, see Vona (1990).

trade have been proposed and refined. The most used measure is the Grubel-Lloyd index, which indicates the proportion of IIT on total trade. Grubel and Lloyd (1975) were the first to discuss the possible bias of their index when trade balance is not balanced. They propose to correct their index in order to express IIT as proportion of total trade minus the trade imbalance.

Aquino (1978) proposes a correction for the original Grubel-Lloyd index on the assumption that the imbalancing effect is equiproportional to all categories. Loertscher and Wolter (1980) suggest a correction method based on bilateral trade imbalances. Bergstrand (1983) corrects the original index by transforming import and export flows in order to distribute the trade imbalance across individual industries[2]. These approaches have been criticized by Greenaway and Milner (1981, 1987).

In his posthumous article Vona (1991) brought to an end this long debate, stressing the fallacies of the "need for correction argument" of the original Grubel-Lloyd index. With a simple numerical example he shows how corrections for trade imbalance in measuring IIT introduce distortions and make it difficult to interpret the phenomenon under analysis. Moreover, the "need for correction argument" is based on the misleading idea that international trade is divided into three categories: inter-industry trade, intra-industry trade and trade imbalances. The last category would not belong to either of the other types and it is treated as a disturbing factor in the definition of an index for IIT. Vona pointed out that underlying this fallacy there is the conviction that an appropriate empirical measure must be able to reflect the fact that, according to theoretical literature on international trade, trade flows must in the long run be balanced. In this respect Vona opportunely writes: "However, care needs to be taken when transferring properties of the theoretical sphere into the empirical world. In fact, most of the empirical works on IIT […] refer to manufacturing sector. There is no theoretical justification for imposing balanced trade in manufacturing on each country considered, because one country may well run a deficit in the manufacturing sector, even for a long period, while earning surpluses on its trade in other sectors […]" (p. 687).

Since then two other strands of literature concerning measurement issues have been developed. The first one concerns the dynamic aspect of

[2] On the "need for correction argument" see also Kol and Mennes (1989) and Fontagné and Freudenberg (1997a), while alternative measures of IIT have been proposed by Vona (1991), Rajan (1996) and Nilsson (1997).

IIT, the so-called marginal intra-industry trade. The marginal intra-industry trade (MIIT) is defined as the simultaneous change of two-way trade, while a variation in the opposite direction of imports and exports is interpreted as inter-industry trade adjustment. It is commonly assumed that adjustment costs due to growth in international trade may differ depending upon whether increasing trade is of intra or of inter type. Increasing intra-industry trade implies a reallocation of factors within industries with the adjustment process being rather smooth. Conversely, growing inter-industry trade determines factors' reallocation between industries and the adjustment process is assumed to be sluggish and costly. These adjustment costs clearly tend to influence the political consensus underlying a process of trade liberalization. The contribution of IIT growth on total trade growth becomes relevant when one wants to assess the adjustment costs and the disruptive effect of international trade on factors' market. If most of the growth in trade is of intra-industry type, then the allocative effects on factors' market tend to be low. IIT requires specialization within industry and does not imply factors' movements from the import to the export sector of an economy. In order to investigate the disruptive effects of international trade in factors' markets one needs a device to measure the pattern of changes in trade flows. This strand of literature focuses on this important measurement issue.

The second strand of literature is related to the two-way trade in products which are different in quality, the so-called vertical intra-industry trade (VIIT). An important distinction stressed in the theoretical literature is the one between horizontal and vertical product differentiation. The former arises in the presence of different varieties of products of the same quality, but with different characteristics; the latter when different varieties of products differ in their quality level. The main difficulty consists in determining a measure able to disentangle horizontal and vertical intra-industry trade. This distinction can be helpful to investigate the reallocative effects of international trade. In the literature, as above mentioned, the disruptive effects of IIT are considered less severe than the effects produced by inter-industry trade, indicating IIT between similar countries as the most politically acceptable form of trade. Nevertheless, in the last two decades IIT has also arisen between countries of different levels of development, taking the form of vertical IIT. There are convincing reasons for believing that the country and the sector-specific determinants of the two components of IIT differ, but so far the empirical literature has not fully supported this idea. One reason behind this failure is that the

commonly used method of measuring vertical intra-industry trade may be inappropriate for this kind of analysis.

So far no one seems to have brought to conclusion the two parallel debates concerning the measurements of marginal and vertical intra-industry trade and we do not claim to do so in this paper. Conversely, we propose an extension of an existing index of marginal-intra industry trade and a new measure of vertical intra-industry trade and we apply them to investigate and discuss the Italian intra-industry trade pattern of the last decade in manufacturing.

This paper is organized as follows: in Section 2 the issue concerning the importance of measuring marginal intra-industry trade is introduced, and evidence for Italian manufacturing marginal intra-industry flows of the last decade is presented; in Section 3 measurement and methodology to disentangle the two components of IIT are described and a new indicator of VIIT is presented. In the same section we present some recent evidence on vertical intra-industry trade for Italian manufacturing. Conclusions are in Section 4.

2. MIIT as Measure of Non-Disruptive Trade Flows

The measurement debate on the "need for correction argument" revolves around the static aspect of IIT and its significance for the neoclassical trade theory, which was not able to explain intra-sector trade flows. The relevance of IIT for factor-market adjustment has been neglected for a long time.

The process of economic integration within countries has stimulated the growth of two-way trade flows. Inter-industry trade, determined by comparative advantage and difference in factors endowment, tends to produce a sector specialization. In general, it leads to a reallocation of resources from import-competing sectors to export-oriented sectors and to a consequent contraction of the former and to an expansion of the latter. Intra-industry trade instead seems to preserve the industrial structures of an economy. Usually, IIT is assumed to entail lower adjustment costs and reallocation effects than inter-industry trade.

Hamilton and Kniest (1991) are the first to observe the importance of measuring the dynamic aspect of IIT, which can be more informative

than static measures when one wishes to analyse the adjustment costs of international trade. They propose a measure of marginal intra-industry trade (MIIT), meant as the simultaneous variation of imports and exports of the same product. Since then many authors have proposed different measures of MIIT[3].

IIT occurs between countries similarly endowed in terms of factors and in general this trade does not involve the income-distribution effect characteristic of inter-industry trade.

Adjustment costs occur if markets fail to clear instantaneously when demand or supply conditions change. The adjustment costs related to international trade expansion refer to the sluggish reallocation of factors and to the welfare losses that this rigidity produces. According to the "new trade theory" IIT arises from the existence of scale economies and imperfect competition. The monopolistic competition is based on the notion of product differentiation and on the assumption that horizontally differentiated goods are homogenous in terms of factor requirements. An increasing specialisation at intra-sector level would not, by assumption, give rise to the reallocation of factors and, by consequence, to adjustment costs. In general, it is likely that factor reallocation within industries is less sluggish than that between industries. The presumption that IIT produces a less disruptive effect on factor markets than inter-industry trade is known in the literature as the "smooth-adjustment hypothesis"[4].

The distinction between shares and changes of IIT becomes relevant in the study of the adjustment implications of international trade. In this case it is more appropriate to measure the variations rather than the levels of IIT. This important distinction has been proposed by Hamilton and Kniest (1991) in a contribution which has given rise to a wide debate on the measuring aspect of non-disruptive trade growth.

2.1 Aggregate Measures of MIIT

Changes in Grubel-Lloyd index are considered inadequate and rather misleading measures of non-disruptive trade growth, as this index expresses the share of two-way trade in each industry's total trade.

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3 See Brülhart (1999; 2001) for complete surveys.

4 On the so-called "smooth-adjustment hypothesis" and on its real significance, see the contribution of Brülhart (1999).

The Grubel-Lloyd index of the total intra-industry trade of a country is calculated as a share of its total trade:

$$(1)\ GL_{IIT} = \frac{\sum_{i=1}^{n}(X_i + M_i) - \sum_{i=1}^{n}|X_i - M_i|}{\sum_{i=1}^{n}(X_i + M_i)}$$

where i denotes all n-digit level product categories in manufacturing industry and X_i and M_i denote the value of exports and imports respectively. The comparison between the levels of Grubel-Lloyd index in different periods enables us to assess if the share of IIT on total trade has changed, but it does not offer any information on the relative magnitude of the possible observed changes in the level of IIT. Moreover, an increase in inter-industry trade, which acts to reduce the trade imbalance, causes an increase in the level of Grubel-Lloyd index. These shortcomings make this static indicator an inappropriate measure of the pattern of changes of trade flows.

In order to assess the importance of the adjustment effects of trade flows it is necessary to focus the attention on the changes in time of trade flows, rather than on the levels at different points in time. With this aim Brülhart (1994) proposes a dynamic version of the Grubel-Lloyd index decomposing the variations of trade flows into the proportions attributable to inter and to intra-industry adjustment[5]. His index at sector level is simply defined as:

$$(2)\ B_i = \frac{\left(|\Delta x_i| + |\Delta m_i|\right) - |\Delta x_i - \Delta m_i|}{\left(|\Delta x_i| + |\Delta m_i|\right)}$$

while the aggregate version is

$$(3)\ B = \sum_{i=1}^{n} B_i w_i$$

where

[5] Alternative measuring approaches of MIIT have been proposed by Greenaway, Hine, Milner and Elliott (1994), Dixon and Menon (1997), Azhar, Elliott and Milner (1999).

$$(4)\ w_i = \frac{|\Delta x_i| + |\Delta m_i|}{\sum_{i=1}^{n}(|\Delta x_i| + |\Delta m_i|)}$$

In particular, Δx_i and Δm_i indicate, respectively, the change of exports and imports in sector i[6].

Marginal intra-industry trade is defined as the simultaneous variation of two-way trade (simultaneous rise or reduction of imports and exports), so that a change in opposite direction of imports and exports is not interpreted as MIIT but as inter-industry trade adjustment.

To distinguish the simultaneous increase of imports and exports from their simultaneous reduction we can use an index of MIIT which takes into account the sign in the variation of trade flows. Starting from the Grubel-Lloyd style index proposed by Brülhart, we define the following index of MIIT at sector level[7]

$$(5)\ AQ_i = \frac{(|\Delta x_i| + |\Delta m_i|) - |\Delta x_i - \Delta m_i|}{(|\Delta x_i| + |\Delta m_i|)}(-1)^k$$

where $k = 1$ if $\Delta x_i, \Delta m_i < 0$

and $k = 2$ if $\Delta x_i, \Delta m_i > 0$

The indicator AQ_i takes values between minus one and one and takes into account the sign of the simultaneous changes. The index is equal to one when the positive variations of imports and exports have brought to an increase in the level of intra-industry trade; AQ_i is equal to zero when the changes of imports and exports are such that the level of intra-industry has not varied and a change of inter-industry trade has occurred; finally, the index is equal to minus one when the negative variations of imports and exports have brought to a decrease in the level of intra-industry trade.

As in the Brülhart index, the product level index of (5) can be used to measure the MIIT for the whole economy in the following way:

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6 The product level index is zero when changes of imports and exports have opposite sign.

7 As observed for the Brülhart's index, at product level, *AQ* index is zero when changes of imports and exports have opposite sign. See Annicchiarico and Quintieri (2000a).

$$(6) \qquad AQ = \sum_{i=1}^{n} AQ_i w_i$$

where w_i is the weight of trade variations of sector i on total trade variations for the economy defined in (4). The aggregate index represents the weighted average of the indexes at product level and it should be considered complementary to the index proposed by Brülhart[8].

In the following sub-section we present some evidence for the Italian manufacturing MIIT in the last decade by comparing the static Grubel-Lloyd indexes for different years and by computing the described dynamic indexes for the period 1990-1995 and 1995-2000.

2.2 MIIT in the Italian Manufacturing Industries, 1990-2000

Table 1 reports indexes of IIT and MIIT for total Italian manufacturing with different geographical areas and main trading partners. All indexes have been computed at 6-digit NC level (chapters 30-96)[9]. Some important stylised facts emerge from the analysis of the results.

First, we observe a general increase in the Grubel-Lloyd index during the decade. The share of Italian IIT on its total trade has increased in all areas and, in particular, in Central and East Europe and Asia. This general trend, already observed by other authors during the eighties, seems to persist.

Second, according to the B index of MIIT, 30% of total trade changes, occurring in the two sub-periods considered, can be attributed to

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[8] In order to understand the logic behind this extension of Brülhart's index consider an economy in which there are two sectors. Assume that in the first sector a simultaneous increase in the level of imports and exports (positive MIIT) occurs and that at the same time in the other sector a simultaneous decrease in the level of imports and exports (negative MIIT) of the same amount as the former is observed. At aggregate level these flows of opposite signs can be considered an inter-industry re-allocation of trade. The level of trade in fact increases in the first sector but decreases in the latter and the index *AQ* is equal to zero, showing the inter-industry origin of these changes in trade flows. Now assume, instead, that in both sectors a positive simultaneous change of imports and exports is observed. In this case the index *AQ* is equal to one, showing that in a given period the trade flow variations represent an increase in the level of intra-industry trade. Conversely, in the case of negative simultaneous changes of imports and exports in both sectors the index is equal to minus one.

[9] The data collection used contains information on the current value of annual imports (c.i.f.) and exports (f.o.b.) in Italy. The flows of imports and exports by country are expressed in value (thousands of US Dollars) and quantity (per kilo). All items referring to raw materials, primary commodities and energy have been discarded.

matched changes in imports and exports. High levels of the B indexes are observed for trade with European countries and USA. For both sub-periods, moreover, a high share of matched trade changes on total trade changes is observed for Central and East Europe. Low levels of MIIT are instead observed with Asia. In this case the contribution of simultaneous changes in imports and exports on total trade is 19.3% for the period 1990-95 and 12.4%, for the period 1995-00.

Finally, the AQ index, which does not include the simultaneous reductions of imports and exports in the measure of non-disruptive trade changes, indicates that part of the observed simultaneous trade changes, measured by the B index, consist in a matched contraction of imports and exports. Wide reductions with respect to the B index are observed for both periods, but especially for the second one the matched changes of imports and exports have consisted in a matched contraction. This tendency is very noticeable for trade flows with Central and East Europe and Asian countries. In the first sub-period most of the observed simultaneous changes of imports and exports consist of expansions, while in the second sub-period most of the simultaneous changes amount to matched contractions. Most of the matched contractions of simultaneous trade flows observed for the period 1995-2000 with Central and East Europe occurred in the manufacturing of fabricated metal products, basic metal products and in the chemical sector.

A possible source of the observed matching reduction in Italian imports and exports can be related to the general slowdown in growth of international trade flows which occurred in the second half of the decade. This period was dominated by the negative consequences produced by the financial crises that in 1997 hit the so-called Newly Industrialised Economies of Eastern Asia and that later destabilised all the Asian economy. Subsequently, the crisis moved west to involve Russia, which was engaged in a complex and slow transition process in 1998, and Brazil in 1999. The negative effects of financial instability were more apparent for the countries directly involved and their neighbouring economies, but they indirectly concerned the rest of the world, requiring a prudent and watchful monetary policy, with the aim of avoiding contagion. At the same time, imports and exports of countries hit by the financial crisis sharply decreased. The pattern of growth in international trade was similar to that in GDP, pointing to a considerable decline which concerned all the second quarter of the last decade.

Table 2 presents indexes for IIT and MIIT for the Italian manufacturing at industry level. With the exception of the sector “other transport equipment” the GL index shows an increase in the total share of IIT on total trade in all sectors. A remarkable increase in the IIT share on total trade is observed for the so-called traditional sectors, “textiles”, “clothing and apparel”, “leather products”, “wood products” and “furniture”. The B index shows that for all sectors matched changes in trade flows represent from ten to forty per cent of total trade variations. The AQ index indicates that most of the observed matched changes have consisted in a reduction, especially in the second sub-period. Important exceptions, however, can be seen in “furniture”, “chemical products” and “other transport equipment”. For this last sector, in particular, in the first sub-period most of the matched changes have consisted in a reduction of trade flows. This striking result is related to an important simultaneous decrease in the trade of aircraft.

3. VIIT and the 'Quality' Aspect of Intra-Industry-Trade Flows

From a theoretical point of view it is important to emphasise the difference between vertical and horizontal differentiation. Vertical differentiation refers to products which are different in quality. Under the assumption of a universally accepted concept of quality, rational consumers prefer higher-quality products to lower-quality products. Moreover, assuming that the price of certain goods increase as their quality improves, it follows that all consumers will demand higher-quality goods in the absence of budget constraint. In this case the demand for commodities of different quality depends on the income of consumers. Horizontal differentiation, instead, refers to products of the same quality but having different characteristics.

The majority of the theoretical models, implicitly, refer to IIT in horizontally differentiated products, assuming that the production functions exhibit increasing returns to scale due to the presence of fixed costs. Other types of models deal with IIT in vertically differentiated products. The Helpman and Krugman (1985) standard model of IIT represents the basic model for the empirical literature on two-way trade in similar products (horizontal differentiated products). In the presence of economies of scale and product differentiation there are incentives for trade and specialization due to reasons which are not related to differences in factor endowments or

in technology across countries. On the supply side they consider a sector in which the product is differentiated and in which the economies of scale are small enough that many firms can operate in the industry. If the market structure is characterized by monopolistic competition, each firm can produce a different variety of the product. This means that each producer will choose the variety and price in which will maximise profit, given the choices in variety and pricing of the other firms operating in the sector. On the demand side they assume the presence of demand for variety, so that differentiated goods are requested by consumers. Given this structure, it is natural for IIT to be observed between two countries producing different varieties of the same product. In particular, the monopolistic competition structure of the market assures that each country will produce different varieties of the same good, while in both countries there will be a demand for all the varieties produced in the world market. The volume of IIT depends on the countries' relative factors endowments and on the countries' size. In particular, the less dissimilar two countries are in their relative factor endowments and the more similar they are in their size, the larger the intra-industry will be.

The model of Falvey (1981), further developed by Falvey and Kierzkowski (1987), is the main reference for all the empirical literature on the determinants of the vertical component of IIT[10]. In these models VIIT (i.e. IIT in vertical differentiated products) occurs in the presence of perfect competition between countries which differ in factor endowments. In a simple $2\times2\times2$ scheme Falvey explains the existence of VIIT. He considers two countries having different endowments of capital and labor, where higher level of quality is associated with relatively capital-intensive techniques. In this way the country with higher income and relatively capital-abundant will specialize in the production of high quality products, while the lower income and relatively labor-abundant country will specialize in the production of low quality products. The main outcome is that capital-abundant countries will export high quality products and import low quality products coming from labor-abundant countries.

In Falvey and Kierzkowski the demand side is also considered, suggesting that the share of VIIT depends on the average market size of two countries. The basic idea is that we cannot have IIT without a certain

[10] Alternative models on VIIT have been presented by Gabszewicz et al. (1981), Shaked and Sutton (1984), Flam and Helpman (1987), Martin (1993) and Petrucci and Quintieri (2001).

overlap in the demand structure of two economies. The so-called Linder's proposition should hold[11]. This requires a demand for low quality goods in the country specialised in the production of high quality goods, and a demand for high quality goods in the country specialised in the production of low quality goods. If countries differ too much in factor endowments and in per capita income there will be no room for VIIT, since the demand for qualities produced abroad is missing (i.e. the high quality specialised country will be so rich that there will not be any demand for low quality goods). Therefore, the demand side requires a certain resemblance of the two countries, while the supply side requires difference in the capital and labor endowments. According to this model, in order to have VIIT, two countries must differ in terms of relative factor endowment, but at the same time they must not have too dissimilar demand structures. It is clear that this double origin of VIIT is the source of many difficulties when one tries to assess the empirical relevance and the determinants of vertical differentiation in international trade.

Many authors have attempted to distinguish the determinants of the two components of IIT looking at the country and sector specific factors, but their results differ greatly, so there is no consensus on which specific counterparts in terms of industrial organisation or country specific factors (factor endowments and technology) may underlie this phenomenon[12]. In order to distinguish the determinants of VIIT from those of HIIT, one must take into account the above mentioned double origin of these trade flows and devise an appropriate method to measure them.

3.1 Disentangling the Vertical Component of IIT Flows

The most commonly used method of disentangling the two components of IIT is based on the Grubel-Lloyd unadjusted index. In order to distinguish between trade in differentiated goods of the same quality and trade in goods of different quality, unit values of imports and exports are used[13]. This procedure has been widely adopted in the literature on vertical

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[11] Linder's basic proposition states that domestic demand determines potential imports and potential exports of a country. It follows that trade will be larger between countries with similar demand structures.

[12] Greenaway, Hine and Milner (1994, 1995), Torstensson (1996), Fontagné and Freudenberg (1997b), Fontagné, Freudenberg and Péridy (1998), Aturupane, Djankov and Hoekman (1999).

[13] This procedure, proposed by Abd-El-Rahman (1991), has been widely used in the literature on vertical IIT. Unit values are defined as the ratios between values and quantities of imports and exports. See Grenaway, Hine and Milner (1994, 1995), Ballance, Forstner and Sawyer (1992), Aturupane, Djankov and Hoekman (1999). The idea underlying this method is that the quality of a certain product (continues)

IIT, in which unit values have been used as an indicator of quality, under the assumption that, with perfect information, goods sold at a higher price must be of higher quality than cheaper goods. Moreover, as Stiglitz (1987) has demonstrated, even in the case of imperfect information, prices would tend to reflect quality[14].

The numerator of the Grubel-Lloyd index (1) can be calculated by considering only those categories in which the unit value of imports (UVM_i) and the unit value of exports (UVX_i) satisfy the condition:

$$(7)\ 1-\alpha \le \mathrm{UVX_i} / \mathrm{UVM_i} \le 1+\alpha$$

where $\alpha = 0.25$[15].

Consequently index (1) becomes the share of horizontal intra-industry trade (HIIT) on total trade:

$$(8)\ \mathrm{GL_{HIIT}} = \frac{\sum_{i=1}^{n}(\mathrm{X_i^h} + \mathrm{M_i^h}) - \sum_{i=1}^{n}\left|\mathrm{X_i^h} - \mathrm{M_i^h}\right|}{\sum_i (\mathrm{X_i} + \mathrm{M_i})}$$

where $\mathrm{X_i^h}$ and $\mathrm{M_i^h}$ are, respectively, export and import at *n*-digit level for which condition (7) holds. Index (8) measures the share of IIT on total trade in which the unit values of imports and exports differ by less than 25%.

The same procedure can be adopted to calculate the share of vertical intra-industry trade (VIIT) in total trade. In this case the numerator of index (1) can be recalculated by considering only those categories for

can be measured by its price. However, care must be taken in using unit values as proxy of prices for two reasons. First, a higher-quality product, more durable for example, can be made of heavy material, so that its unit value per tonne could be lower than the unit value of the corresponding lower quality product. Second, the unit value of two bundles of the same goods may be different because the prices of a certain item differ between the two bundles or because the product composition of the two bundles differs. Nonetheless, it is reasonable to assume that, for very disaggregated data, unit values reflect prices which measure the quality level.

[14] Of course, price is an imperfect measure of quality, but it reflects with good approximation the consumers' assessment of products.

[15] In the literature the values 0.25 and 0.15 have been widely used as discrimination edge. Here the value 0.25 has been preferred to 0.15 in order to obtain most robust indicators of vertical differentiation.

which the unit value of imports (UVM_i) and the unit value of exports (UVX_i) satisfy the following conditions

(9) $\mathrm{UVX_i} / \mathrm{UVM_i} > 1-\alpha$ or $\mathrm{UVX_i} / \mathrm{UVM_i} < 1-\alpha$

where α =0.25.

The result is:

$$(10) \quad \mathrm{GL_{VIIT}} = \frac{\sum_{i=1}^{n}(\mathrm{X_i^v} + \mathrm{M_i^v}) - \sum_{i=1}^{n}\left|\mathrm{X_i^v} - \mathrm{M_i^v}\right|}{\sum_i(\mathrm{X_i} + \mathrm{M_i})}$$

where $\mathrm{X_i^v}$ and $\mathrm{M_i^v}$ are, respectively, export and import at *n*-digit level for which conditions (9) hold. From (1), (8) and (10) it follows that:

(11) $\mathrm{GL_{IIT}} = \mathrm{GL_{HIIT}} + \mathrm{GL_{VIIT}}$

It can be useful to distinguish further between positive and negative shares of VIIT, where the former implies that the unit values of exports exceed the unit values of imports and the latter that the unit values of imports exceed the unit values of exports. The positive share of vertical intra-industry trade ($\mathrm{VIIT^+}$) can be obtained calculating the numerator of index (3) by considering only the categories for which $\mathrm{UVX_i} / \mathrm{UVM_i} > 1-\alpha$, while the negative share of vertical intra-industry trade ($\mathrm{VIIT^-}$) is obtained by using only the categories for which $\mathrm{UVX_i} / \mathrm{UVM_i} < 1-\alpha$. Under the above assumptions it follows:

(12) $\mathrm{GL_{VIIT}} = \mathrm{GL_{VIIT+}} + \mathrm{GL_{VIIT-}}$

As we have seen the vertical component of IIT has two origins: the first one is related to its "intra-industry" origin, which requires that two countries must not be too dissimilar; the second one refers to its "inter-industry" origin, which requires that two countries must be different in terms of resource endowment or of technology. This double origin complicates the analysis and makes it difficult to study the determinants of vertical intra-industry trade. For this reason the $\mathrm{GL_{VIIT}}$ is informative in descriptive studies, but it can be misleading when used in empirical studies. In order to measure the degree of quality differentiation of the pattern of trade of an economy, one must device an appropriate index which may well be used in the study of the determinants of VIIT flows. We

aim to propose an aggregate index to measure the degree of vertical differentiation between trading partners[16]. This indicator is defined as the weighted average of the degree of vertical differentiation of trade in each commodity, where the degree of vertical differentiation is given by the normalised difference between unit values of export and import in each product and the weights are defined as the share of IIT in each product on total IIT. In this way we *extract* the IIT origin of vertical trade and the supply side determinants of VIIT between countries can be studied.

The index is defined as:

$$(13) \quad A = \sum_{i=1}^{n} \left(\frac{UVX_i - UVM_i}{UVX_i + UVM_i} \right) \left(\frac{TIIT_i}{TIIT} \right)$$

where
$$TIIT_i = (X_i + M_i) - |X_i - M_i|$$
$$TIIT = \sum_i \left[(X_i + M_i) - |X_i - M_i| \right]$$

while i denotes the n-digit product, X_i and M_i denote the value of exports and imports respectively, UVX_i and UVM_i represent the unit value of exports and the unit value of imports of product i, while $TIIT_i$ is the level of two-way trade for the product i and TIIT is the total two-way trade of the economy.

The *A* index is positive and tends to *1* when on average the country's exports are of higher quality than the imports; conversely, it is negative and tends to *-1* when the quality of the imports are relatively higher. In both cases VIIT presents an *inter-industry* origin and it could be the result of a certain degree of difference in factor endowments between two trading partners. If the *A* index is close to zero, instead, it indicates that the VIIT is more *intra* than *inter* and that presumably two countries are rather similar in terms of factor endowments and productivity.

In the following sub-section some evidence on quality differentiation in Italian IIT is presented and discussed.

[16] See Annicchiarico and Quintieri (2000b).

3.2 Vertical Specialisation in Italian Manufacturing Industries, 1990-2000

Intra-industry trade in Italian manufacturing industry has been divided into vertical and horizontal components using the unadjusted Grubel-Lloyd index computed at 6-digit NC level. Tables 3a, 3b and 3c report measures of vertical and horizontal IIT in Italy with respect to geographical areas and main trading partners. The first column of each table reports the Grubel-Lloyd index for total IIT flows and the second and the third ones present, respectively, the Grubel-Lloyd based indexes for horizontal and vertical IIT. In 2000 almost 50% of Italy's trade is IIT and more than half is vertical IIT. As we can see, there are some interesting differences across trading partners. When we consider the industrialised countries, horizontal and vertical components of IIT have almost the same weight on total trade, with the exception of trade with UK, Japan and USA. Conversely, trade flows with Europe tend to be almost equally split in horizontal and vertical IIT. By comparing the three tables we observe a general stability of the two components of IIT in trade with all the industrialised countries, with the exception of the VIIT with USA[17]. When we look at the other areas, it is apparent that most of IIT with Central and East Europe is vertical. In all three years VIIT represents about 20% of total Italian manufacturing trade with Central and East European countries and similar levels are observed for the trade with Asia.

The fourth and the fifth columns of tables 3a, 3b and 3c report, respectively, the positive and the negative components of VIIT. Most of VIIT with European countries is negative, denoting that Italy is a net importer of relative high quality goods. The share of high quality vertical IIT exceeds low quality vertical trade with Central and East Europe, Asia, Latin America and Africa. Conversely, with industrialised countries, the negative component of vertical IIT is dominant.

The last column of the three tables reports the *A* index for Italy's trading partners. In general, the index is negative and relatively small in size for trade with industrialised countries, indicating that the level of vertical differentiation of IIT is relatively small, and that Italy tends to import high quality products. However, two important exceptions are observed for Germany and USA. In these cases, in fact, the *A* index is negative and not close to zero. In general, the index tends to be close to

[17] The choice of the critical level α to distinguish the two components of IIT on the base of unit values is crucial. As showed in the previous sub-section a high level of α tends to increase the share of horizontal intra-industry trade, but it offers a more robust measure of vertical differentiation.

zero when the intra-industry origin of vertical differentiated trade prevails on its inter-industry origin, indicating similarities between trading partners in terms of factor endowments and technology. Conversely, the index is positive and big in size when less developed areas and Central and East Europe are considered, indicating that the level of vertical differentiation of IIT is relatively high, and that Italy tends to import low quality products. In this case, however, the origin of VIIT tends to be more of inter than of intra type, implying differences in factor endowments and technology between countries.

By comparing the composition of IIT a puzzling stylised fact emerges. The share of HIIT is lower in 1995 than in 1990 and in 2000; at the same time VIIT is higher in 1995 that in the other two years. For the most part the observed change can be attributed to an increase in the share of positive VIIT on total trade. The following question immediately arises: why did we observe this change in the Italian IIT composition during the nineties? Without looking for exotic explanations more attention should be attributed to the effect produced by the devaluation of the Lira in 1992. After this devaluation the Italian terms of trade worsened, favouring an increase in the level of exports, the improvement of trade balances, and a rise in inflation. Subsequently the depreciation at the beginning of 1995 further boosted price levels and export prices. The higher share of VIIT observed in 1995 may be the result of this inflationary dynamics which increased the unit value of exports with respect to imports[18].

By comparing the three tables we can observe an increasing share of HIIT on total trade with Central and Eastern European Countries. This general tendency should reflect an improvement in the terms of trade in this area, which has been involved in the transition process since the beginning of the decade[19].

Tables 4a, 4b and 4c present measures of Italian IIT flows in total manufacturing industry decomposed in the two components for different manufacturing sectors. The most relevant increases of VIIT during the last decade are observed in the so-called “traditional” sectors. In 2000 half of total trade flows in clothing and apparel consists in VIIT and the positive

[18] We are grateful to Giorgio Basevi to have made this point clear to us.

[19] These last two paragraphs have been added to the original version of the paper taking into account the excellent remarks made by the discussant and by the other participants.

component constitutes almost the total vertical IIT[20]. Similar tendencies, but of smaller amounts, can be seen for “leather products”, “textiles”, “wood products” and ”furniture”.

High levels of VIIT can be observed in all the sectors of manufacturing of metal products. For these sectors, conversely, the negative component is larger than the positive. These results confirm the well known tendency in the Italian trade pattern, which appears to be oriented towards the exporting of high quality goods in the traditional sectors and towards the importing of high quality goods in the high tech industries.

The last columns of tables 4a, 4b and 4c report the *A* index of vertical IIT specialisation. The *A* index is relatively high and positive in the traditional sectors, while it tends to be negative and close to zero for the other sectors. Relevant exceptions are observed for “road vehicles”, “electrical machinery” and chemicals in 1990, and for “other manufactures of fabricated metal products” for all the years. This last category includes precision instruments, optical and photo products, clocks and watches, arms and ammunition. In these sectors the *A* index is remarkably less than zero, confirming the well known weakness of Italian trade pattern in the high-tech industries.

4. Conclusion

During the last decade two new strands of literature on the measurement of intra-industry trade have been developed. The first one is related to the dynamic aspect of IIT and to the concept of marginal intra-industry trade. The second one deals with quality differentiation of intra-industry trade flows and to the concept of vertical intra-industry trade.

The measure of MIIT proposed in this paper, which should be considered complementary to the dynamic Grubel-Lloyd style index presented by Brülhart, is derived from the consideration that the reallocative implications of simultaneous trade expansion differ from those entailed by simultaneous trade contraction.

[20] For some evidence of Italian VIIT in textiles and clothing industry, see Annicchiarico and Quintieri (1999).

We claim that the measure of VIIT, based on the unadjusted Grubel-Lloyd index and on unit values, may be informative in descriptive analysis, but may give rise to misleading result because of the double origin of this typology of trade. Vertical intra-industry trade presents inter-industry trade characteristics in the sense that it requires a certain difference in factors' endowments between countries, and it shows intra-industry trade characteristics, in the sense that it requires a certain resemblance on the demand side of the economies involved.

The index of vertical differentiation of intra-industry trade proposed in this paper, defined as the weighted average of the degree of vertical differentiation of trade in each product, has the advantage of stripping the vertical component of IIT of its intra-industry characteristics. However, the empirical behaviour of the proposed index of vertical intra-industry trade needs to be investigated.

The analysis of Italian manufacturing trade data for the last decade shows that IIT constitutes most than half of total trade and that there are some interesting differences across trading partners and across sectors. There are five main findings stemming from this analysis.

Firstly, the share of Italian IIT on its total trade has increased with all the areas and the main trading partners. Important increases are observed with Central and East Europe and Asia. *Secondly*, a large part of total trade changes observed in the period under analysis can be attributed to matched changes of imports and exports. *Thirdly*, disentangling the so-called vertical component of IIT from the horizontal component, according to the nature of product differentiation, shows that horizontal and vertical components of Italian IIT with industrialised European countries represent almost the same weight on total. The share of high quality vertical IIT exceeds low quality vertical trade for the majority of transition economies and developing countries, conversely, with industrialised countries vertical IIT is dominated by its negative component. *Fourthly*, a large increase in the IIT share on total trade is detected for the so-called traditional sectors, "textiles", "clothing and apparel", "leather products", "wood and cork products" and "furniture". *Finally*, the distinction between vertical and horizontal components of IIT shows that Italy tends to be a net importer of high quality products in the high-tech industries and a net exporter of high quality products in the so-called "traditional sectors". These results confirm the well known weaknesses in Italian trade patterns.

Table 1

Indexes of IIT and MIIT for Italian Total Manufacturing

	TIIT-GL Index			MIIT- B Index		MIIT- AQ Index	
	1990	1995	2000	1990-95	1995-00	1990-95	1995-00
World	**0.473**	**0.481**	**0.505**	**0.332**	**0.302**	**0.251**	**0.091**
Europe	**0.484**	**0.496**	**0.524**	**0.311**	**0.300**	**0.203**	**0.104**
EU15	**0.477**	**0.482**	**0.508**	**0.288**	**0.284**	**0.153**	**0.094**
EMU	**0.471**	**0.476**	**0.504**	**0.298**	**0.270**	**0.153**	**0.069**
Germany	0.401	0.418	0.438	0.203	0.213	0.083	0.001
France	0.421	0.430	0.462	0.295	0.075	0.225	0.015
UK	0.373	0.410	0.389	0.230	0.232	0.144	0.093
Spain	0.345	0.342	0.352	0.217	0.224	0.131	0.118
Central and East Europe	**0.274**	**0.340**	**0.335**	**0.280**	**0.274**	**0.261**	**0.063**
Russia	0.031	0.028	0.038	0.021	0.025	0.020	-0.011
Asia	**0.222**	**0.259**	**0.285**	**0.193**	**0.124**	**0.178**	**-0.025**
Japan	0.123	0.166	0.156	0.098	0.060	0.108	-0.025
China	0.027	0.082	0.090	0.082	0.079	0.063	0.017
Africa	**0.073**	**0.066**	**0.088**	**0.098**	**0.069**	**-0.001**	**0.030**
North America	**0.253**	**0.292**	**0.297**	**0.152**	**0.217**	**0.106**	**0.123**
USA	0.258	0.296	0.304	0.139	0.241	0.088	0.127
Central and South America	**0.117**	**0.075**	**0.105**	**0.061**	**0.029**	**0.077**	**0.037**
Oceania	**0.038**	**0.031**	**0.042**	**0.048**	**0.039**	**0.000**	**0.014**

Source: Authors elaboration.
Notes: Computations based on CN trade data, chapters 30-96.

Table 2

Indexes of IIT and MIIT for Italian Manufacturing Sectors

	TIIT-GL Index			MIIT- B Index		MIIT- AQ Index	
	1990	1995	2000	1990-95	1995-00	1990-95	1995-00
Total	0.473	0.481	0.505	0.332	0.302	0.251	0.091
Textiles	0.395	0.405	0.420	0.218	0.256	0.102	-0.023
Clothing & Apparel	0.317	0.443	0.534	0.426	0.271	0.342	0.104
Leather, skin products and footwear	0.266	0.308	0.346	0.217	0.137	0.198	0.006
Wood and cork products	0.252	0.341	0.427	0.406	0.244	0.361	0.035
Furniture	0.186	0.157	0.222	0.104	0.250	0.104	0.242
Paper and paperboard	0.386	0.365	0.466	0.236	0.150	0.232	-0.021
Rubber and plastics	0.545	0.575	0.609	0.449	0.317	0.422	-0.025
Chemical and related products	0.502	0.573	0.640	0.403	0.497	0.355	0.400
Non-metallic mineral products	0.178	0.187	0.210	0.178	0.129	0.110	0.023
Basic metal products	0.436	0.417	0.431	0.317	0.324	0.241	-0.210
Non-electrical machinery	0.563	0.511	0.520	0.319	0.277	0.244	0.206
Electrical machinery	0.570	0.613	0.616	0.404	0.438	0.367	0.051
Road Vehicles	0.622	0.654	0.570	0.361	0.205	0.311	0.186
Other transport equipment	0.777	0.667	0.615	0.466	0.411	-0.427	0.388
Other manufactures of fabricated metal products	0.558	0.625	0.584	0.291	0.362	0.225	0.067

Source: Authors elaboration.
Notes: Computations based on CN trade data, chapters 30-96

Table 3a

Indexes of VIIT for Italian Total Manufacturing-1990

	TIIT-GL Index	HIIT - GL Index	VIIT - GL Index	Positive VIIT - GL Index	Negative VIIT - GL Index	VIIT - A Index
World	**0.473**	**0.236**	**0.236**	**0.102**	**0.134**	**-0.044**
Europe	**0.484**	**0.255**	**0.229**	**0.079**	**0.151**	**-0.067**
EU15	**0.477**	**0.237**	**0.239**	**0.064**	**0.175**	**-0.091**
EMU	**0.471**	**0.235**	**0.236**	**0.061**	**0.175**	**-0.097**
Germany	0.401	0.191	0.210	0.052	0.157	-0.119
France	0.421	0.192	0.230	0.074	0.155	-0.065
UK	0.373	0.126	0.247	0.104	0.143	-0.021
Spain	0.345	0.230	0.116	0.069	0.046	-0.001
Central and East Europe	**0.274**	**0.052**	**0.222**	**0.204**	**0.019**	**0.346**
Russia	0.031	0.003	0.028	0.026	0.002	0.437
Asia	**0.222**	**0.061**	**0.161**	**0.106**	**0.054**	**0.114**
Japan	0.123	0.020	0.103	0.056	0.046	0.041
China	0.027	0.003	0.024	0.023	0.002	0.483
Africa	**0.073**	**0.042**	**0.031**	**0.023**	**0.008**	**0.054**
North America	**0.253**	**0.080**	**0.173**	**0.050**	**0.123**	**-0.150**
USA	0.258	0.081	0.178	0.052	0.126	-0.149
Central and South America	**0.117**	**0.041**	**0.076**	**0.051**	**0.025**	**0.064**
Oceania	**0.038**	**0.003**	**0.034**	**0.009**	**0.025**	**-0.116**

Source: Authors elaboration.
Notes: Computations based on CN trade data, chapters 30-96.

Table 3b

Indexes of VIIT for Italian Total Manufacturing-1995

	TIIT-GL Index	HIIT - GL Index	VIIT - GL Index	Positive VIIT - GL Index	Negative VIIT - GL Index	VIIT - A Index
World	**0.481**	**0.173**	**0.308**	**0.209**	**0.098**	**-0.019**
Europe	**0.496**	**0.199**	**0.297**	**0.197**	**0.100**	**-0.038**
EU15	**0.482**	**0.204**	**0.278**	**0.166**	**0.112**	**-0.061**
EMU	**0.476**	**0.194**	**0.281**	**0.166**	**0.115**	**-0.070**
Germany	0.418	0.172	0.245	0.129	0.116	-0.104
France	0.430	0.152	0.277	0.170	0.108	-0.065
UK	0.410	0.138	0.272	0.162	0.110	0.003
Spain	0.342	0.165	0.177	0.145	0.032	0.017
Central and East Europe	**0.340**	**0.119**	**0.221**	**0.191**	**0.030**	**0.187**
Russia	0.028	0.001	0.027	0.025	0.002	0.316
Asia	**0.259**	**0.047**	**0.212**	**0.171**	**0.042**	**0.125**
Japan	0.166	0.023	0.143	0.086	0.057	-0.019
China	0.082	0.006	0.076	0.072	0.004	0.317
Africa	**0.066**	**0.015**	**0.052**	**0.037**	**0.015**	**0.029**
North America	**0.292**	**0.055**	**0.237**	**0.109**	**0.128**	**-0.115**
USA	0.296	0.060	0.237	0.103	0.134	-0.119

Source: Authors elaboration.
Notes: Computations based on CN trade data, chapters 30-96.

Table 3c

Indexes of VIIT for Italian Total Manufacturing-2000

	TIIT-GL Index	HIIT - GL Index	VIIT - GL Index	Positive VIIT - GL Index	Negative VIIT - GL Index	VIIT - A Index
World	**0.505**	**0.237**	**0.268**	**0.135**	**0.133**	**-0.006**
Europe	**0.524**	**0.262**	**0.262**	**0.117**	**0.145**	**-0.038**
EU15	**0.508**	**0.266**	**0.242**	**0.086**	**0.156**	**-0.064**
EMU	**0.504**	**0.263**	**0.241**	**0.081**	**0.160**	**-0.071**
Germany	0.438	0.196	0.242	0.069	0.173	-0.104
France	0.462	0.217	0.244	0.105	0.140	-0.048
UK	0.389	0.137	0.252	0.133	0.118	-0.022
Spain	0.352	0.204	0.147	0.094	0.053	0.014
Central and East Europe	**0.335**	**0.124**	**0.211**	**0.165**	**0.046**	**0.111**
Russia	0.038	0.006	0.032	0.027	0.005	0.291
Asia	**0.285**	**0.062**	**0.223**	**0.158**	**0.066**	**0.162**
Japan	0.156	0.028	0.128	0.063	0.064	-0.093
China	0.090	0.010	0.080	0.070	0.010	0.381
Africa	**0.088**	**0.019**	**0.069**	**0.036**	**0.033**	**0.013**
North America	**0.297**	**0.037**	**0.261**	**0.102**	**0.159**	**-0.188**
USA	0.304	0.031	0.273	0.115	0.159	-0.166
Central and South America	**0.105**	**0.030**	**0.076**	**0.056**	**0.019**	**0.099**
Oceania	**0.042**	**0.008**	**0.034**	**0.013**	**0.021**	**-0.129**

Source: Authors elaboration.
Notes: Computations based on CN trade data, chapters 30-96.

Table 4a

Indexes of VIIT for Italian Manufacturing Sectors-1990

	TIIT-GL Index	HIIT - GL Index	VIIT - GL Index	Positive VIIT - GL Index	Negative VIIT - GL Index	VIIT - A Index
Total	**0.473**	**0.236**	**0.236**	**0.102**	**0.134**	**-0.044**
Textiles	0.395	0.154	0.241	0.194	0.047	0.100
Clothing & Apparel	0.317	0.087	0.230	0.200	0.030	0.167
Leather, skin products and footwear	0.266	0.060	0.206	0.186	0.021	0.221
Wood and cork products	0.252	0.017	0.236	0.227	0.008	0.394
Furniture	0.186	0.084	0.102	0.079	0.024	0.068
Paper and paperboard	0.386	0.182	0.204	0.102	0.102	-0.009
Rubber and plastics	0.545	0.328	0.218	0.056	0.162	-0.070
Chemical and related products	0.502	0.162	0.340	0.113	0.227	-0.151
Non-metallic mineral products	0.178	0.080	0.099	0.040	0.058	-0.069
Basic metal products	0.436	0.298	0.138	0.066	0.072	-0.021
Non-electrical machinery	0.563	0.296	0.266	0.104	0.162	-0.034
Electrical machinery	0.570	0.156	0.414	0.139	0.275	-0.106
Road Vehicles	0.622	0.440	0.182	0.038	0.144	-0.100
Other transport equipment	0.777	0.568	0.209	0.204	0.006	0.051
Other manufactures of fabricated metal products	0.558	0.123	0.436	0.026	0.409	-0.265

Source: Authors elaboration.
Notes: Computations based on CN trade data, chapters 30-96.

Table 4b

Indexes of VIIT for Italian Manufacturing Sectors-1995

	TIIT-GL Index	HIIT - GL Index	VIIT - GL Index	Positive VIIT - GL Index	Negative VIIT - GL Index	VIIT - A Index
Total	**0.481**	**0.173**	**0.308**	**0.209**	**0.098**	**-0.019**
Textiles	0.405	0.101	0.304	0.281	0.023	0.108
Clothing & Apparel	0.443	0.010	0.434	0.429	0.005	0.331
Leather, skin products and footwear	0.308	0.047	0.261	0.241	0.021	0.220
Wood and cork products	0.341	0.015	0.327	0.326	0.000	0.442
Furniture	0.157	0.053	0.104	0.093	0.011	0.083
Paper and paperboard	0.365	0.082	0.284	0.204	0.079	-0.055
Rubber and plastics	0.575	0.180	0.395	0.317	0.078	-0.033
Chemical and related products	0.573	0.174	0.400	0.191	0.208	-0.090
Non-metallic mineral products	0.187	0.067	0.119	0.087	0.032	-0.044
Basic metal products	0.417	0.091	0.325	0.296	0.030	0.002
Non-electrical machinery	0.511	0.183	0.328	0.189	0.139	-0.062
Electrical machinery	0.613	0.194	0.419	0.225	0.194	-0.048
Road Vehicles	0.654	0.524	0.130	0.046	0.084	-0.073
Other transport equipment	0.667	0.081	0.586	0.510	0.076	0.024
Other manufactures of fabricated metal products	0.625	0.200	0.425	0.093	0.331	-0.235

Source: Authors elaboration.
Notes: Computations based on CN trade data, chapters 30-96.

Table 4c

Indexes of VIIT for Italian Manufacturing Sectors-2000

	TIIT-GL Index	HIIT - GL Index	VIIT - GL Index	Positive VIIT - GL Index	Negative VIIT - GL Index	VIIT - A Index
Total	**0.505**	**0.237**	**0.268**	**0.135**	**0.133**	**-0.006**
Textiles	0.420	0.136	0.284	0.238	0.046	0.113
Clothing & Apparel	0.534	0.030	0.504	0.500	0.004	0.344
Leather, skin products and footwear	0.346	0.042	0.304	0.273	0.032	0.232
Wood and cork products	0.427	0.026	0.401	0.387	0.013	0.416
Furniture	0.222	0.066	0.156	0.138	0.018	0.132
Paper and paperboard	0.466	0.239	0.227	0.082	0.145	-0.075
Rubber and plastics	0.609	0.363	0.245	0.065	0.180	-0.050
Chemical and related products	0.640	0.390	0.250	0.095	0.154	-0.067
Non-metallic mineral products	0.210	0.096	0.113	0.041	0.072	-0.048
Basic metal products	0.431	0.254	0.177	0.102	0.075	0.006
Non-electrical machinery	0.520	0.219	0.301	0.128	0.173	-0.032
Electrical machinery	0.616	0.246	0.371	0.108	0.262	-0.086
Road Vehicles	0.570	0.413	0.158	0.048	0.110	-0.047
Other transport equipment	0.615	0.295	0.320	0.232	0.088	0.032
Other manufactures of fabricated metal products	0.584	0.137	0.447	0.084	0.363	-0.161

Source: Authors elaboration.
Notes: Computations based on CN trade data, chapters 30-96.

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COME DEFINIRE E MISURARE IL COMMERCIO INTRA-INDUSTRIALE: L'ATTUALITÀ DEL CONTRIBUTO DI STEFANO VONA

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«…'One side will make you grow taller, and the other side will make you grow shorter.'
'One side of *what*? The other side of *what*?' thought Alice to herself
'Of the mushroom,' said the Caterpillar, just as if she had asked it aloud; …»

(Carroll 1865, p. 60)

1. Introduzione: l'evoluzione dei metodi statistici per la misura del commercio intra-industriale

Si parla di commercio internazionale intra-industriale quando tra due paesi si incrociano scambi di prodotti appartenenti allo stesso settore. Lo studio di questo fenomeno, che è stato uno dei principali interessi di ricerca di Stefano Vona fin dall'inizio della sua attività[1], si trova da molti anni al centro del dibattito sul commercio internazionale, perché rappresenta il terreno empirico di confronto tra le teorie tradizionali, pensate per spiegare gli scambi di beni prodotti in settori diversi (inter-industriali) in un contesto di concorrenza perfetta, e quelle moderne, basate su mercati imperfetti, economie di scala e differenziazione dei prodotti.

Il punto di riferimento fondamentale per l'analisi empirica del commercio intra-industriale restano ancora oggi i lavori di Grubel e Lloyd (1971, 1975), nei quali si offriva un ampio riscontro statistico della rilevanza del fenomeno, sulla base di un indicatore che è diventato, nonostante i suoi limiti, lo strumento più usato nelle ricerche sull'argomento. Come si vedrà meglio più avanti, l'indice di Grubel-Lloyd è basato sul presupposto che il commercio intra-industriale di un paese in un'industria si identifichi con i suoi flussi *bilanciati* di interscambio bilaterale, cioè con la differenza tra la somma delle esportazioni e delle

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[1] Le prime pubblicazioni di Vona sul commercio intra-industriale (1979a, 1979b) sono dedicate soprattutto a sottolineare la grande rilevanza del fenomeno e la difficoltà di spiegarlo con le teorie tradizionali, nonché ad esplorare la capacità esplicativa di alcune nuove ipotesi interpretative. I suoi ultimi lavori sull'argomento (1990, 1991) sono concentrati prevalentemente sui problemi metodologici posti dalla misurazione del commercio intra-industriale.

importazioni e il valore assoluto del saldo bilaterale. Non si trattava di un'innovazione radicale: gli stessi autori proponevano un'attenta rassegna dei diversi indicatori usati negli studi precedenti, sottolineandone gli elementi di continuità con la propria impostazione.

La scoperta degli scambi intra-industriali risale almeno agli anni quaranta, nell'ambito di ricerche volte a valutare le tendenze della divisione internazionale del lavoro tra paesi produttori di materie prime e di manufatti, come il libro di Hirschman (1945), in cui si sottolineava la rilevanza degli scambi bilaterali di prodotti industriali tra paesi ad analoga struttura economica. In questo studio già compariva, sia pure a un livello di disaggregazione minimo, un indicatore come quello di Grubel e Lloyd, dato dal rapporto tra il valore dei flussi bilanciati e il commercio totale di un paese.

Successivamente il fenomeno degli scambi intra-industriali è apparso nell'ambito di una serie di studi volti a spiegare le differenze internazionali nei tassi di crescita delle esportazioni e – in maniera più esplicita – nelle ricerche sugli effetti commerciali dei processi di integrazione preferenziale, svoltisi principalmente nel continente europeo a partire dagli anni cinquanta. Lavori come quelli di Verdoorn (1960), di Balassa (1963, 1966) e di Kojima (1964) contenevano i primi indicatori pensati appositamente per misurare l'intensità del commercio intra-industriale.

Tuttavia un approccio analogo a quello che sarebbe stato usato da Grubel e Lloyd era già presente negli anni trenta in un contesto parzialmente diverso: le indagini promosse dalla Società delle Nazioni per valutare in che modo la direzione geografica del commercio internazionale fosse stata influenzata dagli accordi di compensazione bilaterale dei flussi di interscambio, conclusi durante la depressione economica che aveva caratterizzato quel periodo (Hilgerdt 1943). L'intensità del bilateralismo veniva misurata dalla quota degli scambi tra due paesi costituita da flussi equivalenti di esportazioni e importazioni, che si otteneva sottraendo all'interscambio totale bilaterale il valore assoluto del saldo[2]. Questo legame con gli studi sul bilateralismo è dunque la probabile origine di ciò che, come vedremo più avanti, costituisce il limite fondamentale

[2] Una formula molto simile a una di quelle proposte da Grubel e Lloyd compariva già in League of Nations (1934, pp. 65-69). Un aggiornamento degli studi sul bilateralismo fu condotto successivamente da Michaely (1962b). Un approccio simile caratterizza il recente contributo di Glick e Rose (1999), i quali hanno tentato di stimare l'intensità dei legami commerciali tra coppie di paesi, sulla base dell'importanza relativa dei flussi di interscambio di valore equivalente, reciproci o su mercati terzi.

dell'indice di Grubel-Lloyd e di tutti gli altri indicatori elaborati successivamente sullo stesso presupposto: l'idea che i flussi di esportazioni o importazioni di un'industria non bilanciati da un flusso in direzione opposta vadano esclusi dal valore del commercio intra-industriale.

