The Architecture of Globalization: A Network Approach to International Economic Integration.

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Abstract

We combine data on international trade linkages with network methods to examine the global trading system as an interdependent complex network. We map the topology of the international trade network and suggest new network based measures of international economic integration, at both a global system-wide level and a local country-level. We develop network based measures that incorporate not only the volume of trade but also the influence that a country has on the international trading system. These measures incorporate the structure and function of the network and may provide a more meaningful approach to globalization than current measures based on trade volumes. We find that in terms of participation and influence in the network, global trade is hierarchical with a core-periphery structure at meaningful levels of trade, though integration of smaller countries into the network increased considerably over the 1990's. The network is strongly "balkanized" according to geography of trading partners but not as strongly by income or legal origin. Using these new measures we find that a country's position in the network has substantial implications for economic growth and that network position is a substitute for physical capital but a complement to human capital. We therefore suggest that a network approach to international economic integration has potential for useful applications in international business, finance and development.

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I. Introduction.

While popular usage of the term "globalization" provokes strong and polarizing opinions across the world, such sentiments are usually associated with the effects, real or perceived, of what economists refer to as international economic integration. The increase in international economic integration that has characterized the last half-century has been associated with the spectacular economic performance and move out of poverty for large parts of the world (Sachs and Warner, 1995), but also with the increase in the volatility of country-level performance, reflected in several recent episodes of economic and financial "crises" (Forbes 2001). There is also a growing perception that the process of globalization has accelerated over the last decade and that the benefits and costs of increasing economic integration have not been evenly distributed across the world (Stiglitz, 2002; Bhagwati, 2004).

Despite a sharp increase in interest on these issues, discussions are often handicapped by the dearth of meaningful measures of international economic integration. Most studies of international economic integration or globalization in the economics literature focus on the volume of trade (exports and/or imports as a fraction of total trade) between countries, or define "trade integration" as the sum of exports and imports divided by GDP (see for example Rodrik, 2000, IMF World Economic Outlook, 2002). While these indicators[2] have been useful, the literature recognizes their shortcomings (which we describe in more detail below). Nevertheless, they are still widely used for studying international economic integration, primarily for lack of better alternatives.

Recent advances in the study of networks (Albert and Barabasi, 2002; Newman, 2003) have placed elegant and powerful tools at our disposal, enabling us to suggest alternative measures of international economic integration (henceforth IEI) that turn from a sole focus on individual country trade levels to a consideration of the pattern of linkages that tie together countries around the world as a whole. In this paper we combine a network approach with data on international trade linkages in order to examine the global trading system as an interdependent complex network[3]. A network approach enables us to derive statistics that describe the structure and evolution of global trade in ways that existing measures do not capture, such as the number of actual and potential trading partners, the structure of regional trading and the influence of individual countries and groups of countries for the whole network and for specific regions. We use this change in perspective toward IEI to suggest new measures of integration that provide insights into global trade that have been overlooked by the literature.

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[2] Other measures based on volumes such as gross private flows to GDP, and total trade to merchandise value added also fall into this category.

[3] Complex networks are large scale graphs that are composed of so many nodes and links that they cannot be meaningfully visualized and analyzed using standard graph theory. Recent advances in network research now enable us to analyze such graphs in terms of their statistical properties. Albert and Barabasi (2002) and Newman (2003) are excellent surveys of these methods.

With this objective, we first map the topology of the international trade network with a view to understanding its structure and properties. Armed with such an understanding, we then suggest new measures of IEI, at both a "local", country-level, and a "global", system-wide level, that incorporate the structure and function of the network. We use these measures to parse IEI along a number of different lines: geography, income and legal origin. This enables an examination of whether global trade has become more integrated or "balkanized" along these dimensions. We suggest network-based measures that capture not only the volume of trade but also the "influence" that a country may have on the international trading system. We have data on the network of international trade linkages at two points in time, 1992 and 1998, and are able to construct these measures for both years and examine how the network and thus "globalization" has evolved over the 1990's. Since trade levels vary considerably from country to country and there could be some debate over what constitutes "meaningful" levels of trade, we construct the network for different trade level thresholds[4]. We find that at low levels of trade, the global trading network has become much more integrated, while at higher levels of trade it has not changed much. At low levels of trade, the global trade network is quite decentralized and homogenous but at higher levels of trade the network looks much more hierarchical and heterogeneous, with a core-periphery structure. We also find that there is a high level of multilateralism in global trade and this has not changed much between 1992 and 1998[5].

As an application, and to demonstrate the potential of the network approach to IEI, we use our measures of network importance in a cross-country growth regression and find that they are all statistically and economically significant, have the expected signs and raise the explanatory power of the regression above that obtained using only volume based measures current in the literature. Using one of our measures of local integration, degree centrality, a measure of how centrally located a country is in the network[6], we find that an improvement in the degree centrality ranking by ten units increases the average GDP per capita growth rate by 0.24%[7]. A country's position in the network can thus have substantial implications for development outcomes.

The regression analysis also uncovers an intriguing relationship between the position of a country in the network and measures of physical and human capital that are included in the estimated equation. When

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[4] We describe this procedure in more detail in section II.

[5] While we believe this is the first exercise to explicitly chart the topology of the international trade network and suggest the use of this topology for the understanding of economic integration, we are by no means the first to use network ideas in international business and economics. An excellent introduction to this literature is Rauch and Casella (2001) and the critique by Zuckerman (2003). Systems- or network-based measures of globalization have, to the best of our knowledge, not been used in economics before, but there is antecedent in the sociology literature. A paper by Smith and White (1992) uses international trade flow data to consider the change in the structure of the international division of labor with the goal of understanding patterns and cycles of hegemony in the world-system. The focus of this work is thus quite different from ours.

[6] We describe various network measures in more detail below.

[7] This is judged to be a substantial effect by the standards of the literature. For example, Yanikkaya (2003) finds that an increase of 10% in the total trade to GDP ratio would increase the average growth rate of per capita GDP by 0.18%.

measures that represent the importance of a country to the network are included in the regression, the coefficient on human capital becomes higher, both in a statistical sense and in an economic sense. The coefficient on physical capital however, becomes smaller and is less often statistically significant when network measures are included. Furthermore, when proper interaction terms are included in the regression, the statistical findings suggest that network position may be a substitute for physical capital but a complement to human capital. One way to interpret this is that being higher up in terms of importance to the network and thus "better connected" is a proxy for the aggregate "social capital" that a country possesses, which in turn facilitates greater productive opportunities for human capital (Glaeser, Laibson and Sacerdote, 2002; Granovetter, 1985; Putnam 2000). The constraints imposed by limited physical capital are minimized by better network position.

The paper is organized as follows. Section II describes the data and definitions that we use to organize the trade-link data. Section III applies concepts from network analysis to understand properties of the network. We first provide an overview of the topology of the network and then delve deeper into the data and propose measures of local and global economic integration. Section IV is our application to economic growth. Section V summarizes our findings and suggests further applications of these measures.

II. Definitions and Data.

The first step in our approach is to identify the fundamental building blocks of the network and their specific properties. A network is a set of points, called *nodes* or *vertices*, with connections between them, called *links* or *edges*. In our context, each country is considered to be a node of the network. Since international trade is usually measured using the monetary value of exports and imports between countries, trading relationships are analogous to valued links in a network, and these vary from country to country. In order to chart the structure of the network we wish to take into account the magnitude of these relationships but not specifically their exact value.

We do this by considering a network link between two countries to be present if the trade level between them is above a certain threshold. Specifically, we define a trade-link between country *i* and country *j* to be present if the value of exports from country *i* to country *j* as a proportion of country *i*'s total exports is greater than or equal to a given magnitude. Since exports of country *i* to country *j* are in effect imports of *j* from *i* we are able to construct both export and import networks in order to understand IEI from both sides. We find that there are important differences between export and import networks. Moreover, since trade levels vary considerably from country to country and there could be some debate over what constitutes "meaningful" levels of trade, we construct the network for different trade level thresholds, which we explain below. Examining how the structure of the network changes as the trade threshold used to define the presence

of links varies also enables us to understand the sensitivity of various topological characteristics of the network to differing trade magnitudes. Constructing the network for different thresholds enables us to incorporate both magnitudes and network features into our analysis. Using thresholds enables us to avoid working directly with valued-directed links even though implicitly these thresholds embody the values of the trade links in our data.

The data used for our international trade network was extracted from the COMTRADE Database of the United Nations[8]. We use the US dollar value of exports and imports of all commodities between 182 countries for the years 1992 and 1998[9]. Countries are the nodes of the network and a link between them represents trading relationships among these countries. We study import and export relations separately and therefore we have a directed graph where country A can export to country B without having country B exporting to country A. We analyze the flow of payments instead of the flow of goods. This means that exporting countries will be recipients of payments for their exports, while importing countries will be sources of payments for their imports. This methodology allows us to analyze the influence of importing countries on exporting ones as influential buyers. We use the share of exports of country A to country B out of the total exports of country A and construct binary matrices for different magnitudes of trade. If country A's exports to country B, out of the total exports of country A are greater or equal to a given threshold, then the link B→A is present[10]. Our primary trade-link definition thus measures cash-flow dependency.

As an illustration, Table 1 is the binary matrix for the first 10 countries in our sample when we use the cash flow dependency ratio described and a trade-link threshold of 0% for 1992. For example, the link between Algeria (source of payments) and Albania (recipient of payments) exists and the cell entry (source = Algeria, Receiver = Albania) is 1, denoting that imports of Algeria from country Albania are greater than zero[11].

[Insert Table 1 here]

It is also important to note that the number of countries across the two years considered is not constant. There are a total of 194 countries included in the analysis but only 189 existed in 1992 and 192 in 1998. The 1992 list excludes the Czech Republic, Eritrea, and Ethiopia, while the 1998 excludes Czechoslovakia and Former Ethiopia. All the network indicators computed take this into consideration.

As a robustness check, we also consider an alternative dependency measure for the trade-link definition and associated network indicators, the value of exports of country *i* to country *j* out of the gross domestic product (GDP) of country *i,* which is a measure of economic dependency of country *i* on country *j*. We also use different trade-link thresholds using this measure. We find that the results for both dependency

[8] United Nations database STIC 1.
[9] A list of countries is included in Table 1A of the Data Appendix.
[10] The directed edge goes from B to A because B is the source of payment and A is the recipient of this payment.
[11] Note that this also means that the exports from Albania to Algeria are also greater than zero.

measures are very similar, and in the following sections focus on the results obtained using the cash flow dependency ratio. We expand on the results obtained with the alternative economic dependency ratio to define trade-links in Section IV, which applies the network indicators to economic growth.

III. A Network Approach to Measuring International Economic Integration.

III.I Network Overview

Just as nodes and links are the basic components of any network, node *degree* is the basic component of complex network analysis. The degree is the number of links connected to a given node. For directed networks we have two different measures, in-degree and out-degree. The first one deals with inbound links, in other words how many times a specific node acts as a receiver. The second one deals with the outbound links, counting how many times a specific node acts as a source. These two measurements provide an initial overview of network structure. We can locate highly connected nodes, referred to sometimes as hubs, and by looking at in- and out- degree measures separately, identify potentially influential receiver and source countries. It is also possible to obtain an overall idea of how homogeneous the network is. In a homogeneous network, flows are not dominated by a small group of nodes, implying that there should be no dominant nodes. Since our data are on the dollar value of exports and imports, and exporting countries are recipients of payments for their exports (in-degree) and importing countries are sources of payments for their imports (out-degree), henceforth we use the more intuitive terms export-degree and import-degree instead of in-degree and out-degree respectively. Using our binary matrix representation of the network [as in Table 1], the export-degree of country i is calculated by summing up the links that are present in column i, while the import-degree for country j corresponds to the summation of the links present in row j.

We construct the network and associated network measures for several different values of the trade-link threshold[12]. The zero percent threshold indicates the mere existence of trade among two countries and in this sense it is the least restrictive threshold. It simply acknowledges the presence of positive trade. We choose the one and two percent thresholds because eighty three percent of the trade shares in 1992 (eighty seven percent in 1998) are between zero and one percent, and this number increases to eighty nine percent when the range between zero and two percent is considered for the 1992 data (and to ninety two in 1998)[13]. Therefore we could say that these thresholds are close to embodying meaningful or representative trade.

[12] The export and import degree results for all countries in the 1992 and 1998 trade networks at the 0, 0.5, 1 and 2 percent thresholds are not reported here for matters of space but are available upon request.

[13] The reader should be alerted to the possibility that if trade flows over existing links increase substantially over time the current approach could be problematic. Consider the case where the number of links is constant across time but the flow has increased in such a way that the number of links that meet the threshold of two percent remains constant but a large portion of these move from a range of two percent to a level of four percent. In this case our measures would not capture

As the trade-link threshold is increased, the export and import degree distributions change, providing insights into the structure of international trade. For relatively low levels of trade the degree distribution for both imports and exports are similar. Most of the nodes have a relatively high export and import degree which means that most of the countries have a large number of trade partners for both exports and imports. But as the trade-link threshold is increased, the distribution of export-degree and import-degree changes dramatically[14]. The export-degree (number of countries exported to) falls considerably for all the nodes while the import-degree (number of countries importing from) remains constant only for a very small group of nodes (the G-7 appear in this group) and falls substantially for the others.

The export-degree change tells us that at meaningful levels, all the countries (G-7 included) export to a relatively small number of partners – which turns out to be by and large the same set of countries, the G-7 plus Spain, Belgium and the Netherlands. These countries account for almost fifty percent of world imports. The interpretation for the change in import degree is that for meaningful levels of trade, a small block of influential countries import from most of the other 179 - 182 countries, while the rest only import from a small number of countries. The asymmetric change of the import and export degree distributions imply that from the imports (source of payments) perspective the network is quite skewed, but from the exports (receiver of payments) perspective it is quite evenly distributed. The mean of the export-degree distribution is 9 countries at the 2%, for 1992 and 1998, trade-link threshold and 13 and 15 countries at the 1% threshold in 1992 and 1998, respectively.

