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ABSTRACT

Exports and Information Spillovers*

Exporters' performance in a particular market may affect their future exports to the rest of the world. Importers may base their future transaction decisions upon the information revealed by exporters' past performance in other countries. Similarly, exporters acquire valuable information on foreign consumer tastes, product standards or customs administration that may profitably be used in future transactions with other countries. This Paper estimates the large effects of these information spillovers across markets on the export patterns of four developing countries (Egypt, Korea, Malaysia and Tunisia). A dollar increase in exports to the United States generates on average an extra 2 to 14 cents of exports to the rest of the world in the next period. Social and ethnic networks seem to reinforce these information spillovers, especially in developing countries, where they appear to be geographically more concentrated. The exception is China and to some extent Hong Kong, probably reflecting a geographically more diversified migration pattern.

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NON-TECHNICAL SUMMARY

There is little doubt that in any type of business, individual relationships among trading partners are extremely valuable and can determine the success or decline of a firm. The information acquired through each interaction is seen, by both buyers and sellers, as an investment, which will bring future benefits. The need for information among business partners is probably more pronounced in the case of international transactions. The export success of a firm (and ultimately a country) will depend on the quality of its business relationships. Through repeated interactions, both exporters and importers will acquire valuable information on reliability in terms of the credit and delivery of their trading partners.

The information created by the business relationship may spill over to other exporters and importers. These information spillovers may not necessarily be limited to national borders. Importers' direct experience with an exporter may generate valuable information that can be used as an important guide in deciding future transactions with other countries. This implies that a good export performance in one market will not only have positive effects in the same market in the future, but may also positively affect export performance in 'neighbouring' markets through information spillovers. Similarly, exporters may acquire valuable information regarding the functioning of customs administrations or foreign consumer tastes, which could profitably be used in future transactions with other countries.

This Paper focuses on the importance of these international information spillovers on the export performance of four developing countries, which have experienced varied export performance in the last decade: Egypt, Korea, Malaysia and Tunisia. Using the United States as an example of a market where information is generated, we found that an extra dollar exported to the United States by Korea generates on average an increase in Korean exports to the rest of the world of 14 cents. A similar figure for Malaysia is 10 cents, whereas in Egypt and Tunisia, the figure is close to 2 cents. We also found that some developing countries' export markets, such as India and Argentina, generate larger increases in exports to the rest of the world through information spillovers. These tend, however, to be geographically more concentrated, in the sense that most of the additional exports occur within a few geographically close countries.

The exception in developing countries in terms of geographic concentration as a source of information spillovers to the rest of the world is China and to some extent Hong Kong, where information spills over to geographically diversified countries. This is probably due to the less geographically-concentrated migration pattern of China and Hong Kong.

These results suggest an important role for public or private export information agencies in developing countries. Diffusion of export information across firms can significantly contribute to the export performance of a country. The analysis also detected the presence of externalities at the two-digit industry level, which suggests that there is room for cooperation through bundling of export offers across firms in the same two-digit industry. The presence of these information spillovers also implies that one bad deal or poor performance in one market not only hurts exporters in that particular market, but may also hurt them in other markets. This suggests an important role for quality controls, such as ISO standards, that can be publicly or privately organized.

"*Most foreign buyers prefer to give orders to firms that already have considerable export experience and require little instruction and assistance. This is one reason success is cumulative"* (Vinod Thomas, John Nash *et al.*, 1993, p. 128).

1. Introduction

There is little doubt that in any type of business, individual relationships among trading partners are extremely valuable and can determine the success or decline of a firm. Through repeated business transactions, a certain degree of trust is developed between sellers and buyers, which reinforces the relationship. Future transactions become more profitable through a better understanding and knowledge of each others' needs. The information acquired through each interaction is seen, by both buyers and sellers, as an investment which will bring future benefits.[1]

The need to create bilateral information among business partners is probably more pronounced in the case of international transactions. The export success of a firm (and ultimately a country) will depend on the quality of its business relationships.[2] Through repeated interactions, both exporters and importers will acquire valuable information on reliability in terms of the credit and delivery of their trading partners. It will also provide knowledge of the functioning of custom administrations, foreign market tastes, product quality, standards, certification and design (Egan and Mody, 1992, Evenson and Westphal, 1995, Grossman and Helpman 1991, Rhee, Ross-Larson and Pursell, 1984 and World Bank, 1997).[3] .

For a potential exporter to successfully enter an export market, it needs to build a reputation as a reliable supplier and learn about market tastes and structures. The process

[1] Repeated interaction also solves the problem of asymmetric information as shown by Riordan (1986).
[2] As reported in a study done by Egan and Mody (1992) based on a survey of US importers, one bad shipment can lead to a complete break of a business relation with low reputation suppliers.
[3] Note that the recent empirical literature has found very little evidence of "learning by doing" associated with export activities on the productivity of the firm. See for example Clerides, Lach and Tybout (1998) for a study of Colombian firms and Bernard and Jensen (1999) for a study of US firms.

of building a reputation may be costly. However, reputation building may also show some multiplier effects, as the individual relationship established between an exporter and an importer will typically generate information spillovers beyond the two trading partners. Importers may use other importers, who have had direct experience with potential suppliers, as a source of information on the performance of alternative exporters (World Bank, 1989). This effect may be reinforced by information spillover effects on the exporter side, as export activities generate a better understanding of how foreign markets work. This is valuable information for future transactions. Also, the export success of a firm in some markets may generate demonstration effects for other firms, which become aware of potential opportunities in foreign markets. Export promotion or industry agencies, both public and private, may also help diffuse this information across firms.

Information spillovers may not necessarily be limited to national borders. Importers who have had direct experience with an exporter may generate valuable information that can be used as an important guide in deciding future transactions in other countries. This implies that a good export performance in one market will not only have positive reputation effects in the same market in the future, but may also positively affect export performance in "neighboring" markets through information spillovers. Similarly, exporters acquire valuable information regarding the functioning of customs administrations, foreign consumer tastes, shipping procedures, and distribution networks, which could profitably be used in future transactions with other countries.[4]

Social or ethnic networks may help the international transmission of these information spillovers in various ways: helping to match buyers and sellers across borders; creating market similarities; easing the transmission of these flows across borders; and serving as a deterrent for opportunistic behavior, as in Rauch (1999) or Rauch and Trindade (1999). Even in countries with well-developed judiciary systems, an important share of what makes a successful business deal will typically lie outside the contract established by

[4] An alternative explanation for the observation of this export reputation spillovers across borders is the existence of production networks, where plants of the same network are located in different countries. Initiating business with one plant in the network allows much easier access to other buyers within the network (see Kaminski and Ng, 1999).

trading partners (McLaren, 1999). Trust provided by ethnic networks therefore has an important business value. As the empirical section will reveal, the importance of these ethnic networks in explaining the export performance of developing countries is indirectly confirmed in our study. Information flows among countries will be facilitated by the presence of these ethnic networks.

The objective of this paper is to try to identify the importance of these international information spillovers to the export performance of four developing countries which have experienced varied export performance in the last decade: Egypt, Korea, Malaysia and Tunisia. The choice of countries is deliberate in the sense that we wanted to have a set of developing countries from different regions and at different stages of development.[5]

The questions we will be asking are, for example: *Does the export performance of Egypt in France affect exports from Egypt to countries which share large information flows with France?;* and if so: *How important is Egypt's export performance in France in explaining Egypt's export performance in the rest of the world?*

In the empirical section we found that information spillovers had important effects in the export performance of these four developing countries. Interestingly enough, we also found that information spillovers have little effect on the export pattern of the US. This suggests that the role of information spillovers is more important in developing countries, where the need for building a reputation in international markets is larger.