Parallelamente all'approccio che potrebbe quindi essere denominato del "bilanciamento" (*trade overlap*), si sviluppava, a partire dal contributo di Michaely (1962a), una serie di ricerche volte a valutare la "somiglianza" tra le strutture settoriali delle esportazioni e delle importazioni di un paese (o di paesi diversi). Gli indicatori di bilanciamento e di somiglianza sono talvolta presentati in contrapposizione (Kol e Mennes 1986), mentre si tratta in realtà di diverse specificazioni dell'ampia classe delle misure statistiche della distanza.

La pubblicazione del libro di Grubel e Lloyd (1975) diede l'avvio a una fase di grande intensificazione degli studi sugli scambi intra-industriali, nell'ambito del processo di profondo rinnovamento che investiva la teoria del commercio internazionale. Sul versante delle ricerche empiriche si sono sviluppate aspre controversie riguardo alla stessa esistenza del fenomeno, considerato da taluni un mero artificio statistico risultante dall'eccessivo livello di aggregazione dei dati disponibili, che indurrebbe a considerare erroneamente "intra-industriali" scambi riguardanti in realtà industrie diverse, accorpate in un'unica categoria statistica. Con il passare del tempo e con l'accumularsi dell'evidenza empirica, è apparso chiaro che, anche spingendo l'analisi a livelli molto elevati di disaggregazione, il fenomeno del commercio intra-industriale risulta comunque molto rilevante. Lo studio di Vona (1990) ha offerto un contributo importante in questa direzione.

Altre controversie hanno investito le proprietà statistiche dell'indicatore proposto da Grubel e Lloyd. Gli stessi autori hanno sostenuto che esso, in presenza di un saldo commerciale globale non in equilibrio, sarebbe distorto verso il basso, e ne hanno proposto una possibile correzione. Altri studiosi hanno elaborato formule di correzione diverse e la questione appare oggi ancora aperta, benché Vona (1991) abbia mostrato in modo molto chiaro la sua sostanziale infondatezza e la preferibilità dell'originario indicatore non corretto, rispetto a tutte le varianti proposte successivamente.

Una questione metodologica emersa recentemente riguarda la misurazione del cosiddetto commercio intra-industriale "marginale", cioè dell'incidenza della componente intra-industriale sulle *variazioni* dei flussi

commerciali, indotte, tra l'altro, dai processi di liberalizzazione degli scambi (Brülhart 2001).

L'interesse per l'indice di Grubel-Lloyd è alimentato anche dalla sua grande versatilità. Esso è stato ad esempio impiegato per cercare di misurare separatamente l'intensità del commercio intra-industriale nelle sue componenti "orizzontale" e "verticale", individuate sulla base della qualità relativa dei prodotti scambiati (Greenaway, Hine e Milner 1994). Recentemente l'indice di Grubel-Lloyd è stato usato inoltre con riferimento agli investimenti internazionali, per valutare l'entità degli scambi bilanciati svolti tramite filiali produttive insediate all'estero (Markusen e Maskus 2001), o l'intensità del commercio intra-industriale "esteso", che si ottiene sommando questi ultimi ai consueti flussi trans-frontalieri bilanciati di esportazioni e importazioni (Greenaway, Lloyd e Milner 2001), in modo da esplorare le conseguenze della crescente frammentazione internazionale delle attività produttive.

Anche questi ultimi sviluppi sono tuttavia accomunati dallo stesso presupposto fondamentale su cui si basa l'indice di Grubel-Lloyd: l'idea che i flussi di commercio intra-industriale tra due paesi siano necessariamente in equilibrio. Tale ipotesi, palesemente arbitraria, era stata criticata nell'ultimo lavoro di Vona (1991) sull'argomento. Egli ne aveva tratto motivo per elaborare un nuovo tipo di indicatore, basato sul più ragionevole assunto che tutti i flussi bilaterali facenti capo a una stessa industria siano da considerare intra-industriali, indipendentemente dal loro saldo.

Un approccio molto simile era stata proposto qualche anno prima da Abd-El-Rahman (1986) e sarebbe stato ripreso e sviluppato in alcuni lavori del Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) (Freudenberg e Müller 1992; Fontagné e Freudenberg 1997). Recentemente esso è stato adottato anche da altri studiosi (Chiarlone 2000; Gullstrand 2001), ma nel complesso i limiti dell'ipotesi del bilanciamento non sono ancora largamente percepiti e il nuovo approccio stenta a diffondersi. Le due ultime autorevoli rassegne apparse sull'argomento (Greenaway e Torstensson 1997; Lloyd 2001) ignorano completamente il problema e ripropongono la centralità dell'indice di Grubel-Lloyd.

In questo lavoro, dopo una sintesi delle principali caratteristiche degli indicatori tradizionali e delle controversie metodologiche che hanno suscitato (paragrafo 2), sarà sottolineata nel paragrafo 3 la persistente attualità della proposta innovativa di Stefano Vona e degli studiosi del

CEPII, discutendone tuttavia alcuni problemi specifici. La rassegna degli indicatori sarà poi completata con alcuni accenni alla separazione tra commercio intra-industriale orizzontale e verticale (paragrafo 4) e alla misurazione del commercio intra-industriale marginale (paragrafo 5). In questo contesto sarà proposta una formulazione "dinamica" dell'indice di Vona. Seguiranno alcune considerazioni conclusive.

2. Bilanciamento e somiglianza nelle misure del commercio intra-industriale: l'indice di Grubel-Lloyd e gli altri indicatori tradizionali

Secondo l'approccio del bilanciamento, che caratterizza lo studio di Grubel e Lloyd (1975), il commercio intra-industriale tra due paesi è costituito dal totale dei flussi equivalenti di esportazioni e importazioni in ciascuna industria, e sono quindi esclusi gli scambi non bilanciati da un flusso in direzione contraria. L'indice di Grubel-Lloyd, nella sua versione elementare (GL_{ijk}), è il rapporto tra il valore dei flussi bilanciati e l'interscambio totale dell'industria:

$$GL_{ijk} = 1 - \frac{\left| x_{ijk} - m_{ijk} \right|}{x_{ijk} + m_{ijk}} \qquad (1)$$

dove x_{ijk} e m_{ijk} rappresentano rispettivamente le esportazioni e le importazioni tra il paese *i* e il paese *j* nell'industria *k*.

L'indice varia tra un minimo di zero, quando uno dei flussi è assente (commercio esclusivamente inter-industriale), e un massimo di uno, quando tutto il commercio bilaterale è perfettamente bilanciato (commercio esclusivamente intra-industriale).

La sua versione aggregata per industrie (GL_{ij}) consiste nella media aritmetica degli indici elementari, ponderati con l'importanza di ciascuna industria sul commercio totale tra i paesi, e può essere scritta nel modo seguente:

$$GL_{ij} = \frac{\sum_{k=1}^{n} \left(x_{ijk} + m_{ijk} \right) - \sum_{k=1}^{n} \left| x_{ijk} - m_{ijk} \right|}{\sum_{k=1}^{n} \left(x_{ijk} + m_{ijk} \right)} \qquad (2)$$

Un'analoga aggregazione per paesi partner consente di valutare in termini globali l'intensità del commercio intra-industriale di un paese con il resto del mondo.

In questo paragrafo saranno riassunte le principali questioni metodologiche sorte intorno all'indice di Grubel-Lloyd, che hanno per oggetto il livello di disaggregazione dell'analisi, l'influenza del saldo commerciale aggregato e il confronto con gli indicatori di somiglianza.

2.1 La definizione di industria e il livello di disaggregazione dell'analisi

Il fondamento analitico di qualsiasi studio sul commercio intra-industriale risiede in una corretta definizione del concetto di industria e dei suoi confini, che consenta di discriminare con chiarezza i casi nei quali i flussi di interscambio tra due paesi riguardano prodotti appartenenti allo stesso settore.

La questione è densa di implicazioni teoriche e viene dibattuta da molto tempo[3]. Una definizione adeguata di industria deve fare riferimento simultaneamente al tipo di bisogno soddisfatto dai beni e alle caratteristiche tecnologiche del processo produttivo. Quest'ultimo criterio è essenziale nella teoria del commercio internazionale, dove i modelli tradizionali spiegano la specializzazione di un paese in base alle sue dotazioni fattoriali relative e/o alle caratteristiche tecnologiche delle industrie. L'eventuale presenza di rilevanti flussi di commercio intra-industriale sarà in questo caso una manifestazione dell'operare di fattori di specializzazione diversi, come le economie di scala e la differenziazione dei prodotti.

Ammesso che le difficoltà teoriche del concetto di industria possano essere superate specificando convenzionalmente alcuni criteri definitori, si presenta immediatamente il problema del riscontro offerto dalle classificazioni statistiche concretamente esistenti. Le nomenclature usate nei dati di commercio internazionale non seguono criteri omogenei e non si prestano ad essere manipolate facilmente per ricostruire "industrie" coerenti con le esigenze della ricerca teorica.

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[3] Uno dei primi contributi al dibattito fu quello di Clapham (1922), che cercò di dare un contenuto concreto alle classificazioni usate nella teoria microeconomica. In Italia il tema è stato rilanciato in una chiave diversa da vari saggi di Becattini (1962; 1979; 1998), nei quali è stata posta in discussione l'utilità delle classificazioni industriali delle attività produttive e riscoperta la necessità di fare riferimento a unità di analisi territoriali (tra le quali, i distretti industriali) per comprendere le caratteristiche effettive della produzione e i modelli di specializzazione internazionale.

Alcuni autori, ad esempio Abd-El-Rahman (1986), hanno proposto di aggirare il problema collocando l'analisi al livello di singoli prodotti (individuati con un riferimento pragmatico al massimo livello di disaggregazione offerto dalle statistiche disponibili), e cercando di misurare l'entità degli scambi bilaterali di beni definiti "simili" in base al valore unitario dei flussi di interscambio. Tuttavia la questione della definizione di industria si ripresenta non appena si tenti di aggregare i risultati ottenuti sui singoli prodotti.

All'incertezza sui criteri di classificazione più appropriati si collega una caratteristica specifica dell'indice di Grubel-Lloyd (e di altri indicatori di commercio intra-industriale), e cioè la sua tendenza a dare risultati sempre più bassi, al crescere del livello di disaggregazione dell'analisi. Si tratta di una proprietà intrinseca dell'indicatore, legata al fatto che, se si scompone un'industria in comparti più piccoli, la somma dei valori assoluti dei saldi elementari che appare nella (2) aumenta, oppure (nei rari casi in cui i saldi commerciali di tutti i comparti abbiano lo stesso segno) resta invariata ("proprietà triangolare").

È stato pertanto avanzato il dubbio che gli elevati livelli di commercio intra-industriale riscontrati nelle prime analisi basate sull'indice di Grubel-Lloyd siano soltanto un "artificio statistico", che scomparirebbe quasi completamente se l'analisi fosse condotta a un livello di disaggregazione adeguato (Finger 1975). In altri termini, quello che appare come commercio intra-industriale sarebbe soltanto un complesso di flussi inter-industriali (spiegabili con le teorie tradizionali), tenuti insieme dall'insufficiente grado di dettaglio dell'analisi.

In mancanza di criteri sicuri, coerenti con la teoria e applicabili ai dati esistenti, si è diffusa la tendenza a condurre le misurazioni al livello più elementare consentito dalle statistiche, in modo da minimizzare il rischio di aggregazioni improprie. I risultati ottenuti confermano la grande rilevanza del commercio intra-industriale, anche nei rapporti di interscambio bilaterali rilevati per le voci merceologiche più elementari, fugando i dubbi che si tratti di un artificio statistico. Come già accennato, un contributo rilevante a questo filone di studi è stato offerto proprio da Vona (1990). D'altra parte va ricordato che l'uso di dati estremamente disaggregati non è necessariamente la soluzione ottimale, perché c'è il rischio di separare artificiosamente prodotti che fanno capo alla stessa industria (Balassa 1979).

In conclusione, un certo grado di discrezionalità nella scelta del livello di disaggregazione appare attualmente inevitabile.

2.2 Saldo commerciale aggregato e intensità del commercio intra-industriale: le "correzioni" dell'indice di Grubel-Lloyd

L'indice di commercio intra-industriale aggregato della (2) ha un campo di variazione compreso tra zero e uno soltanto qualora il saldo commerciale aggregato sia in equilibrio. Negli altri casi il suo limite massimo effettivo è una funzione inversa del valore assoluto del saldo aggregato.

Gli stessi Grubel e Lloyd (1975, p. 22), ritenendo che questo legame introduca una distorsione verso il basso nella misura del commercio intra-industriale, hanno proposto una versione "corretta" dell'indice aggregato, ottenuta sottraendo dal denominatore della (2) il valore assoluto del saldo commerciale aggregato[4]. Aquino (1978) e altri autori hanno criticato la correzione di Grubel e Lloyd, proponendo diverse formulazioni alternative, che sono state passate in rassegna da Kol e Mennes (1989).

Vona (1991) ha mostrato in modo semplice che la questione è priva di qualsiasi fondamento. Un saldo commerciale aggregato che non sia in equilibrio è evidentemente il risultato aritmetico di qualche squilibrio presente anche al livello delle singole industrie. In una situazione come questa è dunque naturale che l'indice aggregato di Grubel-Lloyd *non* raggiunga il suo massimo teorico di uno, che richiederebbe invece una situazione in cui *tutti* i flussi disaggregati e *a fortiori* il saldo aggregato siano in equilibrio. Qualsiasi correzione della formula (2) comporta quindi l'introduzione di una distorsione arbitraria.

Malgrado la chiarezza di questo verdetto, il dibattito sulla necessità di correggere l'indice di Grubel-Lloyd ha continuato a svilupparsi, come è testimoniato dalla recente rassegna di Lloyd (2001), anche se nella pratica empirica è prevalso l'uso della sua versione non rettificata.

2.3 L'indice di Grubel-Lloyd e le misure della somiglianza tra esportazioni e importazioni

All'indice di Grubel-Lloyd e ai suoi derivati viene talvolta contrapposto un altro gruppo di strumenti statistici, finalizzati a misurare il grado di somiglianza tra la distribuzione delle esportazioni e delle

[4] Un espediente simile era già stato usato in League of Nations (1934, p. 66) per valutare l'intensità del commercio "bilaterale" di un paese.

importazioni di un paese nelle varie industrie[5]. Esempi spesso citati di questi indici di somiglianza si trovano nei contributi di Michaely (1962a), Balassa (1974), Finger e Kreinin (1979), Glejser, Goossens e Vanden Eede (1979), che sono stati esaminati criticamente da Kol e Mennes (1986) e da Silber (1991).

Tuttavia la distinzione tra il concetto di somiglianza, a cui si riferiscono questi indicatori, e quello di bilanciamento, che è il cardine dell'indice di Grubel-Lloyd, è soltanto superficiale. Gli stessi ideatori di quest'ultimo indice, pur ritenendolo il più adatto a misurare l'importanza relativa del commercio intra-industriale, erano perfettamente consapevoli della stretta parentela tra i due concetti (Grubel e Lloyd 1975, pp. 26-28). Anche Aquino (1978, p. 282), nel proporre la sua formula per depurare l'indice di Grubel-Lloyd dalle presunte distorsioni dovute agli squilibri commerciali aggregati, ne ha sottolineato la perfetta equivalenza con l'indice di somiglianza di Michaely (1962a).

In sintesi si può dire che gli indici di somiglianza valutano il bilanciamento tra i pesi relativi dei flussi bilaterali di interscambio, mentre gli indici di bilanciamento valutano la somiglianza tra i loro valori assoluti.

La statistica offre un'ampia varietà di misure di somiglianza alle quali possono essere ricondotti tutti gli indicatori citati finora (Gower 1985). Ad esempio, l'indice aggregato di Grubel-Lloyd non è altro che il complemento all'unità della misura non metrica di distanza elaborata da Lance e Williams (1966), le cui proprietà statistiche sono state discusse da Anderberg (1973, pp. 112-3).

Riconoscere l'appartenenza di tutti gli indici tradizionali di commercio intra-industriale alla grande famiglia delle misure di somiglianza tra le esportazioni e le importazioni è il primo passo per rendersi conto della loro fondamentale inadeguatezza rispetto al compito principale per il quale sono stati formulati. Non c'è alcuna ragione teorica per ritenere che i flussi bilaterali di commercio intra-industriale debbano essere bilanciati, né nei loro valori assoluti, come presuppone l'indice di Grubel-Lloyd, né in termini di pesi relativi, come nell'indice di Michaely.

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[5] Nelle analisi empiriche del commercio internazionale gli indici di somiglianza, oltre ad essere applicati come indicatori di commercio intra-industriale, possono essere usati anche per confrontare le strutture del commercio estero di paesi diversi e per analizzare la stabilità nel tempo dei modelli di specializzazione internazionale. Inoltre il grado di somiglianza tra la distribuzione effettiva dei flussi commerciali e una loro ipotetica equi-distribuzione può essere assunto come misura della loro concentrazione.

In linea di principio, intensi flussi di commercio intra-industriale sono perfettamente compatibili con bassi valori degli indici di somiglianza.

3. Il commercio intra-industriale non bilanciato: i contributi di Vona e del CEPII

L'elemento più innovativo del contributo dato da Stefano Vona allo studio del commercio intra-industriale è contenuto nelle ultime pagine del suo articolo pubblicato nel 1991, dedicate a presentare con grande cautela un nuovo indice, basato su un criterio radicalmente diverso da quello di Grubel e Lloyd. Non si trattava, in realtà, di una novità assoluta, perché uno strumento statistico molto simile era stato già proposto da Abd-El-Rahman (1986), ma verosimilmente Vona non ne era a conoscenza, e i due indicatori presentano alcune differenze.

Il punto di partenza del ragionamento di Vona è che, una volta risolto in qualche modo il problema della definizione di industria, non c'è alcuna ragione per ritenere che il commercio intra-industriale tra due paesi debba essere bilanciato. Il criterio per identificare il fenomeno è dato semplicemente dalla direzione dei flussi di interscambio: si può parlare di commercio intra-industriale ogni volta che si osservino scambi *bidirezionali* di prodotti appartenenti alla stessa industria, *indipendentemente dal loro saldo*, mentre il commercio è definito inter-industriale soltanto qualora sia *unidirezionale*, e cioè in assenza di uno dei due flussi. Nelle parole di Vona (1991, p. 691): «it is the existence of the simultaneous exchange of very similar goods produced under very similar conditions which constitutes intra-industry trade, the existence of an imbalance is irrelevant».

Per ciascuna industria, quindi, gli scambi tra due paesi potranno essere o interamente intra-industriali o esclusivamente inter-industriali, senza gradazioni intermedie e mescolanze. A un qualsiasi livello di aggregazione superiore, dopo aver suddiviso le n industrie che compongono l'aggregato in due gruppi, costituiti rispettivamente dalle m industrie caratterizzate da scambi bidirezionali di qualsiasi entità e dalle $n-m$ industrie esclusivamente esportatrici o importatrici, l'indicatore di intensità del commercio intra-industriale proposto da Vona (V_{ij}) può essere scritto nel modo seguente:

$$V_{ij} = \frac{\sum_{k=1}^{m}\left(x_{ijk} + m_{ijk}\right)}{\sum_{k=1}^{n}\left(x_{ijk} + m_{ijk}\right)} \qquad (3)$$

A prima vista la proposta di Vona potrebbe sembrare eccessivamente drastica rispetto all'approccio del bilanciamento, e infatti i risultati della sua applicazione mostrano generalmente un'intensità degli scambi intra-industriali assai superiore a quella che apparirebbe con l'indice di Grubel-Lloyd. Tuttavia essa ha il pregio di essere più coerente con le teorie del commercio internazionale alla cui verifica empirica dovrebbe essere applicata: "there are only two types of industry: one is characterized by economies of scale, product differentiation and imperfect competition and tends to give rise only to intra-industry trade, the other is the homogeneous product, perfect competition industry of the Heckscher-Ohlin-Samuelson model, which can only produce inter-industry trade" (ibidem).

Riflettendo su queste parole, appare con grande evidenza l'inadeguatezza di tutti gli indici di bilanciamento e di somiglianza tra i flussi commerciali rispetto al compito di misurare l'intensità degli scambi intra-industriali. Ad esempio, l'indice di Grubel-Lloyd, assumendo che il fenomeno sia costituito soltanto dalla parte bilanciata dei flussi di interscambio di un'industria, introduce una separazione assolutamente arbitraria all'interno del maggiore tra di essi, che viene considerato intra-industriale nella misura in cui è coperto dal flusso opposto, e inter-industriale nella parte eccedente. Il risultato paradossale è che una stessa industria genera simultaneamente flussi di interscambio appartenenti a entrambe le categorie, il che rende assai ardua la loro interpretazione alla luce delle caratteristiche strutturali di tale industria (Fontagné e Freudenberg 1997).

Questa confusione tra il commercio intra-industriale e il grado di bilanciamento tra i flussi bilaterali crea problemi anche nella misura della specializzazione internazionale di un paese. In effetti l'indice di Grubel-Lloyd, nella sua versione elementare, è il complemento all'unità del valore assoluto del saldo normalizzato, che era stato proposto da Balassa (1966) come uno degli indicatori per misurare i vantaggi comparati rivelati da un paese negli scambi internazionali. Implicitamente, quindi, l'approccio di Grubel e Lloyd, espellendo dal fenomeno del commercio intra-industriale qualsiasi eventualità di squilibrio tra i flussi commerciali, esclude la possibilità che un paese manifesti vantaggi o svantaggi comparati nelle

industrie caratterizzate da tale tipo di commercio. L'unica forma di specializzazione ammissibile è quella inter-industriale, misurata dal saldo normalizzato.

L'indice di Vona, invece, separa le due categorie di industrie senza imporre alcun vincolo di bilanciamento tra i flussi commerciali e lascia perciò aperta l'opportunità di valutare con altri strumenti l'intensità della specializzazione rivelata dal paese in ciascuna di esse. A questo scopo, tuttavia, il riferimento alla proposta di Balassa non appare pienamente pertinente. Il *livello* del saldo normalizzato, infatti, misura sinteticamente i risultati conseguiti da un paese nel commercio estero di un'industria, senza istituire quel confronto tra industrie diverse che è essenziale per il concetto di specializzazione. In altri termini, non si tratta di un rivelatore di vantaggi comparati, ma di un indicatore di *performance*, che registra l'influenza delle variabili macroeconomiche sulla dinamica delle esportazioni e delle importazioni di un'industria. Lafay (1992) ha elaborato alcuni indicatori alternativi di specializzazione che, pur risolvendo questo problema, appaiono ambigui, perché inglobano in un'unica misura l'intensità della specializzazione, le dimensioni relative dell'industria considerata e – in alcune formulazioni – anche il suo grado di apertura internazionale. In maniera più limpida, l'intensità della specializzazione può essere valutata con un indice dato dalla *differenza* tra il saldo normalizzato di un'industria e quello aggregato (Iapadre 2001):

$$S_{ijk} = \frac{x_{ijk} - m_{ijk}}{x_{ijk} + m_{ijk}} - \frac{\sum_{k=1}^{n} x_{ijk} - \sum_{k=1}^{n} m_{ijk}}{\sum_{k=1}^{n} \left(x_{ijk} + m_{ijk} \right)} . \qquad (4)$$

Questo indicatore potrebbe essere usato per compilare una graduatoria di tutte le industrie già classificate in base all'indice di Vona, che metta in evidenza la diversa intensità dei vantaggi e degli svantaggi comparati rivelati da un paese, anche nei settori a specializzazione intra-industriale. In questo modo, diversamente da quanto accade nell'approccio del bilanciamento, la misura della specializzazione viene distinta dall'identificazione della sua natura intra- o inter-industriale[6]. La graduatoria delle industrie per ciascun paese basata sulla (4) è ovviamente

[6] L'approccio di Vona implica che un settore venga definito a specializzazione inter-industriale soltanto quando il suo saldo normalizzato sia pari a 1 o a –1. Questi settori si trovano quindi ai due estremi della graduatoria basata sull'indice di specializzazione della (4).

identica a quella che emergerebbe usando direttamente i livelli dei saldi normalizzati, ma la graduatoria dei paesi per ciascuna industria potrebbe risultare sensibilmente diversa, a causa dei diversi livelli assunti dai saldi normalizzati aggregati.

Come già accennato, un approccio molto simile a quello di Vona (1991) si riscontra in un precedente lavoro di Abd-El-Rahman (1986), che è diventato il punto di riferimento di un nuovo filone di ricerche sviluppate nel CEPII (Fontagné e Freudenberg 1997). L'elemento che accomuna l'indice di Vona a quello proposto da Abd-El-Rahman è la critica all'approccio del bilanciamento. La differenza principale risiede nel fatto che quest'ultimo autore identifica i prodotti oggetto di commercio intra-industriale escludendo non soltanto, come fa Vona, quelli nei quali uno dei due flussi di interscambio sia assente, ma anche quelli nei quali il flusso minore tra i due sia inferiore a una certa soglia, collocata arbitrariamente al 10 per cento del flusso maggiore. La ragione di questa definizione più restrittiva del commercio intra-industriale sta nella convinzione che, al di sotto di un certo limite, i flussi commerciali minori possano avere un carattere accidentale, tanto da non configurare una situazione di autentico interscambio bilaterale.

Questa scelta solleva tuttavia alcune perplessità:

a) una soglia uniforme del 10 per cento rischia di essere eccessivamente selettiva se i soggetti dei rapporti commerciali bilaterali sono paesi di dimensioni molto diverse[7];

b) i dati presentati da Fontagné e Freudenberg (1997, p. 35) mostrano che la soglia del 10 per cento esclude dagli scambi intra-industriali circa il 30 per cento del commercio intra-comunitario, il che fa sospettare che non si tratti di situazioni accidentali;

c) più in generale, la teoria del commercio intra-industriale non sembra in grado di prevedere in modo tassativo la distribuzione dei flussi di interscambio di prodotti differenziati tra i due paesi e non sono escluse situazioni in cui quasi tutte le varietà del prodotto vengono realizzate in uno solo di essi, senza perciò pregiudicare la natura intra-industriale della specializzazione.

[7] I problemi derivanti dalle diverse dimensioni dei paesi partner sono stati esaminati in un'altra prospettiva da Nilsson (1997).

Un problema dell'indice di Vona potrebbe essere costituito dalla sua eccessiva sensibilità a piccole variazioni di interscambio: un'industria classificata tra quelle a commercio inter-industriale può essere spostata di colpo nell'altra categoria, se compare un flusso di scambi anche minimi in direzione opposta a quella consueta (e viceversa). Tuttavia anche l'indice di Abd-El-Rahman è soggetto a questo rischio, quando un piccolo aumento del flusso minore comporti il superamento della soglia del 10 per cento. Questa instabilità degli indici elementari tende ovviamente ad attenuarsi a livello aggregato.

Un altro problema dell'indice di Vona deriva dalla sua natura strettamente bilaterale. Se in una stessa industria un paese intrattiene una rete di flussi di interscambio con paesi diversi, può accadere che alcuni di questi flussi siano unidirezionali, e che quindi vengano classificati nell'ambito del commercio inter-industriale, mentre gli altri, essendo bidirezionali, confluirebbero nel commercio intra-industriale. Ne consegue un problema simile a uno di quelli già rilevati per l'indice di Grubel-Lloyd: una stessa industria di un paese potrebbe apparire simultaneamente come soggetto di scambi intra- o inter-industriali, a seconda del partner considerato, il che renderebbe difficile l'interpretazione dei dati in base alle caratteristiche strutturali dell'industria. Paradossalmente, si ripresenta in termini rovesciati la stessa ipotesi dell'artificio statistico già discussa a proposito del commercio intra-industriale: ogni volta che in un'industria a un flusso unidirezionale di commercio con un paese si contrapponga un flusso in direzione opposta con un altro paese, il commercio inter-industriale che emergerebbe dall'analisi dei soli flussi bilaterali in base alla formula di Vona è soltanto un artificio statistico. In realtà in quell'industria i rapporti complessivi di interscambio con il resto del mondo sono di tipo bidirezionale e dunque intra-industriale. L'artificio statistico è dovuto in questo caso all'eccessivo livello di disaggregazione geografica dell'analisi, mentre con l'indice di Grubel-Lloyd il commercio intra-industriale potrebbe rivelarsi un artificio statistico, se l'analisi è condotta a un livello troppo elevato di aggregazione settoriale.

Per risolvere questo problema occorrerebbe portare l'approccio di Vona fino alle sue estreme conseguenze e includere nel commercio intra-industriale tutti i flussi bidirezionali di interscambio con il resto del mondo, indipendentemente dalla loro distribuzione per paese partner. In altri termini, si dovrebbe parlare di commercio inter-industriale soltanto nei casi in cui tutti i flussi bilaterali di commercio che fanno capo a un'industria

abbiano la stessa direzione (esportazioni o importazioni)[8]. Negli altri casi eventuali flussi unidirezionali con singoli paesi partner andrebbero interpretati semplicemente come manifestazioni di vantaggi (o svantaggi) comparati bilaterali di estrema intensità, all'interno di flussi commerciali che sono comunque di tipo intra-industriale.

Un indice così calcolato (in cui le *m* industrie a commercio intra-industriale della formula (3) vengono identificate su dati *non* disaggregati per paese partner) potrebbe essere denominato versione "multilaterale" dell'indice di Vona, e assumerebbe comunque valori diversi a seconda del partner considerato. Tali differenze rifletterebbero semplicemente il diverso peso delle *m* industrie a commercio intra-industriale negli scambi bilaterali di un paese.

Questa formulazione multilaterale della (3) comporterebbe inevitabilmente un ulteriore innalzamento del peso del commercio intra-industriale sugli scambi totali di un paese, anche rispetto ai già elevati valori riscontrati da Vona. Se ciò fosse ritenuto poco plausibile, potrebbe essere introdotta a livello aggregato una soglia di bilanciamento simile a quella proposta da Abd-El-Rahman per i flussi bilaterali: si potrebbero identificare le *m* industrie a commercio intra-industriale con tutte quelle nelle quali il rapporto di copertura tra il flusso minore e quello maggiore, nell'interscambio globale con il resto del mondo, sia superiore a una certa soglia definita arbitrariamente. Le riserve elencate in precedenza a proposito delle soglie bilaterali sarebbero in questo caso meno pertinenti.

D'altra parte, come vedremo nel paragrafo seguente, il grande aggregato del commercio intra-industriale non bilanciato, identificato secondo qualsiasi variante della formula (3), può essere facilmente suddiviso nelle due componenti a specializzazione "orizzontale" e "verticale", il che sottolinea ulteriormente la coerenza di questa impostazione rispetto ai più recenti sviluppi della teoria del commercio intra-industriale.

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[8] La questione dell'aggregazione geografica dei dati è stata discussa anche da Abd-El-Rahman (1986) e da Fontagné e Freudenberg (1997), ma le diverse soluzioni proposte da questi autori non appaiono in grado di superare il problema derivante dall'approccio bilaterale.

4. Flussi orizzontali e verticali nel commercio intra-industriale

I lavori di Abd-El-Rahman (1986, 1991), oltre a mettere in discussione per la prima volta l'approccio del bilanciamento, sono all'origine di un nuovo filone di studi, basato su una stima della qualità relativa dei prodotti esportati e importati[9].

Gli scambi intra-industriali possono avere per oggetto prodotti appartenenti a fasce disomogenee per qualità o grado di lavorazione (commercio intra-industriale "verticale"), oppure varietà differenziate di prodotti di qualità simile (commercio intra-industriale "orizzontale"). La teoria economica offre spiegazioni diverse per queste due categorie di scambi, sollecitando il tentativo di stimare empiricamente la loro importanza relativa.

Partendo dai presupposti che la qualità dei prodotti sia correlata al loro prezzo e che quest'ultimo sia ben approssimato dal valore unitario dei beni scambiati, Abd-El-Rahman (1986) ha distinto il totale del commercio intra-industriale, individuato con il metodo descritto nel paragrafo precedente, nelle due componenti orizzontale (scambi incrociati di prodotti simili) e verticale (scambi incrociati di prodotti di qualità diversa), definendo una soglia di divergenza massima tra i valori unitari dei prodotti esportati e importati.

L'idea della soglia di divergenza è stata poi ripresa da Greenaway, Hine e Milner (1994), che l'hanno usata per tentare di adattare l'indice di Grubel-Lloyd alla misurazione dei due tipi di commercio intra-industriale. I limiti che l'approccio del bilanciamento fa emergere anche in questo campo sono stati messi in evidenza da Fontagné e Freudenberg (1997), i quali hanno perfezionato il metodo di Abd-El-Rahman, applicandolo allo studio degli effetti commerciali del completamento del mercato interno nell'Unione Europea.

5. La dinamica del commercio intra-industriale

Un altro problema rilevato recentemente nell'indice di Grubel-Lloyd è la sua scarsa idoneità a descrivere la dinamica del commercio intra-

[9] Già in un contributo di Frankel (1943), citato da Grubel e Lloyd (1975, p. 13), i valori unitari dei beni scambiati erano stati usati per mostrare come la specializzazione internazionale dei paesi potesse manifestarsi anche nel commercio di prodotti di qualità diversa appartenenti allo stesso settore.

industriale, che è invece essenziale per analizzare i processi di aggiustamento stimolati dalle politiche di liberalizzazione degli scambi. Come hanno mostrato Hamilton e Kniest (1991), l'indice di Grubel-Lloyd può aumentare, denotando apparentemente un'intensificazione del commercio intra-industriale, anche in situazioni nelle quali uno solo dei due flussi di interscambio abbia subito una variazione, il che dovrebbe manifestare invece un processo di aggiustamento di tipo inter-industriale.

Questa osservazione ha stimolato una ricca produzione di studi, volti a misurare l'intensità del commercio intra-industriale "marginale", inteso talvolta come variazione nel tempo degli scambi intra-industriali, e in altri casi come peso della componente intra-industriale sulla variazione complessiva dell'interscambio (Brülhart 2001). Si tratta, in gran parte, di rielaborazioni dell'indice di Grubel-Lloyd, o comunque di formulazioni basate sull'approccio del bilanciamento, di cui riflettono i limiti insuperabili sottolineati nel paragrafo 3.

In realtà, interpretato nel giusto verso, l'indice di Grubel-Lloyd svolge correttamente, anche in senso dinamico, il suo ruolo di misurazione del grado di bilanciamento tra esportazioni e importazioni. Un suo aumento denota infatti una riduzione di intensità degli squilibri bilaterali, qualunque sia il tipo di commercio, ovvero il tipo di industria, nel quale tale riduzione si verifica.

L'unica nota di cautela riguarda l'interpretazione delle variazioni dell'indice aggregato (2). Trattandosi di una media ponderata di indici elementari, un suo aumento può riflettere in misura diversa sia un effettivo aumento del grado di bilanciamento dei flussi elementari, sia un semplice mutamento di composizione (un aumento di importanza dei flussi elementari già caratterizzati da un grado di bilanciamento più elevato), come avviene per qualsiasi variabile aggregata che possa essere espressa come media ponderata delle corrispondenti grandezze elementari[10].

Tornando alla misura del commercio intra-industriale, a prima vista l'approccio seguito da Abd-El-Rahman e da Vona sembra immune dai problemi dinamici dell'indice di Grubel-Lloyd. Una volta separati correttamente i flussi intra-industriali da quelli inter-industriali, il semplice confronto tra i loro tassi di crescita potrebbe indicare con precisione la natura dei processi di aggiustamento in corso.

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[10] All'indice aggregato di Grubel-Lloyd si possono applicare i metodi di decomposizione strutturale della dinamica di variabili aggregate, esaminati in Iapadre (1995).

Ad esempio, si potrebbe calcolare facilmente il contributo, positivo o negativo, che le industrie a specializzazione intra-industriale hanno arrecato alla variazione complessiva del commercio estero tra due paesi, secondo la formula seguente:

$$Vd_{ij} = \frac{\Delta\sum_{k=1}^{m}\left(x_{ijk} + m_{ijk}\right)}{\Delta\sum_{k=1}^{n}\left(x_{ijk} + m_{ijk}\right)} \qquad (5)$$

Tuttavia, anche nel contesto di questa impostazione, potrebbe essere utile una formulazione più strettamente dinamica, che misuri all'interno di qualsiasi comparto (a specializzazione inter- e intra-industriale, verticale e orizzontale) l'incidenza relativa dei processi di aggiustamento di tipo intra-industriale.

Questi ultimi, seguendo Brülhart (1994), possono essere identificati con tutte le situazioni in cui le esportazioni e le importazioni di un paese in un'industria variano nella stessa direzione. Ma, diversamente da Brülhart, che ha costruito un indicatore nello stile di Grubel e Lloyd e ha quindi assunto che il massimo aggiustamento intra-industriale si abbia quando tali variazioni siano perfettamente bilanciate, occorre considerare integralmente le variazioni di segno concorde, senza sottrarre la quota non bilanciata.

A livello di singola industria, quindi, l'indicatore dinamico coerente con l'approccio di Vona può assumere soltanto i valori estremi di uno, quando le variazioni dei due flussi siano di segno concorde, indipendentemente dal loro grado di bilanciamento, e zero negli altri casi.

A livello aggregato, un indice di commercio intra-industriale marginale può essere costruito mettendo a rapporto la somma dei valori assoluti delle variazioni di segno concorde con la somma dei valori assoluti di tutte le variazioni:

$$Vm_{ij} = \frac{\sum_{k=1}^{m}\left(\left|\Delta x_{ijk}\right| + \left|\Delta m_{ijk}\right|\right)}{\sum_{k=1}^{n}\left(\left|\Delta x_{ijk}\right| + \left|\Delta m_{ijk}\right|\right)} \qquad (6)$$

dove le *m* industrie al numeratore sono tutte quelle nelle quali le variazioni dei due flussi di interscambio siano di segno concorde.

Per sua natura un indicatore di questo genere dà informazioni diverse da quelle che si possono trarre dalla dinamica dell'indice di Vona. Quest'ultimo, infatti, può aumentare anche in presenza di variazioni dei flussi di interscambio di segno non concorde, se queste si verificano in industrie già caratterizzate da flussi bidirezionali e quindi incluse nel calcolo del commercio intra-industriale. Viceversa l'indicatore (6) registra soltanto il peso delle variazioni di segno concorde, dovunque si verifichino, e appare quindi più adatto a cogliere la natura dei processi di aggiustamento.

6. Conclusioni

Questo lavoro è stato motivato soprattutto dal desiderio di sottolineare l'importanza dell'apporto dato da Stefano Vona allo studio empirico del commercio intra-industriale, che non appare ancora adeguatamente riconosciuta nella maggior parte delle pubblicazioni sull'argomento. Gli elementi principali del suo contributo si possono riassumere così:

– ha offerto un riscontro empirico importante alla tesi secondo la quale il commercio intra-industriale è un fenomeno reale, e non un artificio statistico dovuto all'eccessiva aggregazione dei dati disponibili;

– ha mostrato in modo limpido che non c'è alcuna necessità di correggere l'indice di Grubel-Lloyd per depurarlo dai presunti effetti distorsivi del saldo commerciale aggregato;

– d'altra parte – e questo appare senz'altro il punto più importante – ha indicato con grande chiarezza il limite fondamentale dell'indice di Grubel-Lloyd (e di tutte le misure di bilanciamento e somiglianza), proponendo con grande prudenza un nuovo indicatore, più coerente con la natura teorica del commercio intra-industriale.

Nel fare questo Vona si è inserito autonomamente in un filone di ricerca che proprio in quegli anni si stava sviluppando nell'ambito del CEPII, a partire dai lavori di Abd-El-Rahman. L'elemento comune di questo approccio innovativo è costituito dall'idea che il commercio tra due paesi debba essere definito intra-industriale in tutti i casi in cui sia bidirezionale, indipendentemente dal grado di bilanciamento tra i due flussi di interscambio.

Quest'ultimo è invece il criterio alla base dell'indice di Grubel-Lloyd e di tutte le misure di somiglianza tra la struttura delle esportazioni e delle importazioni: viene definito intra-industriale soltanto il commercio bilaterale bilanciato, il che genera conseguenze paradossali per l'interpretazione del fenomeno. Come si è visto, l'origine intellettuale di questo "vizio genetico" dell'indice di Grubel-Lloyd può probabilmente essere rintracciata negli studi promossi dalla Società delle Nazioni negli anni trenta, per valutare gli effetti degli accordi commerciali di compensazione bilaterale sulla distribuzione geografica degli scambi mondiali.

L'applicazione dell'indice di Vona ai dati disponibili mostra che l'incidenza del commercio intra-industriale è assai superiore a quanto appaia dagli indicatori tradizionali. E a risultati ancora più elevati si arriverebbe qualora si usasse la versione "multilaterale" di tale indicatore, proposta in questo lavoro. Il commercio intra-industriale, della cui esistenza effettiva molti dubitavano, finisce per rivelarsi di gran lunga preponderante, rovesciando su quello inter-industriale il sospetto che possa trattarsi in gran parte di un "artificio statistico", dovuto alla disaggregazione geografica dei dati.

Inoltre gli indicatori proposti da Vona e da Abd-El-Rahman possono essere usati per separare le componenti verticale e orizzontale del commercio intra-industriale, meglio di quanto consentito dagli indici di bilanciamento. E possono essere integrati efficacemente con appropriati indicatori volti a misurare l'intensità della specializzazione internazionale di un paese, sia negli scambi intra-industriali che in quelli inter-industriali.

Nella parte finale di questo lavoro è stata presentata una possibile formulazione dinamica dell'indice di Vona, che si può inserire tra le misure del commercio intra-industriale "marginale", al fine di cogliere in modo più preciso le caratteristiche dei processi di aggiustamento commerciale.

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COMMENTO A "COME DEFINIRE E MISURARE IL COMMERCIO INTRA-INDUSTRIALE" DI LELIO IAPADRE

Roberto Tedeschi

La teoria classica del commercio internazionale prevede che la specializzazione debba prevalere: con differenze nelle dotazioni dei fattori tra paesi, i beni, più mobili dei fattori, vengono scambiati inducendo specializzazione. Ricardo spiega come un paese omogeneamente meno produttivo esporta il bene (si specializza nella produzione del bene) in cui il suo svantaggio è minore.

La spiegazione dei vantaggi comparati viene da Heckscher, Ohlin e Samuelson, che introducono tra le categorie dell'analisi la dotazione dei fattori e la distribuzione del reddito. Le economie esportano i servizi dei loro fattori abbondanti e importano i servizi dei loro fattori scarsi. Ne conseguirebbe uno svantaggio per i fattori scarsi e una tendenza alla uguaglianza dei prezzi dei fattori stessi. La teoria ipotizza concorrenza perfetta, beni omogenei e rendimenti costanti di scala, in presenza di differenti dotazioni di fattori tra paesi. Prevede che un paese, passando da una situazione di chiusura al commercio a una di apertura si specializzi secondo la dotazione (si verifica una polarizzazione secondo la produttività relativa nei diversi beni). Alla fine, in equilibrio, il commercio in entrata e quello in uscita dovrebbe riguardare beni perfettamente disomogenei.

Empiricamente e in prima istanza, per paesi in cui il settore dell'industria è ampio lo scambio bilaterale di prodotti manufatti simili – il *commercio intra industriale* – è una parte rilevante degli scambi internazionali. La definizione e la misurazione di tale fenomeno interagiscono strettamente con questioni chiave dell'analisi economica.

La similarità dei prodotti reciprocamente commerciati tra paesi e l'ampliamento delle loro quota sul commercio segnala quanto i paesi stiano convergendo piuttosto che differenziandosi; questo a sua volta ha conseguenze sul benessere economico. Paesi simili reagiscono in modo simmetrico a shock esterni; se sono a loro volta ben differenziati al loro interno assorbiranno la gran parte degli shock distribuendone i costi; paesi più specializzati devono suddividere il rischio con strumenti finanziari, con la conseguente necessità di disporre di mercati profondi e resilienti. Una quota più ampia di commercio internazionale intra industriale significa una concorrenza elevata in quanto il commercio aumenta il numero di imprese che offrono, effettivamente oltre che potenzialmente, lo stesso prodotto.

Il contributo del lavoro di Iapadre è di valutare le misure statistiche del commercio intra industriale alla luce della loro capacità di discriminare gli aspetti che le teorie individuano come rilevanti. Nel far questo, ci viene ricordato, bisogna tenere conto del fatto che dagli anni '70, quando gli indicatori di commercio intra industriale sono stati proposti, il paradigma dell'impresa è cambiato.

Alla teoria marshalliana se ne è affiancata una basata su rendimenti crescenti, differenziazione dei prodotti appartenenti alle stesse categorie merceologiche, competizione imperfetta (monopolistica).

Per la misurazione, il punto chiave è definire l'industria: in questo c'è molto di teoria. Se vogliamo misurare beni caratterizzati da sostituibilità elevata valgono le caratteristiche di soddisfazione dei bisogni; se vogliamo misurare la tecnologia della produzione (la somiglianza nell'offerta) le aggregazioni devono guardare alle combinazioni dei fattori.

Iapadre argomenta decisamente in favore dell'opinione di Vona e del CEPII rispetto agli indicatori del tipo Grubel-Lloyd. Questi indicatori misurano la quota sugli scambi internazionali costituita da beni che vengono contemporaneamente importati ed esportati: misurano, nello spazio della teoria dell'impresa competitiva, il paradosso della differenziazione dei prodotti uguali. Poiché il paradosso si trova nella parte bilanciata dei flussi, è solo questa che gli indici misurano; è una specie di punto di vista del consumatore: quanto il consumatore ricompra di quello che ha appena venduto? Vona misura invece quanto del commercio nelle due direzioni viene scambiato dopo essere transitato (dopo essersi trovato in concorrenza) su un unico mercato, quello di ciascun singolo bene.

Iapadre argomenta in modo convincente come gli indici che si basano sui flussi bilaterali tra paesi possono soffrire di un eccesso di dettaglio: una stessa industria avrà flussi di import e export con alcuni paesi e solo di export con altri. Vorremmo che i primi siano classificati come intra industriali e i secondi come inter industriali? Si potrebbe dire che l'indice di Vona-CEPII misura l'interscambio riferito a industrie che producono effettivamente beni commerciabili internazionalmente, cioè che competono su un mercato concorrenziale, in cui i costi di commerciare internazionalmente non assorbono tutto il mark-up.

L'argomento di chiusura, dopo aver considerato con Iapadre una importante linea di ricerca quella che discrimina sulla base della qualità dei prodotti e tiene conto dei prodotti che si trovano in fasi diverse di lavorazione, è la misurazione degli aggiustamenti. Le variazioni del commercio sono dovute a eventi catalogabili come intra industriali? Dopo

aver riportato una versione dinamica dell'indice di Vona-CEPII, che misura quanto avviene nei settori esposti al commercio intra industriale, Iapadre propone invece di misurare come aggiustamento intra industriale, in qualunque comparto avvenga, quello che fa simultaneamente aumentare (o diminuire) entrambi i flussi. La presentazione completa di un nuovo indice avrebbe richiesto una discussione ampia e una esemplificazione pratica che sarebbero andate oltre lo scopo del lavoro; ne viene indicata una sola caratteristica, di escludere i flussi marginali che, in una industria classificata intra industriale dall'indice di Vona-CEPII, vanno nella direzione, dinamicamente, di ridurre l'importanza di uno dei due flussi, quindi in direzione di un passaggio della qualificazione dell'industria a inter industriale. In questo senso, gli aggiustamenti che riducono entrambi i flussi di una corrente di scambi intra industriale sbilanciata potrebbero essere tali da azzerare il flusso minore e quindi da mutare in inter industriale la classificazione di quell'industria particolare. L'indice non sembra distinguere questi incrementi negativi dei flussi da quelli concordi e positivi, che sono certamente tali da aumentare la quantità di commercio intra industriale. Per decidere della appropriatezza o meno, che non può essere decisa sulla base delle caratteristiche statistiche degli indici, sarebbe utile ricorrere agli esempi dell'analisi applicata. È soprattutto sulla base della discussione della coerenza tra ipotesi teoriche e strumenti di misura statistici con l'evidenza empirica che gli indicatori posso trovare conferma quali supporti convincenti per sostenere una particolare interpretazione dei dati.

INVESTIMENTI DIRETTI ESTERI ED ESPORTAZIONI. COMPLEMENTI O SOSTITUTI?

Fabrizio Onida[*]

1. Alcuni dati

Come documentano i Rapporti annuali dell'UNCTAD, World Investment Report, dalla metà degli anni '80 il fatturato totale delle filiali delle imprese multinazionali (MNE) ha superato il valore delle esportazioni mondiali di merci e servizi. Nel 2000 le vendite delle filiali delle MNE sono stimate pari a 15.680 miliardi di dollari (di cui 3.572 di esportazioni), contro 7.036 miliardi di dollari di esportazioni mondiali di merci e servizi commerciali. Il valore aggiunto delle medesime filiali è stimato pari a 3.167 miliardi di dollari, quasi un decimo del PIL mondiale.

L'incidenza delle MNE sul commercio mondiale si aggira sui due terzi, di cui un terzo di scambi "intra firm". La quota degli scambi "intra firm" è cresciuta nel tempo: nei rapporti commerciali fra USA ed Europa, secondo Clausing (2000) è salita dal 43% del 1982 al 50% del 1996.

La quota dei paesi in via di sviluppo (PVS) sugli investimenti diretti esteri (IDE) in entrata, dopo aver raggiunto un picco del 35-40% nella prima metà degli anni '90, ha risentito della crisi asiatica e latino-americana, scendendo a meno del 20% nel 1999-2000. Va tuttavia segnalata una forte concentrazione degli IDE verso paesi come Cina, Hong Kong, Singapore, Malesia, Messico, Brasile: tutti compresi fra i primi 20 paesi riceventi nella classifica mondiale dei flussi recenti, e peraltro inclusi anche nella lista dei primi 20 esportatori e importatori mondiali.

Contrariamente ad una impressione molto diffusa, gli IDE dei settori industriali rappresentano una quota di circa il 35-40% del totale, contro il 10% del settore primario e ben il 50-55% degli IDE da parte di imprese di servizi: principalmente servizi finanziari (banche e assicurazioni) e di telecomunicazione, seguiti da trasporti-logistica, turismo-alberghi, consulenza legale-commerciale-manageriale, pubblicità-comunicazione, engineering ecc. Sulle sole operazioni di fusione-acquisizione, che negli anni recenti rappresentano circa i due terzi di tutti gli IDE tra paesi industriali, i servizi sono arrivati a pesare il 50-60% nel 1998-99, dal 30-35% alla fine degli anni '80. Nel 2001 questa quota è stimata cadere

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violentemente, a causa della congiuntura sfavorevole delle Borse e del forte rallentamento dell'economia statunitense.

2. L'evoluzione delle teorie degli IDE

Molta strada è stata percorsa del famoso saggio di Mundell (1957) sulla perfetta sostituibilità fra mobilità internazionale dei fattori e dei beni: prima attraverso i contributi tratti dalla teoria del'organizzazione industriale e del ciclo di vita del prodotto (Vernon 1966, 1971; Kindleberger 1969; Hymer 1976; Knickerbocker 1973; Buckley-Casson 1976; Hirsch 1976; Rugman 1981; Caves 1982; Casson 1986; Dunning 1981, 1989), poi attraverso l'apporto nella "new international economics" che ha formalizzato alcuni elementi portanti della stessa organizzazione industriale come economie di scala, mercati imperfetti e differenziazione del prodotto (Helpman 1984; Markusen 1984; Ethier 1986) fino ai modelli più recenti di Brainard (1997), Markusen-Venables (1998) Markusen-Maskus (1999, 2001), Baldwin-Ottaviano (2001). Tutto ciò è stato accompagnato da diversi lavori econometrici mirati a stimare sia le determinanti degli IDE, sia la correlazione tra IDE e commercio estero, con dati di paese, settore e impresa.

Potremmo dire che il filone alla Hymer – Kindleberger – Casson – Dunning, ispirato ai fattori di vantaggio cosiddetto OLI (ownership, location, internalisation), mette l'accento più sui pre-requisiti che sulle determinanti degli IDE. Infatti la compresenza di vantaggi proprietari tecnologico-organizzativi (ownership) da sfruttare attraverso transazioni interne alle imprese anziché sul mercato (internalisation) e di dati fattori di vantaggio localizzativo nei vari paesi (locational advantages) costituisce condizione necessaria perché l'impresa intraprenda una decisione di IDE, ma non basta a definire i confini fra scelta di: a) esportare dal paese d'origine a intermediari commerciali esteri, b) concedere licenze di fabbricazione a terze imprese all'estero, c) investire in sole attività di distribuzione commerciale all'estero (IDE commerciali che azzerano o riducono l'intermediazione degli importatori-grossisti esteri), d) intraprendere un IDE direttamente produttivo finalizzato al solo mercato locale oppure a più ampi mercati regionali, se non di "global sourcing".