This pattern of inequality in the degree distribution can be visualized by computing Lorenz curves and Gini coefficients. Figure 1 presents the Lorenz curves plots for the 1% and 2% thresholds and the Gini coefficients derived from the deviation of the forty five degree line from each of the Lorenz curves. These plots and numbers reveal that the 37 most connected countries (20% of the total countries) account for almost 80% of the outbound links in 1992 and 75% in 1998 at the 1% trade-link threshold. These numbers are almost completely reversed for the inbound links, where the 37 (20% of the total countries) most connected countries account for only 30% of all inbound links, in 1992 and 1998[15]. Similar results are obtained from the analysis of the 2% trade-link threshold.

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these changes in trade flows. The percentages discussed in the text show that this is not the case as the number (percentage) of links below one and two percent increase between 1992 and 1998. This suggests that in the data, the number of trade shares above one and two percent are falling even though volume is rising. And this trend holds even for higher thresholds, like five and ten percent.

[14]From an import degree perspective the maximum degree for all threshold levels is equal to the number of countries included in the analysis minus one. For the export degree, this still holds for the zero and 0.5 percent threshold. But given the criteria used to determine the presence of a link, the maximum export degree changes as the threshold increases. For 1 and 2 percent the maximum export degree is 100 and 50, respectively.

[15] Perfect equality, in this case perfect symmetry, would correspond to 37 countries (around twenty percent) accounting for twenty percent of the in or outbound links.

The 80/20 finding has special significance in the study of networks as it reflects the existence of a Pareto distribution, as opposed to a random network where the distribution of node degree is random. This kind of distribution is also often referred to as a power-law (exponential) distribution as the number of nodes with degree k, $N(k)$ follows a power law, i.e., $N(k) \sim k^{-\gamma}$ where γ is the degree exponent. Power laws mathematically formulate the fact that in many networks the majority of nodes have only a few links and that these nodes coexist with a few big hubs, nodes with an anomalously high number of links. In contrast, for a random network, the peak of the distribution implies that the majority of nodes have the same number of links. Therefore a random network has a characteristic *scale* in its node connectivity, embodied in the average node and fixed by the peak of the degree distribution. In contrast, the absence of a peak in a power-law distribution implies that there is no such thing as characteristic node. In other words, there is no intrinsic scale in a power-law network. Such networks are therefore referred to as being *scale-free*[16]. The international trade network is thus scale-free at meaningful levels of trade. This is especially interesting as it implies that it does not make much sense to speak of a "typical" country in terms of the number of trading partners.

III.2. Measures of Integration

We now introduce more detailed measures of global and local integration.

A. Global Integration Measures

Centrality

Degree analysis suggests that the international trade network has a core-periphery configuration from an imports perspective with the industrialized countries as the center of gravity. In this type of system the countries at the core are the most influential nodes since shocks to the core will affect the whole network. Another way to examine this feature of the network is through the notion of *centrality*. In many complex networks, centrality is used as a measure of power and influence. According to Wasserman and Faust (1994), central actors (nodes) must be the most active because they have the most ties to other actors (nodes). For our trade network, we can compute node centrality and network centrality.

Node centrality measures how central a given node is with respect to the others while network centrality measures how centralized the network is with respect to a perfectly centralized network. Here we present the results on network centrality; we address individual node centrality in the section on local measures of integration. We focus here and in the local measures section only on import-degree centrality indices. There are two reasons for this. First, we already know from the node degree analysis that the export-degree distribution is very homogenous. Therefore not much information would be added by analyzing the

[16] A startling discovery from recent research on complex networks is that almost all complex networks in nature are scale-free (see Albert and Barabasi, 2002).

differences in the export-degree centrality. Second, and more importantly, we are interested in understanding which countries are influential importing countries in the international trade network.

In order to analyze the centrality of the international trade network from an imports perspective, we compare it to a perfectly centralized network of the same size. A perfectly centralized network is one in which only one node sends/receives to/from the other vertices. This is called a *star* network (the most unequal possible network)[17]. Freeman (1979) proposes the following expression as a centralization index:

$$C_I = \frac{\sum_{i=1}^{g}\left[C_{\max}^{d} - C_D(n_i)\right]}{\max\sum_{i=1}^{g}\left[C_{\max} - C_D(n_i)\right]} \qquad (2)$$

where $C_{\max}^{d}$ and C_{max} represent the actual maximum degree centrality observed in the data for an individual node and the theoretical maximum degree centrality for an individual node in a network with g countries, and $C_D(n_i)$ denotes the degree centrality of node i[18]. The denominator in expression (2) is the summation for the star network, and equals $(g-1)(g-2)$ where g denotes the number of nodes in the network. The degree centrality of an individual node can be simply represented by its degree $d(n_i)$ but a more standard way is to normalize the individual node centrality in the following fashion,

$$C_D(n_i) = \frac{d(n_i)}{g-1} \qquad (2.1)$$

The Centralization Index, C_I, thus measures the degree of variability in the degrees of nodes in the network as a percentage of that in the star network of the same size.

The way in which the star-like configuration of the import-degree international trade network evolves between 1992 and 1998 provides information regarding the proportion of countries that have moved toward or away from the center of gravity. With the increasing volume of international trade observed during the nineties and the opening of countries like China and former Soviet-bloc countries, it is conceivable that the international trade network has been becoming less of a star-like network. This would result in a lower level of influence for the G-7 countries and the emergence of a number of other influential countries that previously belonged to the periphery.

Table 2 presents the results for the import-degree network centralization index[19]. This index shows us that for the lowest trade-link threshold of 0%, the network centralization index for import-degree is around

[17] In a star network, all nodes but one have an export/import degree of one except for the central node which has an export/import degree equal to the number of nodes in the network minus one.
[18] A more in depth discussion of degree centrality for an individual node is in the section of Local Measures of Integration. Note also that there are two other measures of centrality, Betweenness (Freeman 1977) and Closeness (Sabidussi, 1966). We use the current measure on account of its simplicity as compared to the others and because it seems better suited to the notion of the "core" of a network in the context of international trade than the others.
[19] Calculated using UCINET software package, specifically Freeman's degree centrality measures routine.

56% for the period of 1992 and 42% for 1998. In other words, the network is not very centralized. As we move to higher thresholds, such as 0.5%, 1%, and 2%, we observe dramatic changes that are in line with those obtained from the node degree distribution analysis. As the threshold increases, the imports network becomes extremely centralized. That is, a small group of countries are destinations for the bulk of imports which come from (i.e., are exports from) a large number of countries in the network. We could refer the former group of countries as the core and the latter group as the periphery. The comparisons of these indices across time imply that the core-periphery structure did not change noticeably over the nineties and a relatively small number of countries still constitute the core of the network, a core that is likely to exercise an enormous amount of influence on the periphery. We provide specific measures of influence later in the section.

Network Density

Node degree and centrality analyses are useful because they allow us to identify the presence or absence of a center of gravity for the network and give us an overview of the structure and configuration of the network as a whole. But these indicators do not directly address how integrated the network as a whole really is. One way to start examining the extent of global integration of the network is to measure the proportion of all possible links (trading relationships) that are actually present in the network. This ratio is called *network density*.

The maximum number of edges for a network is determined by

$$E_{\max} = \frac{g(g-1)}{2}$$

$$E^{D}{}_{\max} = g(g-1)$$

where $E_{\max}$ and $E^{D}{}_{\max}$ denote the maximum number of edges/links for an undirected and a directed graph, respectively and g is the number of nodes. The density of a directed network, like the international trade network, is simply the ratio of the links actually present to the maximum possible, $E^{D}{}_{\max}$.

$$\Delta^{D} = \frac{L}{g(g-1)} \qquad (3)$$

where L stands for the number of links present in the network.

The density calculations for the international trade network are also presented in Table 2. It is important to keep in mind that as the threshold increases, the maximum number of potential links decreases. For example, when the threshold used is one percent, the maximum number of countries to which a given country can export is one hundred, therefore the maximum number of possible links, $E^{D}_{\max}$, is determined by $g \cdot 100$ instead of $g \cdot (g-1)$. The results in Table 2 show, as expected given the previous results regarding a

core/periphery structure, that network density drops as the threshold is increased. The results across years allow us to compare changes in economic integration. For the period of 1992 – 1998, network density increased by 35% at the 0% threshold and 15% at the 0.5 % threshold. At higher thresholds, or what we have termed meaningful trade, density increased as well but by a smaller margin; 9% and 4% respectively for the 1% and 2% thresholds. Once again, the implication is that international economic integration measured this way increased much more at lower levels of trade.

Clustering

The 1990's have been a booming era for international trade agreements like the NAFTA, MERCOSUR, and the EU. In light of these preferential trade arrangements, an interesting question is the extent to which trading partners of a particular country are also linked to each other. This corresponds to the analysis of the proportion of multilateral trade relationships relative to bilateral ones. In a more globalized world the share of multilateral relations relative to bilateral ones should be higher than in a more balkanized world.

In terms of network topology, the extent of multilateralism can been seen through the property of network transitivity, sometimes also called clustering. In many networks it is found that if node A is connected to node B and node B to node C, then there is a heightened probability that node A will also be connected to node C. Clustering thus measures the probability that "the partner of my partner is also my partner" and provides insight into what is referred to as the neighborhood structure of the network. Transitivity in network topology means the presence of a heightened number of triangles in the network – sets of three nodes each of which is connected to the each of the others. This can be quantified by defining a *clustering coefficient, C*, (Watts and Strogatz, 1998), which is the mean probability that two neighbors of a given node are also neighbors of each other and can be expressed as the proportion of triples that form a triangle out of all the triples present in the network[20].

$$C = \frac{3 \times Number \quad of \quad triangles}{number \quad of \quad connected \quad triples} \qquad 0 \le C \le 1$$

where a "connected triple" means a single node with links running to an unordered pair of others. In effect, C measures the fraction of triples that have their third link filled in to complete the triangle. In terms of the international trade network, *C* is the mean probability that two countries that are linked to the same

[20] For example a complete triple (triangle) would be A→B, A→C and B→C and/or C→B, and connected triple can be just A→B, A→C. The factor of 3 accounts for the fact that each triangle contributes to three triples and ensures that $0 \le C \le 1$. See Newman (2003).

third country are also linked to each other. Note that since our trade-link definition is directional, C is computed on the basis of these directional links. Thus a triangle with links A to B, B to C, and C to A is different from a triangle with A to C, B to A and B to C.

The results for the international trade network presented in Table 2 show that the clustering coefficient is 0.41 at the 2% threshold for the 1998 network and is very high at all thresholds. Moreover, the clustering coefficient has remained practically constant between 1992 and 1998. The implication of this is that both the number of complete triangles and triples increased proportionally. This suggests that the extent of multilateralism has remained fairly high across the time period of our data.

Assortative Mixing

We examine country specific characteristics to investigate the existence of trade patterns driven by similarities between countries. In network terminology, the presence of such patterns is referred to as assortative mixing and community structure (Newman, 2003). If countries that share similar characteristics trade more between themselves than with countries that do not, then it can be concluded that the international trade network is an *assortative* network and that there is a definite pattern of preferential attachment. The specific characteristics that we use to partition the data are income level, region and legal origin[21]. Such patterns seem particularly relevant given current globalization debates and allow us to view IEI from a number of different angles. For example, if high income countries trade with other high income countries twice as much today relative to previous years, and less with low income countries, we could say that the network as a whole is becoming more "balkanized" rather than more "globalized" along the income dimension. If more trade occurs between instead of within groups, then this could be considered evidence of a more economically integrated system.

While the rationale for examining assortativity in the data along income and geographical region are fairly obvious, the rationale for using legal origin is the idea, emphasized by Rodrik (2000) and others, that transaction costs associated with contractual enforcement owing to differences in legal systems can be a major impediment to trade. Legal origin (La Porta et al. 1998, Shleifer and Glaeser, 2002) has been found to exert an important impact on many developmental outcomes.

Newman (2003) shows that assortative mixing can be quantified by the following assortativity coefficient,

$$r = \frac{\sum_i e_{ii} - \sum_i a_i b_i}{1 - \sum_i a_i b_i} = \frac{Tr(e) - \left\| e^2 \right\|}{1 - \left\| e^2 \right\|} \qquad (4)$$

[21] The countries are grouped according to the World Bank classification of income, the WTO classification for Regions and Legal Origin.

where e is the matrix containing the elements e_{ij}, which is defined to be the fraction of links in a network that connect a vertex of type i (i.e. region 1) to one of type j (i.e. region 2), $\|e\|$ means the sum of all elements of the matrix e. a_i and b_i are the fraction of each type of end of a link that is attached to nodes of type i. If $r = 0$, then we conclude that there is no assortative mixing. If r =1, the network is said to be perfectly assortative, and if the network is disassortative then r is negative and its value is determined by,

$$r_{\min} = -\frac{\sum_i a_i b_i}{1 - \sum_i a_i b_i},$$

which will generally lie in the range of $-1 \leq r < 0$.

[Table 3 here]

The results for the assortativity coefficient obtained for the variously partitioned data sets, presented in Table 3, show evidence of relatively high assortativity in international trade from a regional perspective. For this partition of the network the assortativity coefficient, r, is positive and has increased over time, between 1992 and 1998. This implies that over the nineties trading relationships have been predominantly established or strengthened between countries of the same region. In particular, a closer look at the data shows that the trading relationships within African countries and within CES countries increased significantly, as well as the trading activities of these two groups with the rest of the regions[22]. Additionally, Table 3 also presents the assortativity coefficients based on income and on legal origin partitions of the network. These numbers suggest that preferential attachment within countries of the same group, but the degree of assortativity is not as strong as in the case of regional partitions and the mixing patterns have not changed significantly during the nineties.