Taking the United States as an example of a market where information is generated, an extra dollar exported to the United States by Korea generates on average an increase in Korean exports to the rest of the world of 14 cents. A similar figure for Malaysia is 10 cents, whereas in Egypt and Tunisia the figure is close to 2 cents. We also found that some developing countries' export markets, such as India and Argentina, generate larger increases in exports to the rest of the world through information spillovers. They tend,

[5] We purposely exclude Latin American countries where regionalism may also play an important role. See Nicita, Olarreaga and Soloaga (2000) for an analysis of export information spillovers in a regional context.

however, to be geographically more concentrated, which is probably due to their less diversified migration pattern.

The rest of the paper is structured as follows. In section 2, we discuss the importance of information flows across countries and the different measures used in this paper to capture bilateral information flows. Section 3 develops a simple model with export information spillovers across nations. Section 4 focuses on the econometric model, and section 5 reports the results for the four developing countries in our sample. Section 6 quantifies the importance of export information spillovers for the export performance of these four developing countries. Section 7 outlines the conclusions.

2. Information Flows across countries

Related literature has suggested several ways to capture information flows. First, Rauch (1999) suggests that geographic proximity facilitates the exchange of trade related information. The rationale for this is twofold. First, communication costs might affect the flow of information, second, information from other buyers may be more valuable the closer these other buyers are from the domestic market in terms of tastes, product-designs and other cultural factors.[6] Thus, information flows would follow a distance decay function and would be larger among relatively close countries.

Rauch and Trindade (1999) suggest the use of the share of common ethnic population to capture information flows. The idea is that ethnic networks facilitate the exchange of information. The larger the share is of Chinese population in two countries, for example, the larger the information flow between these two partners.

[6] See Rhee, Ross-Larson and Pursell (1984) or Evenson and Westphal (1995).

Two other proxies are suggested by Portes and Rey (1999). These authors measure information flows using bilateral telephone calls and bilateral trade.[7] For telephone calls, the intuition is straightforward; whereas for bilateral trade the idea is as discussed above, that business relationships are subject to the exchange of information.

Rauch and Trindade (2000) suggest the use of the number of periodicals and newsletters devoted to international trade and commerce as proxy for trade related information. Because we are interested in bilateral information flows, we propose the use of bilateral trade in periodicals and newspapers as proxy for trade-related information flows (SITC rev 1. 8922). The exchange of newspapers will not only include directly trade related information, as in the case of the *Journal of Commerce* or *Export Channel* in the US, *Made for Export* in Europe, *Asian Channel* in Hong Kong, and *Gazeta Mercantil* in Latin America. It will also reflect cultural similarities and bilateral immigration patterns, which will also be important determinants of "indirectly" trade related information flows, such as taste similarities across countries.

All of these proxies have advantages and disadvantages when it comes to their empirical application. In the empirical section we will test each of them, except the bilateral share of ethnic population between partners. The reason for the exclusion is that we would need a matrix of bilateral migration patterns in the world which is, to our knowledge, unavailable (see Zlotnik (1998) for a discussion of data availability for international migration).[8] However, Rauch (1999) has argued that distance may be correlated with the existence of these ethnic networks. We believe that bilateral telephone calls and newspaper trade also capture their presence. However, we will argue that bilateral newspaper trade is the more adequate proxy to capture information flows across countries. Results reported in section 5 are estimated using newspaper trade; but other proxies provided robust results.

[7] See footnote 16 in Portes and Rey (1999) for the use of aggregate bilateral trade as a proxy for information flows between countries.
[8] Rauch and Trindade (1999) focus on the effects of Chinese networks on bilateral trade relations in the world and therefore had smaller data requirements.

There are at least two reasons why distance may be an imperfect proxy: it fails to capture size and cultural or historical effects. To illustrate the importance of size effects, note that using distance as a proxy would imply that the exchange of information between Argentina and Uruguay would be larger than between Argentina and Mexico. However, the exchange of information measured by newspaper trade (for example) suggests that the exchange between Argentina and Mexico was more than ten times larger in 1995 due simply to the relative size of their markets (see Table 1). Regarding the failure of distance to capture cultural and historical links, note that its use would imply that the exchange of information between Australia and the United Kingdom would be smaller than the exchange of information between China and Australia, since the latter are geographically closer. However, cultural factors such as language and colonial links imply that newspaper trade between Australia and the United Kingdom was 200 times larger than between Australia and China in 1995.

Bilateral aggregate trade may solve some of the problems associated with distance, as size and cultural links are important determinants of trade. However, bilateral aggregate trade is also determined by many other factors, such as comparative advantage, and may therefore be poorly correlated with bilateral information flows.[9] More importantly, these information flows may be crucial for an exporter in a third country, who may be able to build a valuable reputation in one of the two markets, and may benefit from the information flows between the two countries to increase its export performance in the other market. As an example, Ireland's newspapers trade with the United Kingdom represented almost 98 percent of its total trade in newspaper in 1995, whereas the share of the United Kingdom in Ireland's total trade is close to 30 percent. Similarly, 20 percent of Kuwait's newspaper trade is done with Egypt; but Egypt only represents 1.5 percent of Kuwait's total trade.

Bilateral telephone calls may also solve the problems described above associated with the use of distance or bilateral trade as a proxy for information flows across countries. But it may raise other problems, when trying to capture information flows among developing

countries. First, the data that is available today at the International Telecommunications Union does not cover a wide range of developing countries (of the 60 countries considered as potential export markets in our sample, 41 are developing countries), and its time dimension is limited (there is no data available before 1985). Second, telephone calls may be a very expensive means of exchanging information for developing countries due to the high cost of international calls. Newspapers are probably the cheapest way to widely disseminate information.[10]

2.1 How large are bilateral newspaper flows?

The value of world newspaper exports was close to 4 billion dollars in 1995, and represented 0.1 percent of world exports. The growth of bilateral newspaper trade during the period 1969-1997 is close to 10 percent in nominal terms per year. Germany is the world's largest trader of newspapers with a total trade (exports plus imports) of 1.2 billion dollars in 1995. It is closely followed by the United States, which was involved in 25 percent of world newspaper trade in the same year (as either an importer or an exporter).

These flows can also be relatively important in developing countries. Brazil's total trade of newspapers was close to 87 million dollars in 1995. The total value of newspaper trade between Brazil and Chile was 30 million dollars, whereas between Singapore and Malaysia it was close to 10 million dollars. Table 1 below provides the share of bilateral newspaper trade and total newspaper trade for a selected number of countries.

INSERT TABLE 1: HERE

[9] To see this, accept for the moment that trade flows are exclusively determined by factor endowments. Two countries with identical factor endowments will not trade with each other, but may have a significant exchange of information.

3. Export Information Spillovers across countries

Export information spillovers are defined as the set of information flows that are generated in a particular export market and that will affect export and import decisions between the original exporter and importers in the rest of the world. They are illustrated in Figure 1. The exporter's performance in *country k* generates information spillovers (the dashed lines) into two locations. First, it gives feedback to the original exporter on information about customs procedures, product standards, and tastes in foreign markets, which may help in the next period its export performance in a third market: *country c*. Second, importers in *country c* learn about the reliability and product quality of the original exporter by observing the exporter's behavior in the rest of the world. This will affect import decisions in the next period.