Nel filone della "nuova teoria" che ha messo in discussione gli schemi alla Heckscher-Ohlin, introducendo modelli basati su economie di scala, mercati imperfetti e differenziazione dei prodotti (Helpman-Krugman 1985) si collocano i contributi più recenti. Helpman (1984), Markusen (1984) e Ethier (1986) propongono modelli di equilibrio in

mercati di concorrenza monopolistica, secondo cui l'impresa assume la decisione di quanto e in quali paesi produrre (impresa multinazionale multi-stabilimento) in base a funzioni di massimizzazione del profitto che contengono un costo fisso di stabilimento, costi marginali connessi al costo dei fattori nelle diverse possibili localizzazioni, nonchè costi di trasporto-distribuzione connessi alla distanza geografica fra produzione e vendita, oltre che ad eventuali barriere agli scambi. Il modello può essere arrichito dalla presenza di eventuali fattori di rischio-paese e/o di diversa tassazione dei profitti nei diversi paesi[1].

Si noti che in tutti questi modelli l'IDE è tradizionalmente definito come una scelta su dove produrre, non essendo contemplato un IDE puramente commerciale (filiale commerciale e di assistenza alla clientela), fenomeno in realtà di grande rilevanza, e spesso primo stadio del processo di internazionalizzazione produttiva dell'impresa. Hanson et al. (2001) stimano, nel caso degli USA, che gli IDE puramente commerciali, non distinti dagli IDE produttivi nelle statistiche per settore e per impresa, siano il veicolo del 24% delle vendite di tutte le filiali estere delle MNE manifatturiere statunitensi, con punte fino al 38% nel settore del macchinario industriale.

Ad uno schema organico di determinanti degli IDE, ispirato ai fondamenti della "new international trade theory" e passibile di verifica-falsifica econometrica per quanto riguarda il nostro tema, mirano i contributi più recenti, in particolare di Markusen (1995), Markusen-Venables (1998), Markusen-Maskus (1999, 2001a ,2001b).

Come si cerca di evidenziare nella Tav. 1, le determinanti di fondo degli IDE possono essere ricondotte a due:

a) accesso al mercato, in presenza di costi di trasporto e/o di specifiche barriere al commercio e/o agli IDE;

b) differenziali nel costo e nella qualità dei fattori.

La strategia di accesso al mercato spiega prevalentemente gli IDE cosiddetti "orizzontali", cioè tipici dell'impresa multi-stabilimento e multi-prodotto/varietà che espande le proprie vendite su mercati via via più differenziati e lontani (IDE "market oriented"). La strategia di sfruttamento dei differenziali nel costo del lavoro spiega essenzialmente gli IDE cosiddetti "verticali", cioè di delocalizzazione parziale o totale all'estero della propria produzione (IDE "cost saving"), finalizzata o meno alla re-

[1] Una breve esposizione didattica del modello si trova in Heffernan-Sinclair (1990, cap. 7).

importazione verso la casa madre per la lavorazione finale e la vendita ("outward processing trade" ovvero "traffico di perfezionamento passivo").

Un caso molto particolare, ma interessante, di questi IDE verticali può essere definito quello motivato dall'inseguimento tecnologico, dal desiderio cioè di localizzare il proprio "sourcing" tecnologico nel paese leader della stessa tecnologia, come mostrano vari esempi di IDE europei e giapponesi nella Silicon Valley e nella vicinanza a centri di ricerca eccellenti negli USA, nel Regno Unito, in Germania e altrove.

Il modello di equilibrio economico generale di Markusen-Maskus (2001a, b), largamente tratto dallo schema di "proximity-concentration trade-off" proposto dalla Brainard (1997), configura due paesi (Home e Foreign) e due settori X e Y, di cui Y omogeneo a rendimenti di scala costanti e intensivo in lavoro ordinario, e X manifatturiero caratterizzato da prodotti differenziati, economie di scala nelle varietà e concorrenza monopolistica, intensivo in lavoro qualificato. In questo modello, e non solo, è fondamentale la distinzione tra economie di scala a livello di stabilimento di produzione (plant) e a livello di impresa (firm), dove queste ultime richiamano esattamente i vantaggi proprietari di conoscenza (ownership) del modello OLI.

Il modello prevede una tassonomia di 6 tipi di imprese manifatturiere che operano nel settore X, comprese quelle puramente esportatrici. Vi sono infatti, innanzi tutto, le imprese nazionali o domestiche (imprese D) mono-stabilimento, prive di IDE, localizzate nel paese più grande (Home o Foreign) per sfruttare le economie di scala di stabilimento e minimizzare i costi di trasporto delle proprie esportazioni verso i mercati più piccoli, e/o localizzate nel paese abbondante in lavoro qualificato onde poter sfruttare i vantaggi comparati alla Heckscher-Ohlin nel settore manifatturiero "skill intensive". In secondo luogo vi sono le imprese MNE orizzontali (imprese M) che producono in entrambi i paesi, sfruttando economie di scala di impresa della case madre localizzata in uno dei due paesi. Infine vi sono le imprese MNE verticali (imprese V), con casa madre in un paese e produzione totalmente decentrata nell'altro

Le implicazioni per il commercio sono abbastanza nitidamente individuabili.

Poiché, come si è detto, le imprese puramente esportatrici domestiche (D) si localizzano nel paese più grande (per ridurre la quota di produzione esportata ed il connesso costo di trasporto) e/o nel paese "skill abundant" (per motivo di vantaggio comparato fattoriale), i flussi di commercio internazionale, e in particolare di commercio intra-settoriale,

saranno tanto maggiori: a) quanto più simili sono Home e Foreign per dimensione; b) quanto più il paese di minore dimensione è "skill abundant", in quanto il vantaggio comparato di dotazione fattoriale compensa lo svantaggio in termini di economie di scala; c) quanto minori sono i costi del commercio (trasporto, barriere); d) quanto maggiori sono i costi fissi di stabilimento (investment cost).

Le MNE orizzontali (M) saranno tanto più numerose, inducendo maggiori flussi di commercio orizzontale e in particolare di "intra-firm trade": a) quanto più simili sono i paesi per dimensione (minore incentivo a sfruttare le economie di scala concentrando la produzione in un solo paese per servire da lì l'intero mercato di Home e Foreign); b) quanto più simile è la dotazione fattoriale dei due paesi; c) quanto maggiori sono i costi del commercio (si va a produrre vicino al mercato di sbocco); d) quanto minori sono i costi fissi di stabilimento.

Simmetricamente, le MNE verticali (V), che generano flussi di commercio inter-settoriale saranno invece più numerose: a) quanto meno simili sono la dimensione e la dotazione fattoriale dei due paesi; b) quanto minori sono i costi del commercio e i costi fissi di stabilimento.

Un interessante modello teorico di IDE orizzontali è presentato da Baldwin-Ottaviano (2001), in cui si considerano due paesi con IDE incrociati, in analogia col modello di "reciprocal dumping" di Brander-Krugman (1983). Ogni impresa multi-prodotto alloca la produzione delle diverse varietà nei diversi paesi, in base ai consueti vantaggi di scala, costo di trasporto e costo dei fattori, per poi servire il mercato mondiale di ogni varietà dalle singole filiali (nella logica del "global sourcing"). Fra i tantissimi esempi, la svizzera Nestlè che produce pasta fresca Buitoni in Italia, pizza congelata Buitoni in Francia e vende entrambi i prodotti sui mercati reciproci, oltre che su mercati terzi, a cominciare dalla stessa Svizzera. Il modello genera una forte complementarietà fra IDE e commercio, entrambi di tipo intrasettoriale, con parziali effetti di spiazzamento di precedenti esportazioni ma prevalenti effetti di "trade creation".

3. Verifiche empiriche dei rapporti tra IDE e commercio estero

Osserviamo in generale che, abbandonando lo schema astratto di perfetta sostituibilità fra mobilità internazionale dei fattori e delle merci e non limitandosi al caso particolare di IDE "tariff jumping", è del tutto ragionevole che strategie di internazionalizzazione commerciale e

produttiva comportino una maggior produzione dell'impresa investitrice fuori dai confini nazionali di Home, e al tempo stesso possano accrescere le esportazioni di Home. Ciò può avvenire, come suggerisce l'esperienza, sia per l'effetto di trascinamento che l'IDE spesso comporta in termini di vendita di parti, componenti, macchinari e beni di gamma complementari da Home al paese Foreign di localizzazione dell'IDE, anche da parte di imprese di Home diverse dall'impresa investitrice, sia per l'effetto di accresciuta competitività sui costi (per l'IDE verticale "cost saving") e/o per le accresciute capacità di sfruttare i vantaggi proprietari ("knowledge capital" nella terminologia di Markusen) dell'investitore. Fra questi ultimi possiamo annoverare il capitale umano e manageriale, le conoscenze di marketing dei prodotti e servizi, brevetti–marchi–blueprints–formule e simili esempi di conoscenze più o meno tacite, la stessa reputazione dell'impresa.

Effetti di vera e propria sostituzione fra IDE ed esportazioni tenderanno a verificarsi nel medio-lungo periodo, quando tuttavia sarà andata mutando la configurazione produttiva di Home in risposta ai processi di riconversione secondo una logica di vantaggi comparati dinamici. A questo proposito, vale l'osservazione di Kravis-Lipsey (1992), secondo cui sull'arco di un ventennio gli USA avevano sì perso quota sul commercio mondiale, ma invece mantenuto o addirittura guadagnato quota in termini di vendite delle filiali estere delle MNE statunitensi rispetto alle esportazioni mondiali.

Una breve rassegna di lavori empirici porta alla conclusione che effetti di complementarietà sono nettamente prevalenti rispetto ad effetti di sostituzione fra IDE e commercio internazionale.

3.1 Effetti sul paese investitore

In un saggio che costituisce ancora oggi un punto di riferimento della letteratura in argomento, Lipsey-Weiss (1981) stimano un modello gravitazionale con dati USA di esportazioni e vendite delle filiali estere in 44 paesi nel 1970, confrontate con le esportazioni di altri 13 concorrenti sui medesimi mercati. Le caratteristiche dei paesi sono definite in termini di dimensione (PIL), distanza geografica e appartenenza o meno all'area regionalmente integrata della CEE. La produzione delle filiali estere delle MNE statunitensi è calcolata in termini di vendite nette (vendite totali meno importazioni dagli USA). I risultati delle diverse regressioni danno coefficienti largamente positivi e significativi circa la relazione tra le esportazioni degli USA e le vendite nette delle filiali estere, anche a scapito delle esportazioni dei paesi concorrenti negli stessi mercati, salvo che queste esportazioni provengano da altre affiliate statunitensi di quei 13

paesi. Si verifica quindi, almeno in parte, un effetto di spiazzamento competitivo da parte della produzione internazionale USA verso la concorrenza estera, soprattutto nel caso di beni intermedi come le materie prime farmaceutiche. È interessante anche l'emergere di un effetto simmetrico: anche l'aumento nel numero delle filiali estere dei 13 paesi concorrenti sembra spiazzare in parte le esportazioni americane negli stessi mercati.

Un successivo lavoro di Lipsey-Weiss (1984) su dati di 14 settori e 5 aree, sempre basato su un modello gravitazionale, conferma ampiamente l'effetto prevalente di complementarietà tra esportazioni della casa madre e vendite nette delle affiliate estere delle MNE americane. Nei settori dove le vendite nette sono superiori alla media anche le esportazioni dagli USA sono superiori alla media. Ad esempio, nel settore dei macchinari non elettrici ogni dollaro di vendite nette delle affiliate è associato ad un aumento medio di 2.5 dollari di esportazioni della casa madre verso quell'area. La complementarietà risulta tanto più alta quanto maggiore è il peso nel settore dei beni intermedi (es. meccanica non elettrica, chimica) e nei confronti di mercati dei PVS. Occorre naturalmente tenere conto dell'osservazione di Clausing (2000) secondo cui il modello gravitazionale tanto più perde forza esplicativa quanto più alto è il peso del commercio "intra firm", notoriamente influenzato da variabili di regime fiscale e relativi prezzi di trasferimento.

I lavori di Swedenborg (1979) e Blomström-Lipsey (1986) forniscono risultati simili, riferiti alle MNE svedesi. Fontagné (1999) con dati 1984-1993 di settore di 14 paesi giunge alla conclusione che ogni dollaro di IDE produce direttamente e indirettamente circa due dollari di esportazione addizionale dal paese d'origine, e simmetricamente aumenta le importazioni del paese di destinazione dell'IDE. L'Autore osserva inoltre che buona parte dell'effetto di complementarietà tra IDE e commercio deriva da effetti di "spillover" tra settori industriali diversi, e ancora che l'effetto di complementarietà si verifica marcatamente per gli IDE americani, ma non altrettanto per gli IDE negli USA da parte degli altri paesi, forse per la particolare configurazione del grande mercato statunitense.

Mori-Rolli (1998) utilizzano un modello gravitazionale di commercio estero con dati su 5 paesi investitori e 12 paesi riceventi nel periodo 1985-94, trovando una correlazione positiva tra importazioni provenienti dal paese investitore e vendite delle sue affiliate sul mercato del paese ricevente, avendo già scontato altre determinanti degli scambi bilaterali come la dimensione relativa dei paesi, il differenziale dei redditi pro capite come "proxy" dello stadio di sviluppo, i differenziali nel costo

del lavoro, la distanza geografica, la presenza di barriere tariffarie e non tariffarie. Si conferma così che gli IDE in un determinato paese inducono maggiori esportazioni verso lo stesso paese, mentre non viene statisticamente confermata una opposta relazione causale che potrebbe andare dalle importazioni agli IDE in entrata.

Con dati longitudinali 1966-90 su 932 imprese giapponesi divenute progressivamente da esportatrici a MNE, Head-Ries (2001) trovano una correlazione positiva e significativa tra IDE ed esportazioni dal Giappone, anche ma non solo per i beni intermedi.

Il caso degli IDE giapponesi nel settore automobilistico negli USA è oggetto dello studio di Blonigen (2001). Gli iniziali IDE giapponesi nell'assemblaggio di autoveicoli negli USA, largamente sospinto dall'apprezzamento dello yen, ma più in particolare dalla risposta alle VER ("voluntary export restrictions" imposte dal governo americano), hanno determinato un forte incremento nell'esportazione giapponese di parti e componenti, anche se successivamente hanno indotto ulteriori IDE giapponesi nella produzione delle stesse componenti direttamente negli USA, generando così una sorta di moltiplicatore IDE-commercio-IDE. Complessivamente si riscontra un'altissima correlazione (0.98) tra il numero dei veicoli prodotti dal Giappone negli USA e le importazioni USA dal Giappone delle componenti.

L'Autore osserva invece segnali di sostituibilità fra IDE ed esportazioni statunitensi quando tratta dati di 11 casi di beni di consumo non soggetti a VER (es. aspirapolvere, sintetizzatori musicali, salsa di soja): in alcuni di questi casi tendono a cadere le esportazioni giapponesi negli USA a seguito dell'inizio di produzione in loco da parte di MNE giapponesi.

Prevalenti effetti di complementarietà fra esportazioni e vendite delle filiali estere americane emergono anche dalle analisi di regressione su dati *cross section* di 27 paesi e 63 settori manifatturieri tratti dal U.S. Bureau of Economic Analysis per il 1989 (Brainard 1997). Assai meno forte è la relazione, pure analizzata nello stesso lavoro, tra importazioni USA e vendite negli USA da parte delle affiliate di MNE estere.

I risultati delle stime econometriche logit del citato lavoro di Markusen-Maskus (2001b), basate su dati 1988-91-94 di commercio tra USA e 10 paesi-aree e delle vendite delle filiali delle MNE statunitensi nei medesimi paesi, sembrano confermare largamente le ipotesi del modello, che rafforzano la tesi della complementarietà tra IDE e commercio intra-settoriale. I flussi di commercio orizzontale o intra-settoriale, e ancor più di

scambi "intra-firm", risultano crescere in presenza di: paesi più grandi e più simili per dimensione agli USA, paesi più simili per dotazione fattoriale relativa, minori costi di investimento e di commercio (approssimati dai giudizi soggettivi contenuti nel World Competitiveness Report del World Economic Forum)[2].

3.2 Effetti sul paese di destinazione

L'evidenza empirica circa la correlazione tra IDE in entrata e commercio estero è assai meno robusta (WTO 1996, p. 54). Come sintetizzato nella Tav. 1, ci si attende una chiara complementarietà tra IDE verticali di "outward processing" (crescono le importazioni ma ancor più le esportazioni dal paese ospite), così come tra IDE verticali di approvvigionamento di materie prime e semilavorati da parte del paese d'origine (Home) ed esportazioni dal paese di destinazione (Host).

Già Lipsey (1981) aveva notato che in alcuni settori (chimica, metallurgia) le affiliate estere operanti negli USA sono più orientate all'esportazione dagli USA che le stesse imprese domestiche americane. In altri settori invece (meccanica non elettrica, mezzi di trasporto) le affiliate estere producono per il mercato interno americano e vanno almeno in parte a sostituire precedenti esportazioni dalla casa madre verso gli USA.

Hanson et al. (2001, pp. 19ss.) rilevano effetti sulle importazioni del paese di destinazione degli IDE di outsourcing: prodotti intermedi per l'ulteriore lavorazione, beni strumentali, altri input necessari all'impianto di lavorazione, anche prodotti finiti per rivendita sul mercato locale. Gli Autori notano che le importazioni delle affiliate USA per questo traffico di perfezionamento hanno aumentato il loro peso sul totale delle vendite delle affiliate USA all'estero dal 9,8% del 1982 al 12,2% del 1994, con punte del 22-23% in settori come mezzi di trasporto, elettronica e meccanica elettrica.

Emerge anche che gli IDE verticali legati all'outsourcing ed alla costituzione di "export platforms" sono relativamente più presenti in paesi di minore dimensione (mentre i mercati maggiori attirano prevalentemente IDE orizzontali), a più basso salario e produttività e geograficamente più vicini agli USA.

Diversi studi confermano il ruolo che le MNE svolgono nel paese ospite come promotrici delle esportazioni del paese stesso (WTO 1996, UNCTAD 2000, pp. 189-192). A parità di settore, le affiliate estere

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[2] Alcune utili schede illustrative della produzione mondiale integrata di Toyota e Honda sono contenute in UNCTAD 1996, pp. 100-102.

mostrano una propensione a esportare superiore alle imprese domestiche. Ad alcuni lavori empirici disponibili agli inizi degli anni ’90 fa riferimento Falzoni (1993).

I vantaggi che il paese ospite, specialmente se paese in via di sviluppo, può trarre dalla presenza di IDE in entrata possono ricondursi ai seguenti effetti, che complessivamente svolgono un ruolo di promozione delle capacità esportative del paese.

In primo luogo, l’IDE in entrata, come peraltro anche molte forme di “non equity investment” (accordi di collaborazione produttiva, contratti di licenza con assistenza tecnica ecc.) forniscono al paese importanti input visibili e invisibili, necessari all’economia locale per sfruttare adeguatamente i vantaggi comparati potenziali del paese: macchinari e tecnologie e relativo addestramento della manodopera locale, input intermedi, esperienza (skills), capacità di management. Naturalmente questi effetti benefici dinamici sullo sviluppo locale presuppongono una capacità di assorbimento di base (un ruolo particolarmente importante gioca la diffusione della scolarità), un ambiente recettivo allo sviluppo, un rapporto contrattuale forte e amichevole tra il governo locale e il management della MNE (WTO 1996).

In secondo luogo, particolarmente nei casi di IDE verticali e di “export platforms” per servire più ampi mercati regionali, la MNE genera sbocchi esportativi per il paese ospite, apportando cultura di marketing e organizzazione, sia pure entro i vincoli delle strategie distributive e di “global sourcing” della stessa MNE. I più dinamici paesi esportatori asiatici e latino-americani sono in molti casi (con le dovute eccezioni come la Corea del Sud e Taiwan) tra i paesi con una significativa presenza di IDE in entrata. Un utile indice di attrattività degli IDE in entrata, sia pure da interpretare con cautela secondo lo stesso proponente, è il “Transnationality Index” costruito anche per gli IDE in entrata da UNCTAD (2001, pp. 39-43).

In terzo luogo, dopo la fase iniziale in cui l’IDE in entrata comporta molte importazioni di beni strumentali e intermedi dal paese d’origine, viene in molti casi stimolata l’attivazione di fornitori locali, i quali a loro volta possono gradualmente trasformarsi in fornitori specializzati sul mercato mondiale, in partnership o meno con la MNE d’origine. L’IDE può così dare origine, in presenza di condizioni favorevoli nel paese

ricevente, a quei "backward and forward linkages" che da sempre hanno costituito un nodo centrale nei processi di sviluppo economico[3].

In generale, a prescindere dalla distinzione tra IDE "greenfield" e di "merger&acquisition" (distinzione pur importante sotto il profilo dell'occupazione e della capacità produttiva), il boom degli IDE negli ultimi due decenni porta a sottolineare l'importanza di economie esterne ("spillover") tecnologiche e organizzative, con un effetto positivo di innanlzamento della capacità competitiva del paese ricevente.

Un profilo di particolare interesse è quello dei rapporti fra IDE e aree regionali integrate, per i ben noti effetti di economie di scala e allargamento del mercato generati dagli Accordi di Integrazione Regionale (RIA, Regional Integration Agreements).

4. Principali conclusioni

Dalla sintetica rassegna che precede derivano alcune conclusioni, non certo esaustive del tema.

4.1 Relazioni tra IDE e scambi commerciali

1. La relazione tra IDE e scambi commerciali è complessa e non si presta a interpretazioni teoriche univoche, anche se tendono a prevalere effetti di complementarietà e di causazione reciproca.

2. La scelta delle imprese tra esportazione pura o IDE risponde a due determinanti di fondo: a) accesso e dimensione del mercato; b) differenze nel costo dei fattori. Le medesime determinanti sono largamente

[3] Al tema di "Promoting linkages" è dedicata la parte monografica dell'ultimo World Investment Report (UNCTAD 2001), corredato di numerosi e interessanti casi studio, come quello della ENGTEK malese nel settore della componentistica elettronica (UNCTAD 2001, pp. 129-130). Svensson (1996) esamina la relazione tra IDE svedesi ed esportazioni svedesi nella UE e fuori UE dal 1974 al 1990. I risultati delle diverse regressioni suggeriscono effetti di complementarietà fra IDE, esportazioni di beni intermedi dalla casa madre ed esportazioni dalle filiali estere verso terzi mercati. Blomström et al. (1997) usano un modello gravitazionale su dati 1982-97 di commercio e IDE degli USA con 54 paesi partner, separando gli scambi "intra-firm" dagli altri. I risultati confermano innanzi tutto l'ipotesi di accresciuti IDE intra-area come effetto dell'integrazione commerciale: le imprese dei paesi membri del RIA si rilocalizzano alla ricerca di maggiore efficienza produttiva e distributiva, cogliendo le opportunità di una progressiva liberalizzazione e apertura dei mercati nazionali. .Per quanto riguarda gli IDE da paesi esterni al RIA, emerge una correlazione negativa con gli IDE di tipo "tariff jumping" sui singoli (piccoli) mercati della regione, ma al tempo stesso una correlazione positiva con nuovi IDE attirati dal mercato più ampio, tanto più se orientato ad una maggiore liberalizzazione delle sue regole interne. La propensione maggiore delle MNE americane a scambi "intra-firm" sembra poi verificarsi preferibilmente con paesi partner economicamente avanzati, a basso rischio e in presenza di regimi fiscali favorevoli ai profitti.

collegabili rispettivamente a IDE di natura"orizzontale" (unità produttive geograficamente separate per varietà-prodotto appartenenti allo stesso settore, coordinate dalla casa madre) e IDE di natura "verticale" (unità produttive geograficamente separate per fasi di lavorazione e prodotti intermedi lungo la stessa filiera). La scelta dell'impresa su come ottimizzare lo sfruttamento dei propri "vantaggi proprietari" ("ownership advantage" o "knowledge capital") porta a soluzioni di IDE (internalizzazione dei vantaggi) o alternativamente di transazione sul mercato (contratto di licenza, esportazione pura).

3. Gli IDE orizzontali sono chiaramente sostituti all'esportazione (e talora sono l'unica alternativa disponibile per l'impresa del paese d'origine) quando si sia in presenza di rigide barriere all'importazione nel paese di destinazione (dazi proibitivi, contingentamenti, VER ovvero restrizioni "volontarie" all'esportazione imposte dal paese importatore). Gli IDE orizzontali sono invece più complementi che sostituti all'esportazione quando mirano a meglio cogliere le opportunità di accesso e vicinanza al mercato, adattamento dei prodotti e dei servizi agli standard locali, controllo delle rete distributiva e dei concorrenti, acquisizione di marchi e quote di mercato da concorrenti che vengono acquisiti o con cui viene operata una fusione, presidio di aree regionali integrate. L'effetto di complementarietà si produce anche tramite "spillover" su settori diversi da quello dell'investitore.

4. Una parte non trascurabile degli IDE, che gioca per sua natura un ruolo di complemento all'esportazione, è rappresentata dagli IDE di MNE manifatturiere in attività puramente commerciali nel paese di destinazione (filiali commerciali e di asssistenza alla clientela, funzionali alle vendite sul mercato locale ed eventuali mercati collegati).

5. Gli IDE verticali tendono per loro natura ad essere "trade creating" in entrambe le direzioni, con possibili effetti di sostituzione a precedenti esportazioni nei casi di riorganizzazione logistica a livello di gruppo ("global sourcing").

6. Negli esercizi di verifica empirica di queste relazioni, le prove econometriche sollevano quasi sempre cautele e riserve interpretative, a causa di variabili omesse come l'eventuale presenza di restrizioni agli scambi commerciali e/o agli IDE in entrata, variazioni dei tassi di cambio reali, distinzione fra beni intermedi e finali ecc.

7. Le interazioni delle variabili in gioco hanno intensità e segni attesi diversi a seconda dei settori e dei paesi. Ad esempio, IDE verticali di tipo "labor cost saving" sono più probabili in settori intensivi in lavoro che

non in settori come chimica e meccanica strumentale; IDE rientranti in una strategia di "export platform" sono destinati a paesi relativamente piccoli e aperti che non a paesi come gli USA.

8. La probabilità di IDE sostituti delle esportazioni aumenta passando da prodotti intermedi a prodotti finali.

4.2 Alcune implicazioni di politica economica internazionale

1. I dazi inducono IDE "tariff jumping", ma orientati al mercato locale o regionale, pertanto potenzialmente non adatti ad accrescere la competitività del paese ricevente sul mercato globale

2. Le VER inducono IDE maggiormente in grado di elevare la competitività del paese che si protegge con questo particolare strumento, anche promuovendone nuove esportazioni verso il mercato mondiale.

3. In generale, minori barriere all'import, e ovviamente minori barriere all'ingresso di capitale estero, attraggono più IDE. Si confronti ad esempio l'esperienza di Asia Orientale e America Latina, in particolare fino a quando in quest'ultimo Continente prevalevano politiche di "import substitution". Nel 1992 il rapporto tra export e vendite delle filiali giapponesi era del 45% in Asia e del 23% in America Latina (World Bank 1995).

4. Accordi di integrazione economica regionale (RIA) tendono ad attrarre IDE di tipo "hub and spoke", salvo applicare regole d'origine troppo stringenti.

5. Restano da approfondire le ragioni del fallimento del progetto MAI (Multilateral Agreement on Investment), tema che verrà ripreso dopo la prossima Quinta Conferenza Ministeriale del WTO. I paesi riceventi meno sviluppati temono condizioni che portino al peggioramento della propria bilancia dei pagamenti (merci, servizi e profitti rimpatriati), alla monopolizzazione del mercato interno (pratiche restrittive, profitti in eccesso, barriere all'entrata per concorrenti locali ecc), all'imposizione di vincoli contrari all'interesse nazionale. I paesi ricchi investitori a loro volta, mentre chiedono garanzie sulla protezione dei propri IDE e sul rimpatrio dei profitti, temono gli effetti di esportazione di posti lavoro verso paesi a basso costo del lavoro e la connessa pressione verso il basso dei salari della manodopera domestica meno qualificata. Va peraltro ricordato che tali effetti possono comunque scaturire dalle semplici importazioni, anche in assenza di investimenti all'estero delle proprie imprese.

Tav. 1

Determinanti degli IDE e relazioni IDE - export

DETERMINANTI DEGLI IDE	RELAZIONE PREVALENTE IDE - EXPORT
1. ACCESSO AL MERCATO (IDE "orizzontali")	
1.1. Con barriere agli scambi	SOSTITUTI
• IDE "tariff jumping" "VER induced"	
1.2. Senza barriere agli scambi	COMPLEMENTI>SOSTITUTI
• IDE "market oriented"	
• Agglomerazione di fornitori	
• Insider in area regionale integrata	
• Apprendimento tecnologico (vicinanza a Centri di eccellenza)	
2. DIFFERENZE NEL COSTO DEI FATTORI	
2.1. Con incentivi e requisiti locali (export processing zones)	COMPLEMENTI>SOSTITUTI
2.2. Delocalizzazione lavorazione di prodotti intermedi da riesportare verso la casa madre	COMPLEMENTI
2.3. Delocalizzazione intera produzione per servire mercato nazionale e mercati esteri	SOSTITUTI
2.4. Approvvigionamento (sourcing) di materie prime e semilavorati	COMPLEMENTI

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COMMENTO A "INVESTIMENTI DIRETTI ESTERI ED ESPORTAZIONI. COMPLEMENTI O SOSTITUTI?" DI FABRIZIO ONIDA

Salvatore Rossi e Roberto Tedeschi

Il tema della relazione tra esportazioni e investimenti diretti esteri, a cui il lavoro di Onida ci spinge a ripensare, sembra a prima vista un tema eminentemente empirico da collegare a una teoria con forti caratteri applicati. Non è così. Il fatto che la maggior parte degli scambi tra paesi riguardi prodotti simili ha attirato a suo tempo l'attenzione dei teorici del commercio internazionale perché confliggeva con il modello di mercato concorrenziale, connotato dalla legge dei vantaggi comparati. Possiamo pensare che quell'evidenza abbia contribuito all'affermazione dei modelli di mercato imperfetto e concorrenza monopolistica con rigidità, modelli oggi prevalenti nell'economia internazionale. L'evidenza empirica che Onida riassume in apertura del suo intervento sposta il punto di vista: parte (o gran parte) del commercio intraindustriale è commercio *intra-firm*, ossia è costituito da scambi di materie prime, beni intermedi e prodotti finiti che avvengono all'interno della medesima impresa. Quello che veniva letto come un segno della prevalenza della concorrenza imperfetta è in parte il riflesso della compresenza di un diverso modo di organizzare l'economia, rispetto al mercato (di qualunque forma): l'impresa. In questo caso l'impresa multinazionale, con impianti localizzati in paesi diversi o con controllate e affiliate in paesi diversi.

È il peso del commercio *intra-firm* che ha quindi imposto di integrare la letteratura di commercio estero con quella relativa alle imprese multinazionali e agli investimenti diretti (IDE).

Il lavoro di Onida offre una rassegna critica dei lavori teorici ed empirici sulla relazione tra IDE ed esportazioni. L'analisi della letteratura teorica, presentata in modo chiaro e sintetico nella sezione 2, si riferisce soprattutto agli sviluppi della teoria delle multinazionali e degli investimenti diretti. Il legame con le esportazioni viene efficacemente ripercorso attraverso la tassonomia proposta da Markusen e Maskus. Successivamente Onida discute l'evidenza empirica disponibile, distinguendo gli effetti degli investimenti diretti sulle esportazioni del paese investitore (sezione 3) da quelli sulle esportazioni del paese ospitante (sezione 4).

Alla domanda chiave se vi sia sostituibilità o complementarità tra gli IDE e le esportazioni, Onida risponde, sulla base delle evidenze discusse, che senza dubbio gli IDE fungono da volano commerciale attivando ulteriori esportazioni da parte del paese investitore; meno nitidi appaiono gli effetti sul paese di destinazione dell'investimento diretto.

Un primo aspetto di discussione riguarda il punto di partenza: il commercio *intra-firm*. Si tratta indubbiamente di un fenomeno importante, dato che, come riporta lo stesso Onida, esso sembra spiegare circa la metà degli scambi commerciali tra Europa e Stati Uniti. È quindi opportuno chiedersi quale sia il modo corretto di trattarlo quando si vogliano analizzare gli effetti degli IDE sulle esportazioni.

La maggior parte dei lavori empirici passati in rassegna utilizza dati settoriali che non possono distinguere tra il commercio *intra-firm* e quello, più standard, tra imprese diverse o tra imprese e consumatori. Una visione alternativa suggerirebbe, al fine di valutare gli effetti degli IDE, di considerare separatamente gli scambi tra le affiliate di un'impresa multinazionale. Questi scambi, che prima della delocalizzazione all'estero di parte dalla produzione (prima dell'investimento diretto) si configurano semplicemente come movimentazioni di merci tra gli stabilimenti domestici di una stessa impresa, dopo l'investimento diretto entrano nelle statistiche di commercio estero. Se, come detto, questi scambi hanno assunto nel tempo dimensioni significative, è ragionevole pensare che i risultati di complementarità tra gli IDE e le esportazioni riflettano la differente contabilizzazione degli scambi *intra-firm* piuttosto che l'attivazione di "nuove" esportazioni.

Considerazioni simili potrebbero applicarsi ai fornitori domestici di un'impresa che, diventando multinazionale, induce l'inclusione dei rapporti di sub-fornitura nelle statistiche di commercio estero. Va riconosciuto, tuttavia, che in questo caso l'argomento critico è più debole: rimane vero che i fornitori domestici potrebbero godere, anche nel lungo periodo, degli effetti benefici derivanti dall'accesso al mercato estero.

Una risposta a queste obiezioni può venire soprattutto dall'utilizzo di dati a livello di impresa, che includano anche informazioni sull'attività produttiva delle affiliate estere.

Altri due aspetti di particolare interesse, soltanto marginalmente considerati dalla letteratura empirica e, quindi, da Onida, riguardano la

distinzione degli effetti degli IDE sulle esportazioni tra breve e medio-lungo periodo e per tipologia di produzione.

Onida riporta la tesi di Kravis e Lipsey che nel lungo periodo i mutamenti della configurazione produttiva nel paese investitore possano ridurre le esportazioni. L'argomento meriterebbe di essere analizzato in modo più sistematico e con il supporto di un modello teorico.

Lo stesso vale per la tipologia di produzione. Onida conclude che "la probabilità di IDE sostituti delle esportazioni aumenta passando da prodotti intermedi a prodotti finali" sulla base dei risultati di Blonigen, che analizza il caso degli IDE giapponesi nel mercato statunitense. Occorrerebbe disporre di un'evidenza più diffusa, che prescinda dalle peculiarità delle imprese produttrici giapponesi o da quelle del mercato di destinazione statunitense: gli effetti degli IDE sulle esportazioni saranno infatti diversi a seconda della differente specializzazione produttiva di un paese.

SUNK COSTS AND EXPORTS: EVIDENCE FROM ITALIAN FIRM-LEVEL DATA

Matteo Bugamelli and Luigi Infante[*]

1. Introduction

In the last decade, Italy's exports have gone through exceptional swings. According to aggregate trade statistics, exported quantities experienced major difficulties before the strong lira depreciation in 1992. Afterwards and until the occurrence of the Asian and Russian financial crises in 1997, there has been a great resurgence of exports: exporting became a more widely diffused activity across Italian manufacturing firms, exporters could increase their market shares almost everywhere, Italian products entered for the first time new markets - in particular developing countries in South East Asia and Latin America. The recent crises have slowed down Italian firms' sales abroad and reduced their market shares.

When dealing with exports, the first thought goes to exchange rate. Undoubtedly, the events above have been mainly affected by the evolution of the exchange rate of the lira. Looking at the trade-weighted nominal effective exchange rate, the lira has depreciated by 12.6 percent between August and October 1992. Later on, in 1995, another big drop has produced further gains in terms of price competitiveness; this effect has been, though, short-lived and after few months the exchange rate was almost back to the previous levels. Since then and specially in 1996, the lira experienced phases of appreciation.

Trade effects, in terms of timing, magnitude and duration, induced by exchange rate movements depend on firm's behaviour. The goal of this paper is to shed some light on two specific aspects of Italian firms' behavior. On one side, we limit our analysis to the decision of entry into and exit out of foreign markets: we therefore neglect any consideration on the decision of the amount to be exported. Secondly, we focus on sunk costs to export; these costs may originate from the need of collecting

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information about demand, learning about the functioning of the institutional and legal environment, establishing a distribution system, marketing and promoting the product, etc.

As pointed out by a series of theoretical papers in the late eighties (Baldwin, 1988 and 1989; Baldwin and Krugman, 1989; Dixit, 1989b; Krugman, 1989), sunk costs may help to explain some empirical puzzles: comparable exchange rate fluctuations[1] may produce significantly different effects in different countries; these effects can also differ in a given country when occurring at different dates. Moreover, it might happen that large depreciations (or, equivalently, appreciations) appear to have smaller effects than small depreciations (appreciations). Sometimes, while large increases in export follow a depreciation no similar reductions occur when the exchange rate goes back to its pre - depreciation level.

According to these authors, the key element is that sunk costs make the firm's export supply function dependent on the exporting vs not-exporting status in previous periods. As a consequence, the aggregate export supply function depends on the type and number of exporters in previous periods; thus the aggregate effect of a given exchange rate fluctuation differ across time and across countries simply because the type and number of incumbent exporters are different. Moreover, sunk costs produce hysteresis in trade flows: temporary shocks determining massive entry of firms in foreign markets might have permanent effects since these firms, after paying sunk costs, find it convenient to stay in the market even when the shock ends.

Few papers have tested this hypothesis using firm-level data. The first one is by Roberts and Tybout (1997) who work with a sample of 650 Colombian plants over the period 1981-89 and find strong evidence in favor of sunk costs. A similar result is obtained by Bernard and Wagner (1998) on a sample of 7,624 German manufacturing plants between 1978 and 1992 and by Bernard and Jensen (2001) for 13,606 US manufacturing plants in 1984-1992. According to Campa (2000), sunk costs to exports are important also for Spanish manufacturing firms[2]; however, he shows that the impact of entry and exit flows on aggregate trade is quite limited[3].

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1 These considerations may equally apply to economic policies.

2 He uses data on 2,188 firms over the period 1990-97.

3 Campa (2000) also analyzes the role of exchange rate uncertainty. According to Dixit (1989a), the need to pay sunk costs makes uncertainty about future conditions a crucial variable for firm's decision. (continues)

Besides showing the relevance of sunk costs also for Italian manufacturing firms, this paper contributes to this literature analyzing in more detail some of their characteristics. First of all, we conduct a more systematic analysis of the temporal structure of sunk costs and find that are paid within very few periods after entry; moreover, the factors generating such costs seem to depreciate quite slowly. Secondly, we interact them with firm characteristics. It results that they come in a sort of fixed amount (or, at most, they grow with firm sales at decreasing rates) so that they are specially relevant for the myriad of small Italian firms. Moreover, we interpret the fact that firms operating in a more informed environment and with a greater ability to collect and process information are less sensitive to sunk costs as a signal that entry in foreign markets imposes a serious learning activity. Since the relevance of sunk costs differ with the quality of the product, we conclude that they might have also a lot to do with marketing and promotion activities[4].

In terms of firm characteristics, we find that the probability to export grows with firm size and productivity, while it decreases with unit labor costs. Also the percentage of resources devoted to marketing, distribution and advertising raises the probability to export. As to R&D intensity, we find a sort of mixed evidence: only when controlling for those firms that combine significant R&D expenses with no experience on export markets, R&D intensity show a direct and positive impact on the probability to export. Finally, while firms located in industrial districts are more likely exporters, Southern firms lag behind.

The rest of the paper is organised as follows. In the next section, we describe the dataset and provide some general descriptive statistics. We also look at figures on foreign markets entry and exit flows as emerging from our sample; the series of nominal effective exchange rate and world demand allow to grasp some preliminary intuitions. Section 3 is devoted to the theoretical model. The description of the estimation strategy and the regressors we are going to use is given in section 4; after that we present the results (section 5). Some concluding remarks are left to the last section.

The idea is that greater uncertainty increases the option value to wait so that firms may decide not to enter (exit) foreign markets despite quite profitable (unprofitable) current conditions; in other words, the inaction band enlarges with uncertainty. However, Campa do not find evidence in favor of this effect.

[4] As we will explain later on, the rationale is that the amount of resources devoted to these activities depend on the underlying characteristics of the product, among which quality is undoubtedly an important one.

2. The data

In the empirical analysis we use a subsample of firms from the Centrale dei Bilanci (Company Accounts Data Service, CADS)[5]. For approximately 30,000 firms per year, CADS collects information on a large number of balance sheet items and some firm characteristics. Data are available from 1982 to 1999. Balance sheets are reclassified in order to reduce the dependence on accounting conventions used by each firm to record income figures and asset values. The focus of CADS on the level of borrowing skews the sample toward larger firms and as a consequence toward Northern firms. Moreover, since banks deal mainly with firms that are creditworthy, the sample is also biased toward better than average quality borrowers.

After ruling out outliers and firms in the first and in the last percentiles computed along various dimension, we end up with 259,159 observations. The distribution of firms across years is described in the first row of Table 1: the size of our sample grows monotonically from 9,000 firms in 1982 to 18,000 in 1994, after that, it drops down to 11,000. About 8 per cent of firms are present in all the eighteen years (a similar percentage for only 1 year); 50 per cent are however observed for at least 8 (not necessarily consecutive) years. The sample has a quite good coverage: in terms of total value added and employment in the Italian manufacturing, our sampled firms covers between 21 and 30 per cent. Importantly, the coverage over total exports is also very high (between 13.5 and 26.5 per cent).

In Table 2 we provide summary statistics relatively to three years: 1985, 1990, 1995; we do it for the full sample and for the subsample of exporting firms. Sample values on sales, value added and employees testify that, despite CADS's bias towards larger firms, we still have a good relative representativeness of smaller ones. In 1995 firm size ranges from 4 to more than 1,000 employees with a mean equal to 87 and a median equal to 58. Both in terms of sales, value added and number of employees, the maximum, the mean and the median reach a peak in 1995 and a trough in 1990. Average firm age is around 20 years; the oldest firm is 140 years old. The average unit wage grows over time from 21 to 28 (1995 equivalent)

[5] Centrale dei Bilanci is the organisation in charge of gathering and managing the data. It has been established in the early '80s jointly by the Bank of Italy, the Italian Banking Association (ABI) and a pool of leading banks with the goal of collecting and sharing information on borrowers. Thus the sample is not randomly drawn since firms enter only by borrowing from one of the pooled banks.

millions liras. Propensity to R&D is dramatically low, in line with what emerges from aggregate information about Italy. Exporting firms are on average larger, makes more sales and produce a higher value added. They also pay higher average unit wages.

Table 3 describes firm distribution in terms of sectors and location. Above 70 percent of our firms are located in the North, less than 10 percent in the South. The sectoral distribution reflects, at least on a qualitative basis, the Italian specialization. The most represented industry is indeed the one producing industrial and commercial machinery (excluding computer and office equipment); many firms (about 18 per cent) operate in the so called traditional sectors (textile, apparel and leather), while very few belongs to the most innovative "computer and office equipment" and "measuring and controlling instruments". Limiting to exporters, the proportion of firms operating in the sectors of specialization grows; they are also mainly located in the Northern part of Italy.

The propensity to export grows with firm size (Table 4). In 1995 it goes from 40.6 per cent for firms with less than 50 employees to 76.9 for those with more than 300 employees. Moreover, these figures have significantly increased across time[6]. Adding the sectoral dimension, some interesting patterns come out. In traditional sectors (with the exception of "leather and leather products"), the propensity to exports is relatively larger among small firms which is a clear indication on the structure of this industry. On the contrary, firms producing "industrial and commercial machinery" show high relative propensities for each size class.

We now turn to some statistics on flows of firms in and out foreign markets (Table 5). For a given pair of years, the top part of the table is a transition matrix: out of the number of firms exporting at time *t*, it gives the proportion of those exporting and not exporting at time *t+1*; the same for firms not exporting at time *t*. The table therefore provides entry and exit rates together with the degree of persistence to stay in and out foreign markets. These flows are then related, in the median part of the table, to the evolution of the nominal effective exchange rate of the lira and of the

[6] More precisely, these increases have been in turn increasing in size. Between 1985 and 1995, the propensity to export has grown by 18,7 per cent for small firms, 22.3 per cent for medium firms and 37.1 per cent for large ones.

world export volumes[7]. The last two rows show the ratio between entrants and exitants' exports over total exports in the sample.

Not surprisingly, entry (No_t - Yes_{t+1} sequence) and exit (Yes_t - No_{t+1} sequence) rates peaked during the period 1992-95. Before the lira depreciation, the difficulties of Italian firms on foreign markets were quite evident: 30 per cent of exporters abandoned foreign markets in 1992, the subsequent year this fraction jumped to 45.4 per cent. The strong depreciation of the lira has afterwards supported entry: for 1993, 1994, 1995 entry rates have been, respectively, equal to 17.2, 19.3 and 25.2. In 1994 and 1995 the acceleration of foreign demand provided a further push to new exporters. It is much relevant to notice that in these years entering and exiting firms produced even one third of total exports; this is to say that these flows of firms had a huge impact on Italian aggregate trade[8]. Interestingly, since 1997, despite entry rates not too smaller than their time average, the contribution of entering firms to total export values has dramatically decreased. This testifies a dominance of small firms among new entrants, which in turn might reflect two facts: the long history of increasing openness of the Italian economy and the 1992-95 depreciation episodes which have favored a thorough internationalization among medium and large firms.

In general, Table 5 shows a quite promising picture. Most of the years, the relationship between exchange rate and world exports on one side and entry and exit rates on the other side has the expected sign and intensity. However, flow patterns can not be read only according to the exchange rate evolution; various firm and sector specific factors and also economic policies, both domestic and foreign ones, affect firms' decision about export participation. Moreover, sunk costs make the relationship between exchange rate, world demand and entry/exit even more complex: what matters is not only the current value of exogenous variable but also firms' expectations over the evolution of these variable and the degree of uncertainty characterizing such expectations. A more structural analysis is therefore needed and this is what we address in the next sections.

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[7] The nominal effective exchange rate of the lira is produced by the Bank of Italy (the methodology is described in Economic Bulletin no. 26): it is an index equal to 100 in 1993. The world export volume is also an index with 1993=100 and is taken from IMF .

[8] This is contrary to what found by Campa (2000) on a sample of Spanish manufacturing firms.

3. The model

The theoretical model, from which we derive our reduced-form empirical specification, is taken from Roberts and Tybout (1997)[9]. We present it here starting from a static problem with no sunk costs of entry and exit and then introducing a more general multiperiod structure with sunk costs. Finally, we extend a bit Roberts and Tybout' model to consider a more complex temporal structure of sunk costs.

Let us define by $\pi_{i,t}$ firm i's profits from exporting at time t. Assuming zero entry and exit (sunk) costs and indicating with $q^*_{i,t}$ the profit maximizing level of exports, the foreign market participation problem of firm i at time t is as follows

$$\max_{y_{i,t}\in\{0,1\}} \pi_{i,t} \equiv [p_{i,t}(q^*_{i,t}, e_t, Z_{i,t}, X_t)q^*_{i,t} - c_{i,t}(e_t, X_t, Z_{i,t} \mid q^*_{i,t})]y_{i,t} \quad (1)$$

where $p_{i,t}$ is the price of firm i's output on foreign markets in domestic currency, which is likely to depend on the quantity $q^*_{i,t}$, on the exchange rate e_t, on various firm characteristics (that in turn affect the quality of the product, the efficacy of distribution and marketing policies, etc.) summarized by the vector $Z_{i,t}$ and, finally, on aggregate (besides exchange rate) factors X_t. Reasonably, the same variables influence also the cost $c_{i,t}$. The optimal strategy $y^*_{i,t}$ is easily derived:

$$y^*_{i,t} = \begin{cases} 1 & if \quad \pi_{i,t} \geq 0 \\ 0 & if \quad \pi_{i,t} < 0 \end{cases} \quad (2)$$

In a multiperiod context, the problem generalizes to

$$\max_{\{y_{i,\tau}\}_{\tau-t}^{\infty}} \Pi_{i,t} = E_t(\Sigma_{\tau=t}^{\infty} \delta^{\tau-t}\pi_{i,t}) \quad (3)$$

where δ is the one-period discount factor. If in a given period revenues and costs do not depend on past choices, then firm is called to maximize a sequence of static problems as in (1) and the solution will be again (2).

One interesting case in which this condition of "intertemporal independence" does not hold is when firms must pay entry (and exit) costs

[9] Also Bernard and Wagner (1997), Bernard and Jensen (2001) and Campa (2000) use this model.

that are partially sunk. In this case, firm's participation problem differs if the firm has paid such costs in the past or not. As a result, before entering a firm must take into account foreign market's future conditions; an exiting firm must instead consider that its current decision will heavily affect future profits by imposing to pay the sunk costs again in case of reentry in foreign markets. When we explicitly include these costs, per period profits from exporting become

$$\tilde{\pi}_{i,t}(y_{i,t-1}) = y_{i,t}[\pi_{i,t} - (1 - y_{i,t-1})K] - (1 - y_{i,t})y_{i,t-1}F \qquad (4)$$

where $y_{i,t-1}$ defines firm *i*'s state (exporter vs non exporter) at the beginning of period *t*, $\pi_{i,t}$ are now gross (of sunk costs) profits from exporting, *K* is the level of sunk entry costs and *F* is the one of sunk exit costs. The Bellman equation for this problem is easily derived

$$V_{i,t}(y_{i,t-1}) = \max_{y_{i,t} \in \{0,1\}} \tilde{\pi}_{i,t}(y_{i,t-1}) + \delta E_t(V_{i,t+1}(y_{i,t})) \qquad (5)$$

The resulting optimal strategy is now equal to

$$y^*_{i,t} = \begin{Bmatrix} 1 \;\; if \;\; \pi_{i,t} + \delta E_t(V_{i,t+1}(1)) - (1 - y_{i,t-1})K \geq 0 + \delta E_t(V_{i,t+1}(0)) - y_{i,t-1}F \\ 0 \;\; if \;\; \pi_{i,t} + \delta E_t(V_{i,t+1}(1)) - (1 - y_{i,t-1})K < 0 + \delta E_t(V_{i,t+1}(0)) - y_{i,t-1}F \end{Bmatrix}$$

that can be written as

$$y^*_{i,t} = \begin{Bmatrix} 1 \;\; if \;\; \pi_{i,t} + \delta A - K + (K + F)y_{i,t-1} \geq 0 \\ 0 \;\; if \;\; \pi_{i,t} + \delta A - K + (K + F)y_{i,t-1} < 0 \end{Bmatrix} \qquad (6)$$

where $A = [E_t(V_{i,t+1}(y_{i,t} = 1)) - E_t(V_{i,t+1}(y_{i,t} = 0))]$. The structural estimation of this equation would require to choose a specific functional form for the profit function and a particular process for the exchange rate and the other exogenous aggregate variable. We choose instead the following reduced-form specification

$$y_{i,t} = \alpha_0 + \alpha_1 y_{i,t-1} + \beta e_t + \gamma X_t + \theta Z_{i,t} + \varepsilon_{i,t} \qquad (7)$$

A positive α_1 would prove the existence of sunk costs. Moreover, since α_1 proxies for $(K+F)$, it measures the width of the inaction band

within which firms neither enter nor abandon foreign markets[10] It is worth mentioning that we capture sunk costs through persistence in firm's behavior; the idea is that in presence of sunk costs firms with past experience in foreign markets are more likely to be exporters today than those without that experience. Importantly, the importance of sunk costs for a given firm has to be evaluated relatively to that firm's sales.

The model as specified above and, consequently, equation 7 embed some strong simplifications. First of all, *K* and *F* do not vary across firms. This is highly implausible: the level of sunk costs must differ according to the type of product - that may require different marketing strategies and distribution policies - and to various firm characteristics - size, management ability, location, relative importance of exports in terms of total sales. We will relax this assumption in the empirical analysis[11].

Secondly, equation 4 presumes that sunk entry costs must be paid again by all non-exporting firms independently of their experience before *t-1*; in other words, the model above implies that all the factors imposing sunk costs that depreciate completely after one period. More reasonably, instead, these factors depreciates more slowly, specially if they relate to some learning activity[12]. We modify equation 4 following Roberts and Tybout (1997), that is identifying with *K* the sunk entry cost that must be paid by those firms which never exported or did it only a long time ago. For the other firms, we introduce a sunk cost K^j where $j>1$ indicates the number of years in which the firm has been out of the export market. Analytically, we write:

$$\tilde{\pi}_{i,t}(y_{i,t-1}) = y_{i,t}[\pi_{i,t} - (1-y_{i,t-1})K - \sum_{j=2}^{J}(K^j - K)Y_{i,t-j}] - (1-y_{i,t})y_{i,t-1}F \quad (8)$$

[10] In a diagram with export market profitability on the vertical axis and time on the horizontal one, the upper band, above which firms enter the foreign market, is increasing in *K*; the lower band, below which incumbent firms abandon the market, is decreasing in *F*.