Degree Correlation

Assortative mixing on the basis of a scalar characteristic such as node degree is known as *degree correlation*. This measure determines whether there is preferential attachment between high-degree nodes and low-degree nodes, or if there is preferential attachment between low and high degree nodes, referred to as disassortative mixing. Newman (2003) shows that it is possible to compute the degree correlation coefficient simply by calculating the Pearson correlation coefficient of the degrees at either ends of a link. This calculation should give a positive number for assortatively mixed networks and negative for disassortative ones.

[22] Density changes are not presented here for reasons of space, but are available upon request from the authors.

The results for the degree correlation coefficient, presented in Table 2, show that the international trade network is a disassortative network. High degree countries trade with low degree countries, and vice versa. In other words, countries with lots of trading partners trade with countries with few trade partners. This could be interpreted as yet another manifestation of the core-periphery structure of the global trade network.

It is worth noting that these results should not be interpreted as a contradiction of our previous assortative mixing results. In this case there are no groupings of nodes according to some specific attribute. Degree correlation only records the node degree (number of trading partners) at both ends of each link and then calculates the correlation between both series. The disassortative mixing result should thus not be surprising from an economics perspective. International trade relations are not determined by the number of trading partners that each country has. They are based on structural or natural characteristics like natural resources and cultural, social, or geographical attributes that lead to comparative advantage.

B. Local Integration Measures

International trade to GDP ratios and individual country shares of international trade out of total world trade are two indicators that have frequently been used as measures of a country's degree of openness. These measures do not take into consideration important features implicit in international trade linkages, like the number and importance of trading partners and the specific configuration of the international trade network. By not doing so they over or underestimate a country's degree of economic integration and cannot be used to make arguments about the influence that a given country can exercise on others. Recent advances in complex network analysis offer a variety of tools that can be used to measure the degree of economic integration at the individual country level.

Node Degree Centrality

The number of in and out-bound links will ultimately determine the connectivity of an individual node, but there are different ways in which this connectivity can be measured. The simplest of these measures is *Node Degree Centrality*. Equation (2.1) (on page 14) shows how it is possible to calculate an index for node degree centrality. This index can show which countries are at the core or close to the core of the network. If a country is at the core of the network then its node degree centrality will be close to one. For a periphery country, this number will be close to zero, given that the number of international trade linkages is relatively small.

In Table A1, included in the data appendix, we report the import-degree centrality indices for the 0, 1 and 2 % thresholds for the years of 1992 and 1998[23] for all the countries in our sample. Higher numbers indicate more central countries. For the same reasons as explained in the overall network centrality discussion, we present only import-degree centrality indices.

As expected, the industrialized economies are part of the core of the network from an imports perspective, ranking in the top 20 for the different thresholds and periods considered. These numbers corroborate the finding that the centrality of the network has not changed significantly over the nineties since very few countries have dramatically increased their centrality indices. In essence, when the top twenty five countries from the 1992 data are compared with the top twenty five of 1998, very few changes are observed.

Countries such as Brazil, South Korea, Indonesia, Malaysia, Mexico, the Russian Federation, Thailand, and Turkey are among the top thirty (some in the top fifteen) most central countries in the international trade network. This is especially noteworthy since these countries have been at the epicenter of several financial, currency and balance of payments crises and contagion episodes of the nineties. This is suggestive of the importance of international trade linkages for financial contagion (Forbes, 2001; Abeysinghe and Forbes, 2002).

For comparison across methodologies, Table A1 in the data appendix presents the share of total international trade (imports plus exports) out of total world trade and the ratio of total trade to GDP for all the countries considered. In the interests of brevity we do not present country rankings according to these indices, but there are significant differences when country rankings obtained with these indicators are compared with those that are obtained when we rank countries according to node degree centrality.

Node Influence or Importance

Node degree centrality provides a preliminary approach to the identification of influential nodes. It is based on the number of countries that can be reached through direct links by an individual country. But it misses important features of the international trade network. The number of trading partners is a relevant statistic, but the specific characteristics of these trading partners may amplify or dampen the influence that a specific country has on others and on the whole network. One could say that it is not only the quantity of your partners that matter for influence, but also how influential they are in turn. If country A trades with country B and B trades with fifty other countries, then A exerts indirect influence on these fifty countries.

In a prominent paper, Salancik (1986) argues that "Accurate assessments of the structural power of several interdependent parties are hampered by the fact that parties depend on one another indirectly as well as directly and that any one's dependencies are not equally important for all parties." He goes on to propose an index for dependency networks in which nodes are defined as more important if others nodes depend more

[23] Calculated using UCINET software.

on them and if the other nodes depending on them are themselves important. Applying his index to our context, the *importance* of country *i* is a function of the dependence of other nodes on *i* and the importance of these other nodes.

$$imp_{(i)} = \sum_j dep_{(ij)} imp_j + \text{int}_{(i)} \quad \text{for all } j \neq i \qquad (6)$$

where $imp_{(i)}$ is the importance of country i , $dep_{(ij)}$ is the extent to which country i is depended upon by country j, and $\text{int}_{(i)}$ denotes the intrinsic value of country i. Equation (6), which represents a system of i equations, determines that if a country is not depended upon by other countries, then this country will be unimportant. Also, if a country is depended upon only by unimportant countries, then it would also be considered unimportant. For the intrinsic value of country i we consider three alternatives, no specific value (IV=1), the share of total trade of country i out of total world trade (IV=TS) and the ratio of the GDP per capita of country i with respect to that of the US (IV=GDP ratio).[24]

Equation (6) can be rewritten in matrix form as follows,

$$IMP_i = [D]_{ij} * IMP_i + INT_i \qquad (7)$$

where $[D]_{ij}$ denotes the matrix of dependencies of each country j on each country i. For the international trade network exporting countries depend on the importing ones. Therefore the elements of $[D]_{ij}$ are the share of exports of country j to country i out of the total exports of country j. This is essentially the same matrix that has been used in the calculation of all the measures reported so far, but in this case there is no need for the threshold analysis. By solving the system of equations, denoted by equation (7), it is possible to determine the importance of an individual country relative to the 181 other countries included in the study. The importance indices thus computed take into consideration volumes of trade and the number and importance of all trading partners.

[Table 4 here]

Table 4 shows the results for the top thirty countries, according to importance in 1998, but the indices for all one hundred and eighty two countries are included in Table A1, located in the data appendix. Importance index measures for the three different approaches to "intrinsic" value of a country described above, as well as the alternative trade-link definition (trade to GDP ratio) are reported. It is worth noticing that country rankings according to importance are starkly different from those obtained when countries are ranked by the ratio of total trade to GDP.

[24] These trade shares were calculated using the same trade data used for the network indicators and for the countries where the GDP per capita was not available the intrinsic value was set equal to zero.

IV. Application to Economic Growth

This section illustrates the usefulness of the local integration indicators discussed above by introducing them in a growth accounting exercise where the objective is to determine the effect of international economic integration, sometimes referred to as "openness", on economic growth. Harrison (1996), Frankel and Romer (1999), Irwin and Trevio (2002), and Yanikkaya (2003), among others, have used different indicators and methodologies, based on volumes of trade, in order to examine the relationship between openness and growth. Most of these studies consider a long-run growth model where a country's GDP or income per capita growth rate (γ_y) is a function of initial GDP conditions (y_I), physical capital (k), human capital (h), and a vector of control variables (Z) that represent country specific characteristics (degree of openness, geographical, and political characteristics).

$$\gamma_y = F(y_I, k, h; Z) \qquad (8)$$

Following Harrison (1996) and Yanikkaya (2003), we use data from the World Development Indicators of the World Bank to calculate GDP per capita growth rates. Initial GDP per capita levels are obtained from the Penn Tables Mark 5.6. Life expectancy and telephone lines/1000 data, obtained from Easterly and Lu's Global Development Network Growth Database[25], are used as proxy variables for human and physical capital, respectively. Political regime and war deaths data is also obtained from Easterly and Yu. The geographical control variables included in the study are physical access to international waters and tropical climate, both obtained from the Sachs and Warner dataset[26].

For the degree of openness two types of variables have been considered in the literature. The first category includes indicators based on volumes of trade, like total trade (imports plus exports), the ratio of total trade (imports plus exports) to GDP, and total trade with OECD countries and non-OECD countries. The other category includes indicators based on trade restrictions, like tariffs, export duties and taxes on international trade in general.

We use total trade to GDP ratio as the control variable for economic openness and compare these results to those obtained when we add the local integration measures, namely importance, maximum flow and degree centrality.

Harrison (1996) and Yanikkaya (2002) estimate the following equation,

[25] http://www.worldbank.org/research/growth/GDNdata.htm
[26] Sachs and Warner data set is published on the Center for International Development Web site accessible from http://www.cid.harvard.edu/

$$\gamma_y = \beta_0 + \beta_1 y_1 + \beta_2 h + \beta_3 k + \beta_4 Tropical + \beta_5 Water + \beta_6 Political + \beta_7 War + \beta_8 Open + \varepsilon_t \quad (9)$$

and report a positive and strong relationship between trade shares in GDP and economic growth[27]. Specifically Yannikkaya (2000), through a panel regression analysis spanning over three decades (70's, 80's and 90's), concludes that the coefficients (and their signs) for initial GDP conditions (-), human (+) and physical (+) capital, climate (-), and the total trade to GDP ratio (+) are strongly significant (at the one and five percent level) and robust, while those for the political regime (-), war deaths (-) and the physical access to international waters (-) are weakly significant (at the ten percent level).

Due to limited data availability for the international trade network we only have network indicators for 1992 and 1998. Therefore we cannot follow Yanikkaya's three period panel regression approach. We consider the data for 1987 to 1998 and divide the data into the periods 1987 - 1992 and 1993 - 1998. We average the variables for these two sample periods and perform a panel regression where the 1992 local integration indicators are used for the 1987 – 1992 sample and the 1998 indicators are used for the 1993 – 1998 sample.

Our results are presented in Table 5. Column (1), which corresponds to the regression that uses the total trade to GDP ratio as the control variable for openness, shows that changing the panel regression from a three decade approach to the two sub-samples of 1987 – 1992 and 1993 – 1998 does not affect the results obtained by Yanikkaya. The coefficient for total trade to GDP ratio (+) is significant at the one percent probability level while the other coefficients and their signs are also in line with his findings[28]. The rest of the columns in Table 5 show the results obtained when the IEI indicators are included in the analysis. These indicators incorporate network based measures of IEI for each country that embody more than just trade volumes. They capture a country's relevance for the international trade network, whether it is at the center or the periphery of the trade network, and the magnitude of the direct and indirect effects it has on other countries. For the regressions we use the country rankings for each of the local integration indicators, where a lower number (higher ranking) denotes higher degree centrality and importance. Therefore we expect negative signs for these variables in the regression results. As a country drops in the rankings, its relevance or its extent of IEI falls and therefore the advantages from trade and its positive effects on economic growth diminish accordingly.

[27] Yanikkaya (2002) uses the natural log of GDP as y_1 and the natural log of life expectancy as h. The regressions in this study, discussed below, use these transformations as well.

[28] Our results show a positive sign for the control variable for access to international waters, while in Yannikkaya (2000) the sign is negative. This is explained by the definition of the variable. We use the proportion of land with access to international waters, while Yannikkaya uses the proportion of landlocked land. We did not include war deaths in our regression given that there is no data available for the late nineties.

[Table 5 here]

Column (2) presents the result for the econometric specification that includes the importance (IV=1) indicator as the IEI variable while excluding the total trade to GDP ratio. Columns (3) through (8) show the results obtained when other IEI indicators were used in the analysis while always including the total trade to GDP ratio. Columns (9) and (10) explore the possibility of the IEI indicators interacting with the level of physical and human capital. As a robustness check, columns (11) through (14) present the results obtained when the economic dependency ratio, share of exports of country *i* to country *j* out of country *i*'s GDP, is used to compute the network indicators, instead of the cash flow dependency ratio, exports of *i* to country *j* out of the total exports of country *i*.

The results of Table 5 show that the local integration indicators are statistically significant and have the expected negative sign. They posses explanatory power individually, when they are included as the sole control variable for economic integration[29], and they add information to the economic growth regression when they are considered in conjunction with the total trade to GDP ratio. Moreover, the effect of higher centrality in the network is quite striking. For example, column (8) reports that an increase in the centrality ranking of 10 units at the two percent trade-link threshold increases the average growth rate of per capita GDP by 1.11 percentage points. A country's position in the network can thus have substantial implications for economic growth.

A more in-depth analysis of the results of Table 5 uncovers a possible relationship between the position of a country in the network and measures of physical and human capital that are included in the estimated equation. When the local integration indicators are introduced into the regression analysis, with and without the trade openness measure, the magnitude and the statistical significance of physical capital decreases while those for the level of human capital increase. Regarding geographical characteristics, climate and access to water, we find that their explanatory power in the regression is also diminished when the local measures of integration are included.

Specifically, *t*-tests show that the human capital coefficients for some of the regressions that include the network measures of IEI are greater (statistically) than the one observed in regression (1). The coefficients on physical capital and the geographical variables (climate and access to water) are statistically significant in regression (1) but become statistically insignificant in a number of regressions that include the IEI indicators. These patterns suggest that a higher ranking in the centrality and importance indices diminishes the effects that country-specific characteristics (region, climate and technology) have on growth. A more internationally economic integrated country is able to make up for the lack of good location and relevant technological improvements by being better connected in the network, i.e. physical capital and IEI are substitutes. And by

[29] The coefficient for importance (IV=1) in column (2) is negative and statistically significant. This result holds for all the other local integration indicators used in the analysis, but individual results are not presented for matters of space.

being better connected, the positive effects of human capital on growth are amplified, i.e. human capital and IEI are complements. An interpretation of this result could be that human capital productivity is enhanced by international economic integration since a more integrated country offers more growth opportunities to individuals from the country.