INSERT FIGURE 1: HERE

The size of export information spillovers between countries *k* and *c* will therefore depend not only on the export performance of the *exporter* in *country k,* but also on the extent of information exchange between *country c* and *country k.*

3.1 A simple model

Firms face constant marginal costs in country 0 (the exporter). Marginal transport costs are also constant. Thus, total cost of exporting from country 0 to country *c* at period *t*, denoted $C_{c,t}$, is given by:

$$C_{c,t} = [\alpha + \tau d_c] x_{c,t} \quad (1)$$

[10] The use of the internet may change this in the future, but it was clearly not an instrument for exchange of information during the period under examination here (1969-1997).

where α is the marginal cost of producing the export good; τ_c is the marginal transport cost; d_c is the distance from country 0 to country *c;* and $x_{c,t}$ are exports from country 0 to country *c*.

Export markets for exports originating in country 0 are segmented, which combined with the assumption of constant marginal costs of production allows us to deal independently with each export market.

Demand for each product in each market is derived from a quasi-linear and additive utility function, which freezes substitution and income effects in demand. Each sub-utility function is quadratic so that demand functions are linear. Units are chosen so that the slope of the linear demand function equals 1.

There are information spillover effects, in the sense that demand today for exports of country 0 depend on the market share of country 0 in the previous period. The larger the market share of country 0 in period *t* is, the larger the demand it will face in period *t+1*.[11]

Information about past export performance also spills over from other countries as suggested in Figure 1. The exporter's past market shares in rest of the world markets also affects the level of demand for its products in country *c*. Thus, information spillovers are here modeled on the demand side, but could be similarly introduced on the supply side. In our empirical section, we will not be able to disentangle between demand and supply spillovers, and therefore our estimates will be a mixture of both. Inverse demand for exports of country 0 to country *c* at period *t* is therefore given by:

$$p_{c,t} = a - x_{c,t} + \lambda s_{c,t-1} + \theta I'_{c,t-1} S_{t-1} \qquad (2)$$

[11] See Froot and Klemperer (1989) or Farrell (1986) for a discussion of the relevance of past market shares in determining future demand.

where a is a parameter; $p_{c,t}$ is the price of exports in country *c* at time *t*; $s_{c,t-1}$ is the share of country 0 in total import demand of country *c* in the previous period; $\lambda > 0$ then captures the own-market effect; $I'_{c,t-1}$ is a transposed vector of information flows between country *c* and all other (potential) export markets of country 0; each element is defined by the share of each rest of the world country in country *c*'s total information flows with the world;[12] S_{t-1} is a vector of market shares of country 0 in each market. Thus, $\theta > 0$ captures the export-market information spillovers across markets.

Free-entry into each export market ensures that:

$$a - x_{c,t} + \lambda s_{c,t-1} + \theta I'_{c,t-1} S_{t-1} = \alpha + \tau d_c \tag{3}$$

Solving (3) for $x_{c,t}$ yields

$$x_{c,t} = (a - \alpha) - \tau d_c + \lambda s_{c,t-1} + \theta I'_{c,t-1} S_{t-1} \tag{4}$$

Equation (4) implies that an increase in export performance in any location will affect exports to all other countries in the next period through information spillovers.

4. Econometric model and data

We will try to capture information spillovers at the product line level and therefore we will use bilateral trade data (60 countries) at the 3-digit of the SITC classification for manufacturing products. For each of the exporting countries in our sample, we will then use the whole sample of potential export products to all countries where a product has been

[12] We use shares instead of actual flows for several reasons. First, it makes interpretation easier. Second, if the proxy used for information flows has a time dimension, then it will avoid our having to deal with the potential bias that this may introduce into our econometric estimates. Finally, the power of some of the statistic tests that we use to test the error term for potential correlation across countries crucially depends on the standardization of this matrix (see Florax and Folmer, 1992 or Anselin, 1999).

exported at least once during the period 1969-1997. Trade data sources are from national sources compiled by the United Nations in Comtrade's data base.

Information flows are captured using the four proxies described in section 2. In the case of distance, we use the matrix of inverse bilateral distance between countries. For total trade, we use the share of bilateral trade with each rest-of-the-world country in the importer's (country *c*) aggregate trade with the rest of the world. For international phone calls, we use the share of international phone call minutes between country *c* and each of the rest-of-the-world countries. Finally, newspaper trade is calculated as the share of bilateral newspaper trade with each rest-of-the-world country in country *c*'s total newspaper trade with the rest of the world. When using newspaper trade and total trade, the proxy for information flows contains a time dimension, as data is available throughout the period. However, the data on telephone calls had very little time dimension before 1992 and no data before 1985. Therefore we took the year 1992 as the base year and used the number of bilateral minutes of phone calls for 1992 values, or the closest year (1991 or 1993) for which there is data available, as a proxy for information flows.[13] In the case of distance, there is obviously no time dimension either.[14] More detailed information on variable construction can be found in the Data Appendix. Results reported in section 5 are obtained using newspaper trade as a proxy for information flows. Other proxies yielded robust estimates, though newspaper trade generally yielded more efficient results.

We will base the empirical analysis on a stochastic version of equation (4) and test for information spillovers by testing the significance of the parameter θ. The non-existence of exports in many products across trading partners leads to a large presence of zeroes in our endogenous variables (89 percent of censoring in the case of Egyptian exports, 40 percent for Korea, 60 percent for Malaysia and 91 percent for Tunisia).

[13] Note that due to the lack of data available at the International Telecommunication Union on minutes of bilateral phone calls our estimation for bilateral phone calls only include 41 of the 60 countries in our sample. However, as suggested before, the results were consistent with what we report in section 5 using newspaper trade as a proxy.

To correct for the bias introduced by censoring, we estimate equation (4) for each of the four exporting countries (Egypt, Korea, Malaysia and Tunisia) using a tobit technique:[15]

$$x_{p,c,t} = \begin{cases} x^*_{p,c,t} & \text{, if } \quad x^*_{p,c,t} > 0 \\ 0 & \text{, if } \quad x^*_{p,c,t} \leq 0 \end{cases} \qquad (5)$$

$$\text{and } x^*_{p,c,t} = (a - \alpha) - \tau d_c + \lambda s_{p,c,t-1} + \theta I'_{c,t-1} S_{p,t-1} + \varepsilon_{p,c,t}$$

where $x_{p,c,t}$ are exports of Korea (for example) of product *p,* to country *c* in period *t;* and . $\varepsilon_{p,c,t}$ is the error term. In Anselin (1999) terminology this specification is an *implicit* pure time-space recursive model. In this paper, the presence of information flows across countries lead to a space recursive model, in the sense that the export performance in country *k* will affect the export performance in all other countries in our sample through information flows. It is *implicit* time recursive because the spatial lag of the endogenous variables is expressed in terms of market share and not levels of exports, which allows us to avoid problems related to lagged spatial endogenous variables. The lack of simultaneity in the spatial correlation allows us, in principle, to abstract from problems of correlation between the spatially lagged variable ($I'_c S_{p,t-1}$) and the error term. However, we will test for error spatial correlation in the next section.