[11] Sunk costs should differ also according to the foreign market, for example large vs small or developed vs developing. Unfortunately, our dataset does not contain information on the destination of exports.

[12] For example, the information collected in year *t* through market researches is probably very useful also some years later.

where $Y_{i,t-j} = y_{i,t-j} * \prod_{k=1}^{j-1}(1-y_{i,t-k})$ is equal to 1 when a firm exported at *t-j*, exited at *t-j+1* and did not reenter afterward[13]: in such a case, $(K^j\text{-}K)$ goes to add to K leaving a re-entry cost equal to K^j. In line with a positive depreciation rate, we would expect $K^2 \leq K^3 \leq ... \leq K^n \leq ... \leq K$. The equation we are going to estimate in this case is then the following:

$$y_{i,t} = \alpha_0 + \alpha_1 y_{i,t-1} + \alpha_2 Y_{i,t-2} + ...\alpha_j Y_{i,t-j} + \beta e_t + \gamma X_t + \theta Z_{i,t} + \varepsilon_{i,t} \quad (9)$$

Finally, we extend Roberts and Tybout (1997) by allowing entrant firms to pay sunk costs over a sequence of periods instead of only in the entry period. We identify with M^j the sunk cost paid at time t by a firm which entered j years before (after at least n periods out of foreign markets) and did not exit afterwards. The correspondent indicator function is as follows:

$$S_{i,t-j} = \prod_{p=1}^{j} y_{i,t-p} * \prod_{k=j+1}^{j+n}(1-y_{i,t-k}), \text{ so that}$$

$$\tilde{\pi}_{i,t}(y_{i,t-1}) = y_{i,t}[\pi_{i,t} - (1-y_{i,t-1})K - \sum_{j=2}^{J}(K^j - K)Y_{i,t-j} - \sum_{j=2}^{J} M^j S_{i,t-j}] - (1-y_{i,t})y_{i,t-1}F \quad (10)$$

The equation to be estimated becomes:

$$y_{i,t} = \alpha_0 + \alpha_1 y_{i,t-1} + \alpha_2 Y_{i,t-2} + ...\alpha_j Y_{i,t-j} - a_1 S_{i,t-1} - a_2 S_{i,t-2} - ...a_j S_{i,t-j} + \beta e_t + \gamma X_t + \theta Z_{i,t} + \varepsilon_{i,t} \quad (11)$$

Our strategy is first to shed some light on sunk costs for the aggregate by estimating equation 7. Then we analyze their temporal structure through equations 9 and 11; finally, we go back to equation 7 and let sunk costs vary with firm characteristics. Before doing that, we dwell upon the estimation strategy

4. The estimation strategy and the regressors

The choice of how to estimate dynamic models of this kind is not an easy one. We have decided to estimate the equations above with a random

[13] Obviously, $Y_{i,t-j}$ is equal to zero in all the other cases.

effect linear probability model, without devoting too much time to the specification search process. In this section, we briefly discuss some of issues to be taken into account and we give some anticipations on the preliminary results we have obtained (but we do not report) with a different strategy.

A first important issue relates to the well known omitted variable bias caused by unobserved firm characteristics; this is a particularly serious problem for us since invariant firm characteristics naturally induce persistence, which is what we would like instead to interpret as proxy for sunk costs. In other words, omitting some of these variables may very likely bring in the so called "spurious state dependence" problem (Heckman, 1981a), that in our case means wrongly concluding in favor of sunk costs. To cope with this, we observe that the consequence of omitting variables is to induce serial correlation in the error term $\varepsilon_{i,t}$: it is ignoring such a correlation that we may overestimate sunk costs. We follow Bernard and Jensen (2001) and Campa (2000) and assume the error term has a permanent plant specific component, $\varepsilon_{i,t}$, called to control for unobserved firm characteristics[14]: $\varepsilon_{i,t} = \xi_i + \omega_{i,t}$ with $\omega_{i,t}$ independently and identically distributed. Roberts and Tybout (1997) go further and assume that $\omega_{i,t}$ has a first-order autoregressive structure, $\omega_{i,t} = \rho\omega_{i,t-1} + \eta_{i,t}$, which aims to account for transitory shocks.

Alike Roberts and Tybout (1997) and Campa (2000), we assume the permanent plant specific effect ξ_i to be randomly distributed across sampled firms (random effects) and hope to limit the inconsistency problem of random effects estimates by explicitly controlling for quite a rich set of firm characteristics. It must be also said that, contrary to us, these authors estimate a Probit model. Bernard and Wagner (1998) and Bernard and Jensen (2001) choose instead to perform a robustness exercise estimating the linear probability model without any individual effect, then in levels with fixed effects, finally in differences[15].

Finally, some attention deserves the presence of dependent variable lags. The problem here is that these can not be treated as exogenous since they depend on ξ_i. Heckman (1981b) suggest to deal with this "initial conditions" problem estimating a presample model where only exogenous regressors are included and disturbances are allowed to be correlated with

[14] This term is meant to capture also permanent idiosyncratic shocks.

[15] They also estimate a Probit model both with and without individual (random) effects.

those of later periods. This has been implemented by Roberts and Tybout (1997) and Campa (2000). For the time being, we do not do that and make the assumption the dependent variable lags are predetermined. To avoid similar problems on the other regressors, we also use $Z_{i,t-1}$ in place of $Z_{i,t}$.

It must be said that we feel sufficiently confident about our results. From preliminary estimates of a dynamic Probit with a AR(1) structure in the error term, all our results do not significantly change neither qualitatively nor, to a lesser extent, quantitatively. It remains to investigate the impact of the presample model estimation.

Let us now focus on the regressors we are going to use. We include two time-varying (but identical across firms) variables: the nominal effective exchange rate of the lira and the index of world volume exports. This is somewhat more informative than including simple yearly dummies, as Roberts and Tybout (1997), Bernard and Wagner (1998) and Bernard and Jensen (2001) do, in that it allows to explicitly assess the role of the two most important macroeconomic factors affecting exporting activity. Campa (2000), that includes the exchange rate, do not control for foreign demand.

We then introduce a wide set of firm specific variables. Sector and location are represented by dummy variables: the sectoral dummies follow the two digits of the Nace Rev. 1 classification, the location ones distinguish between North West, North East, Center and South. Other variables aims to capture those factors influencing firms' competitiveness on foreign markets. To identify them, we refer to the wide empirical literature on firms and exports.

First of all, a series of papers on productivity and exports conclude that more productive firms are more likely to sell their products in foreign markets. Bernard and Wagner (1997) show that high productivity and large German firms are more likely to become exporters but do not outperform after entry. For some developing countries, Clerides et al. (1998) find that low cost firms are more likely to enter foreign markets. Ferragina and Quintieri (2001) conclude that Italian exporters are ex ante larger, more human capital intensive, technologically more advanced, more productive and with lower labor unit costs. According to Basile (2001), in Italy propensity to export is larger in more innovative firms.

We try to control for these effects through an explicit measure of labor productivity (*ywork* is value added per worker at 1995 constant

prices), of the average unit wage (*wage* is the ratio between total labor costs, at 1995 constant prices, and the number of employees) and of R&D propensity (*R&D* is the incidence of research and development expenses on sales). With the variable *Market*, given by the ratio of marketing, distribution and advertising expenses over sales, we aims to measure the degree of firm (or better, product) visibility and the quality of customer services. We also control for firm size (*lsize* is the logarithm of the number of employees). Krugman (1984) argues that firms may decide to export part of their production in order to exploit scale economies[16]. Moreover, as shown by Bernard and Jensen (1998) on US data, exporters have ex ante faster sales and employment growth than non-exporters: thus size can be a further proxy for firm efficiency. Also firm age (*lage* is the logarithm of the age of the firm[17]) is often interpreted as a proxy for firm efficiency[18].

Finally, we control for the percentage of sales that a firm make on foreign markets (*xsales* is exported over total sales). Intuitively, the higher is this percentage, the more likely is that a firm will not abandon foreign markets, independently of sunk costs to exports. We believe that this persistence has more to do with the sunk costs implied by the establishment of the firm as itself so that leaving foreign markets is somehow equivalent to an economic failure or to a significant (and costly) reorganization of activity (presumably, through a reduction of employment and other inputs). Therefore we want to control for this in order to gauge the importance of the sole sunk costs to exports.

5. The results

In Table 6 we report the result from the estimation of equation 7. In column [1], the dependent variable is regressed only on its one-period lag, the nominal effective exchange rate and world exports. The coefficient of y_{t-1} is strongly significant and positive (0.643) in line with the hypothesis of sunk costs to foreign markets. The exchange rate and the world demand

[16] As argued by Basevi (1970), it might be that a firm sells abroad even at a price lower than the average total cost just to exploit the overall cost reduction deriving from the expansion of production.

[17] Unfortunately, we can control for rejuvenations resulting from mergers.

[18] Tybout (1996) for Chile and Roberts (1996) for Colombia find that the probability of failure declines with plant's age. According to Liu and Tybout (1996), Colombian failing firms are always less productive than surviving ones. For the US, the same patterns are found by Dunne et al. (1989). In other words, the idea is that market forces select out inefficient producers so that older firms are more efficient and therefore more competitive in world markets.

have the expected sign: a depreciation of the lira, which is represented by a reduction of the index, increases the probability of exporting; this probability is instead positively correlated with the level of demand.

In the second, third and fourth columns of the Table, we add firm specific variables step by step. First (column [2]), we control for size, age, sector and location. The results are not surprising: controlling explicitly for firm characteristics inducing themselves persistence, the coefficient of sunk costs drops by 5.7 per cent to 0.606 and, more importantly, it remains strongly significant. While firm size has the expected positive[19], firm age is quite puzzling: younger firms are more likely to export[20].

Then we add another wide set of variables (column [3]) with the aim of capturing firm differences in terms of productivity, labor and product quality: *ywork*, *wage*, *R&D*, *Market*. With the exception of *R&D*, all these new variables are significantly different from zero. Not surprisingly, more productive firms are more likely present in foreign markets; the same is true for firms investing more resources in marketing activities. Wage is negatively correlated with the propensity to export signalling the positive effect on price competitiveness. The coefficients of the other variables do not show relevant changes.

In column [4], we include also the percentage of sales that each firm make on foreign markets: its coefficient is significantly positive and contributes to reducing that of y_{t-1} to 0.558. Therefore we conclude that prior export experience increases the probability of exporting by a bit less than 60 percentage points: this is incredibly similar to what found by Roberts and Tybout (1997) and Bernard and Wagner (1998). Looking at the sector and location dummies, some results deserves comments. Firms located in the North-West of the country have the highest propensity to export, while northeastern ones and, to a smaller extent, those in the Center record a slight delay. Southern firms lag significantly behind: besides larger transport costs to reach important markets (e.g., EU), these firms are probably paying for a smaller degree of industrialization and a lower quality of infrastructures.

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[19] Sterlacchini (2000) argues that the positive relationship between firm size and export propensity is positive only for small firms. This is an issue we do not investigate.

[20] Bugamelli, Cipollone and Infante (2000) find weak evidence in favor of a U-shaped relationship between age and propensity to export, signalling that some new firms have been established with a strong foreign market participation. We must admit that our results might be also driven by apparently new firms, i.e. those resulting from mergers.

To account for the possibility that the relationship between the probability to exports and the regressors is somehow not linear, we also estimate a Probit model (column [5]). For the last richest version of the model, the results are qualitatively unchanged; the marginal effect of y_{t-1} is slightly smaller than 0.558.

5.1 The temporal structure of sunk costs

A characteristic of sunk costs to exports which is key to assess the impact of a domestic currency devaluation over aggregate trade is their temporal structure. With this, we mean mainly two things. On one side, we are interested to understand how fast the factors (for example, knowledge, experience, reputation) for which firms pay sunk costs depreciate. Intuitively, the smaller is this depreciation rate, the longer lasting is the effect of a big shock on aggregate trade. On the other side, we want to understand how firms pay these costs upon entry; reasonably, a firm is not forced to pay all of them upon entry but it may distribute them over some periods. Our goal is therefore to investigate on the length of this time.

Depreciation is detected through the estimation of equation 9 where we add dummy variables to capture the number of years a firm has been out of foreign markets. The interpretation of the coefficients is identical to the one of y_{t-1}: a positive and significant coefficients for Y_{t-j} says that a firm that exported last time j years ago is more persistent than a firm that never exported or did it more than j years ago. This is to say that in case of reentry this firms is called to pay a lower amount of sunk costs (always relatively to sales). Moreover, we expect the coefficient of Y_{t-j} to be decreasing in j as a signal that sunk costs depreciate, notwithstanding.

The results are reported in Table 7. In column [1], we add just one more lag. The coefficient of Y_{t-2} is significant, positive and (significantly) smaller than the one of y_{t-1} (0.226 against 0.591 with an identical standard error). When we also include Y_{t-3} (column [2]), we find a further confirmation that depreciation is at work (the coefficient is now 0.136) but still sunk costs are not fully depreciated. We do not report it here, but we have found that these coefficients reduce monotonically up to Y_{t-6} whose coefficient is basically nil.

We then tackle the problem of how sunk costs are distributed over firm's export experience. In column [3], we estimate equation 11 and include one lag that aims to single out of the mass of firms exporting at *t-1*

those that did not export between[21] *t-6* and *t-2*. As expected, a firm with little exporting experience is less persistent than the others, confirming that it has probably paid only a fraction of total entry costs. However, as column [4] shows, these costs must be fully paid quite soon: while the coefficient of S_{t-2} is still significant, negative (and smaller, in absolute value, than S_{t-1}), that of S_{t-3} is instead not significantly different from zero. This is to say that sunk costs are basically paid in the first two years of presence abroad with a larger amount in the entry year.

5.2 Interactions

We then approach a different issue. So far we have imposed a unique sunk costs coefficient to all firms, which is admittedly a quite strong assumption. Now we relax it along three dimensions. The first one has been raised by Caves (1989): do sunk costs impact specially on smaller firms? As pointed out by this author, if sunk costs relate to information acquisition, organization matters and similar things, they should come in an almost fixed amount. As a result, their incidence, for example on sales, reduces with firm size[22]. An alternative hypothesis is proposed by Tybout (2001) that argues that what matters is not firm size but size of exports; the idea is that firms value the level of sunk costs to exports in terms of the amount of sales they contribute to generate in foreign markets.

To test the hypothesis on firm size, we start from the specification given in column [4] of Table 6 and add the interaction between size and y_{t-1} (Table 8, column [1]); more precisely, we multiply y_{t-1} by the deviation of firm size from the sample mean on a yearly basis. Compared to Table 6, we see that while the estimated coefficient for y_{t-1} is unchanged, the interaction is instead negative and strongly significant. This is saying that larger firms exhibit a lower degree of persistence: they can more easily adjust to fluctuations in export markets profitability through entry and exit. In column [2] we focus on the role of export size and find again a negative coefficient supporting Tybout's view. However, when we include both interactions together (column[3]), we see that what matters is only firm size.

A natural question that arises when thinking of sunk costs to exports is about their nature. It is commonly accepted that they relate to the

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[21] The choice of *t-6* is purely casual. We have simply chosen a date sufficiently (but not too much) far from the last relevant date as it comes out from our estimates of Y_{t-j}.

[22] More likely, we believe sunk costs are an increasing but concave function of firm size.

acquisition of information on market demand and institutional aspects, to the merchandising of the product, to the establishment of a distribution network. In Table 9 we show other interactions aiming to shed some light on these issues, in particular on the informational and product components of sunk costs. The analysis we show is preliminary and far from being conclusive.

A way to detect the importance of information is to distinguish firms according to their ease to collect it. We would conclude that information is an important component of sunk costs to exports if firms with a cheaper access to information has a smaller inaction band (i.e., a lower coefficient of y_{t-1})[23]. One way to get easy and cheap access to useful information is to be exposed to information spillovers. Two are the necessary conditions for a firm to learn from others' actions: a) sharing an analogous decision problem (similarity); b) easily and readily observing such actions. Following Guiso and Schivardi (2000), the Italian industrial districts[24] are an useful laboratory to detect the relevance of information spillovers: they satisfy by construction condition a), while the requirement of firms' physical proximity can satisfactorily proxy condition b). We construct a dummy variable (*distr*) to distinguish firms according to their location, in or out an industrial district[25]. The results are reported in Table 9. In column [1], we include *distr* both in level and interacted with y_{t-1}. While "distrectual" firms are more likely to become exporters[26], they do not seem to face lower sunk costs to exports. However, since firms in industrial districts are, by construction, smaller than average, it might be that $distr*y_{t-1}$ captures the negative effect of size on sunk costs. In column [2], we add the interaction between y_{t-1} and size with the effect of slightly raising the negative coefficient of $distr*y_{t-1}$ reducing its *P-value* (from 0.551 to 0.251). We interpret this as a weak signal that our hypothesis might be correct.

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[23] If instead the coefficient would be the same, we should conclude that either information is not important for sunk costs or our criterion for sample splitting does not work out (the technology for collecting information, that hides behind our criterion, is ineffective).

[24] According to Istat, a district is identified as a local labor system, which is a territorial grouping of municipalities characterized by a certain degree of commuting by the resident population, with a high concentration of small and medium size firms belonging to the same two-digit sector.

[25] To this end, we merge our dataset with the Industrial District Database constructed by the Italian National Statistical Institute (Istat).

[26] Given that we control for sectoral dummies, this result should not be driven by the fact that industrial districts are specialized in products where Italy has a strong comparative advantage (textile, apparel, leather, etc.).

Another way to check this hypothesis is to subdivide firms in terms of their endowment of information and communication technologies (ICT); the idea is that firms with a larger endowment are on average more able to collect and process information of any kind. Thus these firms should be in the position to save on sunk informational costs to exports. Again we construct a dummy variable that takes on value 1 if a firm belongs to an ICT intensive sector[27]. The result (column [3]), supports the hypothesis: the coefficient of $ICT^{*}y_{t-1}$ is negative and strongly significant (*t-statistics* -12.16).

Besides other things, the costs of marketing and promoting a product varies with the characteristics of the product itself. We focus in particular on the product quality that we use following the same strategy: if products of different qualities impose different marketing and promotion strategies, then the split of firms according to product quality gives indications on the relevance of marketing and promotion expenses. Contrary to information, we are now agnostic with respect to the result. We figure that better quality products will be associated with a more expensive marketing campaign, but from our perspective what matters is if these costs increase proportionally more or less than the increase in sales that, *ceteris paribus*, a better quality product should also guarantee.

The first thing we do is to distinguish sectors according to the comparative advantages that Italy holds on international markets. These advantages might be due either to a better quality or to a lower price; however, following de Nardis and Traù (1999), we are confident that quality matters relatively more, specially for the goods produced by the traditional sectors. Interacting a comparative advantage sectoral dummy variable[28] (*VCOMP*) with y_{t-1}, we find that these sectors indeed pay lower sunk costs. It is worth noticing that this result is derived keeping the interaction of y_{t-1} with size.

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[27] Using the indications provided by Bugamelli and Pagano (2001), we identifiy as ICT intensive sectors - measured by the ratio between ICT capital stock and value added in 1997 - the following ones: printing and publishing, rubber and plastics products, fabricated metal products, industrial and commercial machinery, computer and office equipment, measuring and controlling instruments, motor vehicles and other transportation equipment.

[28] The criterion used here to identify sectors with comparative advantage is a bit improper; we have in fact used world market shares at sectoral level in 1999-2000 (see Annuario Ice - Istat (2001). Our dummy variables takes on a value equal to 1 for the following sectors: food, beverages and tobacco, textile, apparel and related products, leather and leather products, printing and publishing, rubber and plastics products, stone, clay and glass, industrial and commercial machinery, furniture, fixture and other miscellaneous manufacturing.

In column [5], we tackle this issue from a different and firm-level perspective. We look more directly at the role of product innovation by interacting y_{t-1} with R&D intensity. It turns out that firms investing proportionally more resources in research and development activities pay lower sunk costs. Interestingly, this interaction helps also the coefficient of the level $R\&D_{t-1}$ which jumps to 0.466 and become significant (*t-statistics* 1.87).

6. Concluding remarks

Due to the large fluctuations of the lira exchange rate, many Italian manufacturing firms have entered foreign markets during the nineties. Their contribution to aggregate exports has turned out to be significant. If entry requires paying costs that are partially sunk, these flows have permanently changed the aggregate export supply function.

In this paper we study the export participation decision of Italian manufacturing firms in order to assess the importance of sunk costs to exports. We find that they are significant: prior export experience increases the probability of exporting by 55 percentage points. Moreover, these costs seem to be an impediment in particular for small firms. This raises two considerations. On one side, the strong lira devaluations have offered small firms an extraordinary opportunity to enter foreign markets; moreover, due to the inertia induced by sunk costs, these firms are not likely to exit in the near future. On the other side, though, a very large number of small firms is still producing only for the domestic market (according to Istat, in 1998 more than 90 per cent of firms with less than 50 employees had zero exports); given the large share of these firms in the Italian manufacturing industry, sunk costs to export remain a very important factor to be considered by export promoting policies.

Table 1

Descriptive statistics: sample size

	1982	1983	1984	1985	1986	1987
number of firms in the sample	9,426	10,291	12,154	13,408	14,688	15,265
value added (% of total manuf.)	21.4	22.1	23.4	24.6	26.0	26.5
employees (% of total manuf.)	21.2	21.8	23.3	24.3	25.2	25.7
value of exports (% of total manuf.)	14.0	13.5	19.0	20.1	21.4	21.5
	1988	1989	1990	1991	1992	1993
number of firms in the sample	16,182	18,027	18,710	18,619	18,760	18,428
value added (% of total manuf.)	26.7	27.6	28.7	29.3	29.4	29.8
employees (% of total manuf.)	26.7	28.1	28.8	28.4	27.5	27.2
value of exports (% of total manuf.)	21.5	23.3	24.2	24.3	20.3	18.6
	1994	1995	1996	1997	1998	1999
number of firms in the sample	18,162	11,914	11,803	11,547	11,151	10,620
value added (% of total manuf.)	29.2	25.6	25.5	24.8	23.5	22.5
employees (% of total manuf.)	27.0	23.6	24.1	23.4	22.7	21.7
value of exports (% of total manuf.)	23.4	24.3	26.5	26.5	26.1	24.9

Table 2

Descriptive statistics: sample means

	1985		1990		1995	
	full sample	only export	full sample	only export	full sample	only export
sales (mil. of 1995 liras)	10,380	12,168	10,193	12,379	15,570	18,695
value added (mil. of 1995 liras)	2,968	3,557	2,743	3,347	4,163	5,072
employees (sample mean)	82	101	71	88	87	104
employees (sample median)	43	55	37	50	58	71
capital stock/value added	1.43	1.25	1.59	1.42	1.66	1.53
firm age	16	16	18	18	21	22
average unit wage (mil. of 1995 liras)	21.4	21.4	23.6	23.9	27.8	28.2
R&D expenses (% of sales)	0.03	0.04	0.04	0.05	0.01	0.01
Marketing expenses (% of sales)	3.1	3.5	3.5	4.0	0.7	1.0

Table 3

Descriptive statistics: distribution of sample by sector and location

	1985		1990		1995	
	full sample	only export	full sample	only export	full sample	only export
Food, beverages and tobacco	8.7	5.5	8.4	5.1	10.2	6.3
Textile	10.3	12.0	9.5	11.3	10.9	12.2
Apparel and related products	4.0	5.0	4.0	5.0	3.8	4.3
Leather and leather products	4.4	6.8	4.7	7.1	5.2	5.6
Lumber and wood products	2.4	1.2	2.4	1.4	2.0	1.6
Paper and allied products	2.9	1.9	2.7	2.1	2.9	2.2
Printing and publishing	2.4	1.0	2.9	1.2	2.3	1.3
Petroleum refining and related ind.	0.2	0.1	0.2	0.0	0.2	0.2
Chemicals and allied products	6.1	5.2	5.5	4.7	5.5	5.5
Rubber and plastic products	5.8	6.1	5.9	5.8	6.1	6.3
Stone, clay, glass	7.8	5.7	7.3	5.7	6.3	4.8
Primary metal products	4.3	3.4	3.9	3.1	3.9	3.7
Fabricated metal products	10.3	9.2	10.7	9.6	10.0	10.0
Industrial and commercial machinery	14.3	19.6	14.7	19.8	14.3	18.1
Computer and office equipment	0.3	0.2	0.4	0.3	0.2	0.2
Electrical equipment	4.0	4.0	4.4	4.3	4.3	4.3
Audio, video and comm. equipm.	1.9	1.9	2.1	1.9	1.7	1.7
Measuring and controlling instrum.	1.7	2.1	1.6	2.2	2.1	2.0
Motor vehicles	1.7	2.1	1.6	1.6	2.1	2.4
Other transportation equipment	1.1	1.0	1.0	1.0	0.9	0.7
Furniture, fixture and miscell. manuf.	5.3	6.0	5.8	6.8	5.7	6.7
Total	100	100	100	100	100	100
North West	45.6	49.8	44.4	47.4	44.1	48.4
North East	28.5	28.9	28.6	30.1	30.8	33.5
Center	17.2	18.2	18.0	18.3	17.0	14.1
South	8.7	3.1	9.0	4.2	8.1	4.0
Total	100	100	100	100	100	100

Table 4

Descriptive statistics: propensity to export by sector and size

	1985			1990			1995		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Food, beverages and tobacco	20.6	35.1	37.8	20.3	31.6	28.2	25.8	42.7	50.0
Textile	45.6	47.9	65.8	42.8	48.0	66.2	54.3	58.7	84.9
Apparel and related products	47.9	54.8	58.1	44.3	51.0	74.4	48.5	63.9	75.0
Leather and leather products	58.2	68.1	83.3	52.4	68.8	70.0	45.2	67.0	90.9
Lumber and wood products	13.3	34.5	25.0	16.8	37.2	33.3	31.6	53.0	75.0
Paper and allied products	19.1	34.7	61.5	21.1	40.0	73.3	26.9	50.9	100.0
Printing and publishing	9.7	22.7	27.8	10.6	24.6	30.0	15.9	37.8	50.0
Petroleum refining and related ind.	5.9	37.5	25.0	5.3	11.1	0.0	31.8	62.5	-
Chemicals and allied products	26.6	41.6	52.8	26.6	42.0	44.4	39.7	62.3	65.0
Rubber and plastic products	34.9	54.3	59.3	29.7	51.6	53.1	40.4	62.5	100.0
Stone, clay, glass	25.3	37.0	41.5	23.7	43.5	31.9	28.6	47.4	62.2
Primary metal products	23.2	42.4	57.1	20.6	41.1	48.1	36.1	60.2	70.0
Fabricated metal products	28.4	45.5	66.7	27.0	46.5	64.3	43.2	55.7	87.5
Industrial and commercial machinery	50.0	62.8	61.3	45.9	59.4	67.7	54.8	70.4	84.9
Computer and office equipment	13.3	40.0	75.0	20.5	34.8	80.0	38.5	50.0	100.0
Electrical equipment	34.3	46.3	52.3	31.0	44.9	36.5	37.9	61.3	68.0
Audio, video and comm. equipm.	37.4	44.9	59.1	26.4	47.3	45.8	25.4	64.5	47.4
Measuring and controlling instrum.	49.5	53.6	684	41.7	53.7	66.7	40.9	57.8	83.3
Motor vehicles	39.0	53.0	67.6	32.6	39.9	58.8	51.6	56.9	76.0
Other transportation equipment	33.8	46.6	27.6	33.7	43.1	40.6	33.3	43.5	54.5
Furniture, fixture and miscell. manuf.	39.6	53.0	83.3	38.7	55.7	68.8	50.2	68.2	90.5
Total	34.2	48.4	56.1	32.2	47.9	53.6	40.6	59.2	76.9

Notes: (a) identifies firms with size (number of employees) smaller than 50; (b) with size between 51 and 300; (c) with size bigger than 301.

Table 5

Entry, exit and persistence

t	t+1	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90	90-91
No	No	90.2	78.7	86.0	86.8	86.0	87.8	82.1	86.8	89.2
	Yes	9.7	21.3	14.0	14.2	14.0	12.2	17.9	13.2	10.8
Yes	No	25.1	15.5	17.8	21.8	19.8	23.9	23.0	19.6	19.7
	Yes	74.9	84.5	82.2	78.2	80.2	76.1	77.0	80.4	80.3
NEER	% change	-3.2	-5.1	-51	3.2	0.5	-3.4	0.5	2.7	-1.7
W-trade	% change	2.5	8.3	3.4	4.3	6.3	8.9	7.0	5.6	4.6
Entrants	% di X at t	13.6	28.7	13.4	14.6	13.0	13.6	21.6	13.6	12.2
Exitants	% di X at t-1	21.5	10.6	13.2	16.7	14.6	18.8	15.7	12.9	12.8
t	t+1	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	
No	No	90.2	82.8	80.7	74.8	77.7	82.0	84.1	87.2	
	Yes	9.8	17.2	19.3	25.2	22.3	18.0	15.9	12.8	
Yes	No	30.0	45.4	27.8	11.5	10.3	8.7	6.2	9.0	
	Yes	70.0	54.6	72.2	88.5	89.7	91.3	93.8	91.0	
NEER	% change	-2.9	-16.7	-4.4	-9.0	9.4	0.1	0.8	-2.7	
W-Trade	% change	4.4	3.8	10.0	10.0	6.2	10.4	4.6	5.6	
Entrants	% di X at t	11.6	31.7	33.8	19.7	11.8	8.5	5.9	4.9	
Exitants	% di X at t-1	24.6	31.2	15.9	5.4	5.9	4.8	3.1	5.5	

Notes: YES and NO refer, respectively, to be or not to be an exporter: the sequence NO-YES identifies the fraction of entering firms, YES-NO identifies the fraction of exiting firms: all rates (entry, exit, stay in and stay out) are computed only over the set of firms that are present in both years under consideration; NEER is the nominal effective exchange rate: a negative sign of the yearly variation stands for a depreciation; W- Trade is and index of world export volumes; X is the total value of exports in the sample.

Table 6

Base regression (estimates of equation 7 for the period 1983-1999)

	Linear Probability Model				Probit
	(1)	(2)	(3)	(4)	(5)
y_{t-1}	0.643	0.606	0.605	0.558	1.321
	(0.002)	(0.002)	(0.002)	(0.002)	(0.011)
$NEER_t$	-0.073	-0.059	-0.066	-0.065	-0.030
	(0.010)	(0.010)	(0.010)	(0.010)	(0.045)
$W\text{-}Trade_t$	0.075	0.079	0.081	0.075	0.539
	(0.006)	(0.006)	(0.006)	(0.006)	(0.255)
$lsize_{t-1}$		0.043	0.044	0.043	0.231
		(0.001)	(0.001)	(0.001)	(0.005)
$lage_t$		-0.010	-0.009	-0.007	-0.056
		(0.001)	(0.001)	(0.001)	(0.007)
$ywork_{t-1}$			0.326	0.313	1.273
			(0.033)	(0.033)	(0.160)
$wage_{t-1}$			-0.748	-0.714	-3.197
			(0.097)	(0.096)	(0.475)
$R\&D_{t-1}$			0.065	0.046	0.261
			(0.192)	(0.192)	(0.856)
$Market_{t-1}$			0.117	0.117	0.350
			(0.013)	(0.013)	(0.056)
xsales				0.131	0.467
				(0.004)	(0.021)
I sector (Prob >χ^2)		0.000	0.000	0.000	0.000
I area (Prob >χ^2)		0.000	0.000	0.000	0.000
N. obs.	233,034	233,034	232,892	232,892	232,892
R^2 overall	0.423	0.436	0.437	0.439	-
Prob >χ^2		0.000	0.000	0.000	0.000

Notes: Linear probability (LP) and Probit estimates; standard errors in parenthesis. The dependent variable is the current status (exporters vs non exporter); y_{t-1} is the status at t-1; $NEER_t$ is and index for the nominal effective exchange rate of the lira (1993=100); *W-Trade* is an index for world export volumes (1993=100); $lsize_{t-1}$ is the logarithm of the number of employees; *lage* is the logarithm of firm age; $ywork_{t-1}$ is (deflated) value added per employee; $wage_{t-1}$ is (deflated) average unit wage; $R\&D_{t-1}$ is the ratio between R&D expenses and sales; $Market_{t-1}$ is the ratio between marketing/advertising expenses and sales; *xsales* is the ratio between exported and total sales.

Table 7

Temporal structure of sunk costs (estimates of equations 9 and 11)

	(1)	(2)	(3)	(4)
y_{t-1}	0.591	0.611	0.584	0.640
	(0.002)	(0.003)	(0.003)	(0.003)
Y_{t-2}	0.226	0.239		0.239
	(0.003)	(0.003)		(0.004)
Y_{t-3}		0.136		0.140
		(0.004)		(0.005)
S_{t-1}			-0.145	-0.149
			(0.005)	(0.005)
S_{t-2}				-0.022
				(0.006)
S_{t-3}				-0.000
				(0.005)
$NEER_t$	-0.037	-0.021	-0.075	-0.025
	(0.011)	(0.011)	(0.013)	(0.012)
$W\text{-}Trade_t$	0.083	0.109	0.109	0.135
	(0.006)	(0.006)	(0.007)	(0.007)
$lsize_{t-1}$	0.042	0.039	0.043	0.038
	(0.001)	(0.001)	(0.001)	(0.001)
$lage_t$	-0.008	-0.007	-0.006	-0.006
	(0.001)	(0.001)	(0.002)	(0.002)
$ywork_{t-1}$	0.369	0.351	0.350	0.357
	(0.035)	(0.037)	(0.045)	(0.045)
$wage_{t-1}$	-0.944	-0.914	-0.896	-0.956
	(0.103)	(0.110)	(0.133)	(0.131)
$R\&D_{t-1}$	-0.115	-0.167	-0.009	-0.150
	(0.202)	(0.226)	(0.281)	(0.276)
$Market_{t-1}$	0.160	0.151	0.197	0.161
	(0.019)	(0.020)	(0.024)	(0.023)
xsales	0.137	0.137	0.104	0.109
	(0.005)	(0.005)	(0.006)	(0.005)
I sector and area				
(Prob $>\chi^2$)	0.000	0.000	0.000	0.000
N. obs.	206,744	181,702	136,155	136,155
R^2 overall	0.453	0.462	0.453	0.471
Prob $>\chi^2$	0.000	0.000	0.000	0.000

Notes: Linear probability (LP); standard errors in parenthesis. The variables *Y* and *S* are described in the section on the theoretical model; for the other variables see the note to Table 6.

Table 8

Firm size and value of exports (estimates of equation 7 for the period 1983-99)

	(1)	(2)	(3)
y_{t-1}	0.559	0.533	0.557
	(0.002)	(0.002)	(0.002)
$dsize_{t-1} * y_{t-1}$	-0.092		-0.083
	(0.012)		(0.014)
$dX_{t-1} * y_{t-1}$		-0.010	-0.003
		(0.002)	(0.002)
$NEER_t$	-0.065	-0.064	-0.065
	(0.010)	(0.010)	(0.010)
$W\text{-}Trade_t$	0.074	0.074	0.074
	(0.006)	(0.006)	(0.006)
$lsize_{t-1}$	0.047	0.045	0.047
	(0.001)	(0.001)	(0.001)
$lage_t$	-0.007	-0.007	-0.007
	(0.001)	(0.001)	(0.001)
$ywork_{t-1}$	0.311	0.320	0.314
	(0.033)	(0.033)	(0.033)
$wage_{t-1}$	-0.704	-0.724	-0.708
	(0.096)	(0.096)	(0.096)
$R\&D_{t-1}$	0.041	0.044	0.0419
	(0.192)	(0.192)	(0.192)
$Market_{t-1}$	0.115	0.117	0.115
	(0.013)	(0.013)	(0.013)
xsales	0.131	0.143	0.135
	(0.004)	(0.005)	(0.005)
I sector (Prob $>\chi^2$)	0.000	0.000	0.000
I area (Prob $>\chi^2$)	0.000	0.000	0.000
N. obs.	232,892	232,892	232,892
R^2 overall	0.439	0.439	0.439
Prob $>\chi^2$	0.000	0.000	0.000

Notes: Linear probability (LP); standard errors in parenthesis. The variables *Y* and *S* are described in the section on the theoretical model; for the other variables see the note to Table 6.

Table 9

Interactions (estimates of equation 7 for the period 1983-1999)

	(1)	(2)	(3)	(4)	(5)
y_{t-1}	0.556	0.558	0.573	0.569	0.556
	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)
$dsize_{t-1}*y_{t-1}$		-0.098	-0.090	-0.095	-0.092
		(0.012)	(0.012)	(0.012)	(0.012)
$distr*y_{t-1}$	-0.002	-0.003			
	(0.003)	(0.003)			
$ICT*y_{t-1}$			-0.040		
			(0.003)		
$VCOMP*y_{t-1}$				-0.017	
				(0.003)	
$R\&D_{t-1}*y_{t-1}$					-0.010
					(0.004)
$NEER_t$	-0.062	-0.062	-0.064	-0.065	-0.065
	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)
$W\text{-}Trade_t$	0.072	0.071	0.074	0.074	0.074
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
$lsize_{t-1}$	0.046	0.049	0.047	0.047	0.047
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$lage_t$	-0.006	-0.007	-0.007	-0.007	-0.007
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$ywork_{t-1}$	0.624	0.623	0.315	0.310	0.311
	(0.043)	(0.043)	(0.033)	(0.033)	(0.033)
$wage_{t-1}$	-0.553	-0.540	-0.716	-0.701	-0.703
	(0.110)	(0.110)	(0.096)	(0.096)	(0.096)
$R\&D_{t-1}$	0.048	0.042	0.036	0.039	0.466
	(0.195)	(0.195)	(0.192)	(0.192)	(0.253)
$Market_{t-1}$	0.198	0.195	0.116	0.115	0.115
	(0.018)	(0.018)	(0.013)	(0.013)	(0.013)
xsales	0.131	0.132	0.134	0.133	0.131
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
distr	0.014	0.015			
	(0.002)	(0.002)			
I sector e area (Prob >χ^2)	0.000	0.000	0.000	0.000	0.000
N. osservazioni	224,137	224,137	232,892	232,892	232,892
Prob >χ^2	0.000	0.000	0.000	0.000	0.000

Notes: Linear probability (LP); standard errors in parenthesis; *dsize* $_{t-1}$ is the number of employees in deviation from the yearly mean; *distr* is a dummy variable equal to 1 if the firm belongs to an industrial district; *ICT* is a dummy variable equal to 1 if firm's technology is ICT intensive; *VCOMP* is a dummy variable equal to 1 if the firm belongs to sectors of comparative advantage; for the other variable, see the note to Table 6.

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COMMENTO A "SUNK COSTS AND EXPORTS: EVIDENCE FROM ITALIAN FIRM LEVEL DATA" DI MATTEO BUGAMELLI E LUIGI INFANTE

Sergio de Nardis[*]

1. Introduzione

Matteo Bugamelli e Luigi Infante utilizzano il modello teorico sviluppato da Roberts e Tybout (1997) per verificare la rilevanza dei *sunk costs* – dovuti alla raccolta delle informazioni sui mercati di sbocco, all'apprendimento circa il funzionamento di istituzioni e leggi dei paesi di destinazione, alla realizzazione di reti di distribuzione e di sistemi di promozione del prodotto – nell'influire sulle decisioni di vendere all'estero di un ampio campione di imprese manifatturiere italiane in un arco di tempo che abbraccia gran parte degli anni ottanta e il decennio novanta; tale rilevanza viene esaminata tenendo conto del condizionamento di alcune variabili macroeconomiche che tipicamente incidono sul comportamento delle esportazioni, quali la competitività di prezzo, approssimata dal cambio nominale, e l'andamento del commercio mondiale.

L'analisi si limita alle scelte di "entrata nel" e di "uscita dal" mercato estero – non si considerano, dunque, le decisioni sulla dimensione della produzione da esportare – ed è indirettamente volta a verificare l'esistenza di fenomeni di isteresi o di non linearità nell'offerta di esportazioni, in corrispondenza di cambiamenti nelle variabili macroeconomiche rilevanti. Il fatto che si considerino solo le decisioni di entrata e di uscita nei e dai mercati esteri – e non quelle relative al "quanto" esportare - non viene ritenuto limitativo dagli autori, poiché, secondo questi ultimi, le variazioni delle esportazioni riconducibili a movimenti di entrata e di uscita avrebbero rappresentato una quota significativa dell'evoluzione delle esportazioni italiane nell'arco di tempo considerato e avrebbero esercitato un impatto sensibile sui flussi di export complessivi soprattutto nel periodo 1992-95, di intensa oscillazione del tasso di cambio della lira.

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La conclusione principale degli autori è che i *sunk costs* sono una componente molto importante nel condizionare le decisioni (di entrata e di uscita) del campione di imprese considerato. Ulteriori conclusioni sono che: a) la rilevanza dei *sunk costs* è diversa a seconda delle caratteristiche di impresa (dimensione, qualità dei prodotti venduti, produttività, età, costo del lavoro, ricerca e sviluppo, marketing); b) tali costi presentano un periodo di deprezzamento di alcuni anni c) l'impresa che decide di entrare nel mercato estero paga questi costi nell'arco di un periodo di tempo molto breve.

Il saggio costituisce un esempio del modo "giusto" di utilizzare l'analisi sui micro-dati di impresa. Questo tipo di analisi, che negli ultimi anni ha avuto in Italia una certa fioritura, ha un interesse non tanto perché permette di scandagliare i micro-comportamenti aziendali – col rischio, a volte, di cadere nell'ovvio, di disperdersi nel dettaglio e di giungere a conclusioni fini a se stesse –, ma in quanto riesce a convogliare informazioni sui comportamenti aggregati, a cui alla fin fine si è interessati: per fare alcuni esempi, queste analisi sono molto utili se aiutano a chiarire la reazione delle esportazioni alle variazioni del cambio in condizioni e tempi diversi, oppure a gettare luce sulle determinanti del modello di specializzazione, oppure ancora a misurare gli effetti del *trade* sull'occupazione. Nel caso del *paper* di Bugamelli e Infante, le conclusioni raggiunte hanno, da un lato, un'implicazione per la spiegazione dell'andamento macroeconomico delle esportazioni italiane; dall'altro, mettono indirettamente in questione un'osservazione – o, se si accetta la principale conclusione del saggio, un luogo comune – circa il comportamento dei nostri esportatori sui mercati internazionali che viene correntemente avanzata nelle analisi del commercio estero dell'Italia. L'implicazione macroeconomica è che, a causa della rilevanza dei *sunk costs*, anche le esportazioni italiane, come quelle degli altri maggiori paesi industriali, sono soggette a effetti di isteresi. L'affermazione che, invece, viene messa indirettamente in questione è quella secondo cui le imprese italiane non sono sufficientemente radicate nei mercati di sbocco, perché non effettuano – a causa, soprattutto, delle caratteristiche dimensionali – adeguati investimenti di accompagnamento dell'attività di esportazione, dalla costruzione di reti di vendita all'apertura di uffici commerciali all'estero. L'analisi di Bugamelli e Infante - pur non potendo distinguere i comportamenti nei differenti mercati di sbocco – porta, invece, a sostenere che gli investimenti che affiancano le esportazioni sono rilevanti e tali da determinare una marcata inerzia nelle decisioni delle aziende italiane di entrata e di uscita dai paesi di destinazione. Essi provocano persistenza

degli esportatori nel mercato estero e, come risulta dalle stime con interazioni, in misura comparativamente maggiore proprio nel caso delle imprese di dimensione più piccola, per le quali l'effetto inerziale indotto dalle decisioni passate risulta proporzionalmente più forte.

Il *paper* sottende un notevolissimo lavoro sui dati. E' ricco di spunti - dall'analisi della struttura temporale dei *sunk costs* alle interazioni con le caratteristiche d'impresa – che meriterebbero una discussione approfondita. In quanto segue si limita, però, il commento solo al nocciolo del saggio, vale a dire alla questione dell'importanza dei *sunk costs* nell'influire sul comportamento delle aziende esportatrici italiane. In particolare, si affrontano due questioni che, a giudizio di chi scrive, si prestano a essere maggiormente discusse: il grado di generalizzazione delle conclusioni all'universo delle aziende esportatrici italiane (paragrafo 2 di questo commento) e il ruolo che la possibile omissione di variabili potrebbe avere su solidità e interpretazione delle stime (paragrafo 3); il paragrafo 4 è dedicato a una breve sintesi del commento.

2. Il grado di rappresentatività dei risultati

Un primo punto di discussione riguarda il grado effettivo di rappresentatività dei risultati ottenuti nel *paper*. E' noto che la realtà degli esportatori italiani è, al tempo stesso, estremamente frammentata ed eccezionalmente concentrata in un numero limitato di operatori: nel 1998, le piccole imprese manifatturiere esportatrici, con meno di 50 addetti, rappresentavano il 90% del totale delle aziende esportatrici e vendevano all'estero un valore pari al 25% circa delle esportazioni di manufatti; all'opposto le imprese esportatrici medio-grandi con più di 50 addetti, pari al 10% del totale, fatturavano all'estero il 75% del valore delle esportazioni manifatturiere italiane. Questi squilibri appaiono ancora più marcati considerando le code della distribuzione: le imprese esportatrici piccolissime, con meno di 20 addetti, erano, sempre nel 1998, il 71% del totale e fatturavano all'estero circa l'11% delle esportazioni complessive di beni manufatti; le aziende con più di 100 addetti erano invece appena il 4,6% delle imprese esportatrici e vendevano sui mercati il 63% delle esportazioni complessive manifatturiere dell'Italia.

E' in grado il campione selezionato dalla Centrale dei Bilanci di riflettere questi squilibri e di tenere nel giusto conto la miriade di piccoli e piccolissimi esportatori che caratterizzano l'industria italiana? Gli autori riconoscono che il campione della Centrale di Bilanci tende, per sua natura, a essere distorto verso le imprese di dimensione relativamente più grande e

localizzate al Nord; nondimeno, ritengono accettabile il grado di rappresentanza, nel campione, delle piccole imprese. Permane, però, su questo punto qualche dubbio che viene di seguito evidenziato facendo ricorso alle informazioni di fonte ISTAT sull'universo delle aziende esportatrici. Nella tavola 1 si effettua un confronto tra alcune caratteristiche del campione impiegato nel saggio – desumibili dalle tabelle 1-4 del *paper* – e dell'universo ISTAT-ASIA; in corsivo sono riportati i numeri circa il valore complessivo delle esportazioni manifatturiere e il ricavo medio per impresa ricavabili sulla base delle indicazioni contenute nell'articolo. Dalla tavola si evince che mentre il numero di aziende manifatturiere esportatrici considerate nel campione estratto da CADS e utilizzato nel saggio, circa 11.000 nel 1998, era in quell'anno pari all'11% di quelle presenti nell'Archivio Statistico delle Imprese Attive, il valore delle loro esportazioni era il 26% delle esportazioni manifatturiere totali. Questa differente proporzione – per quanto riguarda numero delle unità produttive e valore delle vendite all'estero – implica ricavi da esportazione per impresa sensibilmente più elevati nel campione estratto da CADS rispetto all'archivio ASIA: nel campione utilizzato nel *paper*, il ricavo medio per impresa era pari nel 1998 a 8,2 milioni di lire, nei dati ASIA a 3,5 milioni. Ulteriori raffronti sono riportati nelle ultime due colonne della tavola. Da essi si vede che il numero medio di addetti per impresa esportatrice nel campione estratto da CADS è pari a 104 (anno 1995), più che triplo di quello ASIA (pari a 32 nel 1996). Inoltre la quota di esportatori localizzata al Sud è notevolmente più bassa di quella desumibile dai dati ISTAT (anche se si deve sottolineare che in questo caso il confronto tra le due fonti statistiche, Centrale dei bilanci e ISTAT, è parziale, comprendendo i dati ISTAT anche imprese non manifatturiere).

Sulla base di questi raffronti si sarebbe portati, dunque, a circoscrivere l'estensione del risultato ottenuto nel *paper* alla generalità delle imprese esportatrici italiane. L'impressione è infatti che sfuggano all'analisi, a causa delle caratteristiche del campione utilizzato, le piccole e piccolissime imprese esportatrici, con basso numero di addetti e modestissimo ricavo da esportazione (in particolare, quelle localizzate al Sud). In altri termini, le moltissime imprese marginali che le ampie fluttuazioni del cambio, verificatesi nell'arco di tempo considerato, hanno portato a entrare e a uscire, a seconda delle convenienze, dal mercato internazionale. In particolare, sono state le imprese di più piccola dimensione che hanno registrato tassi di ritiro dai mercati esteri relativamente più forti negli anni – tra il 1995 e il 1997 – di correzione dell'*overshooting* del cambio della lira: in questo arco di tempo, il numero

di esportatori si è ridotto in Italia di circa 2.700 unità; ciò ha riflesso quasi esclusivamente la contrazione del numero di aziende a più basso ricavo da esportazione, quelle con meno di 50 miliardi di fatturato estero (tavola 2).

3. *Sunk costs*, incertezza e variabili omesse

Il secondo punto che si presta a essere discusso riguarda la possibilità che i fenomeni di persistenza nelle decisioni di esportare, rilevati nelle stime econometriche, possano essere attribuiti in modo univoco all'azione dei *sunk costs*. Questo problema viene in effetti affrontato dagli autori, che ne discutono quando descrivono la strategia di stima (paragrafo 4 del *paper*). La conclusione cui essi giungono è la sostanziale plausibilità dell'interpretazione del coefficiente che moltiplica la variabile dipendente ritardata come *proxy* dei *sunk costs*. Questa affermazione non risulta, però, del tutto convincente. Restano, in particolare, alcuni interrogativi distinguibili in due categorie: a) ruolo dell'incertezza nelle scelte delle imprese; b) problema dell'esistenza di altre variabili che influiscono sulle decisioni di vendere all'estero e che possono essere state omesse nell'analisi.

a) Incertezza e decisioni d'impresa. Il modello teorico, da cui è ricavata la forma ridotta usata nelle stime contenute nel saggio, fa dipendere la decisione di entrare o meno nel mercato estero dalla condizione che il profitto atteso, al netto dei costi di entrata, sia maggiore o uguale a zero. Il valore zero è dunque discriminante per le scelte delle imprese. In condizioni di completa assenza di incertezza, il fatto che il profitto si collochi sotto zero o meno conduce sempre e comunque a una scelta netta – no/sì – circa la decisione di entrare. Se, tuttavia, più realisticamente si ipotizza che sussiste incertezza e che dunque la valutazione sul profitto atteso è caratterizzata da un intervallo di confidenza, ciò di per sé è sufficiente a introdurre un comportamento inerziale nelle decisioni d'impresa, indipendente dai *sunk costs*. In altri termini, la cosiddetta banda di inazione verrebbe a dipendere da informazione imperfetta, oltre che dall'esistenza di costi di entrata/uscita. E', tuttavia, plausibile che l'inazione, derivante dall'incertezza circa il profitto atteso, si riduca in corrispondenza di fluttuazioni molto ampie delle variabili macroeconomiche, quali quelle determinatesi a cavallo del decennio novanta per quanto concerne il tasso di cambio della lira.

b) Omissione di variabili esplicative. La questione delle variabili omesse è affrontata dagli autori, ma la discussione che ne segue non viene portata fino al punto di trarre tutte le conseguenze. In particolare, gli autori

si pongono il problema dell'esistenza di caratteristiche d'impresa non osservate che possono indurre persistenza e la cui omissione condurrebbe ad accettare, erroneamente, l'ipotesi di *sunk costs*. Ad esempio, una non osservata "abilità ad esportare" che caratterizza in modo specifico ciascuna impresa può indurre fenomeni di inerzia e persistenza del tutto indipendenti dai *sunk costs*. La conseguenza dell'omissione di variabili è la correlazione seriale dell'errore e la regressione spuria. Per tenere conto di ciò, gli autori – seguendo la procedura adottata da altri ricercatori – introducono nella struttura dell'errore e, quindi, nell'equazione un fattore specifico di impresa che non varia rispetto al tempo, ma varia da un'azienda all'altra. Così facendo, però, rendono endogena la variabile ritardata che viene a sua volta a dipendere dal fattore specifico d'impresa, invariante rispetto al tempo. Si passa in questo modo da un problema di regressione spuria a uno, altrettanto preoccupante, di inconsistenza nella stima di un panel dinamico. Gli autori di fronte a questo problema optano per una sorta di esplicito "accantonamento", confidando nella sufficiente bontà e robustezza dei risultati. Così facendo, però, lasciano aperto un dubbio e mantengono irrisolta una contraddizione: essi assumono che la variabile dipendente è predeterminata, nonostante che la trasformazione adottata nella struttura dell'errore, per tenere conto degli effetti fissi a livello di azienda, porti piuttosto a dire il contrario.