To test this hypothesis (substitutability/complementarity) more carefully we introduce the IEI indicators through an interaction term. We consider the case for importance (IV=1) and centrality at the one percent threshold and interact them with physical and human capital. The results, presented in columns (9) and (10), confirm the complementarity between human capital and IEI. The coefficient for the human capital interaction term is negative and statistically significant for both centrality and importance, implying that increases in the level of human capital have a greater (positive) effect the more integrated is a country to the international trading system. Regarding the substitution effect between IEI and physical capital, the regression analysis provides weak evidence in favor. This is because even though the coefficient of the interaction term is positive for both IEI indicators, it is only statistically significant when centrality is considered. This may suggest a non-monotonic effect depending on how well connected a country is into the network. For a poorly connected country an increase in the level of capital can have substantial positive effects, but for a well connected country the effect is almost insignificant or, as can be inferred from the coefficient reported in column (10), negative for countries ranked in the top 20 according to centrality at the one percent threshold.

Finally, for robustness, columns (11) through (14) present the results for the case where the network indicators are computed by using the economic dependency ratio (i.e. share of exports of *i* to country *j* out of country *i*'s GDP). The numbers reported show that there are no noticeable differences from the results previously discussed. The network indicators increase the explanatory power of the regression and the complementarities between the network indicators and human capital still hold.

V. Discussion

We have attempted to chart the international trading system explicitly as a network and examine its structure and function from such a perspective. This has enabled us to obtain a clearer understanding of the structure of the global trading system and construct measures of international economic integration at both the global, system-wide level and at a local, country-level. While these metrics are implicitly based on the volume of international trade, they add new dimensions to the analysis of global integration that have not been previously considered and offer a new approach to describing local, country level integration into the global network.

As a preliminary application we use our measures of network importance in a cross-country growth regression. Using these new measures we find evidence consistent with the hypothesis that a country's

position in the network has substantial implications for economic growth and that network position is a substitute for physical capital but a complement to human capital. We believe this is an intriguing discovery and that more detailed research into the relationship between human capital, international economic integration and economic growth is warranted.

The literature on financial contagion (Kaminsky and Reinhart, 2000, 2003; Forbes, 2001, Forbes and Rigobon, 2002) continues to puzzle over why many of the recent crises that began in relatively small economies had such global repercussions and why shocks originating in one economy spread to some markets, while markets in other countries were relatively unaffected. We find that ranking countries according to measures of "importance" to the network may provide insight into why and how financial crises are propagated than simple volume-based measures. For example, using 1992 data to construct the international trade network, we find that Thailand, a country which was the epicenter of the 1997-98 Asian financial crisis, ranks 22nd in terms of global trade share but 12th by our measure of network "importance". In other words, network based measures identify several of the countries behind the financial crises and contagion of the 1990's as highly influential countries, with a number of them even ranking above G-7 countries in terms of influence in the network.

We thus believe that a network approach that is capable of incorporating the cascading of interdependent ripples that happens when a shock hits a specific part of the network will provide us with a deeper understanding of economic and financial contagion. It is also possible that such network-based measures may have real policy relevance in terms of identifying countries that are potentially vulnerable nodes for the entire network in case of economic and financial collapse. In a separate paper (Kali and Reyes, 2005) we examine this question in more detail by using these network measures of country-level and global integration as the backbone upon which to explore transmission mechanisms for international financial crises. In Kali and Reyes (2005) we use network-based measures of connectedness to explain stock market returns during recent episodes of financial crisis. We find that a crisis is amplified if the crisis epicenter country is better integrated into the trade network. However, target countries affected by such a shock are in turn better able to dissipate the impact if they are well integrated into the network. This arguably leads to a better understanding of why the Mexican, Asian and Russian financial crises were highly contagious, while the crises that originated in Venezuela and Argentina did not have such a virulent effect.

In conclusion, we believe a network approach to international economic integration may have useful applications, both academic and policy, in several areas of international business, finance and development.

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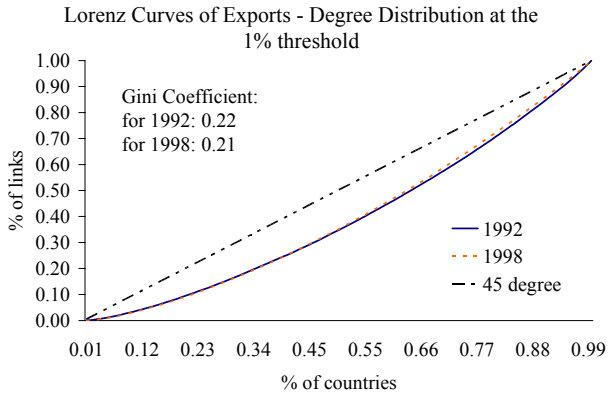
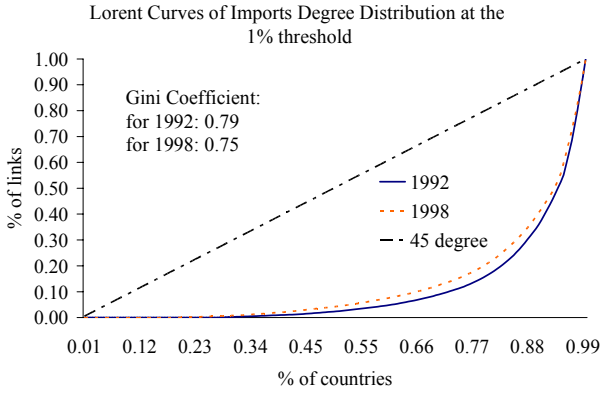
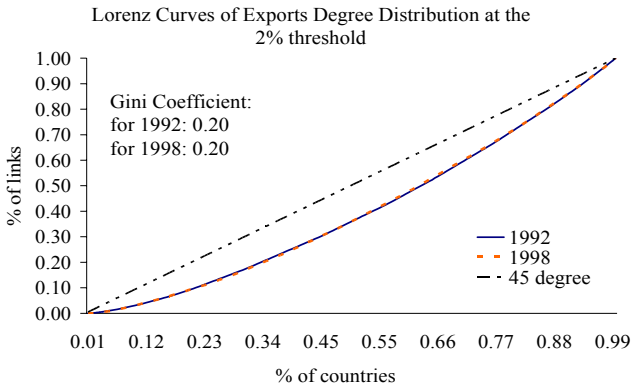
FIGURE 1: LORENZ CURVES AND GINI COEFFICIENTS FOR EXPORT AND IMPORT DEGREE DISTRIBUTIONS

EXPORT DEGREE ***IMPORT DEGREE***







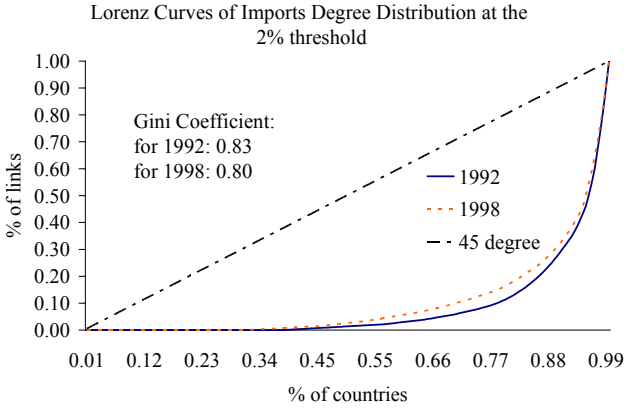


TABLE 1.

PARTIAL BINARY MATRIX FOR ZERO PERCENT

THRESHOLD IN 1992

	Afghanistan	Albania	Algeria	Andorra	Angola	Antigua and Barbuda	Argentina	Armenia	Aruba	Australia	. . .
Afghanistan	0	0	0	0	0	0	0	0	0	1	
Albania	0	0	0	0	0	0	1	0	0	1	
Algeria	0	1	0	0	1	0	1	0	0	1	
Andorra	0	0	1	0	0	0	0	0	0	0	
Angola	0	0	0	0	0	0	1	0	0	1	
Antigua and Barbuda	0	0	0	0	0	0	1	0	0	1	
Argentina	1	1	1	1	0	0	0	0	0	1	
Armenia	0	0	0	0	0	0	0	0	0	0	
Aruba	0	0	0	0	0	0	0	0	0	0	
Australia	1	1	1	0	0	0	1	0	0	0	
:											
:											

TABLE 2. SUMMARY RESULTS: NETWORK OVERVIEW

	Threshold							
	0.00%		**0.50%**		**1.00%**		**2.00%**	
	1992	**1998**	**1992**	**1998**	**1992**	**1998**	**1992**	**1998**
Network Centralization (import degree)	56.79	42.55	82.38	84.23	81.70	82.94	77.03	78.25
Network Density	41.92	56.62	9.54	10.97	13.21	14.40	17.89	18.65
Clustering Coefficient (overall graph)	0.78	0.77	0.54	0.50	0.49	0.46	0.45	0.41
Degree Correlation	-0.48	-0.36	-0.21	-0.15	-0.17	-0.13	-0.12	-0.12

TABLE 3. ASSORTATIVE MIXING

		Regional	Income	Legal Origin
1992	0%	0.067	-0.041	0.012
	1%	0.244	0.057	0.150
	2%	0.248	0.064	0.169
1998	0%	0.075	-0.025	0.019
	1%	0.274	0.074	0.153
	2%	0.276	0.084	0.181

Notes: Higher values signify greater assortativity.
Regional classification according to World Trade Organization. *(North America, Latin America, Western Europe, C./E. Europe/Baltic States/CIS, Africa, Middle East, and Asia)*
Income classification according to World Bank. *(High Income: OECD, High Income: Non-OECD, Upper middle Income, Lower middle Income, and Low Income)*
Legal Origin classification according to La Porta (1998). *(British, French, Socialist, German, Scandinavian, and not classified)*

TABLE 4. TOP THIRTY COUNTRIES ACCORDING TO THE 1998 IMPORTANCE INDEX (IV=1)

	Importance (IV=1)		Importance (IV=TS)		Importance (IV=GDP ratio) (A)		Importance (IV=GDP ratio) (B)		Total Trade to GDP Ratio	
	1992	1998	1992	1998	1992	1998	1992	1998	1992*	1998*
USA	1	1	1	1	1	1	1	1	148	150
Germany	2	2	2	2	9	14	2	2	104	123
Japan	10	3	3	3	4	10	8	3	150	153
France	3	4	4	4	16	20	5	5	117	128
United Kingdom	4	5	5	5	19	17	3	4	100	105
Italy	5	6	6	6	17	19	6	6	125	122
Belgium-Luxembourg	6	7	9	10	10	13	4	7	16	14
Spain	7	8	12	11	22	24	7	9	127	125
Russian Federation	33	9	24	20	35	52	21	10	96	115
Netherlands	9	10	7	9	14	11	10	12	36	42
Thailand	12	11	23	24	59	57	14	11	61	58
India	14	12	31	27	101	102	22	16	151	149
China	8	13	10	8	92	91	12	14	142	138
Rep. of Korea	11	14	13	14	31	32	9	15	75	89
Brazil	24	15	25	21	55	54	23	24	152	151
Singapore	16	16	15	15	18	2	11	8	1	1
Canada	18	17	8	7	8	8	19	19	95	79
Portugal	13	18	29	34	28	26	20	23	62	88
Australia	20	19	20	22	13	7	18	17	135	135
Norway	31	20	26	28	7	3	13	13	64	78
China, Hong Kong SAR	22	21	11	13	3	6	17	18	2	2
Turkey	21	22	32	31	57	50	25	27	138	126
Denmark	15	23	22	25	6	5	16	22	72	91
Switzerland	19	24	14	16	2	4	15	26	65	84
Saudi Arabia	17	25	21	32	135	141	24	33	53	74
Austria	25	26	17	19	11	12	26	25	56	67
Greece	54	27	39	41	29	31	59	20	114	134
Sweden	42	28	18	17	15	15	31	21	81	77
So. African Customs Union	28	29	33	40	45	48	33	36	144	141
Poland	23	30	34	30	54	43	28	29	118	114

Notes: Countries ranked according to 1998 Importance index (IV=1).

* For the ranking according to the Total Trade to GDP ratio, the data in the 1992 column is the average for the 1987 – 1992 period, while for the 1998 column the average is for the 1993 – 1998 time period.

- Importance (IV=1) denotes the importance index was computed using a constant intrinsic value, set equal to one, for all countries, while Importance (IV=TS) and Importance (IV=GDP ratio) denote the importance indices computed using the 1998 world trade shares and the 1998 GDP per capita ratio, respectively as intrinsic values.

(A) Denotes network indicators computed with the Cash Flow Dependency Ratio (i.e. exports of *i* to *j* out of total exports of *i*).

(B) Denotes network indicators computed with the Economic Dependency Ratio (i.e. exports of *i* to *j* out of country *i*'s GDP).