One may be tempted to add fixed country or product effects into equation (5), but as suggested by Anselin (1999), this would lead to inconsistent estimates, in which case a random effect specification should then be considered. Assuming country-specific unobserved effects,[16] the error term becomes: $\varepsilon_{p,c,t} = w_{c,t} + \eta_{p,c,t}$ where $w_{c,t}$ is

[14] Note that to avoid identification problems, we need the elements of the information flow vector to be exogenous. Note that this is the case for all proxies. For example, exports of Egypt to France in period *t* cannot determine the information flows between France and Germany at period *t-1*.

[15] We alternatively used a two-stage tobit technique as in Maddala (1983, p. 221-222) and a two-part model, which yielded similar results to the ones reported in section 5. Generally, results were more efficient when using either the simple tobit or the two-stage tobit technique, which may be due to the structure of the data, as discussed in Leung and Yu (1996).

[16] In the empirical section we also considered a product-specific component for the error term and obtained similar results to the ones reported in section 5.

independently and identically distributed (i.i.d.) across countries and time, and $\eta_{p,c,t}$ is i.i.d across products, countries and time.

The estimation of information spillovers (θ) through equation (5) may be biased by the absence of some other important variables related to comparative advantage aspects or other types of externalities that are absent in (5). To control for these, we add four variables to the right hand side of (5).

First, size may matter. The larger the import market, the larger are exports to this market. To control for the size of the import market, we introduce *size*, which is defined as total imports of product *p* in country *c* at period *t* (purged of exports to country *c*).

Second, comparative advantage aspects may also affect our measure of information spillovers. In some products the exporter may be a "natural exporter" and in others not. To control for this we introduce *ca*, which is defined as total exports to the rest of the world, denoted *ca* (again purged). It could also be interpreted as capturing "learning by doing" or economies of scale in export activities, which would not be related to export information spillovers across markets.[17]

Third, bilateral trade preference and cultural links may also affect our estimates. To capture this, we introduce *gravity*, which is total exports of the source country to country *c* (again purged). *Gravity* can also be interpreted as capturing all the explanatory variables of a gravity equation for the export country (including cultural links, language, regional trade agreements, etc.). It may also be seen as across product externalities within the own market.

[17] See Clerides, Lach and Tybout (1998) or Bernard and Jensen (1999).

Finally, we also control for possible within sector externalities by taking the sum of bilateral exports at the 2 digit level of SITC classification (excluding the export product of each observation) and denote it *2digit* . Thus:[18]

$$x_{p,c,t} = \begin{cases} x^*_{p,c,t} & ,if \quad x^*_{p,c,t} > 0 \\ 0 & ,if \quad x^*_{p,c,t} \le 0 \end{cases}$$

$$and\ x^*_{p,c,t} = (a-\alpha) - \tau\, d_c + \lambda\, s_{p,c,t-1} + \theta\, I'_{c,t-1} S_{p,t-1} + \tag{6}$$

$$\phi_1\, size_{p,c,t} + \phi_2\, ca_{p,t} + \phi_3\, gravity_{c,t} + \phi_4\, 2digit_{p2d,c,t} + \omega_{c,t} + \eta_{p,c,t}$$

A time dummy is also introduced in all estimations. All parameters are positive and therefore expected signs are given by the signs in front of the parameters. Results reported in the next section also correct for heteroscedasticity using Huber correction method. The reported R^2 is calculated following Veall and Zimmermann (1994). As shown in their study, the more traditional McFadden (1973) R^2 has a downwards bias in large samples with a high degree of censoring.[19]

5. Empirical Results

We estimated equations (5) and (6) for each of four countries in our sample. Table 2 reports results of these estimations in the first and second column for each country (we discuss results reported in the third column later). All variables have the expected sign and are statistically significant at the 10 percent level or less, except for within two-digit industry externalities in the case of Tunisia.[20] Note that the introduction of the four control

[18] For a more formal description of variable construction and data sources, see Data and Variable Appendix.

[19] The Veall and Zimmerman (1994) R^2 is given by: $\sum\left(\hat{x}^*_{p,c,t} - \bar{\hat{x}}^*_{p,c,t}\right)^2 \Big/ \sum\left(\hat{x}^*_{p,c,t} - \bar{\hat{x}}^*_{p,c,t}\right)^2 + N\hat{\sigma}^2$; where $\hat{x}^*_{p,c,t}$ is the predicted value of the endogenous variable; $\bar{\hat{x}}^*_{p,c,t}$ is the mean of this predicted value; *N* is the number of observations and $\hat{\sigma}^2$ is the Tobit maximum likelihood estimated of the error variance.

[20] We also try to capture bilateral information spillovers within two-digit industries by weighting the two-digit industry variable by bilateral information flows, but results were insignificant for all countries except Egypt.

variables in the estimation of equation (6) does not change the significance of the estimates of equation (5).

INSERT TABLE 2: HERE

We further test for the statistical significance of the information spillovers by performing an F-test on the residuals of the estimation of equations (5) and (6) for each of the exporting countries, as suggested by Florax and Folmer (1992) in the presence of spatially lagged variables.[21] All F-tests rejected the null hypothesis of absence of information spillovers at the 1 percent level. We also found no evidence of spatial autocorrelation in the residuals of the regressions of equation (6) reported in the second columns of Table 2. As suggested by Anselin and Hudak (1992) we performed a Lagrange Multiplier test that corrected for the panel aspect of our data (product-year observations). We could not reject the null hypothesis of no spatial autocorrelation.[22]

These results suggest that exports from any of the four countries in our sample (Egypt, Korea, Malaysia and Tunisia) to a particular market will be affected by past export performance in the rest of the world, through bilateral information spillovers between the particular export market and rest of the world countries.

The rise of globalization in the last decade may also affect these bilateral information flows. As communication costs plummet, information flows across countries may become cheaper.[23] In order to check for any structural change in the importance of these

[21] The F-test is given by: $\left(E_R^{'}E_R - E_U^{'}E_U\right) / \left(E_U^{'}E_U / (N-q)\right)$, where E_R and E_U are the error vectors of the restricted and unrestricted model, N is the number of observations and q the number of explanatory variables.

[22] According to Anselin (1999) the Lagrange multiplier is among the most powerful tests for spatial autocorrelation in large samples. The Lagrange multiplier test was calculated as:

$LM = \sum_t \sum_p E_{p,t}^{'} \hat{\boldsymbol{I}}_t E_{p,t} \Big/ E^{'}E / N \Big/ \left[n_p \, trace\left(\sum_t \hat{\boldsymbol{I}}_t^{'} \hat{\boldsymbol{I}}_t + \hat{\boldsymbol{I}}_t^{2} \right) \right]$, where $E_{p,t}$ is the partitioned vector of the error term for product *p* and time *t* (i.e., it varies across countries), E is the entire error vector, $\hat{\boldsymbol{I}}_t$ is the matrix of standardized bilateral information flows at time *t* and n_p is the number of products.

[23] Note that world newspaper trade has been growing at a 10 percent rate on average over the period and there is little evidence that there has been a structural change for the world as a whole during the 1969-1997

information flows during the period, we introduce a new variable denoted *Globalization.* It is constructed as the product of the *Information Spillovers* vector and a vector that takes the value 0 for any observation before 1985 and 1 otherwise.