La questione delle variabili omesse e dei rischi di regressione spuria non si esaurisce, peraltro, con la sola considerazione delle caratteristiche specifiche d'impresa. Potrebbero infatti risultare omesse anche variabili macroeconomiche, indipendenti dalle tipologie di impresa, ma varianti in funzione del tempo. L'omissione di tali variabili, tipicamente autocorrelate, comporterebbe – con una più elevata probabilità – problemi di correlazione seriale dei residui. Un esempio sono le variabili nazionali, quali la domanda, la profittabilità interna in rapporto a quella sui mercati esteri e il grado di utilizzo degli impianti: la decisione di entrare o uscire dai mercati esteri dipende, infatti, oltre che dalle variabili internazionali anche dalle condizioni interne del ciclo. Per esemplificare ulteriormente, un'impresa che nel periodo t-1 era fuori dal mercato estero potrebbe decidere di continuare a rimanerne fuori, nonostante un cambio più favorevole, se nel periodo t la domanda nazionale che si rivolge al suo settore è in più forte espansione che all'estero; tale decisione verrebbe erroneamente interpretata come influenza dei *sunk costs*. Alternativamente, un'impresa con problemi di eccesso di capacità produttiva e che nel periodo t-1 era presente nei mercati esteri potrebbe decidere di rimanervi nel periodo t, nonostante un apprezzamento del cambio, se ciò le consente di smussare nel tempo il

processo di riduzione della capacità; in questo caso, c'è un *sunk cost* che crea inerzia, connesso all'eccesso di investimenti effettuati nel passato, ma non è esattamente il *sunk cost*, in cui si incorre per esportare, a cui sono interessati gli autori.

4. Conclusione

In conclusione, il *paper* di Matteo Bugamelli e Luigi Infante è ricco di spunti e risulta di notevole interesse sia per la parte metodologica, sia per il tipo di questioni sollevate. L'esame dei dati micro non rimane fine a se stesso, ma è in funzione dell'esigenza di gettare luce sui comportamenti macroeconomici del commercio dell'Italia con l'estero e di sottoporre a verifica, nel caso italiano, le indicazioni della teoria economica sulla possibilità di fenomeni di isteresi e di "non linearità" nella funzione di offerta delle esportazioni: la microeconometria è quindi finalizzata a verificare ipotesi di comportamento fondate nella teoria.

L'evidenza prodotta nel saggio, riferita a un campione di aziende italiane, di un effetto di persistenza nelle decisioni di vendere/non vendere all'estero, rispetto alle scelte effettuate nei periodi precedenti, appare in generale attendibile, anche se la dimensione di questo effetto è probabilmente amplificata dalla sotto-rappresentazione nel campione utilizzato delle imprese più piccole - la grande maggioranza delle aziende esportatrici italiane - e di quelle localizzate al Sud. Per questo tipo di imprese le scelte dovrebbero essere risultate, nell'arco di tempo considerato, molto dipendenti dalle ampie fluttuazioni del cambio registrate, ad esempio, a cavallo della metà degli anni novanta.

Accanto a ciò sussistono dubbi sulla possibilità di interpretare, in modo netto e univoco, tale persistenza come conseguenza esclusiva dell'azione dei *sunk costs* che si devono sostenere per accompagnare l'attività di esportazione. Incertezza e variabili omesse - a livello sia aziendale, sia macroeconomico - potrebbero, infatti, determinare fenomeni di inerzia nei comportamenti degli esportatori, non necessariamente connessi all'influenza dei *sunk costs* che affiancano le decisioni di esportare. Un irrobustimento delle stime, ad esempio lungo le linee indicate dagli stessi autori nel paragrafo 4 del saggio, potrebbe contribuire a fugare alcuni di questi interrogativi, in particolare quelli che derivano dalle caratteristiche endogene della variabile dipendente ritardata, conseguenti alla (giusta) considerazione degli effetti fissi a livello di impresa.

Tav. 1

Numero di imprese manifatturiere esportatrici, valore delle esportazioni e ricavo medio da esportazione per impresa, anno 1998

	Numero di imprese esportatrici	Valore delle esportazioni in miliardi di lire	Ricavo medio in miliardi di lire	Numero degli addetti per impresa esportatrice	Quota degli esportatori al Sud
1) ISTAT-ASIA	98.984	353.157	3,641	32(*)	11(***)
2) Bugamelli-Infante CADS	*11.151*	*92.174*	*8,266*	*104*(**)	*4*(**)
3) Rapporto 2/1	0,11	0,26	2,27	3,25	0,36

Fonte: Rapporto ICE (2001)
(*)1996; (**)1995; (***) 1995, Fonte ISTAT, Esportazioni di merci degli operatori economici.
In corsivo sono riportati dati, relativi al campione estratto da CADS, che si evincono dalle informazioni disponibili nel *paper*.

Tav. 2

Esportatori per classi di ricavo annuo all'esportazione: 1995 e 1997

Classi di ricavo annuo	Numero operatori 1995	Numero operatori 1997	Variazione assoluta
0-50 milioni	84.387	81.594	-2.793
50 milioni-1 miliardo	59.701	59.075	- 626
1 – 3,5 miliardi	16.103	16.645	+542
3,5 – 15 miliardi	10.248	10.305	+57
15– 100 miliardi	3.320	3.443	+123
100–500miliardi	305	302	-3
> 500 miliardi	44	48	+4
Totale	174.108	171.412	-2.696

Fonte: Rapporto ICE (2000)

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DEVELOPMENT, TRADE AND MIGRATION

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1. Introduction

Labor, and factor, mobility plays a pivotal role in the development process. The movement of labor from low to high productivity sectors is part and parcel of the process of growth and structural change. As the economy develops, the share of agricultural employment in total employment falls and that of other sectors rises. Further economic growth is associated with a reallocation of labor away from industry toward the tertiary sector. Accordingly, the ability of factors to move unencumbered among sectors and regions is considered a source of significant efficiency gains.

Labor mobility can also be a source of growth at the international level. The movement of labor across national borders can boost growth in the relatively backward countries and speed up the process of convergence. Given the sizeable productivity differences among countries, the size of welfare gains arising from international migration is likely to be large. Hamilton and Whalley (1984) estimate the gains in world output from free labor mobility to be at least 20 percent and perhaps as high as 40 percent of world GDP[1] In light of such findings, it is somewhat surprising that the benefits from free international labor mobility seem to have escaped the attention of even the most liberal economists.

Admittedly, market imperfections can limit the benefits of labor mobility. Internal migration can in some instances be associated with rising unemployment and even aggregate output losses. Additionally, factor mobility can lead to the depopulation of entire regions, with an obvious welfare loss for the immobile factors. For international migration, the key consideration is that labor outflows could deprive the sending regions of their most skilled and dynamic members. This "brain drain" effect is seen with great concern in source countries, even more so now that receiving regions appear to be dedicated to promoting skilled immigration. The negative impact of emigration can however be offset by remittances flows and return migration. The ultimate impact is thus an empirical matter.

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[*]I would like to thank Andreas Marschner for excellent research assistance. The opinions expressed in this paper are those of the author and should not be attributed to the institutions with whom he is affiliated. The responsibility for any errors is only mine.

[1] Hamilton and Whalley (1984) seek to control for some of the factors, such as technological or price level differentials, that may account for international wage differences.

In this paper, we take a close look at the role of both internal and international migration. We document the size of internal migration and find that they are-generally associated with more rapid growth. Turning to international migration, we assess the contribution of remittances to growth. We also examine the link between remittances and the skill composition of emigration.

Our results can be summarized as follows. First, growth is positively and significantly associated with the process of structural change. While the causality link is clearly ambiguous, our results suggest that the process of labor reallocation is positively correlated with faster growth. Second, we find that remittances contribute positively to growth but are a declining function of the skilled composition of the migrant labor force. This latter finding indicates that the negative impact from the brain drain may not be compensated by a larger flow of remittances.

2. Internal migration in developing countries

a) The urbanization process

The most visible manifestation of internal migration is the rising share of the urban population. This largely explains why attention in the literature and among policymakers has typically focused on rural to urban migration. The movement of workers and population toward urban areas is also associated with industrialization and structural change, further contributing to the emphasis on migration out of rural areas.

The figures are indeed staggering. In low-income countries, urban areas increased their population share from 21 to 31 percent between 1980 and 1998. For middle income countries, the increase in the rate of urbanization during the same period was even more pronounced, from 55 to 66 percent. Upper middle income countries have also registered a substantial increase in the share of urban population. Only in high income countries has the population share of urban dwellers been basically stable, rising only from 75 to 76 percent. Based on this evidence, one would tend to conclude that urbanization reaches a peak at around three-quarters of the population, and that most developing and emerging countries still have a considerable way to go before reaching such a ceiling.

b) Some basic theory

Urbanization however does not provide but a very imperfect measure of internal migration. Population flows are not systematically

monitored and, at any rate, do not provide the more relevant information on worker flows. Moreover, even if a reliable and unbiased measure of such flows was available, assessing the impact of internal migration on economic growth and structural change would still be a formidable task. Theory, even in its simplest form, offers only some limited guidance in this respect. Consider the standard representation of a two-good economy in fig. 1. Agricultural employment (L_A) is measured from right to left, non-agricultural employment (L_I) from left to right. The two schedules, MPL_A and MPL_I, measure the marginal productivity of labor in the agricultural and the non-agricultural sectors respectively, both as a declining function of their sectoral employment levels. Suppose that the initial equilibrium is at B, with OB workers in the non-agricultural sector and O'B in the agricultural sector. The equilibrium is inefficient. Given that the marginal productivity of labor is lower in agriculture, aggregate output can be increased by reallocating labor away from agriculture. At point C, output has increased by the EIE' area.

In this set-up, therefore, migration is associated with sectoral change and output gains. This is not necessarily the case, as those familiar with the workhorse model of the migration literature - the Harris-Todaro model - are well aware. Consider the case where the industrial wage is fixed at w_I, because of some unspecified market imperfections. Non-agricultural employment will then be identically equal to L_D. Therefore, if because of migration the non-agricultural labor force (L_S) is greater than L_D, there will be unemployment. Let now e, the employment rate (L_D/L_S), be equal to the probability of being employed. In equilibrium, risk neutral migrants will equate the agricultural wage to the expected non-agricultural wage, i.e. $w_A = e\ w_I$. For a given value of L_D, therefore, both the employment rate and the expected wage in the non-agricultural sector are a declining function of Ls. This latter relationship is depicted by the broken line in fig. 1. The equilibrium is at point D, where $w_A = e\ w_I$. Unemployment is equal to L_S-L_D. If migration were restricted to L_D, output would increase by the area L_DADL_S.

c) Some suggestive evidence

Cross-country comparisons on worker migration are hampered by the lack of systematic and comparable data. The only promptly and widely available information refers to employment, i.e. a stock variable, at a given point of time. Accordingly, one strategy (Larson and Mundlak, 1995) is to focus on the employment share in agriculture. Under the (strong) assumption that the agricultural and non-agricultural labor forces grow at the same rate, rural-urban migration can then be inferred from the changes

in the employment share of agriculture.[2] Building on this premise, Larson and Mundlak (1995) find that the rate of emigration from the agricultural sector has risen steadily from 2.13 percent in the 1960s, to 2.51 percent in the 1970s, and to 3.86 percent in the 1980s. The rising trend in the emigration rate reflects both the sustained flows out of agriculture and the absolute fall in the number of agricultural workers.

We have updated Larson and Mundlak calculations. We find some interesting regional patterns. Table 1 shows the decadal (unweighted) changes in the employment share of agriculture. With the noticeable exception of South Asia and Sub-Saharan Africa, the fall in the share of agriculture shows a declining trend. If we are willing to assume that the agricultural and the non-agricultural labor forces grow at the same rate, we can compute the emigration rate out of agriculture (Table 2). The most striking pattern, which confirms Larson and Mundlak's findings, is that migration rates show no declining trend. Actually, for most regions the trend is upward.

We also find that the relatively poorer regions of Sub-Sahara Africa and South Asia do not feature high migration rates. Clearly, this reflects the relatively slower process of growth and structural change taking place in that part of the world. Fig. 2 shows that by and large migration out of agriculture and income growth are positively associated,[3] suggesting that rapid structural change is associated with faster growth. This correlation however has been weakening somewhat, suggesting that most of the gains from labor reallocation have already been exploited.

d) Is the focus on rural-to-urban migration and on earning differentials excessive?

One truly surprising finding is that rural-to-urban migration represents only one, and not the most important, component of labor flows. There is no systematic evidence in this respect, but Skeldon (1986) reports that in India rural-to-rural migration flows are relatively far more important, accounting for 57.4 percent of total labor flows. By contrast, rural-to-urban migration only constitutes 19.5 percent of such flows, the

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[2] The change in the agricultural labor force, $\Delta L_A/L_A$, is identically equal to the sum of the net migration rate, M_A/L_A, and the natural population growth in agriculture. Let $L_A = \alpha L$, where L denotes total employment and α is the employment share of agriculture. In growth rates, we have that $\Delta L_A/L_A = \Delta\alpha/\alpha + \Delta L/L$. By assumption, $\Delta L/L$ is equal to the natural population growth in agriculture. It then follows that $M_A/L_A = \Delta\alpha/\alpha$, i.e. the net migration rate is equal to the percentage change in the employment share of agriculture.

[3] There is however considerable variability, even though the relationship is significant at the 5 percent confidence level. Of course, even a significant correlation does not say anything about the direction of causality.

rest being accounted for by workers moving within the rural or the urban sector. What accounts for this pattern? One possibility is that income and wage differentials are sizeable even within the rural or the urban sectors. Alternatively, some other factors in addition to earning differentials may drive the migration decision:

The new economic literature on migration (NELM) has investigated some additional explanations of the migratory choice, rooted in market imperfections, informational asymmetries, and risk attitudes. First, migration may represent an intermediate investment that facilitates the adoption of more productive agricultural techniques. Faced with capital market imperfections, rural households may be unable to finance the sizeable investment required to shift from familial to commercial production. They may then resort to having some of their members migrate in order to acquire the financial resources necessary to pay for such an investment. Even, risk-averse households may be willing to engage in such a risky activity provided that the returns on investments are increasing at a sufficiently rapid rate. Migrant remittances become then an integral part of this household strategy, as they are used to finance the proposed investment. There is a growing body of evidence consistent with this hypothesis. Lucas (1987) shows that migration to South African mines from five neighboring countries entails an initial loss of agricultural output, which however is soon recouped by a significant increase in agricultural labor productivity. Similarly, Taylor (1994) finds that the impact of remittances on total income in remittance-receiving households grows over time, a fact that is consistent with the notion that remittances are used for investment purposes.

Additionally, migration could be used as a means to better diversify risk. In general, risk averse households should be less keen to engage in a risky activity such as migration. Matters may change, however, when returns are not fully correlated across locations. It is easy to show that migration can bring a utility gain even if expected income and income volatility are the same in the different locations. What is needed is for returns in different locations to be imperfectly correlated.[4] By having some

[4] Consider the case of a risk-averse two-member household with a simple mean-variance utility function:

$U = E(Y) - \alpha\, var(Y)$

where E(Y) and var(Y) denote expected income and its variance respectively, while α is the risk aversion parameter. Take the simplest case with two locations (1 and 2), with expected income equal to y_1 and y_2 respectively, identical income variance (σ), and income correlation equal to ρ. The household's initial location is 1. With no migration, expected utility is equal to:

$2y_1 - 4\alpha\sigma^2$

of its members migrate, the household can then reduce its exposure to risks.[5] Empirical evidence suggests that the desire for risk diversification is indeed a relevant motive for migration. The evidence on remittance behavior following a drought (Lucas and Stark, 1985 and Stark and Lucas, 1988) shows that intra household income transfers are used to smooth shocks among household members. Rosenzweig and Stark (1989) document that the pattern of marriage in rural India is consistent with the desire to diversify risk. Finally, Daveri and Faini (1999) offer direct econometric evidence that risk factors significantly affect the locational choice of Southern Italian migrants.

Overall, internal migration can bring substantive benefits to an economy, not only in the form of labor reallocation toward high-productivity sectors, but in more subtle forms as well. We have highlighted two such channels, one having to do with the overcoming of capital market imperfections and the other with better risk diversification. Our empirical correlations show that the link between migration and growth is generally positive but has been weakening somewhat in the most recent decade. Still, the substantial scope for sectoral reallocation in many developing countries highlights the need for continuing attention to migration issues.

3. Opening the economy: the impact of international migration

a) The absentee of the globalization process

International migration is the grand absentee of the globalization process. In the nineteenth century, intercontinental migration played a key role in fostering income and wage convergence between the two shores of the Atlantic. Williamson (1995) documents the catching up of British and Swedish wages with respect to those in the US and, together with O'Rourke and Taylor (1994), highlights the crucial contribution of migration to this process. Migration flows at the turn of the century were indeed massive, both from the source and the host countries points of view (tables 3 and 4). The contrast with present events is remarkable. Despite pervasive concerns about immigration, labor and population flows are only a trickle compared to the events of the previous globalization episode. In most countries, with

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If one member migrates, expected utility is:

$y_1 + y_2 - \alpha (2\sigma^2 + 2\rho\sigma^2)$

Clearly enough, migration brings a utility gain in the form of lower risk exposure provided that $\rho<1$.

[5] One interesting, and so far untested, implication of this set-up is that migrants will be relatively more risk averse than non-migrants.

the noticeable exception of the US, the share of foreign population has seen only a modest upward trend (Table 5). The sharp rise in immigration toward Germany following the fall of the Berlin Wall has not been sustained. The decline in the size of migration is equally evident if we focus on the heyday of European integration when more than 12 million workers crossed European borders, heading from the south of Europe to the north.

Internal and international migrations seem therefore to be headed in different directions. While, as noticed in the previous section, internal migrations are still sustained, the scope for international migration appears to be significantly more limited. This is a bit puzzling in light of the fact that wage and income differentials are larger in the case of international migration. Similarly, while migration costs are more significant (even though their importance may have declined substantially) and informational problems are likely to be more pervasive in the case of international migration, the opportunities for risk diversification are presumably larger for international than for domestic migrants. On balance, given the preponderant role of earnings differentials (Chiswick and Hatton, 2001), it is probably reasonable to conclude that the factors underpinning the choice of migrating internationally are relatively stronger.

Adding to the puzzle is the fact that income differentials have widened compared both to the 1960s and to the late nineteenth century (Pritchett, 1996). Clearly, the marginal role of international migration in the present wave of globalization cannot be attributed to the lack of economic incentives what has changed is the stance of migration policies International migration was largely free during the late nineteenth century and even encouraged in the 1960s; nowadays the policy imperative seems to restrict immigration, with the noticeable exception of skilled migration. Clearly, migration policies make most of the difference in accounting for the more limited role of international population and labor flows in the present globalization episode. We shall return more fully to these issues later in the paper. For the time being, we turn to three key questions regarding the determinant and the impact of international migration.

b) How does economic development in sending countries affect international migration?

Income growth is a powerful force, perhaps the most powerful one, in reducing the propensity to emigrate. Countries in Southern Europe have undergone a full migration transition from source to destination countries (Fig. 3). Interestingly enough, though, in an initial phase income growth seems to be associated with more rather than less migration. One

immediate explanation for this pattern (Banerjee and Kanbur, 1981; Faini and Venturini, 1994; Lopez and Schiff, 1998) is that higher wages allow potential migrants to pay for their mobility costs. In a context of widespread capital markets imperfections, financial constraints may severely limit migrants' ability to pay for mobility costs and eventually prevent migration from taking place. Higher wages at home should then help relax such constraints and would thus be associated with an increase in the flow of migrants.

There is both direct and indirect evidence that migration costs are indeed non-negligible. Banerjee and Kanbur (1981) find strong support from micro evidence in India for the notion that migration is an increasing function of wages in the source regions. Similarly, Faini and Venturini (1994) show that, at least in an initial phase, income levels in the sending country have a positive impact on migration, even after controlling for wage differentials.[6] Finally, Schiff (1996) provides more direct evidence on the size of migration costs and finds them to be substantive. However, as argued by Lucas (1997); the evidence of a positive link between income and migration must be interpreted with care. There are indeed many confounding factors. For instance, income growth may be associated with a more educated population with more international contacts and therefore better information on employment and wage conditions abroad; with changes in the degree of subjective risk aversion, as well as with differences in the access to capital markets. All these factors are associated with greater migration and it would be an arduous task to identify their separate roles.

A more fundamental problem comes from the fact that the migration transition may have little or no causal relationship with economic factors, but may simply reflect the process of demographic transition. In its most succinct form, the demographic transition theory states that the decline in infant mortality leads in an initial phase to higher population growth and to a larger weight of the young cohorts. Migration increases as a result, since young cohorts have a relatively larger propensity to migrate. In a second phase, however, the fall in fertility catches up with the decline in mortality and population growth tends to subside, with a fall in the population share of young cohorts and a decline in the rate of migration. Opinions on the empirical relevance of this factor are divided. Faini and Venturini (1994) fail to find any significant influence of demographic factors on Southern

[6] Faini and Venturini (1994) also argue that, after a critical income threshold, the role of financial constraints is bound to wane. Also, the preference of domestic residents for living in their own country is likely to increase with income. Passed a critical income threshold, therefore, further income growth should be associated with declining migration, even after accounting for differences in wage levels.

European migration in the 1960s and the 1970s. Hatton and Williamson (2000) come to the opposite conclusion when examining the pattern of intercontinental migration in the nineteenth century. Assessing the respective role of income growth and population changes would be less crucial if economic development went hand in hand with demographic transition. Matters are not so simple however if the changes in the demographic structure do not come together with income growth. The jury on these issues is still out.

c) The impact of emigration on the source country

In assessing the welfare impact of international migration, one faces a basic dilemma: to which community should the welfare of migrants be attributed? (Bhagwati and Hamada, 1975). Temporary migrants that retain close links to their home country should probably be counted in the sending country population. For permanent migrants, attribution to the receiving country would seem more appropriate. Yet, this classification is fraught with difficulties, given that by and large the initial intention of migrants to move permanently or temporarily may not coincide with their final choice.

With these caveats in mind, let us return to the basic diagram (Fig. 4). Let now A be the source country and I be the host country. The initial equilibrium is at point B. The post migration equilibrium is at point D, with BD workers having migrated from country A to country I. It can be easily seen that those left behind in the home country suffer a welfare loss. The gains in labor income (the area NEPQ) are more than offset by the losses in income from capital (the area FEPQ). The net loss is equal to FEN. Conversely, the host country enjoys a net welfare gain (HGE). What about migrants? They are clearly better off; otherwise they would have stayed put. More crucially, the gains to migrants (FGEN) more than offset the losses of those left behind. Independently of whether migrants are classified in the home or the host country population, the key fact is that the gains from migration overwhelm the losses of those left behind Migrants could therefore fully compensate the losers and still be better off. Moreover, while in most of the welfare literature compensating income transfers are typically seen as a merely theoretical possibility, in the case of migration such transfers do occur, in the form of remittances. The net effect on the welfare of the sending country is ultimately an empirical matter, and will depend on the way migrants are classified and on the amount of remittances. Interestingly enough, these two factors are likely to be closely interrelated. Temporary migrants may have a relatively larger propensity to remit to home. On both counts, therefore the welfare of the sending country should increase. Conversely, the flow of remittances from

permanent migrants should be small. The home country will then lose out both because migrants are no longer part of its welfare and because remittances are small.

But how large is the welfare effect of emigration? In a one-good two-factor economy, the rough and ready formula for computing the aggregate welfare impact of migration (Borjas, 1996) is:

$$\Delta Q/Q = -(\alpha_L m^2 \varepsilon)/2$$

where m is the out-migration rate, α_L is the income share of labor, ε is the elasticity of wages with respect to labor, and the welfare change (ΔQ) is measured as a ratio to initial GDP. Suppose that , α_L= 0.7, ε=1,[7] and that 10 percent of the home country population lives abroad (m=0.10). The welfare loss from emigration would then be equal to less than four-tenths of one percent of annual GDP, a relatively small effect. Would this effect be offset by remittances? Most likely yes, given the sheer size of remittances. Consider for instance the case of Turkey where the share of the population living abroad is fairly large, around 8 percent (i.e. m=0.08). During the 1990s remittances averaged almost 2 percent of GDP, dwarfing therefore the welfare loss from emigration. Similarly, existing estimates suggest that slightly more than 7 percent of Mexico's population lives abroad.

Remittances on the other hand account for more than 1 percent of GDP, more than offsetting therefore the loss from emigration.

These are simple back-of-the envelope calculations. To answer the question whether the net effect of out-migration is positive after allowing for remittances we would need some firmer evidence on the relationship between remittances and the number of migrants abroad. If we simply assume that the GDP share of remittances (R) is a function of the percentage of the home country population living abroad, with $R = \beta m$[8], the welfare effect of out-migration becomes:

$$\Delta W = -(\alpha_L m^2 \varepsilon)/2 + \beta m$$

Based on a simple cross-country regression, we take β to be equal to 0.3. This estimate is subject to errors but appears to indicate that if m is not

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[7] With CES production function, $\varepsilon=(1-\alpha_L)/\sigma$, where σ is the elasticity of substitution. Then ε=1 is consistent with α_L=0.7 and σ=0.3.

[8] This relationship however is likely to depend also on the skill composition of migration, the attachment of migrants to their home country, the wage differentials between the host and the source country and other complicating factors. A more accurate analysis of remittances behavior is presented below.

exceedingly large, i.e. $m < \beta/\varepsilon\alpha_L \cong .43$, the welfare impact of additional out-migration is positive.

These calculations assume labor to be homogeneous. However, the most often voiced concern in the literature is that migration deprives sending countries of their most talented, most skilled, and most entrepreneurial workers. In this respect, the basic diagram is much too simple to the extent that it abstracts from differences in skill levels and assumes only one type of labor. Notice though that if workers, whatever their skills, are paid their marginal productivity, then welfare losses from emigration are fully captured by the basic diagram. While we need some form of externality for this "brain drain" effect to be qualitatively different from those described in the basic diagram, such externalities are not too hard to identify. First, skilled workers may generate strong positive externalities in production (Barro and Sala-i-Martin, 1995; Lucas, 1990). Second, while the costs of education are borne by the home country, its benefits are lost to the country if the worker emigrates. Remittances, if sufficiently large, may offset these effects.

Only empirical evidence can cast some light on these conflicting effects. The size of the brain drain is undisputed. Stalker (1994) reports that Sub-Saharan Africa lost 30 percent of its skilled personnel between 1960 and 1987. The Caribbeans are also hard hit, presumably because of the proximity to the US and the relative ease in emigrating there. For instance, Jamaica had to train five doctors in order to keep one. For Grenada, 21 out of 22 doctors were found working abroad. While, until recently, there had been little systematic evidence on the size of the brain drain, this gap has been largely filled by the excellent study of Carrington and Detragiache (1998). The authors rely on the 1990 Census of the United States to estimate the educational attainments of migrants there. They then relate these figures to the Barro-Lee data on educational levels in the source country to get migration rates for separate educational groups. Some selected results are reported in Table 6. The authors also compute total migration rates to the OECD by assuming that for each country the skilled composition of OECD migration is the same as that of the US. Obviously, this set of estimates is bound to be somewhat less reliable, particularly if migration to the US only accounts for a relatively small share of total migration from a given country. In spite of all these caveats, the results are staggering. First, migration rates are disproportionately large among educated people. Second, the absolute figures can also be very large. For instance in Ghana, more than 15 percent of the home country population with a tertiary education has migrated to the US. Extending the analysis to the OECD brings the migration rate for this educational group to 25.7

percent. This latter figure must however be interpreted with some caution since only slightly more than 50 percent of Ghana's migrants go to the US. The figures for North America are equally impressive. More than 20 percent of Mexicans with a secondary education live in the US. For the Dominican Republic the figure rises to 29.7 percent and for El Salvador to 29.1 percent.

What about remittances? IMF data for the mid 1990s put the total amount of remittances, to $65 bn. To put the number in perspective, this is larger than the total flow of official development assistance. Remittances play indeed a critical role as a source of foreign exchange in several countries, as documented by Table 7. The key question however is how remittances are influenced by the skilled composition of emigration. If skilled migrants tend to remit more, then the concern about the welfare impact of the brain drain may be unwarranted. Alternatively, the fording of smaller propensity to remit by skilled migrants would magnify such concerns. To cast some light on this issue, we have run a simple regression relating the ratio of remittances to GDP to the skilled composition of migration. We have excluded those countries for which the share of migration to the US falls below 30 percent. For these countries, the data on the skilled composition of migration are bound to be much less reliable. The results are shown in Table 8. Two facts stand out. First, as expected, remittances are an increasing function of the stock of migrants. Second, and more crucially, remittances decline as the share of migrants with a tertiary education goes up. The first result is in line with expectation, the second runs full course against them. Migrants with a higher education should have larger earnings, and therefore remit more. Presumably, this effect is obfuscated by the fact that more skilled migrants tend to move permanently to the host country. Their attachment to the home country gets progressively weaker and so does the propensity to remit. Additionally, the ease of family reunification that these migrants typically enjoy further weakens their willingness to remit.

If confirmed by future research, these results are striking. Sending countries lose from migration on two grounds. First, there is the standard welfare loss, as described by Fig. 4. Second, skilled migration typically carries a negative externality. While the first effect is likely to be relatively small, the impact of the brain drain may be sizeable and unlikely to be offset by larger remittances as the propensity to remit is lower for more educated migrants.

d) The impact on growth

The lack of systematic information on outward migration has hampered the analysis of its impact on growth in sending countries. There is more evidence on the growth effects of migration in host countries (Dolado, Goria, and Ichino, 1994) and in a regional context (Barro and Sala-i-Martin, 1995). The typical finding is that migration tends to have a negative growth effect in the sending country unless migrants have a similar, or a higher, capital per person than natives. The converse holds for the sending region. Migration therefore is, as expected, a powerful force working toward income convergence between capital-rich and capital-poor countries. These effects can be easily rationalized in terms of a standard Solow-Swan model. Steady immigration can indeed be assimilated to faster population growth, resulting in a fall in the steady state level of per capita income in the receiving country and, as a result, in a less rapid growth during the transition to the new steady state.

These findings must however be interpreted with care. Any attempts to draw welfare implications from them would be severely flawed. Consider again the basic diagram in Fig. 4. We know from this diagram that immigration brings a welfare gain for the immigration country and a welfare loss for the source country. The Solow model seems to make quite a different prediction, namely slower income growth in the host country and faster income growth in the home country. These apparently conflicting results can be easily reconciled, when we consider that migrants are assumed to carry little or no capital. They are therefore relatively poorer. Accordingly, average income falls in the host country and rises in the home country. Nonetheless, natives in the former country are better off, while those left behind in the latter are worse off.

It is not advisable therefore to run a regression of income growth on migration flows and try to draw welfare or worse policy implications from the results of this analysis. In what follows, we take a different route and regress income growth in source countries on the standard set of explanatory variables and on remittances. The purpose is to assess whether remittances contribute to saving and investment or, as often argued in the literature, are used unproductively. Our main finding (Table 9) is that the impact of remittances on growth is positive. The positive coefficient on the policy stance also shows that sound policies are a key determinant of growth. These findings vindicate the claims of the new economic migration literature (Stark and Lucas, 1988; Taylor, 1994) according to which remittances are instrumental in overcoming capital market imperfections and allowing migrant households to accumulate productive assets. For this effect to be fully realized, however, what is needed is a sound policy

environment that does not foster macroeconomic uncertainty, does not penalize agricultural activities and supports the build-up of social and productive infrastructures. Our results provide further support to this view.[9]

4. The policy alternatives

For worldwide welfare free migration would be optimal. However, even the most liberal policymakers have fallen short of advocating such a stance. On the contrary, migration policies have taken in most industrial countries, with perhaps the remarkable exception of the US, an increasingly restrictive turn. As noted before, the policy imperative has become to halt migration. The policymakers' orientation toward migration largely reflects public opinion. Existing polls show indeed that a majority feels that migration is excessive (Table 10). The supposedly negative impact of immigration plays a significant role in generating such an attitude, but other factors must be at work as well. First, the evidence on the impact of immigration on wage and employment conditions is at best weak. A clearly significant impact can only be found for previous migrants. Second, it is difficult to identify a significant link between attitudes toward migration and unemployment (Faini, 1998). Third, economic factors alone cannot explain why previous migrants, which are most negatively affected by additional immigration, tend to be quite supportive of a freer immigration policy (Fetzer, 2000).

An analysis of this topic would take us much beyond the (already broad) scope of this paper. In what follows we take for granted that attitudes toward immigration remain unfavorable if not outright hostile, and assess the scope for alternative policy options. We focus on three main alternatives.

a) Tighter border controls

This is the option to which policymakers tend to commit, particularly in the wake of an immigration amnesty program, the message being that those immigrants who are already inside the country should be allowed to stay, while the door will be inexorably shut for potential newcomers. The problem with this policy is that it is not credible. First, borders are porous, as the Rio Grande, the Oder-Neisse and the Southern European shores repeatedly demonstrate. Second, tight immigration

[9] Notice though that an interaction term between the policy stance indicator and the remittance variable has no explanatory power.

controls will breed illegal immigration, which is even more resented by public opinion in receiving countries. Third, to make migration controls fully effective would require measures that are unacceptable in a democracy.

b) More aid flows

Aid policy may be effective in fostering development in the sending countries, thereby discouraging migration, at least in the medium run. There are a number of objections to this strategy. First, aid policies so far have not been very effective in promoting development. Moreover, industrial countries do not seem to have much appetite for increased aid, as reflected by the fact that official development assistance has stayed well below the - unambitious - targets set by the UN. Also, even if effective at spurring growth, aid may paradoxically lead to more migration to the extent that it relaxes the financial constraints that prevented would-be migrants from moving abroad.

c) Trade liberalization

Standard trade theory provides the strongest basis for the claim that trade liberalization would lead to a fall in desired migration. The intuition is simple. Trade liberalization will increase the return of the abundant factor (labor in the source country) and lower the return of the scarce factor (labor in the host country). On both counts, the incentive to migrate will decline. More generally, in a factor endowment mode, differences in factor endowment are the basis for trade. The migration of workers from labor abundant to labor scarce countries reduces therefore the opportunities for trade. In the economist's jargon, trade and migration are substitutes.

Theory however is not unambiguous on this score. Even models fully rooted in factor endowment theory can deliver opposite predictions. Adding technological differences, allowing for increasing returns to scale, or simply adding the possibility that would-be migrants may be financially constrained can generate a complementarity relationship between trade and migration. For instance in the case where migrants are unable to pay for their mobility costs, the wage increase brought by trade liberalization in the source country could relax such financial constraints and allow more migrants to move abroad.

The empirical evidence is also controversial. Faini and Venturini (1994) find that immigrants tend to concentrate in import-competing sectors, a finding consistent with the notion that immigrants are unskilled and the receiving country has a comparative disadvantage in unskilled-intensive sectors. Trade restrictions then not only discourage labor-

intensive exports from source countries, but also add to the pull factors by fostering labor demand in unskilled labor-intensive sectors in receiving countries. Feenstra and Hanson (1995) show that trade and investment liberalization may discourage the demand for unskilled workers both in the US and in Mexico. Kohli (1999) shows that, at least for Switzerland, imports and foreign labor are complement in production.

The lack of conclusive evidence is somewhat discouraging. The fact remains however that in the medium run trade integration may act as a powerful force working toward income convergence, with a definite impact therefore on the incentives for migration. Moreover, trade restrictions may have more subtle effects on migration than those captured by traditional trade models. Consider for instance the role of agricultural policies in many industrial countries, where domestic prices are artificially kept constant in real terms and production surpluses dumped on world markets. One obvious effect of these policies is to lower the price of agricultural goods, many of which are exported by emigration countries. An additional, and less noticed, effect is to magnify the variance of world prices of these very same goods. If potential migrants were risk-averse, they would then be encouraged to migrate simply to escape from the uncertainties associated with volatile prices and incomes in their home country. This illustrates a general principle: often bad policies have unintended effects that tend to aggravate their distortionary impact.

d) Why is trade liberalization different from freer immigration?

The case for trade liberalization as a means to reduce migration rests on the case that trade and factor mobility are substitutes. But if this is so, why should policymakers that are weary of freer immigration be willing to embrace the cause of trade liberalization? This is a fairly legitimate question that requires a full-fledged explanation.

The main reason why trade liberalization is more acceptable to public opinion largely hostile to additional migration is that the former option can be supplemented by income transfers to compensate the losers from trade liberalization. Consider once again the basic diagram of Fig. 4. We know that in host countries capital will gain from immigration (the area IHEL), but labor will lose (IHGL). Suppose that trade liberalization has, as it should, analogous effects on factor rewards. It would then be possible to tax capital and fully compensate labor, while still leaving capital owners better off. In the diagram, the area IHEL is larger than IHGL. This is no longer possible however in the case of immigration. Unless one is willing to contemplate discriminatory transfer policies, the size of the transfer required to leave the wage unchanged is now equal to IMEL. This is larger

than the income gain to capital owners. To sum up, the increase in the endowment of labor following immigration makes a Pareto-improving redistribution unfeasible. Policymakers that are opposed to immigration may nonetheless be willing to support a more liberal trade regime.

There are two additional reasons underlying the greater reluctance to open the borders to people than to goods. The first has to do with the irreversibility of immigration. Even in the WTO framework, borders can be temporarily closed to imports as a safeguard measure. However, once workers have settled inside a country they will continue to offer their labor services. Finally, in a model where commodity prices do not fully determine factor prices, immigrants may compete with native labor in a way that imported commodities do not. For all these reasons, the outlook for trade liberalization is significantly more promising than that for freer immigration policy.

5. Conclusions

Both internal and international migration can foster income growth and convergence. For these forces to be effective, a favorable policy environment is needed. On the host country's side this requires a more liberal approach to immigration policy and limiting the bias toward skilled migrants. For source countries what is needed is the adoption of a sound policy stance, both on the macroeconomic front, in order to dissipate damaging uncertainty about inflation and exchange rate development, and on the structural front, with a view to reducing the biases of sectoral policies and strengthening the institutional set-up.

One the main findings of this paper is that remittances do not increase with the educational attainments of migrants. Skilled migration therefore hurts the source country on three accounts: the standard welfare loss, the loss of externalities from the decline in skilled labor, and the limited contribution to remittances. A further significant result is to show that remittances can contribute to faster growth in the source countries, particularly if they find a favorable policy environment that does not discriminate against productive investments.

This paper leaves many questions unanswered. Why isn't capital mobility contributing to faster income convergence among countries? Why is skilled labor, a scarce resource in source countries, so willing to migrate toward skilled-abundant countries? Even so, the paper highlights how the global policy outlook for factor mobility is far from reassuring for labor-

abundant countries. The combination of 1) further restrictions on unskilled migration, despite the well-documented role that such migration has played in the past in fostering income convergence; 2) promotion of skilled migration, in spite of the negative effects that such brain drain may entail; and 3) unfettered capital mobility, in spite of the extraordinary volatility of market access for capital-poor countries and the disruptive effects on their economies that sudden cut-offs from such markets imply, falls well short of the needs of emerging and developing countries alike, particularly so if one adds the lingering temptation to limit trade liberalization to a regional context and to put stringent limits on the operations of the financial safety nets provided by the IMF. For international policymakers, there is more to reform than simply the financial architecture.

Table 1

Average Annual Change of Employment Share in Agriculture

	CEE&CA	EAP	LAC	MENA	SA	SSA
60s	-1.2151	-0.5775	-0.7277	-1.0000	-0.2237	-0.3233
70s	-1.0591	-0.6667	-0.7633	-1.1694	-0.5512	-0.4512
80s.	-0.5340	-0.5074	-0.6311	-1.1169	-0.7239	-0.2469
90s	-0.7290	-0.5268	-0.5252	-0.4994	-0.4286	-0.6025
61-98	-0.8521	-0.5792	-0.6797	-1.0468	-0.5128	-0.3974

CEE&CA: Central & Eastern Europe and Central Asia; EAP: East Asia Pacific; LAC: Latin America; MENA: Middle East & North Africa; SA: South Asia; SSA: Sub-Saharan Africa

Source: World Bank data.

Table 2

Proportional Change of Employment Share in Agriculture

	CEE&CA	EAP	LAC	MENA	SA	SSA
60s	-0.0229	-0.0154	-0.0164	-0.0200	-0.0028	-0.0042
70s	-0.0248	-0.0197	-0.0197	-0.0258	-0.0072	-0.0066
80s	-0.0175	-0.0191	-0.0185	-0.0332	-0.0105	-0.0042
90s	-0.0286	-0.0223	-0.0213	-0.0252	-0.0073	-0.0093
61-98	-0.0152	-0.0118	-0.0141	-0.0184	-0.0066	-0.0051

CEE&CA: Central & Eastern Europe and Central Asia; EAP: East Asia Pacific; LAC: Latin America; MENA: Middle East & North Africa; SA: South Asia; SSA: Sub-Saharan Africa

Source: World Bank data

Table 3

EUROPEAN EMIGRATION AT THE TURN OF THE CENTURY
(% of the home country population)

	1871-1880	1901-1910	1913
Austria-Hungary	0.03	0.48	0.61
British Isles	0.50	0.65	1.04
Germany	0.15	0.05	0.04
Ireland	0.67	0.70	0.68
Italy	0.11	1.08	1.63
Spain	0.36	0.57	1.05

Source: Ferenczi and Willcox (1934)

Table 4

Immigration from Europe
(% of the host country population)

	1871-1880	1901-1910	1913
United State	0.55	1.02	1.22
Canada	0.55	1.68	3.84
Argentina	1.17	2.92	3.83

Source: Ferenczi and Willcox (1934)

Table 5

Foreign population in selected OECD countries
(% of total population)

	Late eighties	Late nineties
Belgium	8.8	8.7
France	6.8	6.3
Germany	7.3	8.9
Italy	1.1	2.1
UK	3.2	3.8
US	7.9	9.8
Canada	16.1	17.4
Japan	0.8	1.2

Source: SOPEMI (1995). Data for the US and Canada refer to foreign-born population

Table 6

The Brain Drain
Migration rates by educational attainments
(percentage of host country's educational group)

	To the US		To the OECD	
Origin country	Secondary educ.	Tertiary educ.	Secondary educ.	Tertiary educ.
Korea	1.2	5.7	3.3	14.9
Philippines	4.4	6.6	6.0	9.0
Ghana	0.3	15.1	0.7	25.7
Uganda	0.6	15.4	0.6	15.5
Domin. Rep.	29.7	14.2	30.5	14.7
Guatemala	29.1	13.5	29.1	13.5
Colombia	3.6	5.6	3.8	5.6
Mexico	20.9	10.3	20.9	10.3

Source: Carrington and Detragiache (1998)

Table 7

Aid, exports, and remittances
(1990-97 Averages, percentages)

	Remittances GDP	Aid GNI	Exports GDP
CE Europe & Central Asia	**4.16%**	**2.70%**	**37.00%**
Turkey	1.96%	0.33%	17.82%
East Asia & Pacific	**1.05%**	**3.41%**	**42.88%**
Philippines	5.46%	1.96%	34.67%
Indonesia	0.24%	1.07%	26.82%
Latin America & Caribbean	**2.17%**	**4.56%**	**27.54%**
Colombia	1.16%	0.23%	17.24%
Mexico	1.19%	0.09%	21.92%
Middle East & N. Africa	**7.19%**	**3.07%**	**32.20%**
Egypt	8.69%	6.85%	23.84%
Morocco	6.68%	2.76%	26.08%
South Asia	**2.87%**	**4.68%**	**17.50%**
Bangladesh	3.05%	4.49%	9.19%
India	1.59%	0.64%	9.70%
Sub-Saharan Africa	**3.71%**	**15.06%**	**27.42%**
Ethiopia	0.28%	16.89%	10.15%
Nigeria	2.11%	0.91%	43.13%
Senegal	3.04%	12.99%	28.84%

Source: World Bank data

Table 8

Remittance and the skill composition of emigration

Dependent variable	REM/POP	REMP/GDP
Explanatory variables		
Constant	91.4	0.07
	(62.2)	(2.00)
SM	10.8	0.28
	(4.82)	(2.02)
MSEC	-0.27	0.0007
	(0.43)	(1.42)
MTER	-0.93	-0.0005
	(1.84)	(1.95)
Y_{pc}	-9.76	-0.008
	(1.30)	(1.97)
R^2	0.53	0.33
NOB	33	38

Notes: REM: remittances; POP: working age population; SM: migrants abroad as a percentage of the home country population; MSEC: percentage of population with a secondary education living abroad; MTER: percentage of population with a tertiary education living abroad; Y_{pc}: income per capita in the home country.
NOB: number of observations. T-stats in parentheses.

Table 9

Growth and remittances

Dep. Var.: growth in per capita GDP		
	coefficient	t-stats
Constant	8.04	2.66
D_{70}	-2.62	2.00
D_{80}	-4.04	3.26
D_{90}	-3.72	2.80
ln Y_{pc}(t-1)	-0.84	2.15
Secondary school	0.04	2.99
Policy	0.87	5.28
Remittances	0.14	2.07

Notes: D_t: dummy for period t; Y_{pc}: income per capita; Secondary school: secondary school enrollment; Policy: Dollar-Easterly indicator of policy performance; Remittances: remittances as a share of GDP.

Table 10

Are there too many migrants?

Belgium	54.3
France	54.7
Germany	56.7
Italy	64.0
UK	51.3
USA (in 1993)	54.5
USA (in 1997)	48.0

Figure 1

The basic diagram

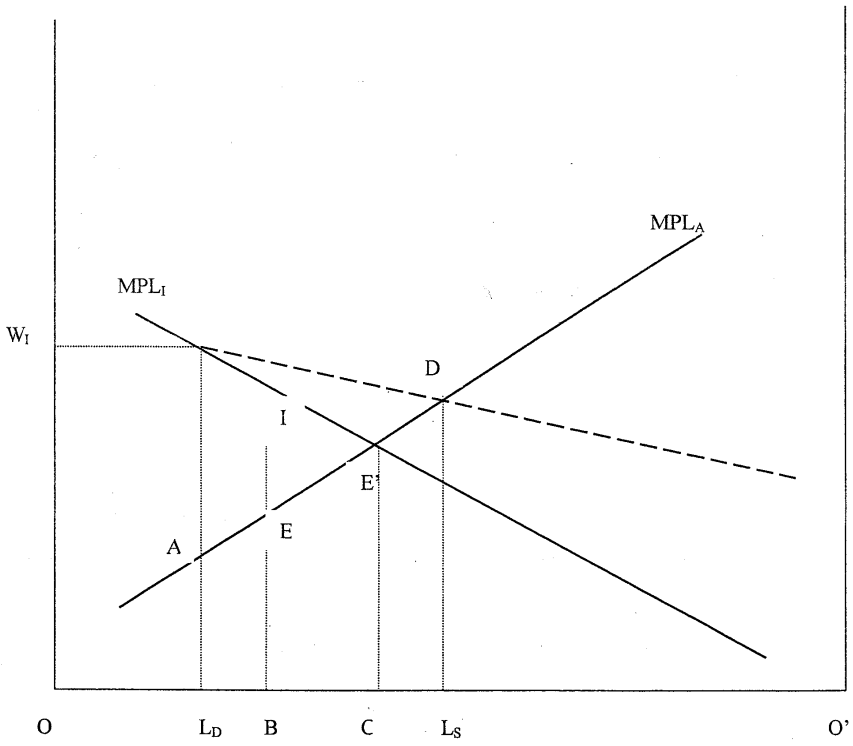
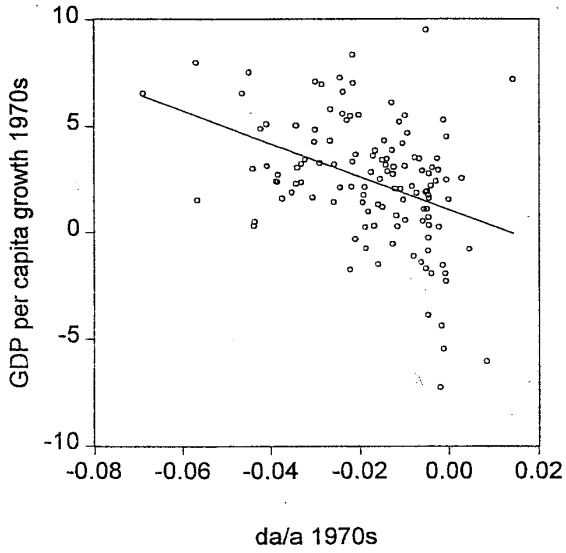


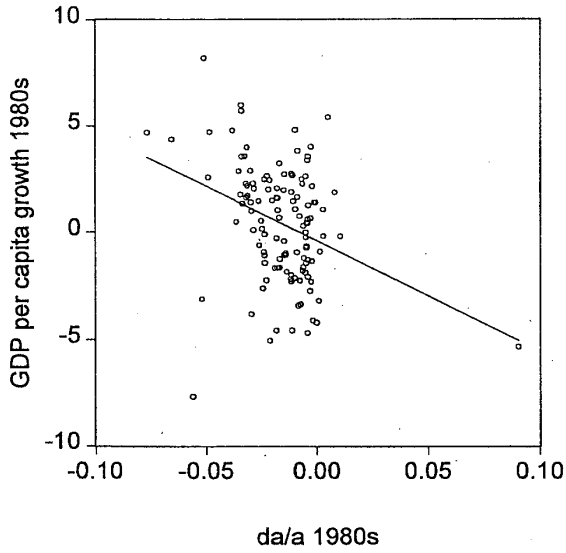
Figure 2

Growth and migration from agriculture

a) the seventies



b) the eighties



c) the nineties

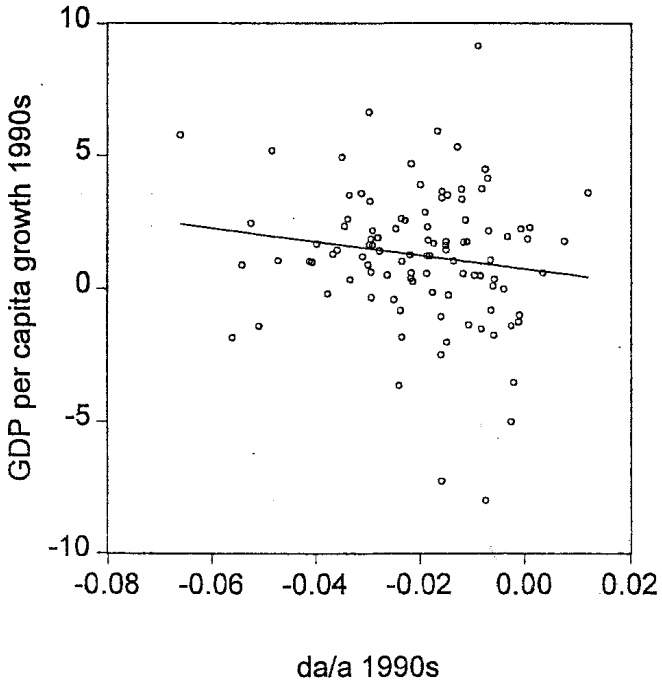


Figure 3

Migrations from Southern Europe

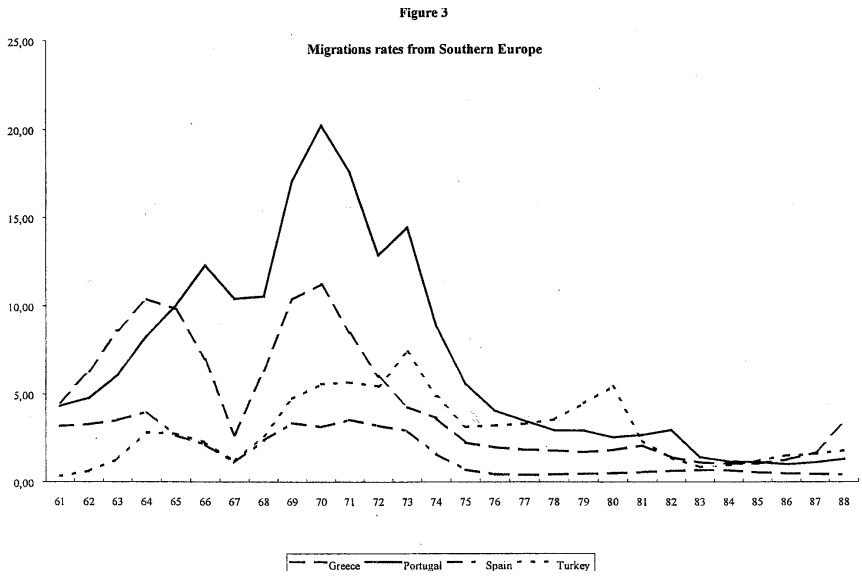
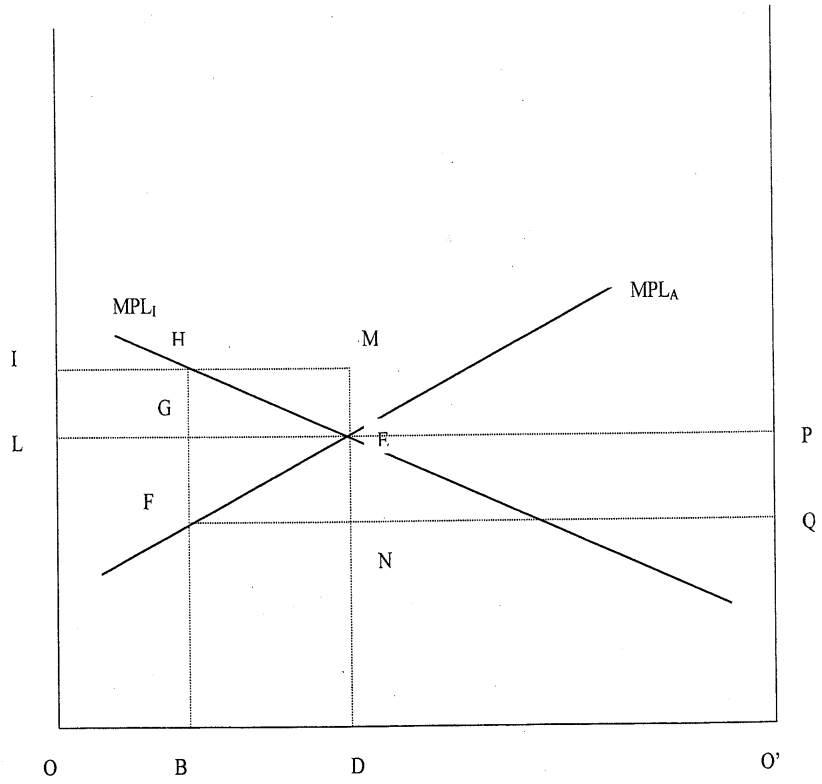


Figure 4

The basic diagram again
(the case of international migration)



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COMMENTO A "DEVELOPMENT, TRADE, AND MIGRATION" DI RICCARDO FAINI

Paola Caselli[*]

Il lavoro di Riccardo Faini è di particolare interesse in quanto affronta, in termini analitici rigorosi, un aspetto dell'integrazione internazionale che è stato lasciato un po' ai margini del recente dibattito sulla globalizzazione, quello cioè della mobilità internazionale del lavoro. Va detto, innanzitutto, che il paper è molto chiaro, ben scritto e ha il pregio di trattare, in modo sintetico, ma sufficientemente esaustivo, numerosi aspetti di un fenomeno assai complesso.