TABLE 5. PER CAPITA GDP GROWTH RATE REGRESSION (1987 - 1992 and 1993 - 1998)

	Network Indicators Based on Cash Flow Dependency Ratio										Network Indicators Based on Economic Dependency Ratio			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Log (IGDP)	-0.7570 **	-0.7316 ***	-1.0009 **	-1.2552 *	-0.9748 **	-0.9720 **	-1.1453 *	-0.9451 **	-1.0126 **	-1.2814 *	-1.2155 **	-1.1705 **	-1.0508 **	-1.2593 *
	-2.0592	*-1.8171*	*-2.2941*	*-2.8034*	*-2.1294*	*-2.3448*	*-2.7069*	*-2.3332*	*-2.3033*	*-3.0794*	*-2.5630*	*-2.4232*	*-2.4236*	*-2.9503*
Human Capital	1.4363 **	1.8231 **	2.1775 **	2.7599 *	2.0968 **	2.1659 **	2.9382 *	2.6308 *	2.2659 **	3.7610 *	2.6785 *	2.6341 **	2.7908 *	4.2168 *
	2.0475	*2.1937*	*2.4511*	*3.0119*	*2.2023*	*2.5960*	*3.2410*	*3.0242*	*2.5261*	*4.0874*	*2.6422*	*2.5250*	*2.8735*	*4.0466*
Physical Capital	0.0120 *	0.0073 ***	0.0093 **	0.0086 **	0.0102 *	0.0086 **	0.0049	0.0034	0.0059	-0.0144 ***	0.0085 **	0.0051	0.0069 ***	-0.0258 *
	3.0078	*1.9539*	*2.4225*	*2.2767*	*2.7196*	*2.2075*	*1.3274*	*0.8925*	*1.1623*	*-1.9465*	*2.1073*	*0.9762*	*1.8243*	*-2.6514*
Regime	-0.0917	-0.2763	-0.1884	-0.1790	-0.1345	-0.1674	-0.1136	-0.0938	-0.1810	0.0071	-0.1539	-0.1126	-0.1151	0.0728
	-0.2642	*-0.9530*	*-0.5854*	*-0.5518*	*-0.4081*	*-0.5104*	*-0.3504*	*-0.2917*	*-0.5617*	*0.0217*	*-0.4551*	*-0.3263*	*-0.3514*	*0.2270*
Climate	-0.7500 ***	-0.6557	-0.4669	-0.4871	-0.4841	-0.4423	-0.4082	-0.4760	-0.5137	-0.5256	-0.4561	-0.5927	-0.5035	-0.7059 ***
	-1.6382	*-1.4091*	*-0.9844*	*-1.0593*	*-0.9664*	*-0.9468*	*-0.9208*	*-1.0582*	*-1.0712*	*-1.2076*	*-0.8890*	*-1.1125*	*-1.1095*	*-1.6097*
Access to Water	1.3522 **	1.3326 *	1.1844 **	0.8438	1.0970 **	1.2331 **	1.1887 **	1.3138 *	1.2400 **	1.3120 *	1.0496 **	1.1460 **	1.0182 **	1.2962 **
	2.4179	*2.6605*	*2.3712*	*1.6338*	*2.1158*	*2.5517*	*2.4429*	*2.6928*	*2.4867*	*2.7317*	*2.1263*	*2.3294*	*1.9698*	*2.4889*
Total Trade to GDP Ratio	0.0102 **		0.0095 **	0.0118 *	0.0089 **	0.0095 **	0.0102 **	0.0088 **	0.0092 **	0.0109 *	0.0084 **	0.0081 ***	0.0091 **	0.0105 *
	2.4777		*2.1378*	*2.8859*	*2.0268*	*2.1779*	*2.5594*	*2.2437*	*2.0630*	*2.7784*	*1.9457*	*1.8617*	*2.2555*	*2.7813*
Importance (IV=1)		-0.0084 ***	-0.0133 *											
		-1.8324	*-2.6113*											
Importance (IV=TS)				-0.0190 *										
				-3.3306										
Importance (IV=GDP ratio)					-0.0115 **						-0.0162 **			
					-2.3916						*-2.0756*			
Centrality 0%						-0.0242 *								
						-3.1289								
Centrality 1%							-0.0795 *						-0.1413 *	
							-4.5165						*-3.3697*	
Centrality 2%								-0.1089 *						
								-4.4856						
Importance (IV=1)*Human Capital									-0.0044 **			-0.0048 **		
									-2.4144			*-2.0302*		
Importance (IV=1)*Physical Capital									0.0001			0.0001		
									1.4405			*1.0376*		
Centrality 1%*Human Capital										-0.0369 *				-0.0877 *
										-4.9010				*-4.5037*
Centrality 1%*Physical Capital										0.0007 *				0.0018 *
										3.6414				*3.9493*
R Squared	0.162	0.146	0.191	0.222	0.181	0.202	0.246	0.238	0.193	0.283	0.173	0.173	0.210	0.262
Adj. R squared	0.134	0.118	0.156	0.189	0.146	0.168	0.215	0.206	0.154	0.249	0.138	0.133	0.177	0.227
Number of observations	183	191	174	174	174	174	174	174	174	174	174	174	174	174

Notes: t-statistics for the coefficients in italics. Rankings data for local IEI indicators was used in these regressions.
*, **, and *** denote statistical significance at the 1%, 5% and 10% level.
Importance (IV=1) denotes the importance index was computed using a constant intrinsic value, set equal to one, for all countries.
Importance (IV=TS) and Importance (IV=GDP ratio) denote the importance indices computed using the world trade shares and the GDP per capita ratios as intrinsic values for the corresponding years.

DATA APPENDIX

TABLE A1. RESULTS FOR LOCAL MEASURES OF ECONOMIC INTEGRATION

	World Trade Shar		Total Trade to		Import - Degree Node Centrality (Index)								Importance (Indices)							
					1992				1998				1992				1998			
	1992	1998	1992*	1998*	0% (A)	1%(A)	1% (B)	2% (A)	0% (A)	1%(A)	1% (B)	2% (A)	IV=1 (A)	√= Trade Share (A	IV= GDP ratio (A)	IV= GDP ratio (B)	IV=1 (A)	√= Trade Share (A	IV= GDP ratio (A)	IV= GDP ratio (B)
1 Afghanistan	0.005	0.005	-	-	21.8085	0.0000	0.0000	0.0000	33.5079	0.0000	0.0000	0.0000	1.000009	0.000051	0.000229	1.000003	1.000023	0.000050	0.000307	1.000005
2 Albania	0.008	0.011	51.196	55.991	20.2128	0.0000	0.0000	0.0000	49.2147	1.0471	0.0000	0.5236	1.000008	0.000076	6.391498	1.000002	1.000061	0.000110	9.519243	1.000011
3 Algeria	0.296	0.207	40.152	52.758	64.3617	4.2553	0.0000	1.5957	70.6806	5.2356	0.0000	3.1414	1.000356	0.002961	18.339408	1.000055	1.000391	0.002069	14.094820	1.000076
4 Andorra	0.015	0.011	-	-	14.8936	0.0000	0.0000	0.0000	56.5445	0.0000	0.0000	0.0000	1.000011	0.000147	0.000605	1.000002	1.000012	0.000108	0.000434	1.000002
5 Angola	0.086	0.053	71.097	135.817	25.0000	0.5319	0.0000	0.5319	39.2670	0.5236	0.0000	0.0000	1.000080	0.000859	6.616348	1.000015	1.000044	0.000533	0.001587	1.000010
6 Antigua and Barbuda	0.003	0.004	197.145	204.961	26.5957	1.0638	0.0000	0.5319	36.6492	1.5707	0.0000	1.0471	1.000051	0.000027	51.981323	1.000010	1.000100	0.000041	46.270562	1.000022
7 Argentina	0.398	0.560	15.718	17.500	62.7660	5.8511	2.6600	4.2553	71.2042	4.1885	1.5710	2.6178	1.000947	0.003980	33.301830	1.000156	1.001010	0.005604	37.007575	1.000162
8 Armenia	0.001	0.006	94.418	94.028	9.5745	0.0000	0.0000	0.0000	31.9372	0.0000	0.0000	0.0000	1.000004	0.000009	10.686923	1.000004	1.000021	0.000063	8.119077	1.000005
9 Aruba	0.012	0.015	-	-	14.8936	0.5319	0.5320	0.0000	24.0838	0.5236	0.0000	0.0000	1.000030	0.000121	0.000566	1.000016	1.000031	0.000147	0.000577	1.000005
10 Australia	1.061	1.047	35.095	40.202	77.6596	16.4894	5.8510	8.5106	90.5759	15.1832	4.7120	6.2827	1.002347	0.010623	76.285661	1.000492	1.002176	0.010478	77.610933	1.000631
11 Austria	1.399	1.181	76.213	78.645	92.5532	26.5957	2.1280	11.7021	97.3822	19.8953	3.1410	12.0419	1.001577	0.014006	77.363925	1.000321	1.001603	0.011822	71.452152	1.000401
12 Azerbaijan	0.004	0.015	-	-	8.5106	0.0000	0.0000	0.0000	50.2618	1.5707	0.0000	1.5707	1.000018	0.000039	0.000226	1.000010	1.000308	0.000153	7.699721	1.000030
13 Bahamas	0.041	0.024	-	-	31.9149	1.0638	0.5320	0.5319	50.7853	0.5236	0.0000	0.0000	1.000069	0.000406	0.001961	1.000029	1.000048	0.000238	0.000971	1.000011
14 Bahrain	0.049	0.046	198.540	185.350	30.3191	1.0638	0.5320	0.5319	40.3141	0.5236	0.0000	0.0000	1.000352	0.000488	0.010866	1.000077	1.000055	0.000464	0.001203	1.000012
15 Bangladesh	0.082	0.112	19.025	28.012	58.5106	3.1915	1.0640	1.0638	79.0576	7.8534	1.5710	5.7592	1.000916	0.000824	4.951931	1.000153	1.000745	0.001126	5.060631	1.000163
16 Barbados	0.010	0.012	96.621	97.431	51.5957	4.7872	2.1280	1.5957	63.3508	3.1414	2.0940	2.6178	1.000231	0.000100	51.105952	1.000085	1.000231	0.000123	49.828717	1.000074
17 Belarus	0.019	0.146	93.043	126.471	11.7021	1.0638	0.5320	0.5319	67.5393	6.8063	2.0940	2.6178	1.000130	0.000186	28.507949	1.000115	1.000490	0.001464	22.290609	1.000135
18 Belgium-Luxembourg	3.522	2.986	130.292	129.938	93.6170	56.3830	15.9570	35.6383	96.8586	58.6387	18.8480	41.8848	1.007874	0.035258	77.467568	1.003179	1.007374	0.029891	71.332601	1.002511
19 Belize	0.006	0.006	125.980	104.711	44.1489	0.5319	0.0000	0.0000	42.4084	0.0000	0.0000	0.0000	1.000031	0.000065	22.577584	1.000006	1.000042	0.000056	20.464405	1.000009
20 Benin	0.009	0.011	58.920	58.838	49.4681	1.5957	0.0000	1.0638	64.3979	2.0942	0.5240	1.5707	1.000213	0.000086	3.887956	1.000010	1.000327	0.000108	3.657450	1.000053
21 Bermuda	0.016	0.013	-	-	52.6596	1.0638	0.0000	0.5319	37.1728	0.0000	0.0000	0.0000	1.000067	0.000163	0.000980	1.000017	1.000020	0.000126	0.000652	1.000005
22 Bhutan	0.002	0.001	78.199	74.871	19.1489	0.0000	0.0000	0.0000	20.4188	0.0000	0.0000	0.0000	1.000004	0.000019	0.000071	1.000000	1.000006	0.000015	0.000069	1.000001
23 Bolivia	0.024	0.031	45.907	47.528	53.1915	1.5957	0.0000	0.5319	62.3037	0.5236	0.0000	0.0000	1.000117	0.000239	9.231486	1.000015	1.000075	0.000312	8.565582	1.000011
24 Bosnia Herzegovina	0.008	0.036	-	-	9.5745	0.5319	0.5320	0.5319	32.9843	2.0942	1.0470	1.5707	1.000063	0.000082	0.000244	1.000021	1.000475	0.000360	0.006992	1.000060
25 Br. Virgin Isds	0.002	0.016	-	-	17.5532	0.0000	0.0000	0.0000	32.4607	0.5236	0.0000	0.0000	1.000008	0.000017	0.000316	1.000001	1.000034	0.000158	0.000850	1.000009
26 Brazil	0.854	1.096	16.081	17.705	62.7660	14.8936	4.7870	10.1064	81.6754	16.2304	5.2360	9.9476	1.001677	0.008551	23.087249	1.000366	1.002553	0.010975	21.834634	1.000415
27 Brunei Darussalam	0.057	0.035	-	-	52.1277	0.0000	0.0000	0.0000	47.6440	0.0000	0.0000	0.0000	1.000026	0.000566	0.000998	1.000011	1.000024	0.000353	0.000897	1.000011
28 Bulgaria	0.091	0.092	87.000	101.073	69.1489	10.6383	1.5960	6.3830	73.8220	4.1885	0.5240	1.5707	1.000979	0.000910	24.484019	1.000122	1.000283	0.000923	17.360599	1.000068
29 Burkina Faso	0.005	0.010	37.685	39.892	20.2128	0.5319	0.0000	0.0000	59.6859	1.0471	0.5240	1.0471	1.000015	0.000048	3.432496	1.000001	1.000111	0.000100	3.040029	1.000028
30 Burundi	0.003	0.002	36.379	30.542	22.3404	0.0000	0.0000	0.0000	41.3613	1.0471	0.0000	0.5236	1.000007	0.000029	2.948036	1.000001	1.000053	0.000023	1.961360	1.000008
31 Cambodia	0.009	0.019	22.024	62.636	19.1489	0.0000	0.0000	0.0000	30.3665	0.0000	0.0000	0.0000	1.000011	0.000094	0.000577	1.000007	1.000016	0.000188	3.987437	1.000009
32 Cameroon	0.037	0.033	36.295	44.478	30.8511	0.0000	0.0000	0.0000	60.7330	2.6178	0.5240	1.5707	1.000014	0.000373	6.854501	1.000003	1.000150	0.000332	6.263795	1.000061
33 Canada	3.537	4.013	52.884	71.659	81.9149	32.9787	5.8510	12.7660	94.7644	36.1257	5.2360	14.1361	1.002507	0.035403	80.221615	1.000443	1.002350	0.040172	77.460183	1.000520
34 Cape Verde	0.002	0.003	65.765	87.228	16.4894	0.0000	0.0000	0.0000	25.1309	0.0000	0.0000	0.0000	1.000015	0.000020	10.835566	1.000003	1.000011	0.000026	10.778145	1.000002
35 Cayman Isds	0.011	0.012	-	-	21.2766	0.0000	0.0000	0.0000	27.2251	0.5236	0.0000	0.0000	1.000018	0.000111	0.000764	1.000003	1.000030	0.000122	0.000705	1.000005
36 Central African Rep.	0.003	0.003	40.339	43.626	19.1489	0.0000	0.0000	0.0000	32.4607	0.0000	0.0000	0.0000	1.000001	0.000027	4.907603	1.000000	1.000003	0.000032	3.038041	1.000001
37 Chad	0.003	0.002	45.615	51.138	17.0213	0.0000	0.0000	0.0000	29.3194	0.0000	0.0000	0.0000	1.000001	0.000026	4.273180	1.000000	1.000014	0.000025	2.911908	1.000002
38 Chile	0.278	0.309	62.454	57.074	64.8936	6.3830	2.1280	4.2553	63.3508	6.8063	1.5710	5.2356	1.000529	0.002786	26.539030	1.000122	1.000628	0.003094	30.850239	1.000169
39 China	2.901	3.921	27.761	38.915	86.7021	31.3830	10.6380	23.9362	87.4346	32.4607	9.9480	21.4660	1.005212	0.029028	8.376523	1.000808	1.003421	0.039231	10.361804	1.001115
40 China, Hong Kong SAR	2.516	2.167	259.622	275.828	78.1915	21.2766	5.3190	13.8298	87.4346	21.9895	4.1880	12.0419	1.002065	0.025185	90.094537	1.000522	1.002043	0.021698	79.453587	1.000596