Results of these estimations are reported in the third column of table 2 for each of the source countries. For Tunisia, the estimated coefficient is positive and significant. This suggests that after 1985, information spillovers increase their importance in the determination of Tunisia's export pattern. Note that none of the other variables changed sign or significance. In the case of Egypt, Korea and Malaysia, the estimated coefficient is negative but insignificant, with the exception of Malaysia, where it is significant at the 10 percent level. This suggests that bilateral information flows tend to lose their relevance for Malaysia after 1985.[24] Again, note that none of the other variables changed sign or significance.

Interestingly, when estimating equations (5) and (6) for exports from the United States, the overall fit of the equation and significance were similar to the ones reported in Table 2, except for the absence of information spillovers, which was highly insignificant (t-statistic of 0.3). This suggests that these information spillovers across countries tend to be more important for developing countries where the need for getting noticed and establishing a good reputation as a reliable exporter is higher. In more developed countries, the need for establishing a reputation as a reliable business partner may tend to be less rigid, perhaps due to the existence of more developed legal systems, the country's overall reputation, and a larger market share in world markets. All of these may make less relevant the inter-country information flow between potential export market.

In order to explore this hypothesis, we created a new variable to capture the notion of world reputation as an exporter. This is constructed as the market share of a particular product of the source country in world markets, and is denoted *WdRep* for world reputation. In this variable, the information flow between two potential export markets

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period. For a discussion of the evolution of communication cost in the last two decades, see World Bank (1999).

becomes irrelevant and only its market share in the world market would be of interest for potential importers in other markets.[25]

Results of the estimation of equation (6) including *WdRep* are reported in Table 3 for the four source countries (Egypt, Korea, Malaysia and Tunisia) and the United States. In the case of Egypt and Tunisia, *WdRep* does not enter significantly into the regression (in the case of Egypt it has a negative sign), but all other variables keep their significance including information spillovers. For Korea, Malaysia and the United States, *WdRep* enters significantly, suggesting that world reputation may be enough to establish a reputation as reliable exporter in these countries. This is particularly true for the United States, where information spillovers do not seem to have any explanatory power. In the case of Korea and Malaysia, however, information spillovers still play a significant role (in Korea they are significant at the 20 percent level).

INSERT TABLE 3: HERE

These results somewhat confirm our hypothesis above: as countries developed, the inter-country information spillovers among potential export markets become less relevant. At low levels of development or country reputation, inter-country information spillovers tend to be relatively more important for exporters.

We also tested for the time length of information spillovers by introducing into equation (6) lags of 2 and 3 years for the *Information Spillovers* variables. The estimated coefficients for these lags were smaller and highly insignificant for Korea, Malaysia and Tunisia, suggesting a short memory in world markets. Again, none of the other variables changed sign or significance. In the case of Egypt, however, the estimates suggested some memory in world markets for Egyptian exports, as the lagged variables were statistically significant.

[24] Similar results were obtained for the four countries using 1980 or 1990 instead of 1985 as the time break.
[25] For a more detailed description of the construction of *WdRep* see Data Appendix.

Finally, note that it is difficult to infer from the reported coefficients the importance of information spillovers in determining the export patterns of these four countries. In other words, what is the effect, of a one-dollar increase in export penetration in one particular market today on exports to the rest of the world in the next period? Do some export markets generate more information spillovers than others? The answer to these questions is given in the next section.

6. Where are Export Information spillovers larger?

The presence of information spillovers implies that an increase in exports in one particular market will affect the whole system through information spillovers and will therefore be followed by increases in exports to the rest of the world. To see how a one-dollar increase in exports to country *k* affect exports to country *c* in the next period differentiate equation (6) with respect to a dollar increase in exports to market *k*:

$$dx_{p,c,t} = \pi_{p,c,t}\theta\, i_{c\leftrightarrow k,t-1}\frac{\partial s_{p,k,t-1}}{\partial x_{p,k,t-1}}dx_{p,c,t-1} = \pi_{p,c,t}\theta\, i_{c\leftrightarrow k,t-1}\frac{1}{m^{T}_{p,k,t-1}}\left(1-s_{p,k,t-1}\right)dx_{p,k,t-1} \quad (7)$$

where $m^{T}_{p,k,t-1}$ are total imports of product *p* by country *k* at time *t-1*; $i_{c\leftrightarrow k,t-1}$ is the information exchange between countries *c* and *k* at period *t-1*; and $\pi_{p,c,t}$ is the probability that $x_{p,c,t}$ is non-zero conditional on the explanatory variables.

Table 4 provides such bilateral estimates for a selected number of countries at the mean (over products and time) using the estimates of the second column of table 2 for each of the source countries (Egypt, Korea, Malaysia and Tunisia). It suggests that, in the case of Korean exports, for example, a one-dollar increase in exports to the United States generates an increase of 0.1 cents in exports to China in the next period and 0.2 cents of extra exports to Germany. Similarly, a dollar increase in Egyptian exports to India

generates an increase of 0.1 cents in exports to Hong Kong and 0.04 cents to Great Britain in the next period.

INSERT TABLE 4: HERE

To obtain the total effect in the rest of the world of a dollar increase on exports to country *k* through information spillovers, one needs to add the left and right-hand-sides of (6) over all rest-of-the-world countries. That is,

$$\Delta X_{p,t} = \sum_{c} dx_{p,c,t} = \sum_{c} \pi_{p,c,t} \theta i_{c \leftrightarrow k,t-1} \frac{1}{m^{T}_{p,k,t-1}} \left(1 - s_{p,k,t-1}\right) dx_{p,k,t-1} \qquad (8)$$

Estimates at the mean (across products and time) of a one-dollar increase in exports to each of the countries in our sample by Egypt, Korea, Malaysia and Tunisia are given in Table 5. A one-dollar increase in exports to the United States provides, through information spillovers, an increase in exports to the rest of the world of 14 cents for Korea, 10 for Malaysia, and 2 for each of Egypt and Tunisia.

INSERT TABLE 5: HERE

The United States, however, is not the largest market in terms of generating export information spillovers for these countries. The largest spillovers for our four source countries are found in Argentina, Colombia, Hong Kong and India (and France for Tunisian exports). The reason has to do with the size of the United States' market rather than the lack of information flows between the United States and the rest of the world. A large market implies that a dollar increase has very little effect on market shares, which is the force behind the spillovers, and therefore generates smaller spillovers for the same amount of information flow.

Countries that generate the lowest spillovers are Panama, Israel, Trinidad and Tobago, and Korea. The reason for the lack of information spillovers from these markets has to do with

the small amounts of information flows between these countries and the rest of the world, partly due to their small size.

6.1 Geographic concentration of information spillovers and ethnic networks

Information spillovers can be larger in developing countries. However, they tend to be geographically more concentrated. In Table 5, the figures in italics show the share of the top four countries to which information spillovers are generated from each market. The spillovers of Argentina, India, Pakistan, Colombia and Singapore tend to be relatively concentrated (regardless of which is the exporting country) compared to some developed markets such as Spain, United States and Japan. China and Hong Kong, to some extent, are an exception as information spillovers generated from these developing countries appear to be geographically diversified. This probably reflects a less geographically concentrated migration pattern.

The large concentration of information spillovers from developing countries also reflects the fact that information spillovers occurred across relatively close markets. In the case of Egyptian exports to Argentina, for example, about 70 percent of the information spillovers generated in Argentina are received by other Mercosur countries (Brazil, Chile, Paraguay and Uruguay). On the other hand, in the case of information spillovers generated in the United States, the top four receivers are Canada, Israel, Trinidad and Tobago and Saudi Arabia, which are geographically dispersed. Note also that they represent only 30 percent of the total information spillovers generated in the American market.