Nel mio commento richiamerò dapprima, brevemente, i principali punti che emergono dalla lettura del lavoro. Successivamente farò alcune considerazioni sulle motivazioni economiche alla base delle "politiche restrittive all'immigrazione" da parte dei paesi "ricchi" che vengono indicate da Faini come la principale causa dell'attuale scarsa mobilità internazionale del lavoro.

Nello schema analitico neo-classico standard, la libera circolazione del lavoro può portare a significativi miglioramenti di benessere, sia nei paesi destinatari "ricchi", sia in quelli "poveri", di partenza. Assieme alla libera circolazione delle merci e dei servizi e del capitale essa costituisce un potente strumento per favorire la convergenza economica fra paesi e aree. Nonostante queste potenti predizioni della teoria economica, tuttavia, osserva Faini, la mobilità del lavoro a livello internazionale è assai scarsa e, inoltre, riguarda in gran parte quello relativamente più qualificato. Questa situazione avvantaggia i paesi "ricchi", che riescono ad approvvigionarsi di capitale umano di buona qualità a prezzi bassi, e sfavorisce quelli "poveri" sia perché questi rinunciano, spesso in modo definitivo, al segmento più produttivo della loro popolazione (cosiddetto effetto di *brain drain*), sia perché gli emigrati con qualifiche professionali relativamente più elevate effettuano minori rimesse in favore del paese di origine. L'interessante evidenza empirica illustrata da Faini mostra, appunto, che vi è una correlazione inversa fra qualifica professionale degli

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emigrati e ammontare delle loro rimesse[1]. Ci troviamo, quindi, nel peggiore dei mondi possibili. Per quale motivo? La risposta di Faini è alquanto netta: nonostante "*free migration would be optimal for worldwide welfare……migration policies are, in most industrial countries, increasingly restrictive*" (pag.11).

Se il problema è fondamentalmente quello di politiche migratorie eccessivamente restrittive è necessario chiedersi innanzitutto se vi siano motivazioni economiche che le possano giustificare, almeno in parte. Questo passo è cruciale al fine dell'individuazione di una linea d'intervento coerente. Numerose considerazioni possono essere fatte a questo riguardo; ne sintetizzerò solo le più rilevanti. Innanzitutto, bisogna tenere conto che nel paese destinatario dei flussi migratori i guadagni che derivano dall'aumento dell'offerta di lavoro vanno confrontati con le conseguenze redistributive che ciò comporta; in particolare, tanto più elevati sono i guadagni di efficienza indotti dall'immigrazione, tanto più elevata è la redistribuzione del reddito che ne consegue in sfavore dei salariati e a vantaggio dei capitalisti. Quindi se la funzione di benessere sociale dipende non solo dal livello di efficienza, ma anche dagli effetti redistributivi, i paesi "di arrivo" saranno cauti nel liberalizzare l'immigrazione, preferendo, ad esempio, liberalizzare l'interscambio di beni e servizi, i cui effetti redistributivi sono meno forti e immediati. Un secondo aspetto che può spingere il paese destinatario a contenere i flussi migratori è che questi ultimi non sono facilmente reversibili e questo può porre problemi in caso di fluttuazioni cicliche; in presenza, ad esempio, di un calo temporaneo della domanda è immediato ridurre l'ammontare dei beni acquistati all'estero, ma gli immigrati che rimarranno disoccupati hanno diritto ai sussidi di disoccupazione. Vi è, inoltre, la tendenza dei flussi migratori a concentrarsi in alcune aree specifiche all'interno di un dato paese, generalmente quelle più sviluppate, dando origine a "costi di congestione" e a possibili diseconomie esterne; in questo caso, i benefici di efficienza indotti dall'immigrazione possono ridursi in misura significativa.

Un aspetto che merita un breve approfondimento è poi quello relativo alla composizione dei flussi migratori. Faini sottolinea che questa è distorta in favore del lavoro qualificato, mentre, in passato, la mobilità del

[1] Circa l'effetto di *brain drain*, va sottolineato che si tratta di una questione abbastanza controversa in letteratura Ad esempio, Beine, Docquier e Rapoport (2001) mostrano che la maggiore probabilità di emigrare, che si associa a un più alto livello di educazione, stimola gli investimenti in istruzione nei paesi d'origine, inducendo, quindi, un miglioramento complessivo del capitale umano, compreso quello che rimane nel paese d'origine (cosiddetto *beneficial brain drain*).

lavoro riguardava soprattutto quello meno qualificato. A questo riguardo basta pensare alle grandi ondate migratorie dell'inizio del novecento e anche a quelle, più recenti, degli anni cinquanta e sessanta. È necessaria, però, cautela nell'effettuare confronti intertemporali della composizione dei flussi migratori. Come sottolinea Borjas (1995), il vantaggio assoluto che deriva dallo scambio internazionale di lavoro non dipende solo dalla differenza relativa delle dotazioni dei paesi (un paese esporta il tipo di lavoro che è relativamente più abbondante), ma anche dalla possibilità di sfruttare le complementarietà fra fattori produttivi. Questo è un altro aspetto che differenzia l'interscambio internazionale di lavoro da quello dei beni. Se il paese ricevente ha una dotazione di capitale tecnologicamente avanzato che richiede lavoro relativamente qualificato potrà essere conveniente importare lavoro dello stesso tipo anche se la percentuale di quest'ultimo è molto più alta di quella che prevale nel paese "di partenza". Il mutamento delle tecnologie nel tempo e, quindi, delle complementarietà fra fattori produttivi è quindi cruciale per dare conto della diversa composizione dei flussi migratori nel tempo.

In conclusione, pare un po' semplicistico ricondurre la situazione attuale, insoddisfacente, a politiche sull'immigrazione eccessivamente restrittive, senza analizzarne le sottostanti motivazioni economiche. Va detto, peraltro, che queste non sono esaustive. Motivazioni di natura politica giocano anch'esse un ruolo assai rilevante in questo ambito. La specificità del lavoro, quale fattore di produzione, e la complessità delle problematiche che la sua mobilità solleva, suggeriscono, pertanto, di intensificare gli sforzi per ridurre gli ostacoli al libero commercio di beni e servizi, per rafforzare le politiche di aiuto ai PVS e per incrementare la mobilità internazionale del capitale quali strumenti per favorire la convergenza fra paesi "ricchi" e "poveri".

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SPACE, FACTORS AND SPILLOVERS

*Andrea R. Lamorgese and Gianmarco I.P. Ottaviano**

1. Introduction

That economic activities are geographically concentrated is a well established fact (Krugman, 1991; Saxenian, 1994; Ellison and Glaeser, 1997). At the same time, since (von Thunen, 1826) many theoretical explanations have been put forth explaining why such concentration may take place (Fujita and Thisse, 2001). In terms of their foundations, all theories can be more or less exactly classified under the three categories discussed by Marshall (1920): input-output linkages, labor market pooling and technological spillovers. In a more abstract way, they are based on either pecuniary or technological externalities (Ottaviano and Thisse, 2001).

Theories of pecuniary externalities formalize (Harris, 1954) insights about the role of the so-called "market potential": under increasing returns to scale and costly transportation, firms are pulled towards larger markets because these allow for higher profits. This maps into the empirical prediction that factor returns should be higher in places offering better access to final customers and intermediate suppliers.

Theories of technological externalities focus instead on the role of localized spillovers (Marshall, 1920). The central idea is that a firm's productivity is influenced by physical contiguity with other firms independently from any market interaction. The reason is that a firm's technical know-how is not entirely appropriable. Part of this knowledge is a public good: it spills over to other firms at no cost. However, a crucial fraction of such a non-rival knowledge is not codified and thus can be transmitted only through face-to-face contacts. This local public good aspect pulls firms towards one another, makes them more productive and affects factor returns. In particular, the empirical implication is that factor returns should be higher in places where economic activity is denser.

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While both theoretically appealing, it has become more and more clear that these two stories suffer from what can be called an "identification curse". Indeed, as pointed out by (Ciccone and Hall, 1996), when it comes to bringing them to the data, they seem to be observationally equivalent: even though for different reasons, they both simply imply that contiguity matters.

To overcome the identification curse, it has been argued *informally* that the relative relevance of the two types of externalities should depend on the scale of the analysis. For example, according to (Anas et al., 1998), cities are replete with technological externalities. The same holds in local production systems where informal face-to-face interactions are crucial (Pyke et al., 1990). Thus, technological externalities seem to have a comparative advantage in explaining geographical clusters of somewhat limited spatial dimension (Henderson, 1974; Fujita and Ogawa, 1982). On the contrary, when it comes to larger interregional agglomerations such as the "Manufacturing Belt" in the US and the "Hot Banana" in Europe, it seems reasonable to think that direct physical contact loses much of its explanatory power. This is the realm of pecuniary externalities. Since they are transmitted by the market, they should decay much less rapidly with distance.

Our aim is to test the above informal argument, according to which technological externalities are more spatially bounded than pecuniary ones. Specifically, we interpret such claim *formally* as implying that *the impact of idiosyncratic technological shocks fades away with distance faster than the impact of non-technological shocks*.

We test this prediction on income and productivity data for US Metropolitan Statistical Areas. In so doing, we follow a three-step procedure. First, we separate common and idiosyncratic shocks. Second, we separate technological shocks from all the other shocks. Third, we estimate the impact of an idiosyncratic shock in a certain city on the variables in other cities controlling for the common shocks.

In particular, in the first step we use dynamic factor analysis to extract the unobservable common components that drive the evolution of the dataset. Since we find that the number of unobservable common components is the same as the number of the variables, then it is natural to assume that the dataset-wide aggregates of the two variables are the observable counterparts of the components.

In the second step, we tackle the fact that the two aggregates are both technological and non-technological in nature. That is, they are generated by the technological and non-technological shocks through some

deterministic filter. We run a VAR of the two aggregates to identify the filter so that we can map back the two types of components from their effects on the observed realisations of the aggregates. Next, we use such filter to identify the idiosyncratic components. Once we have identified common and idiosyncratic components for the aggregates, we turn to the disaggregated model to disentangle common and idiosyncratic, technological and non-technological components for each series of income and productivity. Specifically, we assume that the same filter works not only at the aggregate level but also at the city level for any city in the dataset.

In the last step, we study the impact of an idiosyncratic shock in a certain city on other cities controlling for the common components. In particular, we regress income and productivity on own spatial lags ('decay parameter'), own impact of the common component of income, alien impacts of the common component of income weighted by distance, impact of the common component of own productivity, alien impacts of the common component of productivity weighted by distance, alien impacts of the idiosyncratic component of productivity weighted by distance.

The procedure shows that, when significant, the impact of alien idiosyncratic technological shocks is always smaller in absolute value than the impact of alien idiosyncratic non-technological ones. Therefore, as suggested by theory, technological shocks seem to be hampered by distance more than non-technological ones. Moreover, the estimated impacts are negative for both kinds of shocks. This is consistent with a scenario characterised by increasing returns to scale and spatial (imperfect) competition.

The rest of the paper is organised as follows. Section 2 describes the data. Section 3 discusses how we separate common and idiosyncratic shocks. Section 4 explains how we separate technological shocks from non-technological shocks. Section 5 shows how we estimate the impact of an idiosyncratic shock in a certain city on the variables in other cities. Section 6 reports the results. Section 7 concludes.

2. Data description

Our dataset consists of 2 sets of observations concerning the growth rates of Total Personal Income (henceforth 'income') and the growth rates of Labour Productivity (henceforth 'productivity') across 311 US Metropolitan

Statistical Areas (henceforth 'cities') in 25 years:

$$y^i_{mt}; m = 1, 2; i = 1, ..., 311; t = 1969, ..., 1993$$

where $m = 1$ refers to income and $m = 2$ refers to productivity. The latter variable is obtained dividing income by employment, worked hours being unavailable at this breakdown.[1] The data are contained in the REIS database by the Bureau of Economic Analysis, Economics and Statistic Administration of the U.S. Department of Commerce (see A for details). The series are stationary in log-differences.

Based on this dataset, we test the argument according to which the impact of idiosyncratic technological shocks on income and productivity fades away with distance faster than the impact of non-technological shocks. In so doing we proceed in three steps that correspond to the next three sections. First, we separate common and idiosyncratic shocks. Second, we separate technological shocks from all the other shocks. Third, we estimate the impact of an idiosyncratic shock in a certain city on the variables in other cities controlling for the common shocks.

3. Common and idiosyncratic shocks

At city level we assume that the data generating process is a dynamic factor model (Forni and Reichlin, 1998). This amounts to suppose that the realisations of a panel of covariance stationary vector stochastic processes can be written as the sum of the realisations of a common component and those of an idiosyncratic component. A common component is the observed counterpart of a set of shocks that are common to all cities. Moreover, there are shocks that are not common to all cities. These shocks are funneled into the idiosyncratic component. This section estimates the two components.

3.1 The dynamic factor model

We consider the following data generating model:

$$y^i_t = A^i(L)\, u_t + \epsilon^i_t, \tag{1}$$

[1] The metropolitan area definitions used by BEA for its personal income estimates are the county-based definitions issued by the Office of Management and Budget (OMB) for Federal statistical purposes. OMB's general concept of a metropolitan area is that of a geographic area consisting of a large population nucleus together with adjacent communities having a high degree of economic and social integration with the nucleus.

where y_t^i is a zero mean covariance stationary vector stochastic process in $\Re^2$ (that is $y_t^i = (y_{1t}^i, y_{2t}^i)'$), $u_t = (u_t^1, u_t^2, \ldots u_t^q)'$ is a column vector of q unit variance white noises (the 'common shocks'), $A^i(L)$ is a 2xq matrix of rational functions in the lag operator, and ϵ_t^i is a vector of 2 idiosyncratic shocks. In words, (1) poses that the realisations of the vector y for city i at time t can be written as the sum of the realisations of a common component ($A^i(L)u_t$, which is a linear combination of q common shocks u's) and those of an idiosyncratic component.

We can disentangle the common from the idiosyncratic component by assuming *(a)* that the city specific factors ϵ_t^i — which are possibly autocorrelated — are orthogonal at all leads and lags and have the variances bounded from above; and *(b)* that the common shocks u_t are mutually orthogonal and orthogonal with respect to the idiosyncratic components. If that is the case, we can recover the common components by using the Law of Large Numbers. Indeed, since the idiosyncratic variances are bounded from above, by averaging y_t^i along the cross-section the variance of the idiosyncratic component vanishes and the result converges in mean squares to the common component $\bar{y}_t = A(L)u_t$.

3.2 Number of common shocks

The first issue is to determine the rank q of the vector u_t. To do this, we follow the 4-stage method proposed by (Forni and Reichlin, 1998), which consists in (*i*) choosing a partition of the set of cities i, (*ii*) averaging y_t^i within each subset of the partition, (*iii*) computing the spectral density of the resulting vector of averages and obtain its eigenvalues, (*iv*) choosing q as the number of eigenvalues which explain at least 95% of the trace of the covariance matrix of the spectral density. The number of subsets of the partition has to be large enough to capture the number q of common shocks; at the same time it has to be small enough in order not to overstate q, since having a too fine partition tends to introduce too much noise. As to (i), we form subsets through dynamic clustering over y_t^i.[2] This is different from (Forni and Reichlin, 1998), who instead adopt a random partition.

[2] The dynamic clustering exercise we perform amounts to divide the series y_{mt}^i in the dataset into groups (clusters) such that a certain statistics is maximised within the group and minimised across groups. This is the sense of the joint minimisation of the *global cohesion criterion* in Rodrigues (1998), which we take as reference all along the dynamic clustering exercise. The statistic we consider is *coherence*, which has the analogous interpretation of an R^2 in the frequency domain. At any frequency λ, it can be shown that the coherence spectrum $h_{XY}^2(\lambda)$ between two series $\{X_t\}$ and $\{Y_t\}$ is the proportion of variance of $\{X_t\}$ captured by the best linear projection of $\{X_t\}$ on the leads and lags of $\{Y_t\}$, that is

Accordingly, our number of groups is endogenous, and based on an objective economic criterium.[3] As a result, we observe that two dynamic eigenvalues together represent 96 % of the trace, and therefore we select $q = 2$ as the number of common shocks.

3.3 Estimation of components

Once the number of common shocks is known, we can estimate their observed counterparts, that is, the common components. Since the number of unobservable common shocks is the same as the number of the variables, then it is natural to assume that some dataset-wide linear aggregates of income ($\bar{y}_{1t}$) and productivity ($\bar{y}_{2t}$) are indeed the observable counterparts of the shocks.

In order to decompose each series of income and productivity into its common and idiosyncratic component, we estimate (equation by equation) the following disaggregated model:

$$y^i_{mt} = \alpha_m + \beta_{m1}(L)\bar{y}_{1t} + \beta_{m2}(L)\bar{y}_{2t} + \eta^i_{mt} \tag{2}$$

where $\beta_{m1}(L)$ and $\beta_{m2}(L)$ are real valued polynomials in the lag operator.[4] To construct the aggregates, the weights are chosen such that the idiosyncratic component of variables vanishes through aggregation. This result is achieved by choosing the weights ω^i_m equal to $1/\text{var}(\eta^i_{mt})$. Since $\text{var}(\eta^i_{mt})$ is unknown, we start from $\omega^i_m = 1/\text{var}(y^i_{mt})$, then we get the estimated residuals and re-compute the weights. By iteration we converge to the required weights.

The aggregates are obtained as linear combination of the 311 series of

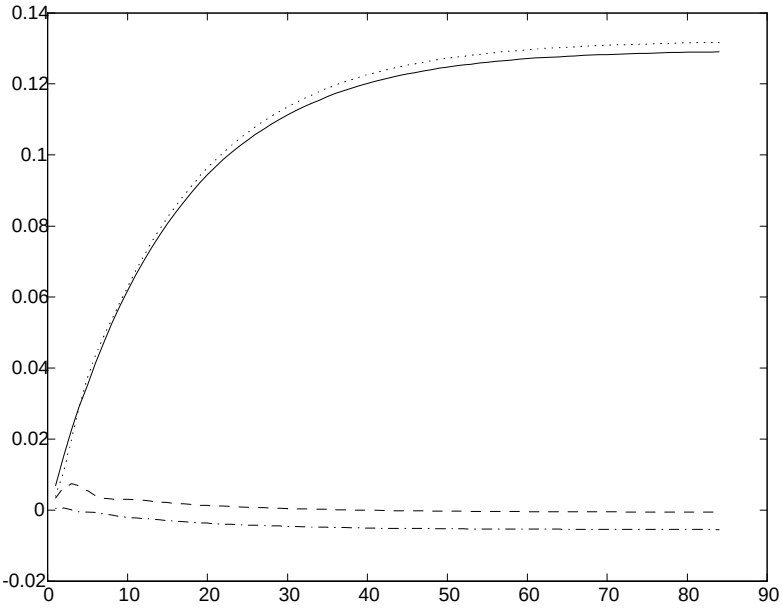
$R^2_{X|Y}(\lambda)$. By the symmetry of the coherence spectrum it can be shown that $h^2_{XY}(\lambda) = R^2_{X|Y}(\lambda) = R^2_{Y|X}(\lambda)$. Considering a statistic in the frequency domain is what makes the exercise dynamic. Another point of strength of this exercise is that it does not impose ex-ante any structure of clustering, that is the classification method is model free, and does not rely on prior beliefs on the clusters composition and number. They both arise endogenously from the data, unlike in more traditional clustering techniques.

[3] We have as well tried to average over the groups resulting from the clustering exercise on income alone: the rank q does not change. When constructing averages on groups chosen randomly as in (Forni and Reichlin, 1998) we underestimate the number of common shocks.

[4] Since we assume that the shocks are fundamental, the whole process can be written as a function of past innovations. Operationally, in the β-polynomials we include four lags and the contemporaneous value.

Figure 1

Impulse response functions of income and productivity



Notes: Dash-dotted line: non technological shock on output. Dashed line: non technological shock on productivity. Solid line: technological shock on output. Dotted line: technological shock on productivity. The plots of the impulse response functions are smoothed using an hamming windows of width 7.

income and productivity, using the vectors ω_1 and ω_2 as weights, as in

$$\overline{y}_{mt} = \sum_i \omega_m^i y_{mt}^i. \tag{3}$$

The common components (χ_{mt}^i) are represented by the fitted values of the above regressions:

$$\chi_{mt}^i = \hat{y}_{mt}^i = \hat{\alpha} + \hat{\beta}_{m1}(L)\bar{y}_{1t} + \hat{\beta}_{m2}(L)\bar{y}_{2t} = A_m^i(L)u_t \tag{4}$$

while the idiosyncratic components are recovered as the corresponding residuals:

$$\xi_{mt}^i = y_{mt}^i - \chi_{mt}^i. \tag{5}$$

4. Isolating the technological shocks

So far we have decomposed each series of income and productivity into its common and idiosyncratic components. However, by adopting model (1), we assume that such components are linear combinations — through some deterministic *filter*— of unobservable technological and non-technological, common and idiosyncratic shocks. We now choose a particular *filter* (an "identification") which allows us to identify both common and idiosyncratic shocks as technological and non technological ones, and estimate them.

4.1 Identification of shocks

By using the aggregates (3) obtained in the previous section, we can separate technological shocks from all the other shocks. Specifically, we estimate a VAR of the aggregates of income and productivity. By identifying the VAR we disentangle the technological from the non technological (common and idiosyncratic) shocks in the aggregate. By assuming that this same identification holds for each city, we separate the technological from the non-technological (common and idiosyncratic) shocks in each city.

Identification of the technological and non-technological shocks is achieved by choosing the rotation of the space of the errors of the VAR such that: (*i*) non-technological shocks have only temporary effects on the levels of output and productivity; (*ii*) technological shocks have permanent effects on output and productivity, and the impulse response function of the levels of income and productivity to the technological shock are S-shaped; (*iii*) positive technological and non-technological shocks have positive effects on aggregate output and productivity.

Operationally, we start from a VAR identified *a la* (Sims, 1980), that is, a triangular VAR in which shocks to income and productivity affect income, while only shocks to productivity affect productivity.[5] Then we rotate the space of errors by any possible angle $\theta \in [0, 2\pi]$, with $\theta = 0$ corresponding to the initial situation, until we achieve the desired identification.[6] The

[5] In general, given a structural model $X_t = G(L)v_t$, X_t has a Wold representation $X_t = F(L)w_t$, where $F(0) = I$ and w_t is a vector of serially uncorrelated structural disturbances with a mean of zero and a covariance matrix Σ_w which is unrestricted. "Identification consists in finding a matrix Q such that $F(L)QQ^{-1}w_t = G(L)v_t$ satisfies conditions deduced from the theory" (Forni and Reichlin, 1995). In the triangular identification *a la* (Sims, 1980), three of the four parameters of matrix Q are identified by the hypothesis of orthogonality of the element of v_t and the normalisation $Evv' = I$, while the fourth is assumed to be zero. $F(L)Qw_t$ is the identified reduced form.

[6] This amounts to post-multiplying the coefficients of the vectoral moving average

rotation matrix represents the *filter* we need in order to recover (common and idiosyncratic) technological and non-technological shocks starting from (common and idiosyncratic) components of income and productivity.

The VAR we estimate and identify includes four lags of the aggregates on the right hand side. The identification compatible with the three conditions listed above is achieved using an angle of rotation θ of 94 hundredths of $2 \cdot \pi$ (=5.9). The impulse response functions of the levels of the logarithms of income and productivity to the technological and non-technological shocks are shown in figure 1.

4.2 Common and idiosyncratic components

To compute common and idiosyncratic components for each city, while distinguishing between technological and non-technological components, we can use the rotation matrix delivering the identification for the VAR of the aggregates:

$$R = \begin{pmatrix} \cos(\theta) & \sin(\theta) \\ -\sin(\theta) & \cos(\theta) \end{pmatrix} = \begin{pmatrix} 0.9284 & -0.3717 \\ 0.3717 & 0.9284 \end{pmatrix} \tag{6}$$

In so doing, we assume that the same filter works not only at aggregate level but also at city level for any city in the dataset. The inner product of the matrix of idiosyncratic components of income and productivity ($[\xi^i_{1t} \;\; \xi^i_{2t}]$) by the rotation matrix allows us to recover the technological and non technological idiosyncratic shocks,

$$[\xi^i_{\text{tech},t} \; \xi^i_{\text{ntech},t}] = [\xi^i_{1t} \;\; \xi^i_{2t}] \cdot R, \tag{7}$$

as well as the inner product of the matrix of the common components of income and productivity ($[\chi^i_{1t} \;\; \chi^i_{2t}]$) times the rotation matrix returns the technological and non technological common shocks

$$[\chi^i_{\text{tech},t} \;\; \chi^i_{\text{ntech},t}] = [\chi^i_{1t} \;\; \chi^i_{2t}] \cdot R = [\mathbf{i} \;\; X^i_{1t} \;\; X^i_{2t}] \cdot \hat{B}(L) \cdot R \tag{8}$$

where $\mathbf{i}$ is a vector of ones, $X^i_{mt} = [\bar{y}^i_{mt} \;\; \bar{y}^i_{mt-1} \;\; \bar{y}^i_{mt-2} \;\; \bar{y}^i_{mt-3} \;\; \bar{y}^i_{mt-4}]$,

$$\hat{B}(L) = \begin{pmatrix} \hat{\alpha}_1 & \hat{\beta}_{11}(L) & \hat{\beta}_{12}(L) \\ \hat{\alpha}_2 & \hat{\beta}_{21}(L) & \hat{\beta}_{22}(L) \end{pmatrix},$$

representation of the VAR times the rotation matrix (6), which basically undoes —according to the econometrician's prior— the linear combination which has produced income and productivity shocks (i.e. the shocks of the structural VAR) starting from the unobservable technological and non-technological shocks (i.e. the shocks of the reduced form of the VAR).

and $\hat{\beta}_{m1}(L)$ and $\hat{\beta}_{m2}(L)$ are real valued polynomials in the lag operator, each one made of 5 elements.

5. The diffusion of technological shocks

We can now estimate the impact of an idiosyncratic shock in a certain city on the variables in other cities controlling for the common components. In so doing, we use a spatial autoregressive framework. The reason is spatial interdependence among the observations, which is likely due to the geographic dimension of our dataset. Indeed, spatial interdependence represents a violation of the Gauss-Markov assumptions, which results in biased estimates.

To see this, consider the data-generating process which produces spatially interdependent observations:

$$y = X\beta + \varepsilon \tag{9}$$

$$y_i = f(y_j), \text{ for } i = 1, \dots, n, \ j \neq i. \tag{10}$$

When applying the ordinary least squares (henceforth OLS) regression method, we suppose that the data generating process is just represented by (**??**), where the set of variables X and the parameter β are fixed, while repeated disturbance vectors ε generate the sample y that we observe. Since X and β are fixed and non stochastic, the distribution of sample y vectors has the same variance-covariance structure as ε. Therefore, if we fail to consider explicitly the spatial interdependence given by the relation (10), we hide the spatial interdependence in the residuals that fail in turn to be independent. This implies that the OLS estimates of a *spatial dependent model* will be both biased and inconsistent.[7]

The specific spatially autocorrelated model we estimate is

$$(\mathrm{I} - \rho W_0)\mathbf{y} = \alpha + \beta W_0 \boldsymbol{\xi} + \boldsymbol{\gamma}_1 \mathbf{X} + \boldsymbol{\gamma}_2 W_0 \mathbf{X} + \nu, \tag{11}$$

[7] We show the details of the argument for model (11) in B, where we also explain the correct procedure to estimate a model featuring spatial interdependence. For the general discussion of the bias and inconsistency of the OLS regressors for a first-order spatial AR, the interested reader may refer to (Anselin, 1988) and (LeSage, 1999).

with

$$\mathbf{y} = \begin{pmatrix} \underline{y}_1 \\ \underline{y}_2 \\ \vdots \\ \underline{y}_T \end{pmatrix}, \quad \boldsymbol{\xi} = \begin{pmatrix} \underline{\xi}_1 \\ \underline{\xi}_2 \\ \vdots \\ \underline{\xi}_T \end{pmatrix}, \quad \mathbf{X} = \begin{pmatrix} \underline{X}_1 \\ \underline{X}_2 \\ \vdots \\ \underline{X}_T \end{pmatrix}$$

and

$$\underline{y}_t = \begin{pmatrix} y_m^1 t \\ y_m^2 t \\ \vdots \\ y_m^{311} t \end{pmatrix}, \quad \underline{\xi}_t = \begin{pmatrix} \xi^1_{tech,t} & \xi^1_{ntech,t} \\ \xi^2_{tech,t} & \xi^2_{ntech,t} \\ \vdots & \\ \xi^{311}_{tech,t} & \xi^{311}_{ntech,t} \end{pmatrix}, \quad \underline{X}_t = \begin{pmatrix} \chi^1_{tech,t} & \chi^1_{tech,t} \\ \chi^2_{tech,t} & \chi^2_{ntech,t} \\ \vdots & \\ \chi^{311}_{tech,t} & \chi^{311}_{ntech,t} \end{pmatrix}.$$

In the above equations, $\mathbf{y}$ and ν are nxT column vectors, $\mathbf{X}$ and $\boldsymbol{\xi}$ are (nxT)x2 matrices and W_0 is a kronecker product between an identity matrix and the (nxn) weighting matrix of normalised bilateral distances among all the MSAs. The normalisation implies that the matrix is re-scaled so that the row sum equals one. Finally, $\beta = [\beta_1 \ \beta_2]$, $\gamma_1 = [\gamma_{11} \ \gamma_{12}]$, and $\gamma_2 = [\gamma_{21} \ \gamma_{22}]$.

We focus on the parameters β's, which measure the spatial diffusion of technological and non-technological idiosyncratic shocks (local spillovers of local shocks), and the γ_2's which represent the diffusion of technological and non-technological common shocks (local spillovers of common shocks). The γ_1's are the coefficients associated to the controls we use to condition out the effect of own common components when estimating spillovers. Finally, the parameter ρ measures the amount of correlation among city i's income (productivity) and neighbouring locations' income (productivity), conditioned on the variables on the left hand side of (11). Thus, ρ, the $\beta's$ and the γ_2's are 'spatial decay parameters'.

Spatial econometrics models normally deal with cross sections of data. Here we have adapted the framework to deal with a panel. The main issue is that we need to model the way neighbouring locations interact over time. The associated hypotheses affect the matrix W_0. For simplicity, we suppose that neighbouring locations are independent at all leads and lags but the contemporaneous, so that local correlations exhaust within one period. Hence the matrix W_0 is constructed as the kronecker product of an identity matrix of dimension T (the time dimension of the panel) and the one-period weighting matrix.[8]

[8] We have also tried an alternative weighting matrix that allows for two lags

6. Results

Tables 1 to 4 present the results. We estimate two regressions, with income growth and productivity growth as dependent variables respectively. For each regression, we consider four different specifications: (1) within estimation with fixed effect on the clusters the city belongs to, and idiosyncratic and common components identified as technological and non technological shocks; (2) within estimation with fixed effect on the clusters the city belongs to, and (unidentified) idiosyncratic and common components of income and productivity; (3) within estimation with fixed effect on the clusters the city belongs to, and (unidentified) common components of income and productivity and idiosyncratic technological and non technological shocks; (4) specification (1) with fixed effects on the state the city belongs to, rather than on the cluster. The first is our favourite specification since it fully implements the procedure presented in the previous sections. The results associated to the other specifications are shown as robustness checks. Lastly, since limited computing power prevents us from running regression (11) for the whole sample at once, we provide estimates for two non-overlapping sub-periods of equal sizes: 1974-1983 and 1984-1993.

The key results are the estimated impacts of neighbouring cities' idiosyncratic technological ('neighbours idio tech') and non-technological ('neighbours idio non tech') shocks on city income and productivity growth. In particular, when significant the impact of the former shocks is always smaller in absolute value than the impact of the latter (except for income in 1973-1984, where the two coefficients are not significantly different one from the other, as suggested by the Wald test (-1.36)). Therefore, as suggested by theory, *technological shocks are hampered by distance more than non-technological ones*.

In terms of signs, the estimated impacts of neighbouring cities' idiosyncratic technological and non-technological shocks are both negative. This is consistent with a scenario characterised by *increasing returns to scale and spatial (imperfect) competition*. In such scenario a positive idiosyncratic (supply/demand) shock in a certain city increases the local scale of production while decreasing the scale of production in other cities. The outcome is higher income and productivity in the former city associated with lower income and productivity elsewhere.

of the geographically weighted variables to have an influence on current values neighbouring variables. Results are virtually unchanged.

7. Concluding remarks

It has been argued that technological externalities are more spatially bounded than pecuniary ones. We have interpreted such claim as implying that the impact of idiosyncratic technological shocks fades away with distance faster than the impact of non-technological shocks. We have tested this prediction on income and productivity data for US Metropolitan Statistical Areas. In so doing, we have followed a three-step procedure. First, we have separated common and idiosyncratic shocks. Second, we have separated technological shocks from all the other shocks. Third, we have estimated the impact of an idiosyncratic shock in a certain city on the variables in other cities controlling for the common shocks.

We have found that, when significant, the impact of idiosyncratic technological shocks is always smaller in absolute value than the impact of the idiosyncratic non-technological ones. Therefore, as suggested by theory, technological shocks seem to be hampered by distance more than non-technological ones. Moreover, the estimated impacts are negative for both kinds of shocks. This is consistent with a scenario characterised by increasing returns to scale and spatial (imperfect) competition.

APPENDIX A

Data description

Employment is Total Full-time and Part-time Employment by Industry. Total Full-time and Part-time Employment by Industry (Table CA25) contains estimates of employment in Standard Industrial Classification (SIC) Division ("one-digit") detail. That's not a problem since we are disregarding sectors in this experiment. Employment is measured as the average annual number of jobs, full-time plus part-time; each job that a person holds is counted at full weight. The estimates are on a place-of-work basis. The estimates are organised both by type (wage and salary employment and self-employment) and by industry.

The source data for REMD's wage and salary employment estimates are from the Bureau of Labor Statistics (BLS) ES-202 series. The ES-202 series provides monthly employment and quarterly wages for each county in four-digit SIC detail. REMD releases local area employment estimates at the one-digit SIC level because self-employment is estimated– based mainly on data tabulated from individual and partnership income tax returns– at the one-digit level. (In the State annual series, however, the employment estimates are prepared and released at the SIC two-digit level.)

Personal income (Table CA05) is a measure of income received; therefore, estimates of State and local area personal income reflect the residence of the income recipients. The adjustment for residence is made to wages and salaries, other labor income, and personal contributions for social insurance, with minor exceptions, to place them on a place-of-residence (where-received) basis. The adjustment is necessary because these components of personal income are estimated from data that are reported by place of work (where earned). The estimates of proprietors' income, although presented on the table as part of place-of-work earnings, are largely by place of residence; no residence adjustment is made for this component. Net earnings by place of residence is calculated by subtracting personal contributions for social insurance from earnings by place of work and then adding the adjustment for residence, which is an estimate of the net inflow of the earnings of interarea commuters. The estimates of dividends, interest, and rent, and of transfer payments are prepared by place of residence only. Total personal income is the aggregate personal income received in the MSA.

Estimates of earnings by place of work are provided in CA05 at the two-digit Standard Industrial Classification (SIC) level. The principal source data for the wage and salary portion of REMD's earnings estimates are from the Bureau of Labor Statistics (BLS) ES-202 series. The ES-202 series provides monthly employment and quarterly wages for each county in four-digit SIC detail. REMD restricts its earnings estimates to the SIC Division ("one-digit") and two-digit levels and suppresses these estimates in many individual cases in order to preclude the disclosure of information about individual employers.

Wage and salary disbursements are defined as the monetary remuneration of employees.

This remuneration includes the compensation of corporate officers (commissions, tips, and bonuses), voluntary employee contributions to certain deferred compensation plans (such as 401(k) plans), and receipts in kind, or pay-in-kind, that represent income. Wage and salary disbursements are measured before deductions, such as social security contributions and union dues, and they reflect the amount of wages and salaries disbursed, but not necessarily earned, during the year. The estimates are prepared, with a few exceptions, at the Standard Industrial Classification (SIC) two-digit level. Wage and salary disbursements accounted for about 57 percent of total personal income at the national level in 1993.

Other labour income consists of the payments by employers to privately administered benefit plans for their employees, the fees paid to corporate directors, and miscellaneous fees. The payments to private benefit plans account for more than 98 percent of other labour income. Other labour income excludes employer contributions for social insurance, which are paid to government-administered funds. Under the conventions of the national income and product accounts, the benefits paid from social insurance funds, not the employer contributions to the funds, are measured as part of personal income. These benefits are classified as transfer payments. Other labour income accounted for about 6.6 percent of total personal income at the national level in 1993.

Proprietors' income with inventory valuation and capital consumption adjustments is the current-production income (including the income in kind) of sole proprietorships and partnerships and of tax-exempt cooperatives.[10] Proprietors' income includes the imputed net rental income of owner-occupants of farm dwellings, but it excludes the dividends and the monetary interest that are received by nonfinancial business and the rental income received by persons not primarily engaged in the real estate business.[11] Proprietors' income accounted for approximately 8 percent of total personal income at the national level in 1993.

Data are provided with a 2 digits SIC sectoral breakdown, which means that 79 sectors, disaggregated from 9 divisions (agricultural services forestry fisheries and other, mining, construction, manufacturing, transportation and public utilities, wholesale trade, retail trade, finance insurance and real estate services), are represented. Twenty one of them are manufactures.

[10] A sole proprietorship is an unincorporated business owned by a person. A partnership is an unincorporated business association of two or more partners. A tax-exempt cooperative is a nonprofit business organisation that is collectively owned by its members.

[11] The dividends are included in personal dividend income, the monetary interest, in personal interest income, and the rental income, in rental income of persons.

APPENDIX B

Bias and inconsistency of OLS estimates of the Durbin model

Consider model (11) and rewrite it as

$$\begin{aligned} y^i =& \rho W_0 y^i + \alpha + \beta_1 X^i + \beta_2 W_0 X^i + \epsilon^i, \\ y =& \rho W y + \beta \tilde{X} + \epsilon \\ \text{where } \tilde{X} =& \big[X, \ WX\big]. \end{aligned}$$

As suggested by (Anselin, 1988), the way to estimate the parameters in this model is given by the following procedure:

1. OLS estimate of $y = \tilde{X}\beta_0 + \epsilon_0$, from which $\hat{\beta}_0 = (\tilde{X}'\tilde{X})^{-1}\tilde{X}'y$;
2. OLS estimate of $Wy = \tilde{X}\beta_L + \epsilon_L$, from which $\hat{\beta}_L = (\tilde{X}'\tilde{X})^{-1}\tilde{X}'Wy$;
3. estimate ρ as a partial regression coefficient $e_0 = \rho e_L + \epsilon$, where e_L and e_L are the residuals of the OLS regression of y and Wy on $\tilde{X}$;
4. given the estimate $\hat{\rho}$ for the autoregressive parameter, compute $\hat{\beta} = \hat{\beta}_0 - \rho\hat{\beta}_L$ and $\hat{\sigma}^2_\epsilon = (1/n)(e_0 - \rho e_L)'(e_0 - \rho e_L)$.

Spatial interdependence represents a problem when estimating ρ (step 3) by simple OLS. Indeed it would come out that

$$\begin{aligned} \hat{\rho} &= (e'_L e_L)^{-1} \ e'_L \ e_0, \quad \text{therefore} \\ E\big[\hat{\rho}\big] &= \rho + \underbrace{E\Big\{\big[(Wy - \tilde{X}\beta_2)' \ (Wy - \tilde{X}\beta_2)\big]^{-1}(Wy - \tilde{X}\beta_2)'\epsilon\Big\}}_{\text{bias}}. \end{aligned}$$

Since Wy is not fixed in repeated samples, one cannot pass the expectation operator over the term $\big[(Wy - \tilde{X}\beta_2)' \ (Wy - \tilde{X}\beta_2)\big]^{-1}(Wy - \tilde{X}\beta_2)'$, which prevents the bias term from vanishing. This rule out also consistency since the plim$\{y'W'\epsilon\}$ does not vanish either. The correct way of estimating ρ is to replace step 3 with

3 bis. given e_0 and e_L, find ρ which maximises the concentrated likelihood function:
$L_C = -(n/2)\ln(\pi) - (n/2)\ln(1/n)(e_0 - \rho e_L)'(e_0 - \rho e_L)$
$+ \ln(\mid I - \rho W \mid)$.

Table 1

Fixed effect estimates: 1974-83

Dependent variable: income				
		within clusters		within states
	(1)	(2)	(3)	
own common non tech	-0.37	-	-	-0.38
	(-17.37)	-	-	(-16.33)
own common tech	0.96	-	-	0.97
	(96.00)	-	-	(86.54)
own common income	-	1.03	1.03	-
	-	(93.93)	(93.53)	-
own common productivity	-	0.01	0.01	-
	-	(0.27)	(0.26)	-
neighbours common non tech	-0.02	-	-	-0.01
	(-0.19)	-	-	(-0.23)
neighbours common tech	-0.06	-	-	-0.07
	(-0.27)	-	-	(-0.76)
neighbours common income	-	0.80	-0.02	-
	-	(6.16)	(-0.06)	-
neighbours common productivity	-	-0.03	-0.03	-
	-	(-1.02)	(-1.06)	-
neighbours idio tech	-1.35	-	-1.31	-1.35
	(-5.09)	-	(-4.17)	(-8.22)
neighbours idio non tech	-0.83	-	-0.84	-0.84
	(-4.24)	-	(-4.05)	(-4.74)
neihbours idio productivity	-	-1.26	-	-
	-	(-6.98)	-	-
ρ	0.03	-0.81	0.00	0.03
	(0.14)	(6.32)	(0.00)	(0.36)
Adjusted R^2	0.84	0.68	0.85	0.83
Wald test	-1.36		-1.15	-4.25

Note: t-stat in parenthesis. For within clusters estimates: specification (1) uses as regressors common and idiosyncratic components identified as technological and non technological shocks; specification (2) uses income and productivity common components; specification (3) a mix of both. For within states estimates, specification (1) is used. The Wald test is a t-test of the linear restriction $H_0 : \beta_1 = \beta_2$.

Table 2

Fixed effect estimates: 1974-83

Dependent variable: productivity				
		within clusters		within states
	(1)	(2)	(3)	
own common non tech	0.88	-	-	0.87
	(50.84)	-	-	(46.66)
own common tech	0.36	-	-	0.37
	(45.44)	-	-	(40.66)
own common income	-	0.00	0.00	-
	-	(0.21)	(0.15)	-
own common productivity	-	1.02	1.02	-
	-	(57.37)	(59.42)	-
neighbours common non tech	-0.22	-	-	-0.30
	(-1.42)	-	-	(-1.76)
neighbours common tech	-0.08	-	-	-0.12
	(-1.24)	-	-	(-1.66)
neighbours common income	-	0.00	0.00	-
	-	(0.14)	(0.15)	-
neighbours common productivity	-	1.74	-0.02	-
	-	(8.68)	(-0.08)	-
neighbours idio tech	-1.06	-	-1.04	-1.11
	(-7.56)	-	(-7.84)	(-7.61)
neighbours idio non tech	-1.65	-	-1.30	-1.72
	(-7.84)	-	(-5.72)	(-7.76)
neighbours idio income	-	-0.48	-	-
	-	(-4.69)	-	-
ρ	0.29	-1.75	0.00	0.39
	(1.72)	(-8.83)	(0.00)	(2.06)
Adjusted R^2	0.76	0.77	0.77	0.76
Wald test	3.20		1.20	3.54

Note: t-stat in parenthesis. For within clusters estimates: specification (1) uses as regressors common and idiosyncratic components identified as technological and non technological shocks; specification (2) uses income and productivity common components; specification (3) a mix of both. For within states estimates, specification (1) is used. The Wald test is a t-test of the linear restriction $H_0 : \beta_1 = \beta_2$.

Table 3

Fixed effect estimates: 1984-93

Dependent variable: income				
	within clusters			within states
	(1)	(2)	(3)	
own common non tech	-0.38 (-16.88)	- -	- -	-0.37 (-15.71)
own common tech	0.87 (79.22)	- -	- -	0.87 (74.38)
own common income	- -	0.94 (73.52)	0.94 (73.38)	- -
own common productivity	- -	-0.01 (-0.27)	-0.01 (-0.26)	- -
neighbours common non tech	0.01 (0.00)	- -	- -	0.01 (0.14)
neighbours common tech	-0.03 (0.00)	- -	- -	-0.03 (-0.28)
neighbours common income	- -	0.47 (4.07)	0.02 (0.06)	- -
neighbours common productivity	- -	-0.02 (-0.61)	-0.03 (-0.71)	- -
neighbours idio tech	-1.12 (-15.07)	- -	-1.10 (-3.61)	-1.13 (-6.21)
neighbours idio non tech	-1.33 (-5.12)	- -	-1.36 (-4.82)	-1.35 (-5.03)
neighbours idio productivity	- -	-1.67 (-5.98)	- -	- -
ρ	0.05 (0.00)	-0.45 (-3.97)	0.00 (0.00)	0.05 (0.44)
Adjusted R^2	0.75	0.75	0.75	0.73
Wald test	1.74		0.58	0.85

Note: t-stat in parenthesis. For within clusters estimates: specification (1) uses as regressors common and idiosyncratic components identified as technological and non technological shocks; specification (2) uses income and productivity common components; specification (3) a mix of both. For within states estimates, specification (1) is used. The Wald test is a t-test of the linear restriction $H_0 : \beta_1 = \beta_2$.

Table 4

Fixed effect estimates: 1984-93

Dependent variable: productivity				
		within clusters		within states
	(1)	(2)	(3)	
own common non tech	0.86 (49.47)	- -	- -	0.86 (46.80)
own common tech	0.34 (40.36)	- -	- -	0.35 (38.22)
own common income	- -	-0.01 (-0.61)	-0.01 (-0.61)	- -
own common productivity	- -	0.97 (57.70)	0.97 (57.75)	- -
neighbours common non tech	0.84 (3.23)	- -	- -	0.91 (2.97)
neighbours common tech	0.29 (3.01)	- -	- -	0.32 (2.76)
neighbours common income	- -	0.02 (1.20)	0.02 (1.18)	- -
neighbours common productivity	- -	2.73 (0.00)	0.08 (0.41)	- -
neighbours idio tech	-1.03 (-7.35)	- -	-1.16 (-8.55)	-1.01 (-6.83)
neighbours idio non tech	-2.25 (-8.49)	- -	-2.38 (-8.83)	-2.21 (-7.75)
neighbours idio income	- -	-0.20 (-2.22)	- -	- -
ρ	-0.74 (-2.69)	-2.65 (0.00)	0.00 (0.00)	-0.81 (-2.50)
Adjusted R^2	0.67	0.68	0.68	0.67
Wald test	6.08		5.17	6.32

Note: t-stat in parenthesis. For within clusters estimates: specification (1) uses as regressors common and idiosyncratic components identified as technological and non technological shocks; specification (2) uses income and productivity common components; specification (3) a mix of both. For within states estimates, specification (1) is used. The Wald test is a t-test of the linear restriction $H_0 : \beta_1 = \beta_2$.

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COMMENTO A "SPACE, FACTORS AND SPILLOVERS" DI ANDREA LAMORGESE E GIANMARCO OTTAVIANO

Marco Lippi

Questa, di Lamorgese e Ottaviano è un'applicazione molto interessante a questioni di economia spaziale di un metodo che è stato sviluppato all'interno della teoria delle serie temporali. L'idea dl base e molto semplice: se abbiamo a disposizione un grande numero di serie temporali relative ad un'area economica come l'Europa, o gli Stati Uniti possiamo isolare per ciascuna variabile una componente comune ed una componente specifica, idiosincratica, come e in uso dire in questa letteratura. Venendo subito ai dati usati in questo lavoro, ciascuna, delle variabili di reddito e produttività relative a 311 città statunitensi può essere decomposta come somma di due componenti:

a) una componente comune in cui si manifestano cause macroeconomiche di variazione. Più precisamente, si suppone che esista un numero piccolo (ma non necessariamente uguale all'unità) di `fattori comuni' i quali influenzano con diverse intensità e dinamiche tutte le variabili.
b) una componente locale. Componenti locali relative a differenti città sono non correlate, o debolmente correlate. Ad esempio, correlazioni tra componenti idiosincratiche di città 'vicine' sono ammissibili.

L'ipotesi che il numero delle variabili sia grande è cruciale per il metodo di stima adottato in questo lavoro. Infatti, se prendiamo aggregati di tutte le variabili, la legge dei grandi numeri implica che solo le componenti comuni si 'salvino'. Prendendo un numero di aggregati uguale al numero dei fattori comuni (quindi e necessario usare sistemi di pesi diversi per i diversi aggregati), questi ultimi vengono approssimativamente ricostruiti, anche se a meno di l una rotazione. In altri termini, ciò che viene ricostruito e lo spazio di tutte le combinazioni lineari dei fattori comuni; la ricostruzione dei fattori comuni pone l n problema di identificazione.

Gli autori stabiliscono che il numero dei fattori comuni da stimare è 2 (sul criterio adottato si veda la Sezione 3.2) . Effettuata la stima, identificano uno shock tecnologico e uno shock non tecnologico per: (1) il vettore dei fattori comuni, e (2) il vettore delle componenti idiosincratiche di ciascuna città. La matrice di rotazione necessaria per l'identificazione degli shock di cui in (2) e la stessa determinata per l'identificazione degli shock di cui in (1). Questa la chiamerei un'ipotesi eroica, nel senso che

consente di procedere ed e senza dubbio parsimoniosa, ma non ha una motivazione se non in una analogia.

Identificati in questo modo gli shock tecnologico e non tecnologico, sia per i fattori comuni che per le variabili idiosincratiche, gli autori analizzano le relazioni spaziali tra shock, in modo da sottoporre a prova l'ipotesi che uno shock alla tecnologia in una data città si propaghi alle città circostanti in modo più debole rispetto ad uno shock non tecnologico (si veda la discussione economica nella Sezione 1) .

Il risultato del modello spaziale è coerente con le attese (si veda la Sezione 6): "technological shocks are hampered by distance more than non-technolgical ones" . Non sono pero completamente convinto dalla spiegazione del segno negativo dell'effetto che uno shock tecnologico idiosincratico ha sulle città vicine. Inoltre, penso che anche l'analisi spaziale delle componenti comuni sarebbe importante. A questo va aggiunto che il modello economico sottostante (esposto nella Sezione 1) non è affatto formalizzato, cosicché non è facile giudicare questi aspetti per chi non sia bene addentro alla letteratura sulla localizzazione.

Nel complesso trovo che si tratti di un contributo importante, che tenta di saldare due terreni di analisi fino ad ora privi di relazione. Mi auguro che il lavoro non resti a questo stadio e cioè che venga inscritto in uno sforzo di lunga durata. In particolare, penso che i seguenti punti andrebbero approfonditi:

a) l'identificazione degli shock tecnologico e non tecnologico alle variabili idiosincratiche. Come detto sopra, mi sembra che la scelta fatta debba essere considerata provvisoria. Forse i vettori idiosincratici delle diverse città andrebbero trattati uno per uno, con lo stesso criterio ma non con la stessa matrice.
b) una formalizzazione accurata delle ipotesi economiche sottostanti dovrebbe consentire una analisi più convincente dei risultati econometrici.