TABLE A1. RESULTS FOR LOCAL MEASURES OF ECONOMIC INTEGRATION (…continues)

41 China, Macao SAR	0.053	0.039	141.237	117.359	32.9787	0.0000	0.0000	0.0000	42.9319	0.0000	0.0000	0.0000	1.000022	0.000532	84.266554	1.000009	1.000021	0.000389	67.703848	1.000006
42 Colombia	0.199	0.255	32.657	35.152	71.2766	6.9149	1.5960	3.7234	83.7696	6.2827	2.0940	3.1414	1.000987	0.001990	18.725478	1.000190	1.000663	0.002551	17.516604	1.000105
43 Comoros	0.002	0.001	56.864	62.036	19.1489	0.0000	0.0000	0.0000	30.3665	0.0000	0.0000	0.0000	1.000010	0.000019	8.100254	1.000002	1.000005	0.000006	5.320368	1.000001
44 Congo	0.029	0.021	86.538	136.199	26.5957	0.0000	0.0000	0.0000	41.8848	1.0471	0.0000	0.0000	1.000013	0.000295	7.371080	1.000002	1.000065	0.000207	4.688901	1.000013
45 Costa Rica	0.078	0.116	74.714	87.684	47.8723	1.5957	1.0640	1.5957	65.4450	2.6178	0.5240	2.0942	1.000393	0.000778	19.138250	1.000051	1.000270	0.001163	17.545786	1.000070
46 Cote d'Ivoire	0.058	0.078	59.724	76.911	31.3830	1.5957	0.0000	0.5319	72.7749	4.7120	1.5710	3.1414	1.000115	0.000580	7.527817	1.000020	1.000425	0.000783	6.384617	1.000137
47 Croatia	0.111	0.122	147.228	95.244	65.4255	3.7234	1.0640	2.1277	76.4398	4.7120	2.6180	3.6649	1.000759	0.001112	0.012796	1.000174	1.000669	0.001224	27.011545	1.000279
48 Cuba	0.031	0.039	-	-	27.1277	0.0000	0.0000	0.0000	39.2670	0.5236	0.0000	0.5236	1.000047	0.000309	20.162670	1.000014	1.000068	0.000387	0.001800	1.000016
49 Cyprus	0.061	0.045	105.810	97.655	64.8936	1.5957	0.0000	1.5957	74.8691	1.0471	0.0000	0.5236	1.000159	0.000613	51.771525	1.000029	1.000121	0.000448	0.003470	1.000022
50 Czech Rep.	n.a.	0.531	n.a.	95.900	n.a.	n.a.	n.a.	n.a.	86.9110	7.3298	0.5240	4.1885	n.a.	n.a.	n.a.	n.a.	1.000728	0.005315	44.120983	1.000224
51 Czechoslovakia	0.323	n.a.	75.980	n.a.	34.0426	2.6596	0.0000	1.5957	n.a.	n.a.	n.a.	n.a.	1.000201	0.003237	43.834048	1.000050	n.a.	n.a.	n.a.	n.a.
52 Dem. People's Rep. of Korea	0.022	0.019	-	-	23.4043	0.0000	0.0000	0.0000	38.2199	0.0000	0.0000	0.0000	1.000021	0.000221	0.000499	1.000005	1.000019	0.000194	0.000651	1.000004
53 Dem. Rep. of the Congo	0.027	0.018	49.319	42.244	22.3404	0.0000	0.0000	0.0000	31.9372	1.5707	0.5240	0.5236	1.000020	0.000266	2.029670	1.000004	1.000125	0.000184	0.000597	1.000025
54 Denmark	1.005	0.836	65.788	65.956	90.4255	15.9574	4.7870	8.5106	91.6230	12.5654	3.6650	6.2827	1.002766	0.010055	82.970932	1.000526	1.001847	0.008367	81.305629	1.000445
55 Djibouti	0.005	0.004	128.603	106.906	26.0638	0.5319	0.0000	0.5319	34.0314	0.5236	0.0000	0.5236	1.000078	0.000054	0.000237	1.000004	1.000094	0.000044	0.000164	1.000011
56 Dominica	0.004	0.003	122.847	111.196	24.4681	1.5957	0.5320	1.0638	35.6021	2.0942	0.0000	1.0471	1.000070	0.000038	24.279924	1.000024	1.000089	0.000028	0.001028	1.000018
57 Dominican Rep.	0.086	0.113	70.156	94.461	29.2553	1.0638	0.5320	0.5319	39.2670	1.0471	0.5240	0.5236	1.000132	0.000862	12.419053	1.000065	1.000117	0.001136	14.889685	1.000030
58 Ecuador	0.086	0.105	59.056	54.652	47.8723	2.1277	0.0000	0.5319	71.2042	4.7120	1.0470	1.5707	1.000126	0.000856	14.440028	1.000023	1.000313	0.001049	11.039027	1.000069
59 Egypt	0.206	0.194	52.547	49.029	37.2340	2.6596	0.0000	1.0638	77.4869	8.3770	0.5240	4.1885	1.000261	0.002063	13.175909	1.000052	1.000566	0.001939	12.396435	1.000122
60 El Salvador	0.029	0.055	44.360	56.907	37.2340	2.1277	0.0000	2.1277	61.2565	4.7120	2.0940	3.1414	1.000137	0.000290	13.381317	1.000032	1.000384	0.000553	13.915658	1.000112
61 Equatorial Guinea	0.001	0.007	110.265	177.558	15.9574	0.0000	0.0000	0.0000	23.5602	0.0000	0.0000	0.0000	1.000001	0.000014	4.507980	1.000000	1.000003	0.000065	9.634090	1.000001
62 Eritrea	n.a.	0.003	n.a.	-	n.a.	n.a.	n.a.	n.a.	21.9895	0.0000	0.0000	0.0000	n.a.	n.a.	n.a.	n.a.	1.000009	0.000034	0.000082	1.000002
63 Estonia	0.006	0.076	114.612	157.232	13.2979	0.5319	0.5320	0.0000	73.2984	4.1885	0.5240	2.6178	1.000013	0.000063	26.525010	1.000012	1.000289	0.000762	28.620795	1.000072
64 Ethiopia	n.a.	0.020	n.a.	32.770	n.a.	n.a.	n.a.	n.a.	65.9686	1.5707	0.5240	1.5707	n.a.	n.a.	n.a.	n.a.	1.000562	0.000205	1.909343	1.000033
65 Faeroe Isds	0.012	0.008	-	-	51.0638	0.0000	0.0000	0.0000	53.4031	0.0000	0.0000	0.0000	1.000012	0.000118	0.001143	1.000003	1.000013	0.000078	0.000800	1.000003
66 Fiji	0.015	0.011	111.199	116.299	52.6596	1.5957	0.0000	1.0638	28.7958	0.0000	0.0000	0.0000	1.000093	0.000147	18.196769	1.000011	1.000011	0.000108	16.454331	1.000004
67 Finland	0.651	0.693	49.426	66.184	80.3191	10.1064	1.5960	5.3191	87.9581	8.3770	1.0470	4.7120	1.000983	0.006512	66.954891	1.000179	1.000903	0.006934	68.959225	1.000286
68 Fmr Ethiopia	0.012	n.a.	21.234	n.a.	53.1915	2.1277	0.5320	1.5957	n.a.	n.a.	n.a.	n.a.	1.000889	0.000118	1.879307	1.000102	n.a.	n.a.	n.a.	n.a.
69 France	6.538	5.547	43.927	43.828	97.8723	81.3830	35.1060	70.2128	98.9529	80.1047	34.0310	63.8743	1.013698	0.065446	75.369818	1.002791	1.011009	0.055524	68.127625	1.002850
70 French Polynesia	0.009	0.013	-	-	18.6170	0.0000	0.0000	0.0000	64.3979	0.0000	0.0000	0.0000	1.000014	0.000086	0.000323	1.000003	1.000024	0.000126	0.000431	1.000006
71 Gabon	0.043	0.032	81.789	95.477	23.4043	0.0000	0.0000	0.0000	35.6021	1.0471	0.0000	0.0000	1.000007	0.000430	31.191388	1.000001	1.000041	0.000318	23.583104	1.000011
72 Gambia	0.006	0.004	124.449	114.676	25.0000	0.0000	0.0000	0.0000	48.1675	0.5236	0.0000	0.0000	1.000006	0.000063	4.515771	1.000002	1.000030	0.000041	3.472129	1.000006
73 Georgia	0.003	0.013	84.161	67.538	11.7021	0.0000	0.0000	0.0000	35.0785	1.0471	0.5240	0.5236	1.000003	0.000027	0.000123	1.000002	1.000205	0.000135	15.043293	1.000030
74 Germany	11.460	9.254	49.322	46.788	98.4043	87.7660	52.6600	78.7234	98.9529	82.1990	47.6440	70.1571	1.019359	0.114713	78.175352	1.003882	1.014137	0.092627	69.996274	1.003763
75 Ghana	0.047	0.043	43.398	58.353	73.4043	2.6596	0.5320	1.5957	46.5969	2.6178	1.0470	2.0942	1.000201	0.000467	4.681447	1.000044	1.000254	0.000432	4.298029	1.000064
76 Greece	0.378	0.382	44.585	40.370	38.2979	4.2553	0.5320	0.5319	84.2932	14.6597	3.1410	7.8534	1.000357	0.003787	45.358450	1.000074	1.001479	0.003826	43.749310	1.000511
77 Greenland	0.011	0.008	-	-	46.2766	0.0000	0.0000	0.0000	50.2618	0.0000	0.0000	0.0000	1.000013	0.000114	0.000858	1.000003	1.000009	0.000076	0.000721	1.000002
78 Grenada	0.002	0.002	105.304	107.831	24.4681	1.0638	0.0000	0.5319	51.3089	1.5707	0.0000	0.5236	1.000053	0.000015	18.564411	1.000010	1.000080	0.000024	16.886398	1.000020
79 Guatemala	0.056	0.087	41.119	42.204	31.9149	0.5319	0.0000	0.5319	54.4503	3.1414	2.6180	2.6178	1.000075	0.000562	13.472651	1.000021	1.000426	0.000866	12.786251	1.000132
80 Guinea	0.016	0.014	54.979	43.800	27.6596	0.0000	0.0000	0.0000	57.5916	0.0000	0.0000	0.0000	1.000010	0.000161	9.862295	1.000003	1.000048	0.000137	8.991573	1.000011
81 Guinea-Bissau	0.001	0.001	53.128	48.721	18.0851	0.0000	0.0000	0.0000	25.1309	0.5236	0.0000	0.0000	1.000003	0.000014	2.301102	1.000001	1.000021	0.000014	2.011349	1.000005
82 Guyana	0.010	0.008	159.240	192.789	50.5319	2.6596	0.5320	0.5319	35.6021	1.5707	0.5240	1.0471	1.000136	0.000103	8.383903	1.000041	1.000090	0.000082	11.083694	1.000028
83 Haiti	0.007	0.012	37.022	31.549	26.5957	0.0000	0.0000	0.0000	36.6492	0.0000	0.0000	0.0000	1.000004	0.000068	3.355387	1.000001	1.000020	0.000119	7.339439	1.000005
84 Honduras	0.036	0.061	63.078	84.614	34.0426	1.5957	0.5320	0.5319	55.4974	2.6178	1.0470	1.5707	1.000095	0.000365	7.970074	1.000028	1.000201	0.000612	6.981768	1.000051
85 Hungary	0.300	0.475	67.541	74.276	73.9362	6.3830	1.0640	1.5957	82.7225	10.4712	1.0470	4.7120	1.000419	0.003006	31.153068	1.000107	1.000644	0.004756	30.621892	1.000154
86 Iceland	0.047	0.045	65.629	68.393	54.7872	0.5319	0.0000	0.5319	64.9215	1.0471	0.0000	0.5236	1.000068	0.000468	77.136290	1.000008	1.000094	0.000448	76.684430	1.000018
87 India	0.592	0.751	16.592	24.792	69.1489	18.0851	6.3830	14.3617	83.7696	20.4188	9.9480	14.1361	1.002892	0.005924	6.524222	1.000387	1.003470	0.007520	7.311329	1.000698
88 Indonesia	0.847	0.798	48.947	52.654	66.4894	13.2979	1.0640	6.3830	89.0052	13.0890	1.5710	5.7592	1.000902	0.008482	12.014279	1.000148	1.000873	0.007986	12.153833	1.000221
89 Iran	0.401	0.261	30.245	47.506	30.8511	7.4468	0.5320	3.1915	56.0209	7.3298	1.0470	3.6649	1.000401	0.004019	18.234856	1.000082	1.000759	0.002618	16.910491	1.000131
90 Iraq	0.014	0.062	-	-	17.5532	1.0638	0.5320	0.5319	32.9843	0.5236	0.5240	0.5236	1.000132	0.000135	0.002043	1.000022	1.000151	0.000623	0.002591	1.000025