To illustrate the relatively high regional concentration of information spillovers generated in developing countries, Figure 2 plots the cumulative distribution for information spillovers generated from Egyptian exports in Argentina, China, France, Germany, Hong Kong, India, Japan, Tunisia and the United States. The horizontal axis is ordered in terms of geographic distance between each of these countries and the rest of the world.

INSERT FIGURE 2: HERE

It is clear from figure 2 that spillovers generated from the United States and France tend to be geographically more diversified than spillovers generated from Argentina or India. More than 75 percent of information spillovers from Argentina and India are transmitted within the five closest countries. For China and Hong Kong, however, only around 50 percent of the total information spillovers are generated within the five closest countries, whereas in the case of the United States the figure is around 25 percent.[26]

7. Concluding Remarks

The exchange of information among (potential) export markets can significantly affect the export performance of a developing country. A good (or bad) export performance in one market can affect not only the future export performance in the same market, but also in "neighboring" markets. This will occur if importers in different countries share information on the performance of a particular exporter or if exporters themselves take advantage of the information acquired while exporting to similar markets. Thus, through information spillovers, the overall export success (or failure) becomes cumulative across markets.

Exports of the four developing countries in our sample (Egypt, Korea, Malaysia and Tunisia) are significantly affected by these bilateral information exchanges; in particular, for those in earlier stages of development (Egypt and Tunisia). We found, however, that bilateral information spillovers across markets are negligible (or non-existent) for exports from the United States, where the need for creating a reputation in international markets is smaller. In the case of the United States (and to some extent Korea and Malaysia) the overall world reputation of the exporter seems to be a more important determinant than the bilateral exchange of information across export markets. For Egyptian or Tunisian exporters, bilateral information exchanges across export markets is the dominant determinant of their export performance.

A dollar increase of Egyptian exports to France generates almost 8 cents of extra exports to the world in the next period through exchange of information between France and the rest of the world. An dollar increase to the United States generates 2 cents of exports to the rest of the world. Similarly, an additional dollar to India can generate as much as 18 cents of exports to the rest of the world. Similar figures for Tunisian exports are 9 cents for information spillovers generated from France, 2 cents from the United States and 7 cents from India.

As suggested by the figures above, some developing countries generate larger benefits for exporters through information spillovers. That is the case of India for Egyptian exporters. Also, information spillovers generated in Argentina provide an additional 12 cents in the next period for each dollar exported to Argentina. This is above the benefits from an extra dollar to France or the United States. The reason for this is probably that a relatively good export performance of Egypt in India or Argentina could be more easily noticed than increased exports to the United States or France, given the relatively smaller size of the Indian or Argentinian market.

However, export information spillovers generated from developing countries also tend to be geographically more concentrated. The reason has to do with the geographic concentration of the exchange of information flows in developing countries, which partly reflects international migration patterns and the presence of ethnic networks, as suggested by James Rauch's work. The exception in our data is China and Hong Kong. This can be partly explained by the geographically more diversified migration patterns of China and Hong Kong.

These results suggest an important role for public or private export information agencies in developing countries. Diffusion of export information across firms can significantly contribute to the export performance of a country. The analysis also detected the presence of externalities at the two-digit industry level, which suggests that there is room for co-

[26] Similar results are found for the other exporting countries in our sample.

operation, for example, through bundling of export offers across firms in the same two-digit industry. More importantly, perhaps, is that the presence of these information spillovers implies that one bad deal or poor performance in one market not only hurts exporters in that particular market, but may also hurt them in other markets. This suggests an important role for quality controls, such as ISO standards, that can be publicly or privately organized.

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Appendix

Variable Construction

The variables are constructed as follows:

$$market\_share_{c,p,t} \equiv s_{c,p,t} = \frac{x_{p,c,t}}{m^{T}_{c,p,t}} \quad ;$$

where $x_{p,c,t}$ are exports of product *p* from the source country to country *c* at time *t*; and $m^{T}_{c,p,t}$ is defined as total imports of country *c* of product *p* at time *t*;

$$gravity\_effect_{c,t} = \sum_{p} x_{p,c,t} - x_{p,c,t} \quad ;$$

$$comp\_advantage_{p,t} = \sum_{c} x_{p,c,t} - x_{p,c,t} \quad ;$$

$$size_{c,p,t} = m^{T}_{c,p,t} - x_{p,c,t} \quad ;$$

$$2digit\_effect = \frac{\sum_{p \in 2d} x_{p,c,t-1} - x_{p,c,t-1}}{\sum_{p \in 2d} m^{T}_{p,c,t-1} - m^{T}_{p,c,t-1}} \quad ;$$

where *2digit* includes all the tariff lines within the same 2-digit category of the SITC classification;

$$s_{c,p,t-1} = \frac{x_{c,p,t-1}}{m^{T}_{c,p,t-1}} \quad ;$$

The element j of the vector of information flows, $I_{c,t-1}$, are defined as:

$$i_{c \leftrightarrow k,t-1} = \frac{\psi_{c \leftrightarrow k,t-1}}{\sum_{k} \psi_{c \leftrightarrow k,t-1}}$$

where $\psi_{c \leftrightarrow k,t-1}$ is the bilateral flow of information between country *c* and country *k*; exports and imports of newspapers when proxied with newspaper trade or minutes of phone incoming and outgoing phone calls between countries *c* and *k*, when proxied with telephone phone calls.

$$I_{c,t-1} \cdot S_{p,t-1} = \sum_{k \neq c} s_{k,p,t-1} i_{c \leftrightarrow k,p,t-1} \quad ;$$

where $s_{k,p,t-1}$ is the market share of product *p* in country *k* and $S_{p,t-1}$ is its vector form;

$$globalization = \begin{cases} I_{c,t-1} \cdot S_{p,t-1} & , \text{if year} > 1985 \\ 0 & , \text{if year} \leq 1985 \end{cases}$$

Data Sources:

Trade data sources are from the national sources compiled by the United Nations in Comtrade's database. The analysis is carried using manufacturing products trade data given of SITC rev.1 classification at the 3 digit level.

Data on newspaper trade are also provided by the Comtrade's database (SITC rev. 1, code 8922)

Distance data are calculate using geographical distance between countries' capitals.

Data on telecommunication has been provided by STARS database by the International Telecommunication Union.