INTERNATIONAL MARKET ACCESS FOR THE EXPORTS OF DEVELOPING COUNTRIES: EMPIRICAL EVIDENCE AND TRADE POLICY ISSUES

Valeria Rolli and Andrea Zaghini[*]

1. Introduction

The long-expected launch of fresh multilateral negotiations of trade liberalisation - which finally received a green light at the World Trade Organisation (WTO) Fourth Ministerial Meeting held at Doha in November 2001 – may bear important implications for the prospects of the international trade system at large and, more specifically, for the participation of developing countries in world trade.

International trade liberalisation has indeed progressed significantly over the last decade, in part as a consequence of the conclusion of the Uruguay Round (1985-1994) of multilateral trade negotiations. Compared to previous multilateral rounds (Kennedy Round, ended in 1967; Tokyo Round, in 1979), it was characterised by a more active participation by developing countries and by their undertaking deeper commitments to bind their tariff protection and to accept multilateral rules. As one implication, the long-pending issue of the high degree of protection of agricultural and textiles markets in developed countries began finally to be tackled. However, subsequent implementation of the Uruguay Round (UR) Agreements has shown that the issue is still far from being settled in a satisfactory way, at least from the point of view of developing countries being large exporters of agricultural and textile products.

Another significant development which took place in the first part of the nineties was a tendency towards the "regionalization" of international trade, through the conclusion of preferential and/or free trade agreements both in the Americas and Europe. Besides the launch of the European Single Market, a distinct feature of such trend was the creation of preferential trade areas involving, for the fist time, partner countries at very different stages of economic development: the conclusion of the North America Free Trade Agreement (NAFTA) among the United States,

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Canada and Mexico in 1992 and the signing of the Association Agreements between the European Union (EU) and each of the countries of Central and Eastern Europe, starting from 1991.

Such regional developments clearly sustained the process of international trade liberalisation, especially as they fostered economic transformation and trade liberalisation in the emerging countries taking part to those agreements. Besides, they provided a significant push for multilateral negotiations of trade liberalisation, especially as regards progress in innovative trade issues, more difficult to tackle in the multilateral forum. A clear example of this positive externality is provided by the NAFTA discipline on trade in services, whose framework facilitated the drafting of the General Agreement on Trade in Services (GATS) signed within the UR Agreement.

However, an unpleasant consequence from the creation of such preferential trade areas was the discrimination against exports from those countries which had been excluded. This negative "trade-diversion" effect was probably significant for many excluded developing countries, since it was under threat their access to the largest and most affluent markets in the world (North America and Western Europe). This adverse effect is also likely to be stronger in those sectors where the EU and the US maintained high external trade barriers, such as the agricultural and textiles and clothing sectors.

Against this background, one may notice that the negotiating agenda which has been finally agreed upon at Doha deals precisely with further multilateral liberalisation of trade in the agricultural and textiles and clothing sectors. Moreover, the agenda also addresses some other trade issues of special interest to developing and poor countries, some of which were left partially unsettled in the UR. The implications of the Doha meeting should not however be overestimated: a very difficult negotiation process lies ahead, which could take several years and whose outcome is very uncertain. One may recall in this respect the very slow progress of the UR, which took eight years, from 1986 to 1994, to be completed and whose full implementation took other six to ten years.

In order to understand the implications of such negotiations for the growth of developing country exports, we propose a systematic review of developing countries' trade performance in major developed country markets over the last two decades; we also try to assess the influence

exerted by trade barriers in those markets and by the creation of preferential trade areas.

The work is divided into three main sections. Section 2 analyses trade flows of agricultural and industrial products from developing countries to major industrial countries' markets, based on indexes of international trade specialisation and market shares. Data cover the period 1980-98, therefore allowing to trace out long-term trends. More specifically, paragraphs 2.1 - 2.3 deal with the general pattern of trade in goods, paragraph 2.4 describes special features in the agricultural and textiles and clothing sectors, and paragraph 2.5 reviews international trade of commercial services. Section 3 examines the extent of import protection in industrial countries' markets, based on computed measures of tariff and non-tariff barriers. In particular, paragraph 3.1 deals with tariff barriers against imports of agricultural and industrial products; paragraph 3.2 tackles the issue of quantitative restrictions in the textiles and clothing sector, that of high public support to the agricultural domestic sector and the abuses in the application of *anti-dumping* trade measures; paragraph 3.3 concludes the section by discussing preferential trade measures in favour of the least developed countries. Section 4 is devoted to the analysis of those provisions of GATS which are of main interest to developing countries. Section 5 concludes and discusses economic implications stemming from the prospective conclusion of the new round of multilateral negotiations.

2. Trade performance by developing countries

2.1 The strong recovery of aggregate flows in the Nineties

The nineties were characterised by a general improvement in the economic conditions of most of the world developing areas. As a result of both sustained global economic growth and a general shift towards the adoption of more liberal economic and trade policies in developing countries, trade flows strongly recovered, following the dismantling performance occurred during most of the eighties. Excluding the four newly industrialised Asian economies (NIEs) and the transition countries of Eastern Europe, export volumes of goods from developing countries grew at an average annual rate of 8.6 per cent in 1990-99, up from virtual stagnation during the eighties, an outcome significantly better than that of industrial countries (tab. 1). The rapid expansion of trade flows was not

confined to few emerging economies in Asia, as it occurred in the previous decade, but spread out to a number of middle-income countries in Latin America and the Middle East, where trade growth during the previous decade had been very low or even negative. As a result of these developments, the total share of non-industrial countries in world exports (valued at 1995 prices) is estimated to have increased from 30 per cent in 1990 to 33 per cent in 1999.[1]

The rapid economic development and the strong expansion of trade which occurred in the nineties brought about a significant expansion in the volume of trade among developing countries themselves. This trend was dominated by a strong growth of regional trade in developing Asia and South America. Trade among Asian countries (excluding Japan) grew between 1980-85 and 1995-99 from 26 to 40 per cent of their total exports (tab. 2). The share of exports of MERCOSUR countries (Argentina, Brazil, Paraguay and Uruguay) directed to Latin America grew from 16 to 40 per cent; only Mexico, due to the trade diversion effect generated by the creation of the North America Free Trade Area (NAFTA) in 1992, did not intensify trade relationship with other Central and Southern American countries. As regards Africa, intra-continental exports, although from a low level, climbed to 11 per cent of total flows. The geographic re-orientation of exports of Eastern European countries to Western markets, which started at the end of the eighties, brought to a decrease in the share of their intra-area trade from 39 to 33 per cent.

Despite a general positive performance, not all developing countries were able to benefit from the new export opportunities arising from the expansion of global trade flows during the last decade. A special mention, in consideration to their development problems and very low level of per-capita income, should be made to the least-developed-countries, which are to a large extent located in Sub-Saharan Africa.[2] Those countries seem to have experienced further marginalisation from global international flows over the last decade. The share of least-developed countries on world exports (valued at current prices) declined from 0.7 per cent to 0.5 per cent

[1] The group of non-industrial countries includes the Asian newly industrialised economies (NIEs), the developing countries and the Eastern European countries in transition. Unless otherwise specified, henceforth they will be indifferently labelled as “developing countries” or “emerging countries”.

[2] The group of LDCs, as defined by the United Nations, is formed by 48 low-income countries, 33 of which located in Sub-Saharan Africa. Of the 39 countries admitted to the HIPC initiative, 28 are least-developed (see the Appendix for the list of the countries included).

over the course of the eighties, to stabilise at that level thereafter (World Bank, 2000a).

2.2 Exports to industrial countries and the polar structure of trade

As regards more specifically the expansion of trade flows from developing countries to the markets of advanced countries, the general picture is one of steady improvement, with an acceleration between the second half of the eighties and the fist half of the nineties. Excluding trade in oil, which is often subject to price shocks, the share of non-industrial country suppliers on the value of imports in the QUAD markets (EU, US, Japan and Canada) rose from 35 per cent in 1980-84 to 45 in 1995-98 (tab. 3). Imports from developing countries account for 56, 48 and 42 per cent of total flows in 1995-98 in the EU, Japan and the US, respectively, with the differences mainly due to exogenous factors such as the relative market size and the geographic location. Between 1980-84 and 1995-98 developing country exporters as a whole achieved gains in each of the three major outlets of comparable size (around 10 percentage points of their market share).

The polar structure of world trade is clearly reflected in the different geographic composition of imports from developing countries across the QUAD markets. Exports from East Asia (NIEs, China, and ASEAN countries) still account for a much larger market share in Japan (38 per cent in 1995-98) than in Western countries (22 and 20 per cent in the US and EU, respectively). Mexico has become one of the largest exporters in the US, with a share of 11 per cent. Given the proximity to EU, exports from the group of Eastern European countries and, by less extent, those from Mediterranean countries held a much larger market share in Western Europe than elsewhere; moreover those shares have significantly increased since the early 1980s, from 10 per cent to 17 per cent, and from 2.5 to over 4 per cent, respectively.

Besides, the importance of the EU as a destination market for exports from Eastern Europe and that of the US for Mexican exports have further increased over the nineties (each of them by about 5 percentage points, between the periods 1990-94 and 1995-1998), partly due to the preferential access granted to these countries by the conclusion of regional trade agreements in the first half of the decade (NAFTA, Association Agreements with Eastern European countries). The role of the Euro-Mediterranean Partnership in increasing the access for Mediterranean country exports to Europe has been by far less significant.

On the other hand, MERCOSUR countries, perhaps as a consequence of their marked characterisation as agricultural exporters, have maintained relatively strong trade links with the EU, with a market share of 3.8 per cent. Also links between South Asian countries (India and Pakistan) and the EU appear to be quite strong. As regards least-developed countries, their largest market share is in the EU; however it almost halved during the eighties, to the present low level of about 1.6 per cent.

2.3 Evolution in the merchandise composition

Over the last two decades, as a result of both low long-term elasticity of world demand of raw materials and the rapid path of industrialisation of developing economies, QUAD imports from developing countries radically shifted their composition in favour of manufactured goods. Manufactures from non-industrial countries represented in 1995-98 a share as high as 78.8 per cent on QUAD imports (non-oil goods only), up from 55 per cent in 1980-84 (tab. 4). This share is at present not very different from the average of industrial countries (83 per cent), and is around 90 per cent for the NIEs, Mexico and China. The most impressive growth in the share of manufacture exports has occurred for the ASEAN countries (from 26 to 71 per cent), followed by Mexico and China. Among the countries considered, MERCOSUR exporters rely only slightly on manufacturing (38 per cent), due to their high specialisation in agricultural products, which is reflected in the largest share in the sample (almost 50 per cent). Highly dependent on agriculture are also the LDCs (30 per cent of their non-oil exports).

Looking more in detail at the product composition of manufacture exports from developing countries, one may note that, especially as regards the most dynamic and fast-growing exporting countries, the commodity structure of trade has deeply changed over the last two decades, above all during the nineties (tab. 5).[3] In order to carry-out our analysis, manufactured goods (based on SITC classification at four-digit level) have been grouped into four classes, depending on our "a priori" assumptions on their different economic characteristics: traditional labour-intensive goods (which include textiles and clothing and other mature products of particular export interest to developing countries), industries with large economies of scale (dominated by energy-intensive industries such as iron and steel, road vehicles and chemicals), specialistic industries (industrial machinery and

[3] We use the shares of the various industries on the overall manufacture exports as a measure of the international specialisation of countries. This methodology is usually referred to as Balassa index.

non-road transport) and high-technology goods (electronics and telecommunication goods, pharmaceuticals, etc.).[4]

It turns out, in general, that the share of labour-intensive goods on the manufacture exports of non-industrial countries has rapidly decreased, from 60 to 52 per cent, between 1985-89 and 1995-98, due, in particular, to a rapid shift of East-Asia's exports away from textiles and clothing productions to electronic and telecommunication goods.

A quite different development has however taken place in South Asia, where the share of labour-intensive goods on manufacture exports has remained quite stable over the last two decades, due to the increase in the share of textiles and clothing, from 58 per cent in 1980-84 to over 65 in 1995-98. That makes South Asia countries the most specialised textiles exporters in the world, even more than Mediterranean countries and LDCs. Despite having turned to capital and technology-intensive productions, also the ASEAN countries and China remain specialised in the production of clothing and textiles and other labour-intensive goods (leather goods, toys and other consumer goods), compared to the average of developing countries.

The high-technology sector has been by far the most dynamic in Asia, while Latin American and Eastern European countries tend to be relatively more oriented to large-economies-of-scale and specialistic industries. Mexico is perhaps the most dynamic and diversified economy in Latin America, with increasing export shares concentrated in the road vehicles industry (28 per cent), the specialistic sector (26 per cent), and the high-technology goods (15 per cent).

As regards LDCs, one may observe the impressive changes over the last two decades, which are likely to reflect the thinness of manufacture activities in those countries. They also reveal quite clearly a trend away from energy-intensive productions (iron and steel and other metals) and towards labour-intensive goods (especially clothing and textiles).

[4] This classification, denominated *à la* Pavitt, is still largely used, despite some methodological problems.

2.4 Two sectors of special interest for developing countries

2.4.1 Agriculture

The share of agricultural goods (edible raw materials and processed food) on overall non-oil imports from developing countries in the QUAD decreased rapidly over the last two decades, from 31 to around 16 per cent (tab. 4). The decline in agriculture is similar to that of other raw materials, and may be partly explained by the historical trend of diminishing relative prices of commodities. It may surprise that the corresponding share of agricultural products on imports from industrial countries showed a decline of much smaller size; that is arguably due, at least in part, to the rapid and widespread industrialisation process of many developing countries.

As regards the evolution of market shares in selected markets, one might wish to investigate whether specific patterns, that could be linked to the effect of the implementation of regional preferential trade agreements, may be detected. In the EU market, it appears that the Association Agreements concluded with respect to several East European countries did not play a prominent role in redirecting trade flows in the agricultural sector between 1990-94 and 1995-98 (tab 6b and fig. 1a); that is hardly surprising, since bilateral free trade agreements signed by the EU tend to exclude to a large extent the agricultural sector. A rather different picture seems to emerge as regards the US market, where Mexico significantly increased its market share following the creation of NAFTA (from 10 to 13 per cent; see tab. 6c and fig. 1b), further jeopardising agricultural exports from South American countries. As a results, MERCOSUR countries share in the US declined to 5 per cent in 1995-98, from 12 per cent at the beginning of the 1980s.

2.4.2 Textiles and clothing

Due to its large weight on exports of non-industrial countries to the QUAD (around one-fifth), a special consideration must be given also to the sector of textiles and clothing.[5] If one looks at market-share gains achieved by non-industrial countries in this sector, one may note that they are more limited, compared to those in manufactures: non-industrial countries' share in manufactured imports in the QUAD has increased from 28 to 43 per cent

[5] This share did increase only slightly (5 percentage points) between the first half of the eighties and the first half of the nineties, to decline over the subsequent period (tab. 4). It decreased steadily throughout the period if shares are computed on manufactures only (tab. 5).

between the first half of the eighties and the second half of the nineties, whereas the corresponding share for clothing and textile goods went up from 76 to 84 per cent only (tab. 6a). The sizeable reduction of NIEs' market share has been offset by cheaper labour cost producers in Asia and by exports from other developing regions. Exports from China, ASEAN countries and India in the QUAD increased from 3.7 to 12 per cent.

If one looks at developments in selected outlets, it is worth noticing that the regional preferential trade agreements implemented at the beginning of the nineties in Europe and North America, significantly altered the distribution of market shares among developing country exporters, crowding-out producers, mainly located in Asia, who were not counterparts to those agreements. East Europe export share in the EU market for textiles and clothing increased from 22 to about 30 per cent between 1990-94 and 1995-98, a much larger gain than that in the manufacture sector at large (tab. 6b and fig. 1); that stands against very low market share gains achieved by both Mediterranean countries and low-cost producers in Asia. As regards the US market, by far the largest part of the impressive reduction in NIEs market share was filled by Mexican exports, whose position improved from 3 to over 11 per cent from 1990-94 to 1995-98.

As regards the Japanese market, one may find that the overall reduction of NIEs share has been offset within Asia: on the one hand, the share of NIEs diminished by 26 percentage points, on the other hand there is an increase of the same size of exports from China. Also ASEAN exporters tripled their weight to 9.4 per cent; whereas that of South Asia shrank to 3.1 per cent. The weight of other non-Asian exporters is indeed negligible. Since trade relations among East Asian countries have never being based on bilateral preferential agreements, these developments simply reflect the delocalisation of textiles and clothing productions to the cheapest labour cost economies in the region.

2.5 Trade in services

Services represent more than 60 per cent of world output; their share on emerging economies' domestic product, albeit being in general smaller than that of developed countries, tends to be quite large and rapidly increasing. Nevertheless, international trade in commercial services is only a small share of global trade in good and services (less than 20 per cent; tab. 7). That might be due to the fact that, still in the recent past, exports of services have been hindered by technological barriers and legal

impediments. As a significant exception, international services in the field of maritime transportation, finance and insurance have been traditionally quite well established.

Developing countries tend to be net importers of commercial services, their aggregate deficit in the sector being on average just below 5 per cent of gross flows (import and exports). The share of services on their total exports (goods plus services) tends to be on average lower (16.5 per cent) than that of developed countries (20.5 per cent), particularly as regards Latin American and Asian countries, in the latter case probably due to their extremely large volumes of goods exports.

Exporters from emerging Asia accounted for about 13.5 per cent of world exports of services in 1999 (up from 10 per cent in 1990), whereas Latin America and Eastern Europe each accounted for about 4 per cent (up from 3.8 and 2.4 per cent, respectively, in 1990).

As for specific sectors, developing country exports of services tend to be more concentrated, relatively to developed countries, in the traditional sectors of *travel* (37 per cent, with peaks of almost two thirds for Mexico and Argentina) and *transportation (excluding passenger services)*, with a corresponding share of 18 per cent, with peaks just below 30 per cent for Eastern Europe, the ASEAN countries and Brazil. Those sectors being very labour-intensive, it is not surprising that developing countries tend to display an international comparative advantage in their production. As for the "other services", they are generally quite skilled labour and technology intensive (including *telecommunications, financial and business services*). Therefore, developing country exports in the sector usually weight less (40 per cent on average) than developed countries' (45 per cent). However, this sector accounts for a very large share of services exports from Asia and Brazil (respectively, 52 and 47 per cent).

3. The pattern of trade protection in developed markets

3.1 Import tariffs

Industrial countries' tariffs on industrial products, have decreased on average by 38 per cent as a result of the implementation of the UR agreements: import-weighted tariffs have been reduced from a level of 6.3 to 3.9 per cent (tab. 8). Tariff reductions by developed countries were

however skewed against exports from developing countries, due to the latter's concentration in sectors characterised by lower-than average liberalisation. For instance, tariffs on textiles and clothing decreased by 22 per cent only, and the post-UR average weighted tariff is still the highest, at 12 per cent. Similar reasoning applies to the sector of leather goods and footwear, where the cut amounted to 18 per cent and the average level stands at 7.3 per cent.

As a result, post-UR tariff protection of major industrial countries remains generally high on labour-intensive, consumer goods. For the EU, import tariffs on textiles and clothing and footwear products are about 8 per cent, double than the level of the overall industry (tab. 9); for the US and Japan the scenario is even worse, since the difference between average tariff rates in the two sectors and those on overall industry ranges from 4 to about 20 percentage points. Due to the high incidence of *peak* tariffs,[6] those are also the two sectors where the dispersion of tariffs across products is the highest, especially as regards imports of textiles (in the US) and footwear (in Japan; tab. 10).

Focusing the attention on agriculture, all indicators point to the fact that this is the sector with the highest tariff protection in industrial country markets, especially as regards Japan, the EU, Switzerland and Norway. The simple average of tariff rates in agriculture is almost five times that on industrial goods in the EU, and more than three times in Japan (tab. 9). Moreover, in most advanced markets, tariffs are especially high on prepared food, an indication that higher tariffs are levied on later stages of the productive process (*tariff escalation*), thereby jeopardising the development of higher value-added activities in developing countries. Finally, *peak* tariffs affect disproportionately agricultural trade, with an incidence of 34 per cent on the number of agricultural tariff lines in the EU, 18 in Japan and 17 in Switzerland (tab. 10).

Post-UR tariffs in agriculture remained high also due to the fact that the UR Agreement on Agriculture (URAA) concluded within the UR Treaty prohibited the use of quantitative restrictions on imports and established the consequent transformation of such measures into tariff equivalents (so called *tariffication*). As regards the EU and Japan, the resulting tariffs were so high, in some instances, as to even reduce market access. Therefore, it was decided that these countries would apply a system

[6] Tariff peaks refer to the ratio of lines for which rates exceed a reference value (usually, 15 per cent) to the total number of lines.

of tariff reductions within given import quantities (tariff-quotas). However, the management of this system by the EU has been non-transparent and highly inefficient, in the way that tariff quotas on imports of some highly protected products were partially unfilled in subsequent years (Painelli et al., 2001).

3.2 Non-tariff protection

3.2.1 VERs in the textiles and clothing sector

The conclusion of the UR brought about an obligation on countries taking part in the Round to phase-out all existing quantitative restrictions on trade; in particular, the ban on a further use of such measures was extended to all sorts of bilateral agreements, aimed at restraining export flows from specific suppliers (so called voluntary export restraints, VERs), which had proliferated during the eighties, especially on exports from Japan and developing countries.[7] VERs had become more and more frequent in industries characterised by large economies of scale and over-production (such as automobiles and iron and steel), as well as in the textiles and clothing sector, a labour-intensive industry where the competitive advantage held by developing countries is very large.

In 1996, the latest year for which comprehensive evidence is available, export restraints were by far the most frequent non tariff measures applied against the imports in the EU and US markets, with an incidence of about 11 per cent on the total number of traded products (tab. 11). Their incidence was particularly high in the textiles and clothing sector, where at least 75 and 67 per cent of the imported products in the EU and the US, respectively, were subject to some non-tariff restrictions.

Quotas and *VERs* in the textiles and clothing sector had been codified during the seventies under the Multifiber Arrangement (MFA), which set rigid limits to the volume and growth of exports from single countries, thereby resulting in a trade barrier, increasingly tilted against fast-growing, low-labour-cost producers located in Asia. This system was coupled, especially in the high-protected market of the US, with high import tariffs, reaching rates of more than two digits on the most sensitive clothing items.

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[7] Being targeted against selective suppliers, VERs are characterised by trade discrimination among producers, which adds an extra-source of trade distortion. In contrast to quotas, however, the generated rents accrue to exporters, which may contribute explaining their large diffusion during the eighties.

The dismantling of such a pervasive network of bilateral quantitative restrictions was finally decided in a separate agreement signed within the UR, the Agreement on Textiles and Clothing (ATC). According to the latter, all quantitative restrictions to trade in the sector had to be phased-out in a 10-year transition period, to be divided into four steps. By the first three implementation deadlines, (already expired in January 1995, 1998 and 2002), each importing country had to liberalise (or to "integrate" into the international trading system) products for at least 51 per cent of its imports (by 1990 volume); by the fourth stage - with deadline January 2005 –another 49 per cent of imports will be liberalised.[8] However, due to weak legal requirements in the text of the ATC, liberalisation in the sector has progressed very slowly in the past years. Several developing countries, leaded by India, Pakistan and other Asian exporters, have raised complains on several aspects of the agreement implementation. A WTO (1998) review of the development of market access liberalisation pointed out that, although proceeding in the way scheduled in the ATC, the integration of products of major importing members was leaving too many items to be liberalised at the very end of the transitional period. As a matter of fact, by 1998 the number of items notified by Canada, the EU and the US was quite large, but the products selected for integration were almost entirely products already unrestricted. Moreover, according to a middle-income countries complaint the measures announced by industrialised economies to open their markets were seldom commercially meaningful, since liberalised items tended to be concentrated in less value-added products such as tops, yarns and fabrics, with only a small share of made-up textile products and clothing. As for clothing products alone, the share of items liberalised by the QUAD within 1999 is indeed small: close to 10 per cent only, although imports of clothing are at least as important as those of textiles in Canada and the US, and much more important in the EU (Finger and Schuknecht; 1999).

3.2.2 Domestic support in agriculture

An important result of the UR was to re-conduct trade in agricultural products under the general multilateral rules which apply to trade in goods. Since the second world war, in particular as a consequence of the creation of the European Common Agricultural Policy (CAP), international trade in

[8] Transitional safeguard measures are allowed for not yet integrated products, in order to deal with cases of serious damage to domestic industries, which may arise during the transition period. Constraints for the use of transitional safeguards mechanism, which may be applied against specific exporters, are tighter than those for ordinary SSGs.

agricultural products has been subject to large distortions, arising from a hindrance of protectionist measures (such as high tariffs, import quotas, export subsidies and domestic price support measures). Due to strong resistance by the EU and Japan, the URAA achieved only partial trade liberalisation in the sector. For such a reason, provisions were introduced (so called "built-in agenda") which envisaged the reopening of negotiations in year 2000 (Anderson and Hoeckman; 1999).

Public support to the domestic agricultural sector, provided by means of different measures, is still heavily used by the industrial countries. For the whole OECD area, overall domestic support amounted to 327 billion of US dollar in 2000 (tab 12). The bulk of the support were measures in favour of producers (75 per cent), whereas consumer subsidies and general services provided to the agricultural sector contributed to a lesser extent (8 and 17 per cent, respectively). EU and Japan relied more on producer support (80 per cent or more) than the US (slightly more than 50 per cent). In terms of aggregate GDP, total domestic support to agriculture in the OECD countries decreased in 2000 to 1.3 percentage points, down from 2.2 in 1986-88; however, this figure is stable since 1997. The measure of support in the EU and Japan is slightly higher than the average OECD level (1.3 and 1.6 per cent of GDP, respectively); that in the US is lower (0.9 per cent; fig. 2).

As the result of the URAA implementation, producer support measures with substantial trade distortion effects were submitted to compulsory schedules of reduction, both on their values and volumes; some kinds of direct payments to farmers, when farmers are required to limit production, and other support on a small scale were allowed to be implemented (blue box); other measure with minimal impact on trade got a green light and could be used freely (green box).

Six years after the URAA conclusion, market price support is still the most relevant measure in many markets. In the EU, however, its use has decreased significantly from the high level of late 1980s, due to the introduction of other form of support like direct payments to farmers and set-aside incentives, as decided within the 1992 CAP reform (tab. 13). The amount of support to producers also differs a lot across commodities. For wheat, rice, sugar and milk, it is close or above half of gross farm receipts on those commodities in the major countries (tab. 14). In particular, the EU supports heavily the production of wheat, milk, meat and sugar; the US that of sugar and milk and Japan that of wheat and rice.

Another trade measure often used by the EU and other developed countries is export subsidies. It turns out (WTO, 2000) that in 1998 EU CAP expenditure on export refunds amounted to 5.4 billion of dollars (2.3 per cent of total EU agricultural production), with its use concentrated on commodities such as sugar, milk and beef.

3.2.3 The use of anti-dumping measures as a trade-protection instrument

Anti-dumping and countervailing actions, which may be regarded as price-control measures targeted against individual exporters, became a rather frequent trade instrument during the eighties, especially in sensitive and large-economies-of-scale industries (such as textiles, chemicals and electric machinery; Michalopoulos, 1999a).[9] Their trade-restraining effect may be quite serious, since they often involve long preliminary investigations (which tend to discourage trade by themselves because of the implied threat) and, almost always, end with the imposition of punitive duties, to be revised only several years later.

Although the multilateral discipline aimed at limiting the use of anti-dumping measures was strengthened as a result of the UR agreements, in particular by setting stricter rules on the determination of the dumping margin and the damage on domestic producers and by increasing the transparency of investigation procedures, there is evidence that their application as a protection device has not diminished in the most recent years and, on the contrary, a number of middle-income countries have also resorted to it. As a matter of fact, being nowadays more difficult to apply other market protection measures with impunity, there is a significant risk that anti-dumping rules may end up becoming the most serious loophole in the multilateral discipline (Mukerji; 2000).

Over the past decade 2,500 antidumping actions and almost 300 countervailing actions have been initiated and notified to the WTO (UNCTAD, 2000). After calming down in the years immediately before the conclusion of the UR, a big wave of new actions has started in 1997. Whereas until quite recently anti-dumping and countervailing actions used to be initiated mostly by the QUAD countries, since the post-UR years a growing number of non-industrial countries has adopted and increasingly applied national anti-dumping legislation. After peaking in 1993, the

[9] Anti-dumping actions are defensive measures taken by the importing country to protect its domestic market from export dumping, i.e. the sale of exports at below-cost prices. Countervailing actions are similar to the anti-dumping ones, but they are targeted against subsidised exports.

number of anti-dumping actions initiated by developed countries diminished in subsequent years, except for the EU, which intensified its actions especially in 1998-99, perhaps as a reaction to cheap imports from East Asia (tab. 15). On the other hand, the number of cases initiated by non-OECD countries climbed from 21 in 1993 to 308 in the year 2000.

Exporters subject to countervailing and anti-dumping actions are disproportionately to be found among developing countries: in the period 1995 - 1999/2000 the latter received, respectively, 62 and 71 per cent of total actions reported to the WTO (tab. 16). ASEAN countries, the NIEs and India received most of the countervailing actions; on the other hand, anti-dumping actions hit also China and, in the most recent years, the transition countries in Eastern Europe. There is evidence that the use of anti-dumping measures by the US in the steel industry has recently substituted vanishing protection through VERs, hitting especially Latin American and Asian countries. A large share of the anti-dumping actions initiated by the EU in the post-UR years have been directed to the textile sector, which makes the EU the most active user of anti-dumping actions in that industry. Subject to these actions were producers of cotton and linen fabrics in China, South Asia and also Egypt and Turkey (UNCTAD, 2000).

3.3 Preferential market access for the least-developed countries

The general principle of special and differential treatment for developing countries had been formally recognised in the international trade system at the beginning of the seventies. It allowed non-industrial countries ample flexibility in the application of trade rules (including the possibility to use export subsidies) and the right not to liberalise trade on a reciprocal basis. Moreover, it formally granted a preferential market access for their exports to developed countries, through a system of lower import tariffs known as the general system of preferences (GSP).

Since the mid-eighties, however, it became increasingly clear to policy makers and advisors that this preferential and special treatment had largely failed to perform its expected development function. As regards, in particular, the GSP scheme, its impact on the exports of developing countries is difficult to be evaluated, but there are reasons to believe that it has produced less-than-expected benefits, especially as regards the more disadvantaged low-income countries (Michalopoulos, 1999b; OECD, 1999). That may be due to some of its features. First, GSP tariffs, depending on unilateral concessions by developed countries, are temporary and therefore less certain than bound-to-GATT tariffs. Second, GSP

benefits were typically not extended to the most sensitive products (such as some agricultural and textile goods, respectively in the case of the EU and the US). Third, small and poor countries were eventually damaged by the fact that GSP treatment was initially granted to almost all developing countries, thereby producing an unequal distribution of benefits, largely accruing to fast growing high-and-middle-income developing countries. Fourth, over the last two decades GSP benefits have gradually lost their importance and they have been replaced by more specific preferential schemes in favour of the group of the least developed countries (LDCs) or groups of poor countries belonging to specific regions (Caribbean Community and Andean Community for the US) or with peculiar historic ties to the economy granting such benefits (for example, the ACP countries for the EU).

The diminished role of such preferential schemes is, however, also the result of their preferential duty margins being significantly eroded over the last two decades by two other important developments: on the one hand, the proliferation of regional free trade areas, some of them including both developed and developing countries (such as the NAFTA and the EU Association Agreements); on the other hand, the progress in multilateral trade liberalisation, which has reduced the average level of tariffs and the incidence of non-tariff barriers. The average duty rate on imports of industrial products by developed countries, measured either by the bound rate or that applied under normal trade relations (most favourite nation; MFN), has decreased by around 30 per cent as a consequence of the tariff cuts scheduled in the UR agreements.

Recently a number of developed countries (led by the EU) took unilateral steps to grant duty-and-quota-free market access to agricultural and industrial exports from the least developed countries.[10] Hoeckman et

[10] The European Union approved in February 2001 the so-called Everything but Arms (EBA) initiative, which granted duty-and-quota-free access to agricultural and industrial imports from LDCs (excluding trade in arms), except imports of rice, sugar and bananas, where a transition period of 6-9 years was introduced before full liberalisation. The EBA proposal adds to the effects of the Co-operation and Trade Agreement signed between the EU and the 71 ACP countries in mid-2000 (Cotonou Agreement), by extending its benefits to all LDCs and including a larger number of sensitive agricultural products. In October 2000 the US administration improved significantly the package of trade preferential concessions for the poor SSA countries, already provided with the African Growth and Opportunity Act. Following the later move, beneficiary countries became 34 and about 2000 textiles and apparel goods, previously excluded from GSP treatment, were added to the list of liberalised products. In December 1999 Japan announced its "99% Initiative", which extends duty-and-quota-free access to 99%, up from 94 %, of its industrial imports (including textiles) from LDCs. Other ten countries recently improved their market access offers for LDCs' exports, including Canada, Norway, Switzerland and a number of developing and Eastern Europe countries.

al. (2001) estimate that the joint implementation of such measures by the QUAD countries could lead to a 11 per cent rise (equivalent to 2.5 billlion of US dollars) in their annual total export flows.

4. The general agreement on trade in services and the developing countries

The degree of market openness for the international trade of services is still quite limited. The way to multilateral liberalisation in the sector has been paved by the General Agreement on Trade in Services (GATS), signed as part of the UR Treaty. Several circumstances have contributed to delay international liberalisation in the services sector until very recently; behind the strong opposition by many countries, especially developing ones, was the fear that foreign operators might have flooded domestically, especially in the highly protected sectors of telecommunications and transportation, in which state monopolies have traditionally dominated. In the late 1990s, however, a growing number of countries, in order to increase the efficiency of the domestic service sector and favour the inflow of foreign technology, started privatisation programmes and unilaterally adopted some liberalisation measures.

The GATS covers the exchange of all commercial services, with the exception (at present) of a large part of the air transport sector. Within GATS, trade in services are considered as taking place under four different modes of supply. The most important mode is the supply of services through the establishment of a commercial presence in the country (i.e., direct investment from abroad); it is followed by the cross-border supply of services, which corresponds to the traditional movement of goods across borders and is recorded as exports of services under the balance of payments. The other two modes are those concerning the consumption of services abroad, in which the service is supplied in the territory of one country to the visitors from another (i.e., it consists of travel expenses by tourists) and the supply through the movement of natural persons, meaning the temporary presence of foreign individuals without legal personality to supply services in a country's market. As for the latter mode of supply, the multilateral Agreement on the Movement of Natural Persons signed in 1995 is considered to have achieved very unsatisfactory liberalisation results, at least as concerns restrictive practises by developed countries to stop temporary labour from emerging nations (Altinger and Enders; 1996).

The outcome of GATS in terms of market access improvements is difficult to asses, at least for two reasons. First, the international exchange of services is more heterogeneous and by far a more complex matter to discipline than trade in goods; in fact, it is extremely difficult, sometimes impossible, to disconnect the production of services from their consumption. Secondly, the production and consumption of services are subject to a vast range of policy interventions by governments, which have usually been developed without regard to their trade effects, the latter being in any case very difficult to disentangle.

Researchers in the field tend to agree that the commitments undertaken by governments within the GATS to liberalise domestic markets are rather modest, especially as regards developing countries, both in terms of the sector coverage and the depth of the liberalisation offers submitted to the WTO (Hoekman; 2000, WTO; 2001). Moreover, in many experts' opinion, most GATS commitments have been confined to binding the status quo, rather than expanding already existing market access opportunities. In several cases, the level of access guaranteed by the commitments was lower than that provided de facto. On the other hand, it must be said that this assessment is based mainly on anecdotal evidence, since there is no comprehensive information on the trade and regulatory regimes of WTO Members, either before or after the Uruguay Round. Lack of detailed and internationally comparable statistics on the evolution of international flows of services makes judgement even more difficult.

As regards those sectors where several developing countries hold an international comparative advantage in production and which make for a relatively large share of their export revenues, one may reckon in the first place maritime transportation and travel services. As regards the former sector, regulatory impediments and powerful international oligopolies still restrain market competition to the disadvantage of new entrants; increased liberalisation in this field would also lower international transport costs, to the benefit of commodity exporters located in geographically-remote and poor areas. As regards the latter sector, it is quite liberalised, but travel to developing countries is significantly restricted by high passenger fares for international flights.

Finally, a large boost to developing country exports of professional services could come from the international liberalisation of temporary labour. Indeed, very populous developing countries hold a strong comparative advantage in the supply of engineering, medical and software services to the markets of advanced countries, due to their abundant and

relatively cheap medium-skilled labour force. The WTO Agreement on the Movement of Natural Persons has been highly ineffective in producing liberalisation results, since several developed countries even failed to bind their national regulations to the status quo.

5. Policy Implications and Conclusions

As a result of both sustained global economic growth and a general move towards the adoption of more liberal economic and trade policies, trade of developing countries strongly recovered in the nineties. Moreover, the rapid expansion of trade flows was not limited to a few dynamic economies but it involved quite a large number of developing countries from several emerging regions. Despite that general positive performance, a number of developing countries, with special development problems and very low per-capita income, were not able to come out of their economic marginalisation; as a result, the overall share on world exports of the group of the 49 least-developed countries did not recover from the low level of 0.5 per cent bottomed out during the eighties.

The structure of world-wide trade in manufactures has deeply changed over the last decade, especially as regards the most fast-growing exporter countries. The share of labour-intensive goods on manufactured exports of non-industrial countries has rapidly decreased, from 60 to 52 per cent, between the second half of the eighties and the same period of the nineties, due, in particular, to a rapid shift of East-Asia's exports away from textiles and clothing productions to electronic and telecommunication goods. If one considers the *textiles and clothing* sector, one may find that market-share gains achieved by non-industrial countries in advanced markets were more limited (from 79 to 84 per cent of advanced markets' imports in the sector), compared to the average of manufactures (from 30 to 43 per cent). Trying to interpret this tendency as a result of the high degree of market protection in the sector may look hazardous, keeping into account the fact that textiles and clothing goods are mature products with low demand elasticity. However, one may find more support to the above hypothesis by noting that, in general, countries that were receiving preferential access to EU and US markets in the nineties on the basis of regional free trade agreements (Eastern European countries and Mexico, respectively), performed better than more efficient East-Asian suppliers. Furthermore, tariff barriers on imports of textiles and clothing products in

developed markets remain high, with peak tariffs especially frequent in the US. The implementation of the UR Agreement on Textiles and Clothing (ATC) has not carried-out the desired amount of liberalisation, since most developed countries have managed to postpone their market opening measures in the most sensitive products to the last possible date. Moreover, at Doha developing countries failed to cast a decision for an immediate relaxation of remaining VERs on textiles and clothing exports to developed markets: as a result, the latter restrictions will have to be fully dismantled only by 2005, as envisaged in the ATC agreement.

Agriculture is the other main sector for which market access for developing country exports is still highly restricted: the share of agricultural goods on overall non-oil imports from developing countries in advanced markets halved to 15 per cent over the last two decades. Although the UR agreements achieved the important result of re-conducting trade in agriculture under multilateral rules, trade in the sector is far from being liberalised. First of all, domestic support to agricultural production in developed countries, and especially in the EU and Japan, although declining, remains high, thereby strongly hampering exports of developing countries. Even if market access conditions have become more transparent and predictable, tariffs remain much higher than those on industrial goods. Peak tariffs are found especially on later stages of the productive process (*tariff escalation*), thus endangering the development of higher value-added production in developing countries. The positive outcome of the Doha meeting may however pave the way for further and more effective trade liberalisation in the agricultural sector. A decision has been reached on broad objectives for the on-going negotiations, based on a significant increase in the degree of market access (i.e., a reduction up to one-third in the average level of tariffs), a large reduction in the amount of trade-distorting domestic support measures, and the elimination of export subsidies. It is still a matter of debate whether these negotiations will eventually succeed, since political resistance in industrial countries, and especially in Europe, may be indeed very strong. As a matter of fact, in the last few years major industrial countries failed to reduce their agricultural budgets and found ways to circumvent the existing discipline by increasing the use of not-yet-regulated support measures.

Although the multilateral discipline aimed at limiting the use of *anti-dumping measures* was strengthened as a result of the UR agreements, there is evidence that their application as a protectionist device has not diminished in the most recent years and, on the contrary, a number of

middle-income countries have also resorted to it. About 60 per cent of the anti-dumping investigations reported to the WTO in the period 1995-99, were initiated by non-industrial countries; around 70 per cent of them were targeted to exporters from non-industrial countries, mainly from Asia. Being nowadays more difficult to apply market protection measures with impunity, anti-dumping rules are indeed becoming a loophole in the multilateral discipline. This issue is going to be addressed in specific multilateral negotiations agreed upon in Doha.

In the services sector, although the UR succeeded in providing a first, basic framework to deal with the complexities of trade liberalisation, tangible results are far from being satisfactory, especially in areas of special interest to developing countries, such as maritime transportation and the international movement of temporary labour. The chances for an agreement in the current negotiations are high. North-South confrontation is not anymore as tough as it was during the UR, since developing countries have increasingly recognised the importance of an efficient domestic services sector (especially as regards the financial and telecommunication industries) for development objectives; moreover, the high degree of flexibility built in the GATS agreement makes negotiations hard to break down (everybody is free to decide the depth and the sector coverage of its own market-opening offers). The latter feature however, is double-edged, because actual liberalisation results may turn out to be disappointingly low.

The focus of the international debate is however gradually moving away from traditional trade barriers to other, less direct measures, which bear important implications for developing country exporters ability to compete in international markets. Multilateral rules on *trade-related domestic policies* have become an important element of the post-UR international trade system and developing countries are required to adopt the necessary regulatory and structural reforms. Despite a special and differential treatment in favour of developing countries (and particularly the least developed ones) being explicitly provided by the WTO discipline, multilateral trade-related rules are largely regarded by developing country exporters as major non-tariff trade barriers. A reason for that is that their implied short-term costs are generally perceived as more tangible and certain than future long-term benefits. An illuminating example is that of technical rules on trade, such as international regulations on safety and health standards, which are going to constitute an impediment, perhaps more powerful than traditional trade barriers, to the growth and

diversification of agricultural and industrial exports of poor countries. Also problematic is the UR Agreement on the protection of intellectual property, which, especially in the pharmaceutical sector, is likely to imply negative welfare effects for developing countries, lacking the necessary research capabilities. These complex issues have been addressed at the recent Doha meeting, where developing and poor countries were granted more favourable terms for the implementation of a number of trade-related rules envisaged in the UR Treaty.

Another restrain on the expansion of exports by developing countries may as well come from their own trade barriers. Following the rapid economic development and the strong expansion of international trade in the nineties, a significant increase in the volume of trade flows took place also among developing countries themselves. As a matter of fact, the latter's markets have received as much as 42 per cent of developing country total exports in the second half of the nineties. Although applied tariff rates were cut on average by at least fifty per cent between the first half of the eighties and the second half of the nineties, import protection remains on average high in developing countries, both on industrial and agricultural goods.[11] Thus, one should not disregard the fact that these economies would greatly benefit from a more broad-based liberalisation of their own markets.

Tentative quantification of the economic implications in terms of global welfare from the successful conclusion of a new round of multilateral negotiations has already been reckoned through numerical estimates from general equilibrium models of the world economy (Dessus et al.; 1999, Hertel and Martin; 2000). Standards static welfare gains from the global reduction in trade barriers prove to be significant, although, as generally found, not very large.[12] Based on the reasonable assumption of a uniform (across countries and sectors) one-third reduction in the level of import protection in the goods sector, a recent study by the University of Michigan (Brown et al., 2001) finds out that the annual world output would increase by 222 billions of US dollars (valued at 1995 prices), equivalent to

[11] According to IMF and World Bank (2001) estimates, the trade-weighted average tariff on imports in developing countries is 28 per cent for agricultural goods and about 11 per cent for industrial products, which compares with an average level of about 26 and 3 per cent respectively, in developed country markets. Average import tariffs are still about 30 per cent in South Asia, 20 in Middle East and Africa and in the range of 10-15 per cent in Latin America and Eastern Europe (World Bank, 2000b).

[12] Gains from models with endogenous total factor productivity dynamics tend to be much larger, but they depend even more on modelling assumptions. See IMF and World Bank (2001) for a survey.

about 0.7 per cent, as a result of the conclusion of the prospective multilateral trade negotiations. Larger gains would derive from a proportionally equivalent reduction in the existing world-wide barriers against international trade and direct investment in the services sector: 390 billions of US dollars, equivalent to 1.1 per cent of world output, according to the same study. Global gains would come from better exploitation of both international comparative advantages and economies of scale in production. Benefits will be divided proportionally between developing and developed countries, which will increase their output by 1.8 and 2.0 per cent, respectively. The distribution of the net benefits across countries comes from a balance between efficiency gains (which are positively related to the depth of each own liberalisation) and the terms of trade effect (which is positively related to the depth of the rest of the world liberalisation).

These estimates, of course, fail to take into account the huge economic cost implied by a rebound of protectionist trade policies around the world in the wake of a collapse of the multilateral talks. A well-functioning multilateral trade system, as opposed to a world where international trade relations are subject to the threat of arbitrary retaliatory actions or based on bilateral agreements centred on the economic and political power of few countries, is to be considered beneficial especially to exporters from developing and poor countries, which are often relatively weak trading partners.

APPENDIX

Composition of Country Groups

Industrial countries

Australia, Canada, Japan, Iceland, New Zealand, Norway, Switzerland, United States, **EU**: Austria, Belgium-Luxembourg, Denmark, Finland, France, Germany, Germany EST, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, United Kingdom.

Non-industrial countries

World excluding Industrial countries.

NIEs (Newly Industrialised Asian Economies)

Hong Kong, South Korea, Singapore, Taiwan Province of China.

ASEAN (Association of South East Asian Nations)

Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Thailand, Viet Nam.

Excluding: Singapore.

South Asia

Bangladesh, India, Pakistan.

MERCOSUR (Southern Common Market)

Argentina, Brazil, Paraguay, Uruguay.

Eastern Europe

Albania, Bulgaria, Cyprus, Former Czechoslovakia, Former Yugoslavia, Former USSR, Hungary, Malta, Poland, Romania, Turkey.

Mediterranean Countries

Algeria, Libya, Egypt, Israel, Turkey.

ACP (Africa Pacific Caribbean Countries)

Angola, Antigua and Barbuda, Aruba, Anguilla, Bahamas, Barbados, Belize, Benin, Botswana, British Antartic Territory, British Indian Ocean Territory, British Virgin Islands, Burkina Faso, Burundi, Cameroun, Cape Verde, Cayman Islands, Central Africa Republic, Chad, Comoros, Congo Democratic Republic, Côte d'Ivoire, Djibouti, Dominica, Dominican Republic, Equatorial Guinea, Eritrea, Ethiopia, Falkland Islands, Fiji, French Polynesia, French Southern and Antartic Territories, Gabon, Gambia, Ghana, Grenada, Greenland, Guinea, Guinea-Bissau, Guyana, Haiti, Jamaica, Kenya, Kiribati, Lesotho, Liberia, Madagascar, Mayotte, Malawi, Mali, Mauritania, Mauritius, Montserrat, Mozambique, Namibia, Netherlands Antilles, New Caledonia and dependencies, Niger, Nigeria, Papua New Guinea, Pitcairn Island, Rwanda, Sao Tome & Principe, Senegal, Seychelles, Sierra Leone, Solomon Island, Somalia, South Georgia and Sandwich Islands, St Christopher and Nevis, St Helena and dependencies, St Lucia, St Pierre and Miquelon, St Vincent & the Grenadines, Sudan, Suriname, Swaziland, Togo, Tonga, Trinidad and Tobago, Turks and Caicos Islands, Tuvalu, Uganda, United Republic of Tanzania, Vanuatu, Wallis and Futuna, Western Samoa, Zaire, Zambia, Zimbabwe.

LDC (Least Developed Countries)

Of which:

ACP:

Angola, Benin, Botswana, Burkina Faso, Burundi, Cape Verde, Central Africa Republic, Chad, Comoros, Congo Democratic Republic, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao Tome & Principe, Sierra Leone, Solomon Island, Somalia, Sudan, Togo, Tonga, Tuvalu, United Republic of Tanzania, Uganda, Vanuatu, Western Samoa, Zaire, Zambia.

non ACP:

Afghanistan, Bangladesh, Bhutan, Cambodia, Lao People’s Democratic Republic, Maldives, Myanmar, Nepal, Yemen.

SSA (Africa Sub Sahara)

Cameroon, Congo Republic Of, Côte d'Ivoire, Gabon, Ghana, Kenya, Mauritius, Namibia, Nigeria, Senegal, Seychelles, South Africa, Swaziland, Zimbabwe.

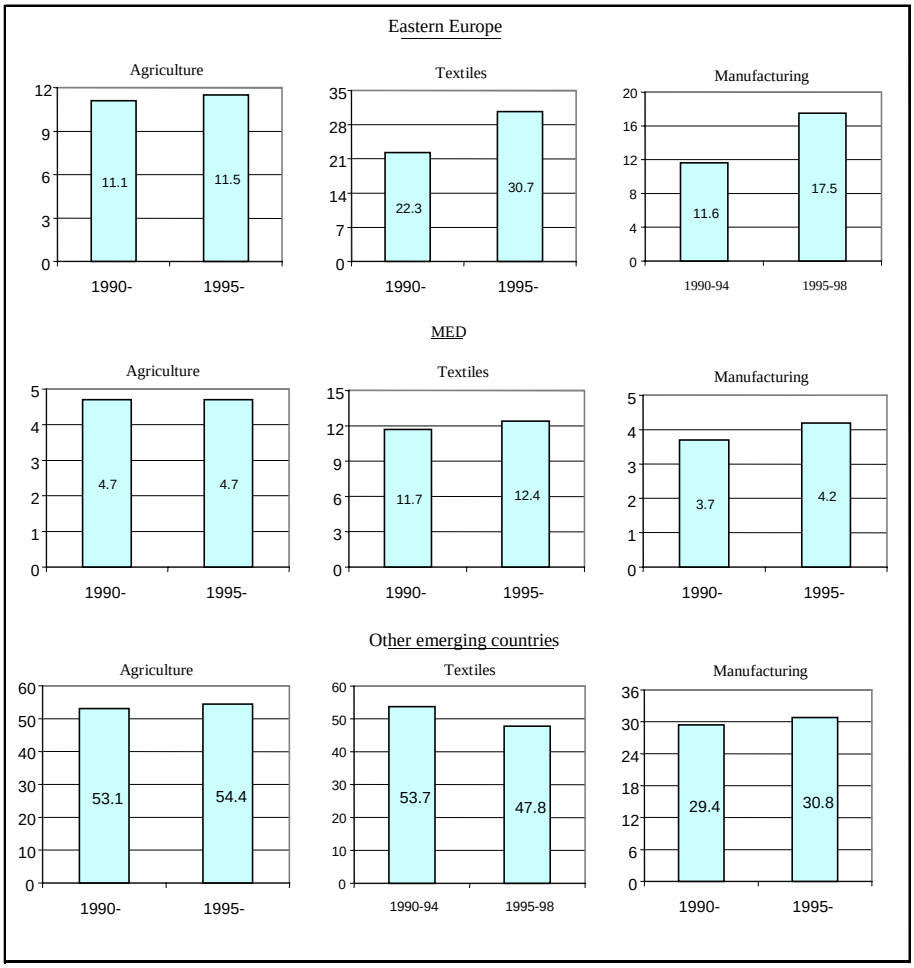
Of which:

LDCs:

Angola, Benin, Botswana, Burkina Faso, Burundi, Cape Verde, Central Africa Republic, Chad, Comoros, Congo Democratic Republic Of, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao Tome & Principe, Sierra Leone, Somalia, Sudan, Togo, Uganda, United Republic of Tanzania, Zambia.