TABLE A1. RESULTS FOR LOCAL MEASURES OF ECONOMIC INTEGRATION (…continues)

91	Ireland	0.708	0.982	112.447	130.501	82.9787	5.8511	0.5320	2.6596	90.5759	7.8534	1.5710	3.6649	1.000686	0.007088	56.001632	1.000118	1.000759	0.009827	69.629486	1.000191
92	Israel	0.408	0.468	82.065	79.234	53.1915	4.2553	0.5320	1.0638	72.2513	6.8063	0.5240	1.5707	1.000291	0.004082	54.545777	1.000068	1.000411	0.004683	54.373270	1.000098
93	Italy	5.099	4.255	38.980	47.448	98.4043	79.2553	32.9790	63.8298	97.3822	67.0157	29.8430	53.4031	1.011094	0.051045	75.100863	1.002402	1.009812	0.042595	68.166548	1.002548
94	Jamaica	0.045	0.046	110.347	122.601	59.0426	4.2553	1.5960	2.6596	64.3979	4.7120	1.5710	2.6178	1.000318	0.000446	14.053449	1.000131	1.000545	0.000465	10.683938	1.000189
95	Japan	6.952	6.423	18.733	16.692	45.7447	30.8511	11.7020	21.2766	96.8586	60.2094	29.8430	46.5969	1.004673	0.069567	87.378619	1.001401	1.011265	0.064285	76.691880	1.003456
96	Jordan	0.059	0.049	128.946	127.796	52.6596	4.2553	0.5320	1.5957	58.6387	2.0942	0.5240	1.5707	1.001289	0.000588	13.952203	1.000073	1.000275	0.000493	12.608815	1.000055
97	Kazakhstan	0.012	0.094	149.337	77.828	11.7021	0.5319	0.5320	0.0000	35.6021	2.6178	0.5240	1.5707	1.000021	0.000122	0.000197	1.000015	1.000360	0.000937	18.629835	1.000091
98	Kenya	0.038	0.052	52.981	68.533	54.7872	1.5957	0.0000	1.5957	60.7330	2.0942	0.5240	0.5236	1.000159	0.000384	4.444755	1.000021	1.000178	0.000520	4.122530	1.000057
99	Kiribati	0.001	0.001	-	-	21.2766	0.0000	0.0000	0.0000	22.5131	0.5236	0.0000	0.0000	1.000013	0.000006	0.000104	1.000003	1.000014	0.000006	0.000117	1.000004
100	Kuwait	0.119	0.175	102.375	93.563	39.3617	2.1277	0.5320	1.5957	71.7277	4.1885	0.0000	2.6178	1.000286	0.001195	0.002355	1.000050	1.000351	0.001749	0.003751	1.000060
101	Kyrgyzstan	0.001	0.012	78.126	79.814	9.0426	0.0000	0.0000	0.0000	46.5969	2.6178	0.0000	1.5707	1.000003	0.000009	0.000006	1.000003	1.000171	0.000120	8.264857	1.000026
102	Lao People's Dem. Rep.	0.004	0.007	38.048	62.011	19.1489	0.0000	0.0000	0.0000	27.2251	0.0000	0.0000	0.0000	1.000005	0.000037	0.000092	1.000002	1.000011	0.000068	0.000157	1.000004
103	Latvia	0.013	0.059	103.494	107.387	13.2979	0.5319	0.5320	0.5319	56.5445	1.0471	1.0470	1.0471	1.000039	0.000130	25.450657	1.000034	1.000207	0.000586	21.855285	1.000081
104	Lebanon	0.047	0.071	103.128	71.152	34.5745	1.0638	0.5320	0.5319	87.9581	3.6649	0.5240	1.5707	1.000177	0.000468	13.273144	1.000032	1.000359	0.000714	16.467114	1.000071
105	Liberia	0.065	0.065	-	-	26.5957	1.5957	0.0000	0.0000	38.2199	1.5707	0.5240	0.5236	1.000081	0.000649	0.002226	1.000023	1.000143	0.000653	0.002491	1.000036
106	Libya	0.193	0.114	-	-	30.3191	2.6596	1.0640	1.0638	35.6021	3.6649	1.0470	1.5707	1.000173	0.001931	0.004225	1.000050	1.000186	0.001144	0.004208	1.000045
107	Lithuania	0.049	0.088	93.540	126.110	29.2553	7.4468	3.1910	7.4468	49.2147	2.6178	1.0470	1.5707	1.001448	0.000487	0.017305	1.000155	1.000263	0.000882	24.595319	1.000106
108	Madagascar	0.011	0.012	40.939	49.203	50.0000	1.0638	0.0000	0.0000	58.1152	0.5236	0.0000	0.0000	1.000054	0.000112	3.150096	1.000013	1.000044	0.000124	2.596810	1.000008
109	Malawi	0.012	0.010	57.611	64.933	24.4681	1.0638	0.0000	0.5319	45.5497	1.5707	0.5240	1.0471	1.000045	0.000125	2.200073	1.000009	1.000116	0.000104	2.438134	1.000023
110	Malaysia	1.135	1.325	140.611	189.409	79.7872	14.3617	2.1280	7.9787	80.6283	13.0890	4.7120	6.8063	1.001132	0.011360	26.395285	1.000301	1.000953	0.013264	31.657577	1.000358
111	Maldives	0.003	0.004	-	-	18.6170	0.0000	0.0000	0.0000	31.9372	0.0000	0.0000	0.0000	1.000010	0.000035	0.000124	1.000003	1.000016	0.000044	0.000169	1.000005
112	Mali	0.008	0.011	50.323	56.834	25.5319	0.0000	0.0000	0.0000	38.7435	2.6178	0.5240	2.6178	1.000007	0.000077	3.116485	1.000001	1.000207	0.000106	2.820555	1.000042
113	Malta	0.054	0.044	177.891	194.689	61.7021	0.0000	0.0000	0.0000	62.8272	0.5236	0.0000	0.0000	1.000053	0.000536	0.001104	1.000011	1.000048	0.000440	46.471870	1.000011
114	Marshall Isds	0.001	0.002	-	-	9.0426	0.0000	0.0000	0.0000	20.4188	0.0000	0.0000	0.0000	1.000006	0.000009	0.000015	1.000001	1.000004	0.000016	0.000060	1.000002
115	Mauritania	0.010	0.011	105.392	99.741	22.3404	0.0000	0.0000	0.0000	35.0785	0.5236	0.0000	0.5236	1.000006	0.000104	4.852306	1.000001	1.000047	0.000114	4.211827	1.000010
116	Mauritius	0.043	0.037	131.269	125.468	64.8936	3.7234	0.0000	1.0638	69.1099	3.1414	0.0000	1.5707	1.000216	0.000431	38.850725	1.000032	1.000221	0.000373	41.704624	1.000039
117	Mexico	1.534	2.325	36.481	52.920	72.8723	12.2340	1.5960	7.9787	89.0052	13.6126	1.5710	2.0942	1.001456	0.015363	28.830682	1.000250	1.000955	0.023278	25.294002	1.000206
118	Micronesia	0.001	0.001	-	-	6.9149	0.0000	0.0000	0.0000	11.5183	0.0000	0.0000	0.0000	1.000000	0.000008	0.000011	1.000000	1.000000	0.000011	0.000017	1.000000
119	Mongolia	0.004	0.008	85.339	119.317	16.4894	0.0000	0.0000	0.0000	34.5550	0.0000	0.0000	0.0000	1.000003	0.000041	0.000042	1.000001	1.000013	0.000081	0.000194	1.000003
120	Morocco	0.168	0.176	54.334	58.292	36.7021	2.6596	0.0000	0.5319	73.2984	3.1414	0.0000	2.0942	1.000208	0.001682	13.296199	1.000033	1.000417	0.001765	13.374015	1.000087
121	Mozambique	0.017	0.010	47.447	52.689	23.9362	1.0638	0.0000	0.5319	31.9372	0.5236	0.0000	0.0000	1.000057	0.000166	3.567050	1.000011	1.000026	0.000103	3.183892	1.000005
122	Myanmar	0.020	0.033	-	-	53.7234	0.5319	0.0000	0.5319	32.9843	0.0000	0.0000	0.0000	1.000055	0.000201	0.000612	1.000010	1.000033	0.000333	0.000729	1.000017
123	Nepal	0.011	0.015	34.394	56.627	23.9362	0.0000	0.0000	0.0000	40.8377	0.5236	0.0000	0.5236	1.000022	0.000106	4.271000	1.000004	1.000048	0.000151	4.392844	1.000008
124	Neth. Antilles	0.052	0.039	-	-	46.8085	3.1915	1.5960	2.1277	36.6492	1.0471	0.5240	0.5236	1.000209	0.000521	0.007739	1.000074	1.000123	0.000386	0.002139	1.000032
125	Netherlands	3.873	3.169	101.836	99.291	95.7447	62.2340	18.0850	44.6809	98.9529	59.1623	19.3720	37.1728	1.005041	0.038768	75.920383	1.001040	1.004893	0.031718	73.479269	1.001303
126	New Caledonia	0.014	0.011	-	-	19.1489	0.0000	0.0000	0.0000	24.0838	0.5236	0.0000	0.5236	1.000015	0.000144	0.000453	1.000004	1.000053	0.000112	0.000266	1.000004
127	New Zealand	0.267	0.226	54.824	58.597	68.0851	4.2553	1.0640	2.1277	49.7382	0.5236	0.0000	0.5236	1.000513	0.002673	57.477683	1.000096	1.000155	0.002264	56.122345	1.000035
128	Nicaragua	0.013	0.023	67.688	85.110	26.0638	1.0638	0.5320	1.0638	55.4974	2.6178	1.0470	2.0942	1.000115	0.000126	6.911151	1.000026	1.000171	0.000229	5.170872	1.000053
129	Niger	0.006	0.007	38.687	39.769	23.4043	0.0000	0.0000	0.0000	52.8796	2.0942	0.0000	0.5236	1.000008	0.000059	3.328483	1.000001	1.000091	0.000069	2.610686	1.000017
130	Nigeria	0.282	0.169	63.302	78.713	38.8298	1.0638	0.0000	1.0638	72.2513	1.5707	1.0470	1.5707	1.000184	0.002819	3.367481	1.000044	1.000665	0.001687	2.537720	1.000128
131	Norway	0.851	0.747	70.882	71.779	78.1915	10.1064	3.1910	6.3830	84.2932	12.5654	5.7590	8.9005	1.001142	0.008521	80.964717	1.000678	1.002060	0.007475	81.688101	1.001286
132	Oman	0.122	0.109	83.145	90.117	47.3404	1.0638	0.5320	1.0638	61.7801	1.0471	0.5240	1.0471	1.000191	0.001224	0.002294	1.000046	1.000290	0.001089	0.001889	1.000053
133	Pakistan	0.224	0.170	34.792	36.653	72.3404	10.6383	1.5960	7.4468	79.5812	8.9005	3.1410	5.2356	1.001318	0.002241	6.830991	1.000164	1.000930	0.001698	6.360905	1.000167
134	Palau	0.001	0.001	-	-	6.3830	0.0000	0.0000	0.0000	12.0419	0.0000	0.0000	0.0000	1.000001	0.000008	0.000015	1.000000	1.000000	0.000007	0.000010	1.000000
135	Panama	0.133	0.052	69.915	76.166	36.7021	2.6596	0.5320	1.0638	53.4031	3.1414	0.5240	1.5707	1.000193	0.001331	20.652176	1.000056	1.000190	0.000521	19.294675	1.000055
136	Papua New Guinea	0.029	0.027	93.312	101.263	22.8723	0.5319	0.0000	0.0000	60.7330	1.5707	0.5240	1.0471	1.000032	0.000288	12.259805	1.000009	1.000157	0.000275	10.275025	1.000053
137	Paraguay	0.030	0.040	62.612	100.573	38.2979	0.5319	0.0000	0.0000	43.4555	1.5707	0.0000	0.5236	1.000056	0.000303	19.056968	1.000009	1.000083	0.000396	14.790340	1.000011
138	Peru	0.105	0.129	24.541	27.236	61.1702	4.7872	0.0000	2.1277	67.5393	4.7120	0.5240	2.0942	1.000313	0.001049	13.773895	1.000057	1.000397	0.001287	14.367943	1.000059
139	Philippines	0.359	0.592	58.850	91.258	55.8511	11.1702	3.1910	6.3830	75.9162	10.9948	4.7120	5.7592	1.001001	0.003590	10.878976	1.000249	1.000875	0.005924	10.608268	1.000299
140	Poland	0.428	0.690	43.689	50.939	78.7234	17.0213	4.2550	10.6383	82.7225	18.8482	2.6180	7.8534	1.001839	0.004282	23.522992	1.000293	1.001129	0.006905	27.102359	1.000303

TABLE A1. RESULTS FOR LOCAL MEASURES OF ECONOMIC INTEGRATION (…continues)