Figure 1: The Role of Information Spillovers for Export Performance

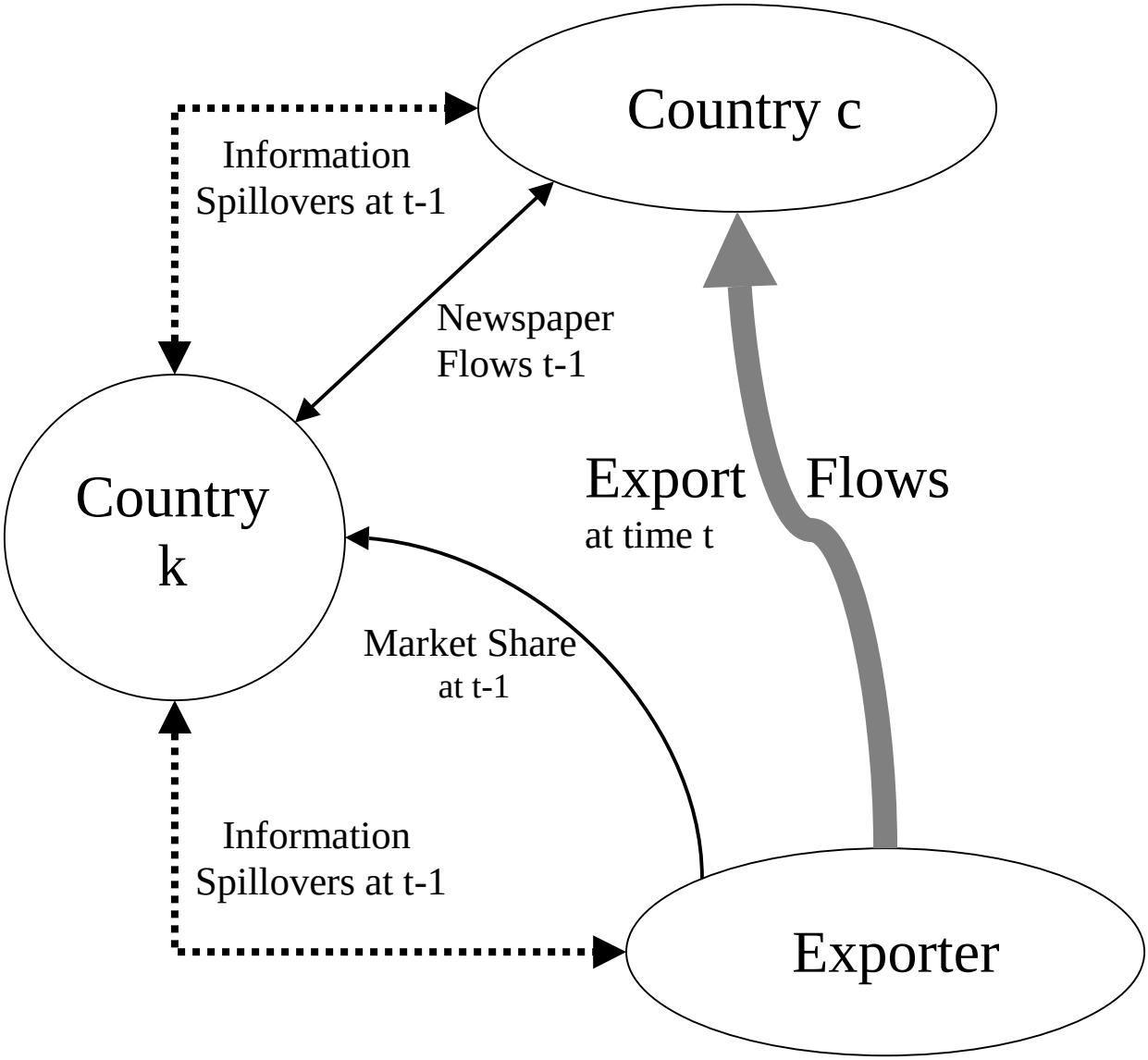

Figure 2: Geographic concentration of information spillovers (selected countries)

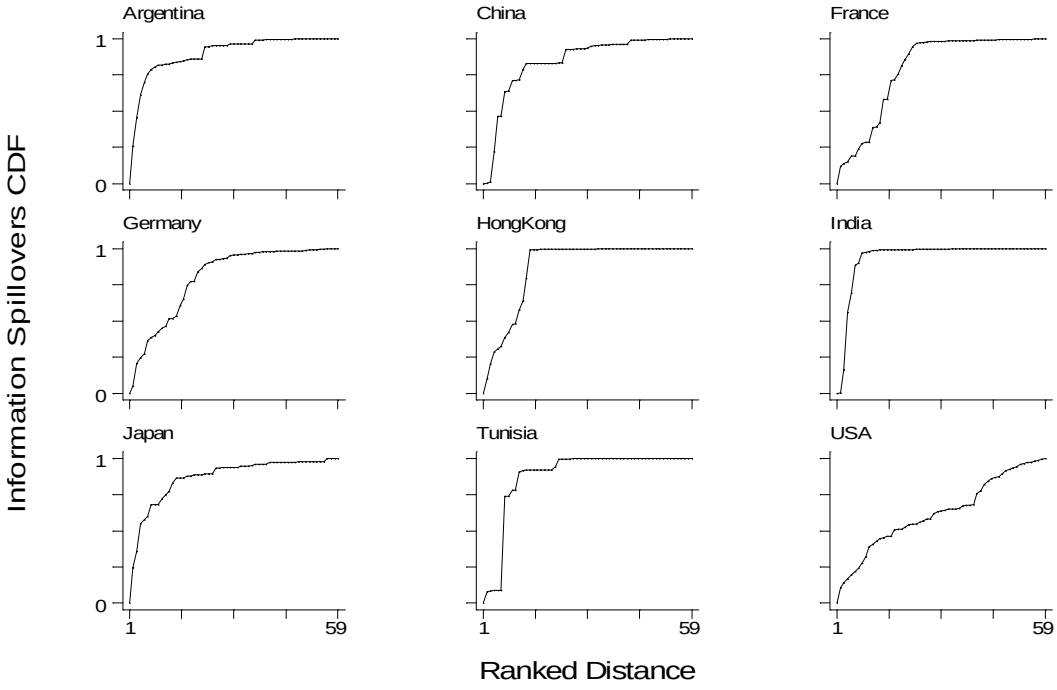

Table 1: Bilateral Newspaper flows in 1995 for selected countries (percentage of importing country total flow).[a]