Fig. 1a

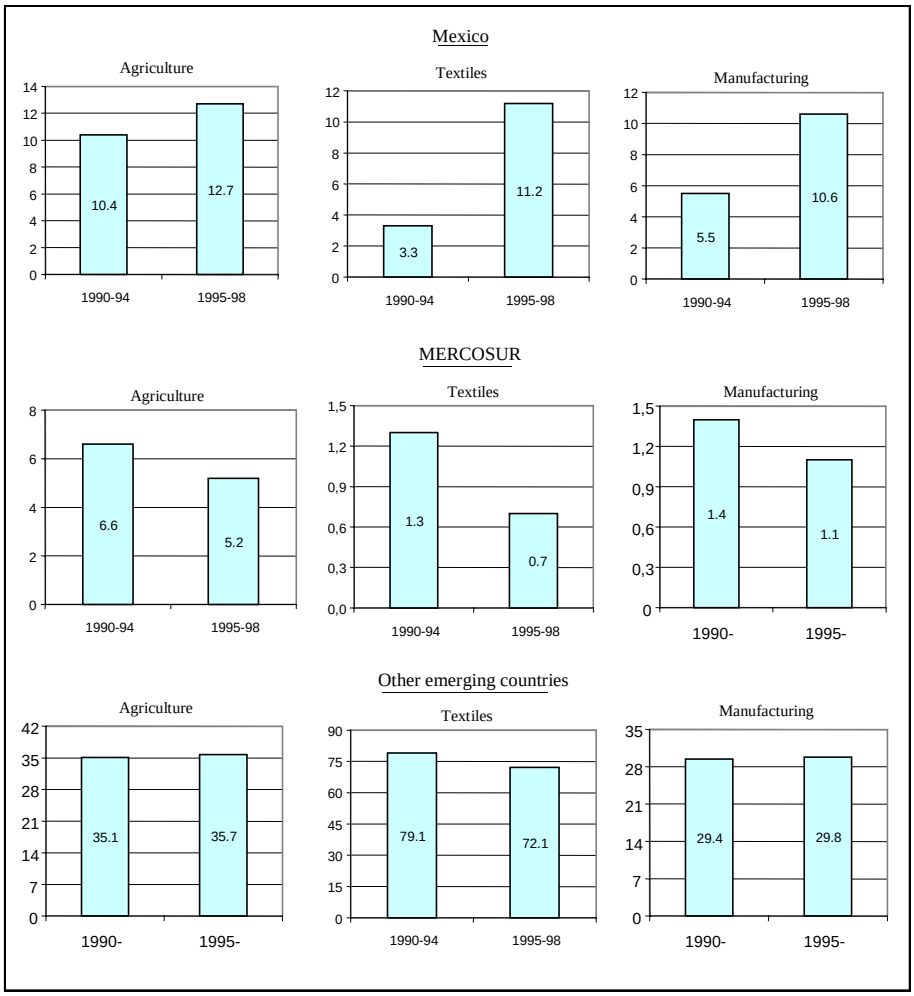
Market shares in the EU



For source and definitions, see tab. 6b.

Fig. 1b

Market shares in the US

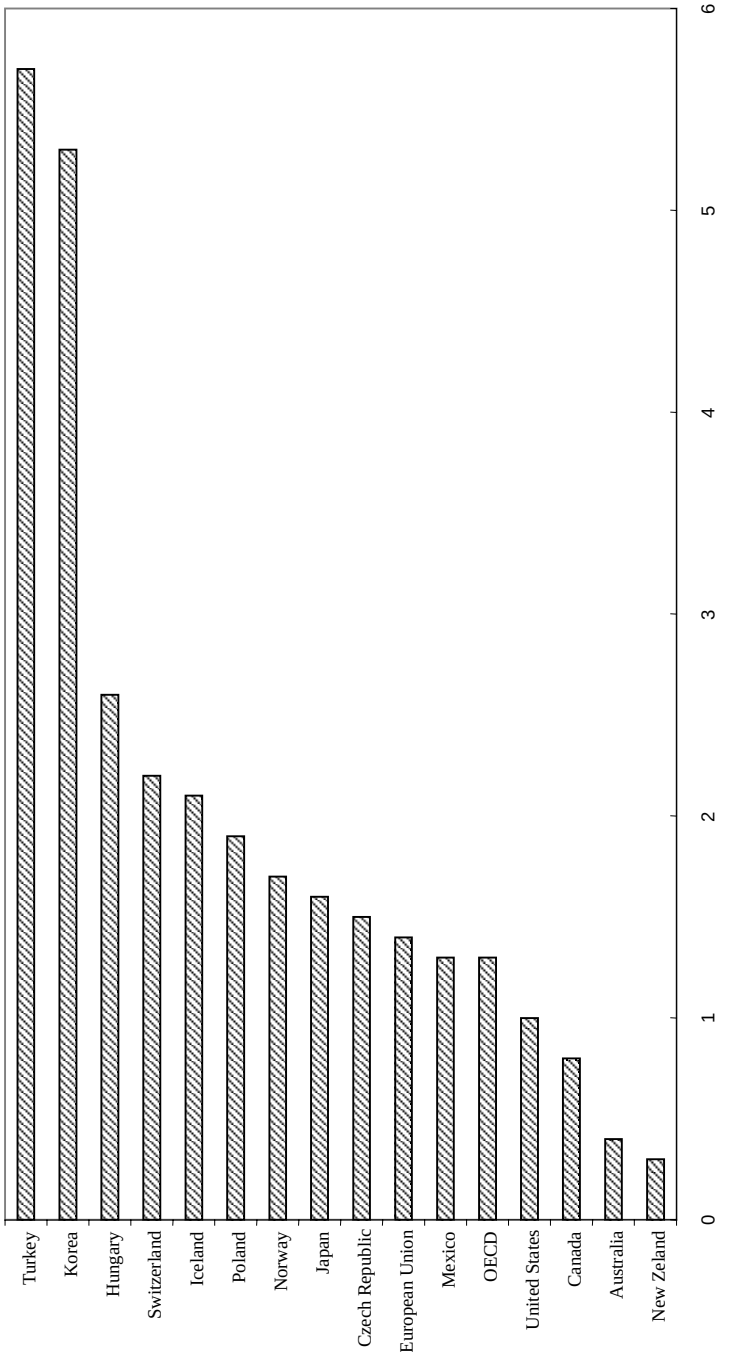


For source and definitions, see tab. 6c.

Fig. 2

Total agricultural support estimate by country (1998-2000)

% of GDP



ource: OECD, Agriculture policies in OECD Countries, 2001.

Tab. 1

World trade in goods [1]

(percentages)

	Shares on world exports			Average annual growth rates of exports	
	1980	1990 [2]	1999 [3]	1980-89	1990-99
World [4]	100.0	100.0	100.0	4.2	6.3
Industrial countries	71.3	71.1	66.9	4.9	5.7
USA	10.4	10.6	11.6	5.5	7.5
Japan	11.3	10.9	7.7	6.0	2.6
Euro area [5]	34.3	34.6	33.2	4.6	5.9
NIEs	4.4	8.1	10.6	11.9	9.3
Non-industrial countries	20.7	16.6	19.3	0.6	8.6
Africa	4.2	3.2	2.0	0.0	2.9
Latin America	4.5	4.3	5.4	4.0	9.4
Asia	4.8	5.7	8.8	6.7	11.5
China	1.0	1.5	3.2	10.2	15.4
ASEAN-4 [6]	2.7	2.9	3.9	5.7	9.6
Middle East	6.0	3.7	3.4	-4.5	5.8
Central and eastern Europe	3.6	4.2	3.2	4.5	4.2
Memorandum:					
SSA	….	0.7	1.4	0.3	4.4
LDCs	0.7	0.5	0.5	….	….

Source: Based on IMF data.

(1) At 1995 prices and 1995 exchange rates.

(2) As regards SSA and LDCs countries, 1988-90.

(3) As regards SSA and LDCs countries, 1998-99.

(4) Mean of exports and imports.

(5) Intra Eura area flows are included.

(6) Philippines, Indonesia, Malaysia and Thailand.

Tab. 2

Exports of non-industrial countries by geographic destination (1)

(in percentage of total flows)

Report	Non-industrial countries		Latin America						Asia								Eastern Europe		Africa	
			Total		Mexico		Mercosur		Total		NIEs		ASEAN		China					
Partner	1980-84	1995-99	1980-84	1995-99	1980-84	1995-99	1980-84	1995-99	1980-84	1995-99	1980-84	1995-99	1980-84	1995-99	1980-84	1995-99	1980-84	1995-99	1980-84	1995-99
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Industrial countries	61.0	55.3	68.0	70.1	85.1	93.1	54.7	46.7	59.1	51.2	56.4	46.3	66.0	55.4	43.2	53.8	41.0	54.6	69.8	63.7
EU	27.5	21.6	22.8	14.6	18.6	3.7	28.9	24.7	13.7	15.3	15.0	14.1	11.9	15.7	11.6	14.0	34.8	45.5	44.8	42.5
North America	18.9	22.5	39.0	51.4	60.0	87.8	19.3	16.4	23.2	21.4	27.1	21.1	18.7	21.1	8.4	20.0	2.4	5.0	18.2	16.1
Japan	12.2	9.0	4.7	3.1	6.3	1.0	5.1	4.3	18.8	11.8	10.0	8.0	32.9	16.0	21.5	17.9	1.5	1.4	3.9	3.0
Non-industrial countries	34.7	42.4	29.1	27.5	13.2	6.8	43.4	52.2	39.7	47.9	42.0	52.6	33.9	44.2	54.5	45.8	54.1	44.4	15.6	27.5
Latin America	5.4	4.8	17.7	19.4	7.9	5.4	16.8	33.9	2.4	2.5	2.5	3.3	2.9	1.4	2.2	2.4	0.8	1.4	4.0	2.9
Mercosur	2.1	2.0	5.1	8.3	3.4	1.1	8.1	22.7	0.5	0.8	0.3	1.0	0.3	0.5	1.6	0.9	0.4	0.3	1.2	1.9
Asia	12.8	26.5	2.8	4.7	1.6	1.0	5.0	9.1	25.7	39.7	28.7	44.2	25.8	38.1	35.2	36.9	3.7	5.5	2.9	9.6
East Asia	9.2	21.6	1.7	3.6	1.4	0.9	3.2	6.7	21.0	33.3	21.6	36.9	22.1	30.3	31.4	32.1	1.5	4.1	1.4	5.1
Eastern Europe	8.7	6.2	3.8	1.1	0.4	0.1	10.6	2.7	2.7	1.8	0.8	1.7	2.0	1.0	4.5	2.6	39.3	33.0	2.1	2.3
Africa	2.4	1.9	2.1	0.9	0.2	0.1	5.1	2.6	2.5	1.3	3.0	1.2	1.1	0.9	2.8	1.5	1.9	1.1	5.3	10.5
Memorandum:																				
World (billions of US$)	611.8	1796.9	104.0	271.0	20.6	108.0	32.0	77.0	180.1	1003.0	66.8	430.4	47.9	211.7	21.7	172.3	94.0	251.0	67.5	99.3

Source: IMF, Direction of Trade Statistics.

(1) Goods only. Flows valued at current prices.

Tab. 3

Market shares of selected groups of developing countries (1) (2)

Markets \ Suppliers	Non-industrial countries	NIEs	ASEAN	China	South Asia	MERCOSUR	Mexico	Eastern Europe	MED	LDCs	SSA	ACP
QUAD												
1980-1984	35.3	9.9	3.2	1.5	1.2	4.1	1.3	4.5	1.3	1.6	3.9	3.8
1985-1989	35.6	12.5	3.2	1.6	1.3	3.2	1.4	4.1	1.7	1.2	3.1	2.8
1990-1994	40.2	13.2	4.8	3.2	1.6	2.6	2.7	4.8	1.9	0.8	2.1	2.1
1995-1998	44.6	11.7	5.3	5.4	1.8	2.3	4.9	6.4	2.1	0.8	1.7	1.8
EU												
1980-1984	45.1	6.9	3.2	1.6	1.4	6.2	0.4	10.0	2.5	2.9	7.2	6.7
1985-1989	46.0	8.5	3.5	1.8	1.7	5.2	0.4	10.4	3.3	2.5	6.7	5.9
1990-1994	49.4	11.2	4.7	2.7	2.4	4.3	0.4	11.9	3.7	1.6	4.5	3.9
1995-1998	55.6	11.0	5.1	4.1	2.7	3.8	0.5	16.9	4.1	1.6	4.1	3.6
USA												
1980-1984	31.2	13.7	2.1	1.0	0.9	3.1	2.6	1.0	0.8	0.9	1.8	2.2
1985-1989	31.4	15.9	2.3	0.9	1.0	2.5	2.8	0.8	1.0	0.5	1.1	1.4
1990-1994	37.4	15.8	4.1	2.7	1.3	1.9	5.9	0.8	1.2	0.4	0.6	1.1
1995-1998	42.0	13.1	4.5	4.7	1.6	1.5	10.6	1.1	1.3	0.4	0.5	1.0
Japan												
1980-1984	40.4	11.4	8.9	3.9	2.0	3.3	0.5	2.3	0.5	1.3	3.1	2.5
1985-1989	43.5	16.4	7.9	4.8	2.0	2.5	0.3	2.1	0.7	1.0	2.9	1.9
1990-1994	44.9	16.3	9.5	7.6	1.6	2.0	0.2	1.8	0.7	0.6	1.4	1.3
1995-1998	48.0	14.6	10.5	13.1	1.3	1.8	0.3	1.5	0.6	0.5	0.9	1.0

Source: Statistics of Canada, *World Trade Analyzer*.
(1) Computed as percentages of non-oil imports from world in the corresponding market. Intra EU imports are excluded.
(2) As regards the abbreviations and country groups, see the Appendix.

Tab. 4

Sectoral composition of non-oil imports in the QUAD by selected suppliers (1) (2)

(percentages)

Sectors:	Commodities								Manufacturing							
	Agricultural products (3)				Mineral non-oil products (4)				Total				Textiles and clothing			
Suppliers:	80-84	85-89	90-94	95-98	80-84	85-89	90-94	95-98	80-84	85-89	90-94	95-98	80-84	85-89	90-94	95-98
Non-industrial countries	30.8	24.6	19.2	15.7	14.2	9.7	6.8	5.4	55.0	65.7	74.0	78.8	17.6	20.6	22.4	20.0
NIEs	8.0	7.2	6.3	4.4	2.9	1.4	0.8	0.6	89.1	91.4	92.9	95.0	33.1	29.8	25.4	18.8
ASEAN	37.3	32.0	23.9	19.6	36.7	23.9	11.7	9.3	25.9	44.1	64.4	71.1	12.8	19.8	22.4	21.5
China	25.7	25.3	16.7	9.9	13.1	9.6	4.2	1.9	61.2	65.1	79.1	88.1	37.2	39.6	36.3	27.8
South Asia	26.7	17.1	13.1	13.1	9.3	6.9	3.8	2.5	64.1	76.0	83.1	84.5	37.4	46.1	54.7	55.2
MERCOSUR	57.7	48.9	47.0	48.2	15.5	12.1	12.9	13.8	26.8	39.0	40.1	38.0	4.9	5.4	4.8	2.9
Mexico	39.2	31.3	16.4	9.8	7.5	4.8	3.2	1.9	53.3	64.0	80.4	88.3	3.7	3.4	4.8	9.4
Eastern Europe	20.9	19.1	16.4	11.0	15.1	13.2	9.9	8.1	64.0	67.7	73.7	80.9	15.1	19.2	23.9	23.2
MED	29.8	20.9	17.3	13.6	4.1	2.9	1.9	1.4	66.2	76.2	80.8	85.1	22.2	30.2	35.3	33.4
LDCs	39.5	36.7	28.6	29.6	25.8	21.3	17.5	10.8	34.7	42.0	53.9	59.6	5.8	11.3	24.2	36.2
Memorandum:																
Industrial countries	16.7	13.8	14.2	13.3	7.2	5.7	4.4	3.9	76.1	80.5	81.4	82.7	6.5	6.4	6.4	5.7

Source: Statistics of Canada, *World Trade Analyzer* .

(1) As percentages of overall non-oil imports.

(2) As regards the abbreviations and country groups, see the Appendix.

(3) Only edible products.

(4) Includes non-edible agricultural products.

Tab. 5

Industry composition of manifacture imports in the QUAD by selected suppliers (1) (2)

	Industrial countries				Non-industrial countries				NIEs				ASEAN				China				South Asia			
	80-84	85-89	90-94	95-98	80-84	85-89	90-94	95-98	80-84	85-89	90-94	95-98	80-84	85-89	90-94	95-98	80-84	85-89	90-94	95-98	80-84	85-89	90-94	95-98
Traditional labour intensive goods	23.9	22.7	23.7	22.1	60.2	60.1	59.2	52.0	72.0	67.9	62.6	51.6	82.7	78.0	68.1	58.1	82.1	80.9	77.9	69.2	92.0	93.8	91.6	89.3
Cork, wood and furniture	0.9	0.8	0.9	1.0	2.5	2.2	2.1	1.9	2.4	1.3	0.7	0.5	13.2	14.6	10.2	7.8	0.5	0.7	1.2	1.1	0.3	0.1	0.1	0.2
Leather, footwear and rubber	2.3	2.1	2.0	2.0	7.5	7.8	8.0	6.6	11.3	11.6	10.8	8.5	4.3	4.5	9.4	9.4	5.3	5.5	12.3	12.7	2.1	2.4	3.1	3.1
Textiles and clothing	8.5	8.0	7.8	6.9	32.0	31.5	30.2	25.4	37.2	32.6	27.3	19.8	49.6	45.3	34.9	30.2	60.7	61.0	46.3	31.5	58.3	60.7	65.9	65.4
Miscellaneous	12.2	11.8	12.9	12.2	18.3	18.6	19.0	18.1	21.1	22.4	23.8	22.8	15.5	13.6	13.6	10.6	15.5	13.8	18.1	23.9	31.4	30.5	22.6	20.7
Large economies of scale industries	44.4	44.2	42.2	41.9	23.5	22.8	19.2	20.4	6.8	10.3	9.3	11.3	11.3	11.5	6.4	7.8	13.9	13.9	11.2	10.9	3.3	3.2	4.9	6.5
Paper and editing	4.3	4.4	4.5	4.4	0.7	0.8	0.8	0.9	0.4	0.4	0.4	0.5	0.0	0.2	0.3	0.8	0.4	0.3	0.3	0.4	0.0	0.0	0.0	0.1
Basic chemicals	3.4	2.7	2.3	2.1	3.5	3.0	2.3	2.4	0.3	0.3	0.3	0.3	1.4	1.5	0.7	1.0	5.1	5.2	2.9	2.2	0.9	0.4	0.6	1.1
Other chemicals	3.7	3.7	4.4	4.7	1.3	1.2	1.2	1.2	0.4	0.6	0.8	0.8	1.7	1.5	1.0	1.4	5.5	4.2	1.9	1.4	0.9	1.2	1.6	1.8
Iron steel & non ferrous metals	9.0	6.7	5.9	5.7	13.7	11.4	8.2	6.9	1.9	1.8	1.2	1.4	7.4	6.7	1.9	1.6	2.8	3.6	2.7	2.8	0.8	1.2	1.6	1.9
Household elet & non-el. equip.	1.2	1.2	1.3	1.1	1.4	1.8	1.7	1.8	2.5	3.0	2.7	2.7	0.0	0.7	1.2	1.1	0.0	0.1	1.4	2.8	0.1	0.0	0.0	0.0
Road vehicles	22.8	25.6	23.8	23.8	2.8	4.5	5.1	7.2	1.2	4.2	3.8	5.4	0.8	0.8	1.2	1.9	0.1	0.5	2.0	1.4	0.5	0.4	1.0	1.5
Specialistic industries	15.7	16.3	17.1	17.5	5.7	6.6	7.7	10.2	3.6	5.1	6.8	8.7	1.8	3.8	5.5	6.6	1.0	1.5	3.4	5.4	1.6	1.0	1.1	1.7
Ind.and power generating mach.	13.2	13.5	13.9	14.0	4.3	4.8	4.4	5.1	2.2	3.3	3.5	4.2	1.0	2.0	2.4	3.0	0.8	1.3	2.4	2.6	1.3	0.8	0.8	1.3
Miscellaneous	2.5	2.8	3.1	3.4	1.4	1.7	3.4	5.0	1.3	1.8	3.3	4.5	0.8	1.8	3.0	3.7	0.2	0.2	1.0	2.8	0.3	0.2	0.2	0.4
High technology goods	16.0	16.8	17.1	18.5	10.5	10.5	13.8	17.4	17.6	16.7	21.3	28.4	4.2	6.7	20.0	27.4	3.0	3.7	7.5	14.4	3.1	2.0	2.5	2.5
Pharmaceutical	2.1	2.1	2.9	3.8	0.7	0.6	0.6	0.6	0.3	0.2	0.2	0.2	0.4	0.2	0.1	0.1	2.3	2.8	2.1	1.4	1.1	0.8	1.4	1.1
Telec. & Aircraft and equip.	3.9	4.1	3.7	4.3	4.5	4.4	5.5	6.6	8.6	7.7	8.2	8.6	1.9	2.9	11.0	13.9	0.1	0.2	2.0	5.5	0.3	0.1	0.1	0.2
Electronics	2.8	3.6	3.6	3.7	1.8	2.3	3.9	5.9	3.2	3.9	7.1	12.6	0.2	1.7	6.0	9.4	0.0	0.1	1.1	2.5	0.1	0.1	0.1	0.2
Miscellaneous	7.2	7.0	6.8	6.8	3.5	3.3	3.8	4.4	5.4	4.9	5.8	6.9	1.8	1.9	2.9	4.0	0.6	0.6	2.3	5.0	1.6	1.1	0.9	0.9

Source: Statistics of Canada, World Trade Analyzer.

(1) As percentages of overall manufacture imports.

(2) As regards the abbreviations and country groups, see the Appendix.

Tab. 6a

Market shares of selected groups of developing countries in the QUAD (1) (2)

	Non-industrial countries	NIEs	ASEAN	China	South Asia	MERCOSUR	Mexico	Eastern Europe	MED	LDCs	SSA	ACP
Agriculture												
1980-1984	53.1	3.9	5.9	1.9	1.5	11.5	2.4	4.5	1.9	3.1	8.7	9.5
1985-1989	56.7	5.9	6.7	2.7	1.4	10.2	2.9	5.1	2.3	2.8	8.0	8.9
1990-1994	54.7	5.9	8.2	3.5	1.5	8.8	2.8	5.6	2.3	1.7	5.6	6.4
1995-1998	55.7	4.1	8.2	4.2	1.9	8.6	3.8	5.6	2.2	1.9	5.8	6.8
Manufacturing												
1980-1984	28.3	12.8	1.2	1.4	1.1	1.6	1.0	4.2	1.3	0.8	1.7	1.3
1985-1989	30.5	14.9	1.9	1.4	1.3	1.6	1.2	3.6	1.6	0.6	1.5	1.1
1990-1994	37.4	15.4	3.9	3.3	1.7	1.3	2.8	4.5	1.9	0.6	1.1	0.9
1995-1998	42.9	13.6	4.6	5.8	1.9	1.0	5.3	6.3	2.1	0.6	0.9	0.8
Textiles and clothing												
1980-1984	75.9	39.9	5.0	7.0	5.3	2.4	0.6	8.1	3.6	1.1	0.9	1.1
1985-1989	78.6	39.7	6.9	7.0	6.4	1.9	0.5	8.4	5.4	1.4	1.2	2.1
1990-1994	82.7	31.0	9.9	10.5	8.3	1.2	1.3	10.7	6.1	1.8	1.2	2.3
1995-1998	84.4	20.9	10.7	14.1	9.5	0.6	4.4	14.1	6.5	2.8	1.1	2.1

Source: Statistics of Canada, *World Trade Analyzer*.
(1) Computed as percentages of imports from world. Intra EU imports are excluded.
(2) As regards the abbreviations and country groups, see the Appendix.

Tab. 6b

Market shares of selected groups of developing countries in the EU (1) (2)

	Non-industrial Countries	NIEs	ASEAN	China	South Asia	MERCOSUR	Eastern Europe	MED	LDCs	ACP
Agriculture										
1980-1984	60.5	1.2	5.7	1.5	1.4	15.8	7.6	3.2	4.2	13.8
1985-1989	69.2	1.3	6.6	2.0	1.4	16.0	9.5	4.3	4.6	15.6
1990-1994	68.9	1.3	7.2	2.3	1.9	15.9	11.1	4.7	2.8	12.3
1995-1998	70.6	0.9	6.9	2.2	2.3	16.2	11.5	4.7	3.3	13.6
Manufacturing										
1980-1984	36.6	10.3	1.6	1.5	1.7	1.8	10.9	2.5	1.6	2.4
1985-1989	38.0	11.6	2.1	1.7	2.0	1.8	10.4	3.4	1.3	2.1
1990-1994	44.7	14.3	4.1	2.8	2.7	1.5	11.6	3.7	1.1	1.5
1995-1998	52.5	13.6	4.7	4.7	3.0	1.2	17.5	4.2	1.2	1.3
Textiles and clothing										
1980-1984	79.2	28.7	5.9	5.2	7.3	3.3	16.8	7.8	1.1	1.1
1985-1989	82.9	26.7	7.7	5.8	8.9	2.3	19.2	11.9	1.2	1.8
1990-1994	87.7	22.1	10.7	6.5	11.1	1.3	22.3	11.7	2.0	1.7
1995-1998	90.9	15.9	9.6	7.5	12.4	0.7	30.7	12.4	3.5	1.8

Source: Statistics of Canada, *World Trade Analyzer*.
(1) Computed as percentages of imports from world. Intra EU imports are excluded.
(2) As regards the abbreviations and country groups, see the Appendix.

Tab. 6c

Market shares of selected groups of developing countries in the US (1) (2)

	Non-industrial Countries	NIEs	ASEAN	China	South Asia	MERCOSUR	Mexico	MED	LDCs	SSA
Agriculture										
1980-1984	59.1	3.6	6.0	0.9	1.3	12.0	8.1	1.1	2.8	5.1
1985-1989	54.5	4.4	5.9	1.0	1.3	8.9	9.3	1.2	1.2	2.8
1990-1994	52.1	3.3	8.0	1.7	1.4	6.6	10.4	1.3	0.8	1.6
1995-1998	53.6	2.2	8.3	1.8	1.8	5.2	12.7	1.1	0.8	1.8
Manufacturing										
1980-1984	26.5	16.2	1.0	1.0	0.8	1.7	1.8	0.8	0.4	0.9
1985-1989	29.2	17.8	1.7	0.9	1.0	1.8	2.1	1.0	0.3	0.7
1990-1994	36.3	17.6	3.6	2.8	1.3	1.4	5.5	1.2	0.3	0.4
1995-1998	41.5	14.5	4.1	5.1	1.6	1.1	10.6	1.4	0.4	0.3
Textiles and clothing										
1980-1984	78.7	53.3	4.9	6.5	3.6	1.8	1.3	0.6	1.5	0.3
1985-1989	79.2	49.4	7.7	5.1	5.1	1.9	1.0	1.6	2.0	0.6
1990-1994	83.7	41.1	10.5	8.0	7.0	1.3	3.3	2.4	2.3	0.6
1995-1998	84.0	26.7	13.1	9.5	9.3	0.7	11.2	3.0	3.3	0.6

Source: Statistics of Canada, *World Trade Analyzer*.
(1) Computed as percentages of imports from world.
(2) As regards the abbreviations and country groups, see the Appendix.

Tab. 6d

Market shares of selected groups of developing countries in Japan (1) (2)

	Non-industrial Countries	NIEs	ASEAN	China	South Asia	MERCOSUR	Mexico	MED	LDCs
Agriculture									
1980-1984	37.2	11.1	7.4	4.3	2.2	3.0	0.3	0.2	1.5
1985-1989	44.8	16.2	8.5	6.3	1.9	3.0	0.2	0.3	1.8
1990-1994	45.7	15.7	10.9	7.5	1.4	2.3	0.2	0.3	1.2
1995-1998	45.8	10.7	11.0	10.1	1.8	2.9	0.4	0.3	1.3
Manufacturing									
1980-1984	38.0	17.3	2.4	4.7	1.4	1.8	0.6	1.0	1.3
1985-1989	42.4	21.4	4.1	4.6	1.9	1.5	0.2	1.1	0.8
1990-1994	45.0	19.7	7.5	8.7	1.6	1.3	0.2	1.0	0.4
1995-1998	49.3	18.0	9.5	15.8	1.1	1.0	0.2	0.8	0.2
Textiles and clothing									
1980-1984	74.0	46.9	3.1	17.4	4.5	1.1	0.0	0.0	0.2
1985-1989	77.0	49.4	3.4	17.2	5.2	0.5	0.0	0.2	0.2
1990-1994	76.4	34.4	7.4	28.7	4.2	0.3	0.0	0.2	0.1
1995-1998	79.9	21.2	9.4	44.7	3.1	0.3	0.0	0.2	0.2

Source: Statistics of Canada, *World Trade Analyzer*.

(1) Computed as percentages of imports from world.
(2) As regards the abbreviations and country groups, see the Appendix.

Tab. 7

World trade of services (1)

	Exports							Trade balance (2)				
	Percentage of world exports of services		*Percentage of exports of goods and services*	*Percentage of exports of services*				*Percentage of gross flows*				
				Transportation		Travel	Other	Total	Transportation		Travel	Other
	1990	1999		Total	*of which:* Passenger services				Total	*of which:* Passenger services		
World	100.0	100.0	19.2	23.3	6.2	32.8	43.9	0.2	-9.6	3.3	4.6	2.8
Industrial countries	77.3	73.1	20.5	23.6	7.0	31.1	45.3	2.1	-3.2	1.9	0.3	6.4
EU	47.3	42.6	20.3	23.4	5.8	30.8	45.8	1.5	-0.2	9.9	-0.2	3.6
United States	16.9	18.8	26.0	20.4	8.8	36.7	42.9	19.7	-1.3	5.3	21.6	31.1
Japan	5.3	4.5	13.7	34.3	2.9	5.9	59.8	-30.1	-18.4	-64.2	-79.9	-16.8
Developing countires	22.7	26.9	16.5	22.5	4.2	37.2	40.2	-4.5	-23.2	9.9	15.3	-6.5
Latin America	3.8	4.0	14.7	21.2	6.3	52.5	26.3	-11.3	-35.0	-14.2	13.1	-21.9
Mexico	0.9	0.9	9.3	12.3	7.2	65.1	22.6	-2.0	-19.5	15.2	30.1	-38.5
Brazil	0.5	0.5	11.0	29.4	1.2	18.4	52.2	-38.9	-46.3	-79.1	-58.9	-18.5
Argentina	0.3	0.3	14.8	24.4	7.9	64.1	11.5	-30.8	-40.7	-47.9	-17.4	-55.4
Asia	9.9	13.5	15.8	20.4	3.3	31.9	47.6	-2.9	-28.8	22.7	14.3	2.8
NIEs (3)	5.1	6.2	11.7	12.7	3.1	52.0	35.4	-8.6	-51.8	-10.7	22.7	-13.0
ASEAN	2.0	2.6	13.5	29.8	2.9	23.8	46.4	5.4	-3.0	33.5	5.0	11.7
China	0.7	1.8	17.3	12.9	6.2	42.4	44.7	-11.3	-52.9	48.5	33.7	-16.7
Eastern Europe	2.4	4.0	20.2	30.8	3.2	41.8	27.3	6.8	23.3	28.4	14.9	-15.2

Sources: IMF and WTO.

(1) Excluding government services. Average flows in 1995-99 at current prices .

(2) Balance between exports and imports in percentage of the sum of exports and imports. The world balance is not equal to zero due to statistical problems.

(3) Excluding Hong Kong and Taiwan.

Tab. 8

Pre and Post Uruguay Round trade weighted tariffs on imports of industrial products by developed countries (1)

Product category	Import values from all sources (2)	Average weighted tariff			Import values from non-industrial countries (2)	Average weighted tariff		
		Pre-UR	Post-UR	Reduction(3)		Pre-UR	Post-UR	Reduction (3)
All industrial products (exc. petroleum)	100.0	6.3	3.9	38	100.0	6.8	4.5	34
Textiles and clothing	9.0	15.5	12.1	22	19.6	14.6	11.5	21
Metals	9.4	3.7	1.5	59	14.4	2.7	0.9	67
Mineral products, precious stones and metals	9.9	2.3	1.1	52	13.1	2.7	0.8	70
Electric machinery	11.7	6.6	3.5	47	11.3	6.3	3.5	44
Leather, rubber, footwear & travel goods	4.3	8.9	7.3	18	7.2	8.1	6.6	19
Wood, pulp, paper & furniture	5.5	3.5	1.1	69	6.8	4.6	1.7	63
Fish & fish products	2.5	6.1	4.5	26	6.2	6.5	3.4	48
Non-electric machinery	16.0	4.8	2.0	58	5.8	4.7	1.9	60
Chemicals & photographic supplies	8.3	6.7	3.9	42	4.8	7.2	4.0	44
Transport equipment	13.1	7.5	5.8	23	4.5	3.8	3.1	18
Manufactured articles n.e.s.	10.3	5.5	2.4	56	6.4	6.5	3.4	48

Source: Laird and Safadi (1996). Based on GATT estimates.

(1) Industrial products include: manufactured goods, tropical products and natural resource-based products. Trade in petroleum products is not included.

(2) Percent weights on import values of industrial products in 1993.

(3) In percent of the tariff level.

Tab. 9

Average import tariff rates in selected industrial and emerging markets[1]

	Industrial countries						Emerging countries							
							Latin America		Asia				Eastern Europe	
Shares on world imports in 1999	European Union 14.9	United States 18.1	Japan 5.4	Canada 3.7	Switzerland 1.4	Australia 1.1	Mexico 2.0	Brazil 0.9	South Korea 1.9	Malaysia 1.2	Thailand 0.8	India 0.7	Poland 0.8	Turkey 0.7
Agriculture	19.5	5.5	11.7	4.6	51.1	3.3	42.9	35.3	62.2	13.6	34.6	124.3	52.8	63.9
Prepared food	19.2	7.1	17.4	6.0	27.7	6.6	51.0	36.8	38.2	15.9	34.6	136.5	64.9	68.6
Industry	4.1	3.8	3.6	5.3	1.9	10.6	34.8	29.7	11.4	16.4	28.4	59.0	10.6	40.7
Hides and skins	2.7	5.5	10.3	5.9	1.4	8.7	29.6	34.6	18.0	14.5	29.2	61.5	15.6	100.7
Textiles and clothing	7.9	8.0	6.6	12.3	4.5	21.9	34.8	35.0	18.5	20.3	29.3	88.3	13.0	75.7
Footwear	8.0	13.0	26.0	13.1	4.3	18.5	35.0	35.0	13.0	27.0	30.1	100.0	14.4	94.2
Transport equipment	4.6	2.4	0.1	6.5	2.2	11.7	35.8	33.3	23.3	28.6	40.7	53.0	18.4	25.8
Total	7.4	4.1	5.1	5.2	8.9	9.7	35.5	30.3	18.3	16.1	29.1	67.4	19.9	44.1
Memorandum: Applied (MFN) tariff rates in 1996	9.5	6.2	6.7	9.2	3.2	5.3	14.0	12.2	9.1	10.0	22.9	78.6	18.7	10.3
Number of products with bound tariff rates (in %)	100.0	100.0	98.9	99.7	98.8	96.0	100.0	100.0	91.3	66.9	73.3	67.0	96.2	46.0

Source: OECD (1999b)

(1) Simple averages of Post-Uruguay Round bound rates. Specific duties converted in ad-valorem equivalents.

Tab. 10

Standard deviations of import tariff rates in selected industrial and emerging markets[1]

	Industrial countries					Emerging countries								
						Latin America			Asia				Eastern Europe	
	European Union	United States	Japan	Canada	Switzerland	Australia	Mexico	Brazil	South Korea	Malaysia	Thailand	India	Poland	Turkey
Shares on world imports in 1999	14.9	18.1	5.4	3.7	1.4	1.1	2.0	0.9	1.9	1.2	0.8	0.7	0.8	0.7
Agriculture	22.1	55.5	12.6	4.7	96.1	4.6	35.2	10.1	108.8	20.5	22.1	51.0	44.6	55.4
Prepared food	15.9	8.2	16.7	5.3	40.9	5.2	33.4	7.2	21.0	6.8	19.3	26.1	61.7	38.6
Industry	3.6	4.2	3.8	5.2	3.4	10.8	3.1	6.9	9.0	10.7	9.6	33.5	5.2	34.2
Hides and skins	2.3	4.7	7.3	4.3	1.7	8.2	9.7	4.1	9.0	9.6	10.5	36.1	9.5	49.9
Textiles and clothing	3.4	5.3	2.8	5.2	3.2	16.8	2.6	1.7	10.0	7.6	9.0	33.8	5.2	31.8
Footwear	5.9	9.9	15.0	6.6	2.6	12.7	0.0	0.0	0.0	6.3	1.3	0.0	3.1	17.2
Transport equipment	3.8	5.5	0.7	5.7	2.6	6.6	6.5	3.7	17.3	13.9	23.5	35.4	11.0	17.5
Total	9.6	4.4	6.1	5.1	29.9	10.5	13.6	7.6	43.7	12.3	12.4	42.3	20.4	38.2
Memorandum Number of products with "peak" tariffs (in %) [2]														
Agriculture	33.9	2.6	17.5	1.2	16.5	3.0	96.2	96.4	74.1	18.9	91.4	98.3	74.7	86.7
Industry	0.6	2.0	0.6	7.2	0.3	15.9	99.6	97.3	18.9	41.8	89.1	98.9	12.9	77.3
Total	5.0	2.1	2.8	6.4	1.7	14.1	99.1	97.2	26.4	39.1	89.4	98.9	21.3	78.6

Source: OECD (1999)

(1) Standard deviations of Post-Uruguay Round bound rates. Specific duties converted in ad-valorem equivalents.

(2) Peak tariffs are defined as duties equal or above 15%.

Tab. 11

Incidence of Core Non-Tariff Barriers in QUAD Markets [1]

	European Union			US			Japan			Canada		
	1988	1993	1996	1988	1993	1996	1988	1993	1996	1988	1993	1996
By sector [2] :												
Agriculture	20.6	14.9	8.5	5.5	3.6	2.8	11.3	10.3	7.0	6.0	4.1	2.3
Mining	0.0	3.5	5.0	2.3	2.3	2.3	3.5	0.4	0.4	0.4	0.7	0.7
Manufacturing	26.2	22.8	13.4	27.3	24.7	17.9	12.8	11.7	10.3	9.4	8.8	7.8
Food, bevarages and tobacco	50.7	44.2	17.2	14.5	12.1	2.8	22.2	12.4	5.9	14.2	11.4	0.4
Textiles and apparel	73.8	76.8	75.2	82.6	69.9	67.5	31.9	32.0	31.9	35.2	41.5	42.9
Basic metal industries	37.5	19.0	0.6	53.4	57.1	30.4	5.5	6.1	5.1	16.6	4.6	1.7
All products	**25.5**	**22.1**	**13.0**	**25.6**	**23.0**	**16.7**	**12.5**	**11.4**	**9.9**	**9.0**	**8.3**	**7.3**
By typology:												
Quantative restrictions	19.5	17.2	13.1	20.4	18.1	10.9	11.7	10.5	9.2	6.6	6.8	5.9
Export restraints	15.5	13.9	11.4	19.5	13.1	10.8	0.3	0.1	0.0	4.8	5.8	5.9
Non-automatic licensing	4.4	3.5	1.5	0.0	0.0	0.0	8.9	8.9	8.6	2.6	0.2	0.0
Other [3]	0.2	0.2	0.2	6.6	5.6	0.6	2.8	1.6	0.6	0.8	0.8	0.0
Price control measures	12.4	8.4	3.2	17.8	10.8	7.6	0.8	0.9	0.7	2.4	1.4	1.3
Variable charges	6.3	5.4	0.9	0.1	0.0	0.1	0.8	0.9	0.6	0.0	0.0	0.0
AD/CVs and VEPRs [4]	2.6	1.9	0.9	17.8	10.8	7.6	0.0	0.0	0.0	2.4	1.4	1.3
Other	4.3	1.1	1.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0

Source: OECD, 1997

(1) Frequency ratios (in %).
(2) For the US, 1989 instead of 1988.
(3) Includes quotas and prohibitions.
(4) Anti-dumping and countervailing actions and voluntary export price restraints.

Tab. 12

Support to Agriculture
(billions of US dollars)

	Producer Support Estimate			General Services Support Estimate			Consumer Support (1) Estimate			Total Support Estimate			Total Support Estimate in percent of GDP		
	1986-88	1998-00	2000	1986-88	1998-00	2000	1986-88	1998-00	2000	1986-88	1998-00	2000	1986-88	1998-00	2000
European Union	94.7	104.4	90.2	11.4	10.2	9.7	5.0	4.0	3.5	111.1	118.5	103.4	2.4	1.4	1.3
United States	41.9	50.9	49.0	15.2	22.2	22.5	11.1	20.3	20.8	68.2	93.3	92.3	1.4	1.0	0.9
Japan	53.2	55.2	59.9	8.6	14.4	13.3	-0.1	0.1	0.1	61.7	69.6	73.3	2.5	1.6	1.5
OECD	236.4	257.6	245.5	41.6	57.1	55.5	20.4	25.8	25.6	298.5	340.5	326.6	2.2	1.3	1.2

Source: OECD, *Agricultural Policies in OECD Countries* , 2001; national statistics and IMF.

(1) Transfers to consumers from taxpayers.

Tab. 13

Producer Support in major industrial countries (1)

	1986-88	1998-00	1998	1999	2000
European Union					
% Producer Support Estimate	44	40	39	43	38
of which:					
Market price support	38	25	24	27	22
United States					
% Producer Support Estimate	25	23	23	25	22
of which:					
Market price support	12	9	11	10	7
Japan					
% Producer Support Estimate	67	63	62	64	64
of which:					
Market price support	61	58	57	58	58
OECD					
% Producer Support Estimate	39	35	34	37	34
of which:					
Market price support	24	23	23	25	22

Source: OECD, *Agricultural Policies in OECD Countries*, 2001.

(1) Gross transfers to agricultural producers expressed as a percentage of gross farm receipts.

Tab. 14

Percentage Producer Support Estimate (1)

	European Union				United States				Japan				OECD			
	1986-88	1998	1999	2000	1986-88	1998	1999	2000	1986-88	1998	1999	2000	1986-88	1998	1999	2000
Wheat	52	48	54	43	49	38	49	49	87	84	86	86	48	40	45	40
Rice	57	26	17	8	52	15	36	41	84	84	87	88	81	74	79	82
Oilseeds	59	22	28	30	8	15	23	23	75	54	57	61	26	17	23	25
Sugar	60	52	58	49	58	56	79	47	66	65	67	43	54	51	61	50
Milk	57	54	48	43	60	61	56	50	84	79	81	81	58	56	52	48
Beef & Veal	59	77	77	75	6	3	4	4	44	33	33	32	33	37	37	32
Sheepmeat	70	57	59	52	6	5	15	16	n.c.	n.c.	n.c.	n.c.	55	45	47	40
Pigmeat	7	11	39	25	4	5	4	4	42	50	56	58	14	16	32	22

Source: OECD, *Agricultural Policies in OECD Countries*, 2001.

(1) Gross transfers to agricultural producers expressed as a percentage of gross farm receipts.

Tab. 15

Use of anti-dumping actions
(Actions reported for the year ending 30 June)

	1987	1993	1996	1997	1998	Jan. - Jun. 1999	2000
European Union [1]							
Initiations	17	33	16	26	44	32	49
Provisional measures	12	17	23	26	28	11	31
Definitive duties	7	19	25	10	38	10	15
Price undertaking	11	7	6	5	7	0	13
Total	47	76	70	67	117	53	108
United States							
Initiations	41	68	16	20	28	28	29
Provisional measures	55	70	13	22	15	12	38
Definitive duties	38	35	17	15	12	11	37
Price undertaking	2	5	0	0	5	0	4
Total	136	178	46	57	60	51	108
Canada							
Initiations	24	37	6	8	10	10	11
Provisional measures	12	31	12	8	10	13	12
Definitive duties	8	12	6	3	5	1	18
Price undertaking	2	3	0	0	0	1	0
Total	46	83	24	19	25	25	41
Australia							
Initiations	40	61	8	22	35	10	18
Provisional measures	17	21	2	6	23	0	4
Definitive duties	3	24	1	1	3	6	4
Price undertaking	1	0	0	1	4	0	0
Total	61	106	11	30	65	16	26
Other OECD2							
Initiations	6	39	18	29	19	18	20
Provisional measures	5	33	3	23	12	3	10
Definitive duties	0	19	26	16	11	5	13
Price undertaking	7	2	3	5	5	0	2
Total	18	93	48	73	47	26	45
OECD Total2							
Initiations	128	238	64	105	136	98	127
Provisional measures	101	172	53	85	88	39	95
Definitive duties	56	109	73	45	69	32	87
Price undertaking	23	17	9	11	21	1	19
Total	308	536	199	246	314	171	328
Total non-OECD [2]							
Initiations	..	7	85	95	99	80	109
Provisional measures	..	7	17	58	52	32	91
Definitive duties	..	7	43	40	61	44	98
Price undertaking	..	0	0	3	0	4	10
Total	..	21	145	196	212	160	308

Source: Coppel and Durand (1999) and WTO Annual Report, various issues.
(1) Before 1995, excludes Austria, Finland and Sweden. Data prior to 1993 refer only to actions against Parties to the anti-dumping Agreement. (2) Of those countries reporting.

Tab. 16

Exporters subject to initiations of countervailing and anti-dumping investigations

	Number of countervailing investigations							Number of anti-dumping investigations							
	1995	1996	1997	1998	1999	1995-1999 Number	in %	1995	1996	1997	1998	Jan.-Jun. 1999	Jul. 1999-Jun. 2000	1995 - Jun. 2000 Number	in %
Industrial countries	7	5	6	6	15	39	37.9	23	68	91	71	41	58	352	29.4
European Union	6	3	5	5	2	21	20.4	21	35	59	42	20	32	209	17.5
US	1	0	0	0	6	7	6.8	0	21	15	15	7	10	68	5.7
Japan	0	0	0	0	6	6	5.8	0	7	12	10	11	11	51	4.3
Others	0	2	1	1	1	5	4.9	2	5	5	4	3	5	24	2.0
Non-industrial countries	2	4	10	15	33	64	62.1	87	139	146	158	137	178	845	70.6
Asia	1	0	4	12	28	45	43.7	56	87	97	81	71	118	510	42.6
NIEs	0	0	1	5	9	15	14.6	20	18	38	33	30	40	179	15.0
Asean	1	0	0	1	13	15	14.6	17	18	20	11	19	36	121	10.1
China	0	0	0	0	0	0	0.0	16	39	31	25	16	30	157	13.1
India	0	0	3	6	6	15	14.6	3	10	7	12	6	11	49	4.1
Latin America	0	1	5	1	3	10	9.7	8	18	13	22	14	18	93	7.8
Eastern Europe	1	0	0	0	1	2	1.9	20	23	25	43	46	34	191	16.0
Others	0	3	1	2	1	7	6.8	3	11	11	12	6	8	51	4.3

Source: WTO Annual Report, various issues.

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COMMENTO A "INTERNATIONAL MARKET ACCESS FOR THE EXPORTS OF DEVELOPING COUNTRIES: EMPIRICAL EVIDENCE AND TRADE POLICY ISSUES" DI VALERIA ROLLI E ANDREA ZAGHINI

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Il contributo di Rolli e Zaghini documenta i principali fatti stilizzati del commercio internazionale dei paesi emergenti e i problemi aperti nel dibattito sulla liberalizzazione. La ricchezza dell'informazione nelle tavole e un commento puntuale ne fanno un testo utilissimo per chi si occupa di economia e politica internazionale. Al dettagliato lavoro di organizzazione dell'informazione statistica nella prima parte del testo, segue un'analisi sintetica degli impedimenti alla liberalizzazione. La terza e ultima parte porta l'attenzione su un importante capitolo di discussione, il commercio dei servizi.

Il tema è indubbiamente di grande rilievo. Guardando al panorama economico mondiale nell'ultimo decennio, l'elevato tasso di crescita del commercio è forse il dato che, su scala planetaria, meglio differenzia il periodo rispetto agli anni precedenti. Per i paesi emergenti, il commercio estero è cresciuto negli anni novanta a un tasso doppio rispetto agli anni ottanta. E a differenza degli anni ottanta, il fenomeno ha interessato la maggior parte dei paesi, a eccezione di quelli in aree geografiche di grande povertà. La composizione del commercio internazionale è cambiata a favore dei beni manifatturieri, mentre sono cresciuti gli scambi non solo con i paesi sviluppati, ma anche tra paesi in via di sviluppo.

Rolli e Zaghini documentano le caratteristiche di tre aree regionali di scambio debolmente specializzate: Giappone e Asia dell'est; Unione europea, Est Europeo e i paesi del mediterraneo; e il Nord America. Al di fuori di queste aree, gli autori mostrano che il commercio del Sud America è orientato in egual misura all'Unione Europea e agli Stati Uniti, mentre l'Asia del Sud è specializzata in tessili e vestiario.

L'analisi quindi evidenzia che alla disponibilità mostrata dai paesi industrializzati a ridurre le tariffe sui beni manifatturieri, non corrisponde

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un'analoga disponibilità a intervenire sulle tariffe che colpiscono prodotti agricoli e tessili. Inoltre, alla riduzione delle tariffe medie sui beni di manifattura, corrisponde il proliferare di barriere non tariffarie e l'uso improprio dell'antidumping, selettivamente orientato a colpire prodotti o produttori specifici. Allo stesso modo, la struttura delle tariffe colpisce selettivamente prodotti a valore aggiunto più alto.

Dal punto di vista del commercio internazionale e dello sviluppo, il quadro statistico e istituzionale presentato dagli autori sollecita approfondimenti su temi classici dell'economia internazionale. In primo luogo, il testo richiama la necessità di comprendere le strategie di localizzazione geografica della produzione perseguite dalle imprese dei paesi avanzati. Anche se i dati presentati non permettono una distinzione tra beni finali e intermedi, è noto che vasta parte dello scambio riguarda questi ultimi, e parte dello scambio tra paesi in via di sviluppo corrisponde a differenti fasi nella produzione di beni destinati al mondo industrializzato. Non a caso un capitolo di crescente interesse nel processo di liberalizzazione riguarda la riduzione della protezione tariffaria tra paesi in via di sviluppo.

La costruzione di basi di dati sul commercio "intra-firm", seppure difficile, sembra un passo necessario nella direzione di documentare il processo di articolazione geografica della produzione. Ma a questo fine la base di dati costruita da Rolli e Zaghini potrebbe già essere utilmente correlata con i dati sui flussi di investimento diretto estero (e finanziari).

Un secondo tema è il legame tra aspetti reali e finanziari del commercio internazionale. Con l'articolazione regionale della produzione, un motore della liberalizzazione degli scambi viene a coincidere con la necessita' delle grandi imprese di operare in regioni con istituzioni stabili e tariffe basse sui propri prodotti (mentre i paesi di origine possono contare su strumenti non tariffari selettivi di protezione). Ma questa è una strategia che richiede stabilita' politica e finanziaria, nella prospettiva di integrare economicamente mercati sempre più vasti. In questo senso la riforma dell'architettura finanziaria nelle sue dimensioni interna e internazionale si integra con considerazioni di strategia e politica industriale.

Un terzo tema riguarda la stabilizzazione macroeconomica, laddove la forte crescita del commercio in beni manifatturieri dovrebbe ragionevolmente influenzare la trasmissione internazionale degli shock e

delle politiche economiche. Questo è un tema vicino ai miei interessi di ricerca, su cui vorrei soffermarmi in chiusura.

Qual'è il meccanismo di trasmissione in presenza di imprese articolate su più paesi, o in presenza di rapporti tra imprese e consumatori in mercati non perfettamente concorrenziali (data la diffusione di beni manifatturieri non perfettamente sostituibili)? Gran parte della recente letteratura macroeconomica in economia aperta ha direttamente o indirettamente affrontato questo problema. In gioco è il modello tradizionale di trasmissione internazionale, largamente influenzato dallo schema di Dornbusch-Mundell-Fleming, laddove il tasso di cambio è regolatore dei prezzi relativi e quindi della domanda relativa dei prodotti interni e esteri.

Alcuni autori hanno avanzato critiche a questo approccio, producendo una vasta letteratura empirica che documenta la scarsa sensibilità dei prezzi al consumo rispetto ai movimenti del tasso di cambio – da cui questi autori deducono che il cambio non può influenzare la domanda relativa di beni finali di consumo (si veda Engel, 2002). La visione tradizionale viene difesa da questa critica sottolineando che i prezzi alle importazioni sono in realtà sensibili ai movimenti del cambio. Ad esempio, Obstfeld e Rogoff (2000) sottolineano che nei dati esiste una correlazione positiva tra deprezzamento nominale del cambio e peggioramento delle ragioni di scambio. Anche se il cambio non influenza, o influenza poco, la domanda per consumi, esso crea forti incentivi per le imprese a modificare la composizione dei prodotti intermedi utilizzati nel ciclo produttivo. Non solo la domanda di beni intermedi e scorte può variare con il tasso di cambio. Il processo produttivo può essere riallocato geograficamente su sedi diverse. La funzione allocativa del tasso di cambio alla base della teoria tradizionale non è affatto messa in discussione dal basso grado di "pass-through" del tasso di cambio sui prezzi al consumo (si veda la discussione in Obstfeld, 2002).

Teoria e ricerca empirica stanno avanzando velocemente lungo queste direttive di ricerca. In particolare, nuovi modelli macroeconomici mostrano che la distanza tra teoria e importanti fatti stilizzati dell'economia internazionale può essere fortemente ridotta qualora, realisticamente, si assuma che le imprese esportatrici sostengono costi in diverse valute (modelli al cui sviluppo i ricercatori della Banca d'Italia hanno dato importanti contributi). Ma soprattutto si è diffusa la consapevolezza che

comprendere le decisioni di localizzazione della produzione da parte delle imprese è un elemento chiave per costruire modelli dell'economia internazionale.

Anche dal punto di vista della macroeconomia, i fatti stilizzati documentati dal lavoro di Rolli e Zaghini, e i molti interrogativi sollevati dalla lettura del loro testo, non possono che rafforzare l'opinione che la crescita del commercio internazionale debba essere messa al centro della ricerca teorica e empirica nelle discipline economiche.

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