141 Portugal	0.692	0.591	71.323	67.480	85.6383	23.4043	5.3190	12.7660	88.4817	21.4660	5.7590	12.0419	1.002935	0.006927	48.958924	1.000429	1.002177	0.005922	47.079143	1.000431
142 Qatar	0.054	0.083	-	-	53.1915	2.1277	0.0000	1.5957	57.5916	1.0471	0.0000	0.0000	1.000139	0.000545	0.001283	1.000025	1.000114	0.000835	0.001645	1.000026
143 Rep. of Korea	2.137	1.970	63.644	66.375	79.7872	28.7234	10.6380	23.9362	89.0052	27.7487	10.9950	17.2775	1.004080	0.021391	43.296530	1.001384	1.002952	0.019716	42.316816	1.000970
144 Rep. of Moldova	0.002	0.020	116.370	122.062	10.6383	0.5319	0.5320	0.0000	51.8325	1.0471	0.0000	0.0000	1.000011	0.000016	0.000088	1.000011	1.000063	0.000198	7.120538	1.000018
145 Romania	0.100	0.202	45.109	58.545	34.0426	2.1277	0.0000	0.5319	79.5812	6.8063	1.0470	2.6178	1.000124	0.001003	15.709880	1.000022	1.000457	0.002023	15.052632	1.000122
146 Russian Federation	0.933	1.148	52.823	50.701	37.7660	10.1064	2.1280	5.8511	82.7225	24.0838	12.0420	17.2775	1.001037	0.009339	34.591843	1.000425	1.005329	0.011488	22.068008	1.001446
147 Rwanda	0.003	0.003	23.855	36.704	20.7447	0.0000	0.0000	0.0000	56.5445	2.0942	0.0000	1.0471	1.000014	0.000033	4.135726	1.000003	1.000111	0.000034	2.836722	1.000015
148 Saint Kitts and Nevis	0.002	0.002	140.507	127.539	18.6170	0.5319	0.0000	0.0000	22.5131	1.0471	0.0000	0.5236	1.000032	0.000015	32.415887	1.000006	1.000052	0.000016	40.179348	1.000012
149 Saint Lucia	0.006	0.004	163.290	137.100	47.8723	3.7234	0.5320	2.6596	47.1204	3.1414	0.5240	2.0942	1.000344	0.000065	23.042458	1.000077	1.000217	0.000042	19.851502	1.000055
150 Saint Vincent and the Grenadines	0.003	0.003	140.178	112.562	22.8723	0.5319	0.0000	0.5319	43.4555	2.0942	0.0000	0.5236	1.000055	0.000032	24.845484	1.000008	1.000101	0.000034	20.882870	1.000022
151 Samoa	0.003	0.001	97.932	115.388	15.9574	0.5319	0.0000	0.0000	17.8010	0.0000	0.0000	0.0000	1.000027	0.000031	0.000384	1.000007	1.000002	0.000013	0.000061	1.000000
152 Sao Tome and Principe	0.000	0.001	95.195	115.775	16.4894	0.0000	0.0000	0.0000	21.9895	0.0000	0.0000	0.0000	1.000001	0.000005	5.662109	1.000000	1.000005	0.000006	3.984000	1.000001
153 Saudi Arabia	1.045	0.684	80.617	74.158	75.5319	18.6170	3.7230	10.6383	80.1047	12.0419	3.1410	8.3770	1.002576	0.010455	0.023868	1.000360	1.001837	0.006845	0.017393	1.000260
154 Senegal	0.021	0.022	55.373	69.226	30.3191	0.5319	0.5320	0.0000	61.7801	1.0471	0.0000	0.5236	1.000030	0.000211	5.809950	1.000014	1.000234	0.000225	4.991881	1.000026
155 Serbia and Montenegro	0.167	0.067	-	-	60.6383	6.9149	2.6600	3.1915	79.5812	4.7120	0.5240	1.5707	1.000632	0.001667	0.010419	1.000142	1.000594	0.000669	0.002705	1.000116
156 Seychelles	0.004	0.004	121.023	128.891	35.6383	0.5319	0.0000	0.5319	30.8901	0.0000	0.0000	0.0000	1.000034	0.000040	32.119525	1.000009	1.000009	0.000037	38.270087	1.000003
157 Sierra Leone	0.008	0.003	36.635	46.370	23.9362	0.0000	0.0000	0.0000	35.0785	0.0000	0.0000	0.0000	1.000002	0.000075	3.708233	1.000001	1.000009	0.000026	2.422815	1.000002
158 Singapore	1.766	1.779	375.556	352.436	63.8298	26.5957	10.6380	18.0851	76.9633	22.5131	9.4240	15.7068	1.002712	0.017678	70.374220	1.000970	1.002547	0.017814	81.719478	1.001860
159 Slovakia	n.a.	0.226	n.a.	117.998	n.a.	n.a.	n.a.	n.a.	75.9162	3.1414	0.5240	0.5236	n.a.	n.a.	n.a.	n.a.	1.000301	0.002265	36.731237	1.000099
160 Slovenia	0.156	0.183	138.556	113.324	80.8511	6.9149	1.0640	2.6596	85.8639	4.7120	1.5710	2.6178	1.000720	0.001563	40.260357	1.000141	1.000459	0.001834	46.757611	1.000093
161 So. African Customs Union	0.439	0.453	24.190	35.560	80.8511	7.9787	1.5960	4.7872	91.0995	6.2827	2.6180	4.7120	1.001412	0.004389	27.567363	1.000184	1.001291	0.004535	23.644578	1.000222
162 Solomon Isds	0.003	0.003	-	-	14.8936	0.0000	0.0000	0.0000	18.8482	0.0000	0.0000	0.0000	1.000006	0.000028	0.000131	1.000002	1.000004	0.000030	0.000106	1.000001
163 Somalia	0.003	0.002	-	-	22.8723	0.5319	0.0000	0.5319	26.7016	0.5236	0.0000	0.0000	1.000024	0.000032	0.000091	1.000004	1.000031	0.000020	0.000049	1.000004
164 Spain	2.298	2.326	38.297	45.453	96.2766	58.5106	13.2980	40.4255	97.3822	63.8743	18.3250	43.9791	1.005749	0.023012	56.057349	1.001667	1.006225	0.023281	53.851243	1.001737
165 Sri Lanka	0.081	0.087	66.074	79.420	55.8511	3.7234	0.5320	1.5957	44.5026	1.5707	0.5240	0.5236	1.000336	0.000815	10.060867	1.000071	1.000218	0.000875	10.642130	1.000050
166 Sudan	0.013	0.027	-	-	27.1277	0.5319	0.0000	0.0000	72.2513	4.7120	0.5240	1.5707	1.000041	0.000132	0.000373	1.000008	1.000342	0.000266	0.001851	1.000088
167 Suriname	0.014	0.010	49.377	10.947	23.9362	1.0638	0.0000	0.5319	42.4084	1.5707	0.5240	1.5707	1.000052	0.000141	0.001005	1.000021	1.000092	0.000104	0.001020	1.000028
168 Sweden	1.324	1.456	59.544	71.957	43.0851	11.7021	2.6600	4.7872	89.5288	16.7539	4.1880	5.7592	1.000871	0.013249	75.394605	1.000243	1.001422	0.014578	69.801958	1.000449
169 Switzerland	1.871	1.570	70.834	68.547	93.0851	25.5319	3.1910	13.2979	94.7644	24.6073	3.6650	8.3770	1.002429	0.018729	91.597355	1.000532	1.001843	0.015712	81.614385	1.000390
170 Syria	0.070	0.072	52.695	71.553	32.9787	1.5957	0.0000	0.5319	45.5497	2.6178	0.0000	1.0471	1.000108	0.000701	13.738387	1.000020	1.000210	0.000716	13.231600	1.000035
171 Tajikistan	0.001	0.006	-	-	9.0426	0.0000	0.0000	0.0000	27.2251	0.5236	0.0000	0.5236	1.000003	0.000012	0.000030	1.000002	1.000044	0.000059	3.830060	1.000012
172 TFYR of Macedonia	n.a.	0.028	n.a.	-	n.a.	n.a.	n.a.	n.a.	62.8272	3.1414	0.0000	0.5236	n.a.	n.a.	n.a.	n.a.	1.000162	0.000277	14.945334	1.000035
173 Thailand	0.997	0.935	71.543	85.776	79.7872	25.0000	7.4470	15.4255	92.6702	24.6073	10.4710	16.2304	1.003648	0.009980	20.740801	1.000671	1.003496	0.009357	19.915362	1.001346
174 Timor-Leste	0.000	0.000	-	-	4.2553	0.0000	0.0000	0.0000	3.1414	0.0000	0.0000	0.0000	1.000000	0.000000	0.000002	1.000000	1.000004	0.000000	0.000005	1.000000
175 Togo	0.013	0.010	82.292	69.722	24.4681	1.0638	0.5320	0.5319	59.1623	1.5707	0.5240	0.5236	1.000105	0.000127	4.685590	1.000017	1.000102	0.000098	3.052881	1.000029
176 Tonga	0.001	0.000	-	-	14.8936	0.5319	0.0000	0.5319	17.8010	0.0000	0.0000	0.0000	1.000035	0.000009	0.000315	1.000009	1.000000	0.000005	0.000013	1.000000
177 Trinidad and Tobago	0.045	0.054	73.030	94.107	59.0426	4.2553	2.1280	2.6596	64.3979	4.7120	2.6180	3.1414	1.000399	0.000446	36.229550	1.000089	1.000400	0.000538	26.166296	1.000118
178 Tunisia	0.150	0.139	85.362	89.068	62.2340	3.7234	0.0000	0.0000	74.8691	2.0942	0.0000	0.5236	1.000232	0.001501	19.666077	1.000037	1.000261	0.001391	19.713282	1.000050
179 Turkey	0.538	0.686	32.766	44.592	79.2553	19.1489	4.7870	11.1702	84.2932	22.5131	4.7120	9.9476	1.002224	0.005389	22.635384	1.000352	1.001967	0.006873	22.397474	1.000384
180 Turkmenistan	0.004	0.010	-	-	10.6383	0.0000	0.0000	0.0000	30.3665	0.5236	0.0000	0.5236	1.000009	0.000035	0.000111	1.000006	1.000061	0.000099	0.000595	1.000011
181 Uganda	0.007	0.016	27.789	31.179	26.0638	0.5319	0.0000	0.5319	73.8220	2.6178	1.0470	2.6178	1.000063	0.000072	2.505207	1.000011	1.000532	0.000160	2.897545	1.000063
182 Ukraine	0.054	0.271	54.155	80.383	17.5532	1.0638	0.5320	0.5319	81.1518	11.5183	3.6650	6.8063	1.000167	0.000536	31.258953	1.000139	1.000936	0.002712	14.077592	1.000253
183 United Arab Emirates	0.212	0.484	106.450	127.932	59.0426	3.1915	1.0640	1.5957	53.9267	7.8534	1.5710	4.7120	1.000339	0.002125	0.005415	1.000062	1.000784	0.004850	0.011292	1.000201
184 United Kingdom	5.415	5.300	50.376	56.488	91.4894	74.4681	31.9150	63.2979	98.4293	73.2984	33.5080	59.6859	1.011954	0.054205	68.633975	1.003402	1.010674	0.053059	69.508126	1.002911
185 United Rep. of Tanzania	0.020	0.023	44.069	55.821	29.2553	0.5319	0.0000	0.5319	72.7749	1.5707	0.0000	0.5236	1.000071	0.000201	1.609739	1.000018	1.000164	0.000233	1.396282	1.000032
186 Uruguay	0.053	0.066	43.543	43.079	29.7872	1.5957	0.0000	0.5319	63.8743	2.0942	0.5240	1.0471	1.000077	0.000534	30.500886	1.000009	1.000500	0.000661	32.803976	1.000140
187 USA	13.744	15.589	20.696	23.750	96.8085	88.2979	53.7230	81.3830	97.9058	90.0524	63.3510	82.7225	1.030205	0.137579	100.589834	1.007497	1.030747	0.156061	100.579422	1.009328
188 Uzbekistan	0.008	0.043	72.690	85.778	10.6383	0.5319	0.5320	0.0000	33.5079	1.0471	0.5240	0.5236	1.000026	0.000085	0.000197	1.000019	1.000177	0.000433	0.002554	1.000049
189 Vanuatu	0.001	0.002	-	-	18.6170	0.0000	0.0000	0.0000	21.4660	0.0000	0.0000	0.0000	1.000011	0.000014	0.000127	1.000003	1.000002	0.000018	0.000061	1.000001
190 Venezuela	0.392	0.323	53.222	49.683	54.2553	8.5106	2.1280	3.7234	65.9686	8.9005	2.0940	3.6649	1.000704	0.003923	26.985461	1.000149	1.000887	0.003235	19.340935	1.000175
191 Viet Nam	0.060	0.179	47.742	84.208	27.1277	0.5319	0.0000	0.0000	43.4555	1.5707	0.5240	0.0000	1.000054	0.000603	4.401174	1.000025	1.000119	0.001794	0.004792	1.000055
192 Yemen	0.041	0.035	44.834	73.319	29.7872	1.5957	0.5320	0.5319	38.7435	1.5707	0.0000	1.0471	1.000130	0.000411	3.742668	1.000031	1.000113	0.000350	3.604136	1.000024
193 Zambia	0.027	0.019	70.610	72.583	28.1915	1.0638	0.0000	1.0638	59.1623	2.0942	0.5240	0.5236	1.000071	0.000269	3.612574	1.000014	1.000172	0.000191	2.485421	1.000041
194 Zimbabwe	0.050	0.034	49.147	76.482	59.0426	2.1277	0.0000	0.5319	40.8377	1.0471	0.0000	1.0471	1.000130	0.000505	10.032842	1.000021	1.000086	0.000342	8.688628	1.000019

Notes: (A) Denotes network indicators computed with the Cash Flow Dependency Ratio (i.e. exports of *i* to *j* out of total exports of *i*).
(B) Denotes network indicators computed with the Economic Dependency Ratio (i.e. exports of *i* to *j* out of country *i*'s GDP).
(-) data is not available. (n.a.) country is not applicable.