Partner ⇓ / Reporter⇒	Argentina	Brazil	Chile	China	Spain	France	UK	Germany	Hong Kong	Indonesia	India	Italy	Japan	Korea	Mexico	Malaysia	Pakistan	Singapore	Taiwan	USA
Argentina	0.0%	22.0%	41.0%	0.0%	4.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Brazil	24.0%	0.0%	47.0%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%
Chile	33.0%	34.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%
China	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	1.0%	2.0%	0.0%
Spain	16.0%	6.0%	3.0%	0.0%	0.0%	5.0%	10.0%	5.0%	0.0%	0.0%	0.0%	3.0%	0.0%	1.0%	17.0%	0.0%	0.0%	0.0%	0.0%	0.0%
France	1.0%	2.0%	0.0%	2.0%	15.0%	0.0%	9.0%	9.0%	1.0%	7.0%	1.0%	27.0%	4.0%	1.0%	2.0%	0.0%	0.0%	0.0%	0.0%	3.0%
UK	1.0%	2.0%	1.0%	6.0%	28.0%	8.0%	0.0%	7.0%	3.0%	30.0%	4.0%	15.0%	15.0%	0.0%	0.0%	12.0%	5.0%	14.0%	0.0%	7.0%
Germany	3.0%	4.0%	0.0%	8.0%	20.0%	13.0%	11.0%	0.0%	2.0%	6.0%	4.0%	23.0%	10.0%	3.0%	2.0%	0.0%	5.0%	1.0%	2.0%	3.0%
Hong Kong	0.0%	0.0%	0.0%	42.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.0%	2.0%	0.0%	10.0%	26.0%	0.0%	6.0%	4.0%	8.0%	33.0%	1.0%
Indonesia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
India	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	3.0%	0.0%	0.0%
Italy	1.0%	5.0%	0.0%	0.0%	4.0%	11.0%	6.0%	6.0%	1.0%	0.0%	1.0%	0.0%	1.0%	3.0%	0.0%	0.0%	0.0%	0.0%	2.0%	1.0%
Japan	0.0%	5.0%	0.0%	16.0%	0.0%	0.0%	2.0%	1.0%	18.0%	1.0%	0.0%	0.0%	0.0%	39.0%	0.0%	3.0%	0.0%	27.0%	42.0%	2.0%
Korea	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	13.0%	0.0%	0.0%	8.0%	0.0%	0.0%	0.0%	0.0%	5.0%	0.0%	0.0%
Mexico	3.0%	0.0%	1.0%	0.0%	4.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%
Malaysia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	0.0%	2.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	17.0%	1.0%	0.0%
Pakistan	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%
Singapore	0.0%	0.0%	0.0%	4.0%	0.0%	0.0%	1.0%	0.0%	8.0%	0.0%	16.0%	0.0%	15.0%	13.0%	0.0%	50.0%	6.0%	0.0%	2.0%	0.0%
Taiwan	0.0%	0.0%	0.0%	5.0%	0.0%	0.0%	0.0%	0.0%	16.0%	0.0%	0.0%	0.0%	11.0%	0.0%	0.0%	2.0%	0.0%	1.0%	0.0%	0.0%
USA	2.0%	12.0%	1.0%	15.0%	2.0%	3.0%	10.0%	3.0%	10.0%	8.0%	25.0%	2.0%	17.0%	9.0%	65.0%	12.0%	6.0%	5.0%	12.0%	0.0%
Total	Argentina	Brazil	Chile	China	Spain	France	UK	Germany	Hong Kong	Indonesia	India	Italy	Japan	Korea	Mexico	Malaysia	Pakistan	Singapore	Taiwan	USA
Mill. $	78.8	86.7	63.1	14.5	285.8	852.0	813.5	1255.0	61.4	2.5	5.5	348.4	115.1	23.1	62.1	22.9	7.5	64.7	29.6	1098.0

[a]The cells in each column give the trade share of each of the partner countries in the total exports and imports of newspaper of the reporter. For example, 24 percent of Argentina's total trade of newspaper is undertaken with Brazil and 22 percent of Brazil's total trade of newspapers is undertaken with Argentina. The total value of newspaper trade for each country (export plus imports) is given in the last row of the table in million dollars.

Table 2: Estimating Export Information Spillovers[a]

	Egypt			Tunisia		
Constant	-1567.87***	-1489.38***	-1489.12***	-1852.8***	-2239.4***	-2222.33***
	(406.89)	*(386.75)*	*(389.46)*	*(374.65)*	*(447.67)*	*(445.81)*
Market share (t-1)	6568.25***	5729.15***	5728.90***	68154.9***	59717.6***	59420.6***
	(2342.55)	*(2044.65)*	*(2045.96)*	*(25202.3)*	*(21205.28)*	*(21130.7)*
Distance	-0.1209***	-0.1000***	-0.1000***	-0.2997***	-0.2430***	-0.2413***
	(0.3427)	*(0.028)*	*(0.028)*	*(0.1070)*	*(0.0810)*	*(0.0807)*
Information Spillovers	84614.15***	39446.7***	39292.6***	95156.5***	51373.7***	46501.7***
	(21631.4)	*(8916.44)*	*(10394.4)*	*(28702.0)*	*(17212.7)*	*(16311.3)*
Time trend	31.28***	12.94***	12.93***	9.897***	8.332***	6.314***
	(7.52)	*(4.17)*	*(4.24)*	*(2.722)*	*(1.967)*	*(1.722)*
Size		0.0002***	0.0002***		0.0005**	0.0005**
		(0.00004)	*(0.00004)*		*(0.0002)*	*(0.0002)*
Gravity effects		0.0370***	0.0370***		0.3844***	0.0385***
		(0.0059)	*(0.0059)*		*(0.0044)*	*(0.0044)*
2digit effects		9131.5**	9129.83**		19449.36	19403.5
		(3985.88)	*(3999.24)*		*(20422.5)*	*(20409.3)*
Comp advantage		0.0368***	0.0367***		0.0321***	0.0318***
		(0.0093)	*(0.0095)*		*(0.0099)*	*(0.0099)*
Period dummy (>1985)			356.19			167519.4***
			(8023.57)			*(39092.8)*
R squared	0.187	0.2376	0.2375	0.300	0.314	0.314
Wald chi squared	20.21***	157.28***	226.99***	16.80***	138.20***	140.26***
# observations	131424	131424	131424	131419	131419	131419

	Korea			Malaysia		
Constant	-11802.5**	-11263.6***	-11833.2***	-12599.7***	-9305.1***	-9539.5***
	(4808.1)	*(3341.28)*	*(3534.8)*	*(4713.7)*	*(2990.6)*	*(3050.03)*
Market share (t-1)	81482.4***	64010.9***	64726.2***	107235.9***	82452.8***	82413.3***
	(25871.7)	*(16437.5)*	*(16641.6)*	*(34942.6)*	*(23982.7)*	*(24027.6)*
Distance	-0.7221***	-0.4214***	-0.4173***	-1.1245***	-1.0679***	-1.068***
	(0.2001)	*(0.1552)*	*(0.1540)*	*(0.2683)*	*(0.2751)*	*(0.2753)*
Information Spillovers	46707.5***	30371.3**	47538.3**	154895***	62507.1**	101672.3***
	(16900.0)	*(12164.8)*	*(20903.95)*	*(56221.9)*	*(24535.8)*	*(32941.3)*
Time trend	555.05***	154.92***	187.72***	589.11***	296.02***	310.12***
	(155.23)	*(50.377)*	*(61.574)*	*(163.49)*	*(83.43)*	*(86.503)*
Size		0.0259***	0.0259***		0.0131***	0.0131***
		(0.0039)	*(0.0039)*		*(0.0018)*	*(0.0018)*
Gravity effects		0.0058***	0.0058***		0.0084***	0.0084***
		(0.0005)	*(0.0005)*		*(0.002)*	*(0.0020)*
2digit effects		19379.6*	19467.1*		15538.4***	15389.8***
		(9936.4)	*(9978.6)*		*(5210.8)*	*(5209.92)*
Comp advantage		0.0101***	0.0102***		0.0148***	0.0151***
		(0.0031)	*(0.0032)*		*(0.0053)*	*(0.0053)*
Period dummy (>1985)			-30628.2*			-56689.4*
			(16831.3)			*(29245.3)*
R squared	0.110	0.328	0.328	0.195	0.303	0.305
Wald chi squared	20.01***	2151.87***	2484.01***	18.54***	336.01***	344.55***
# observations	131418	131418	131418	131417	131417	131417

[a] Estimation technique is Tobit to control for censored data. Figures in parenthesis are White-Robust standard errors. *** stands for significance at the 1 percent level; ** at the 5 percent level and * at the 10 percent level.

Table 3: World Reputation and Information Spillovers[b]

	Egypt	Tunisia	Korea	Malaysia	USA
Information	41929***	331230**	24805	29225*	-1765
Spillovers	(12666)	(16674)	(18645)	(17235))	(1701)
World Reputation	-1931	24558	39454**	225845***	43714***
	(1253)	(38487)	(15979)	(84786)	(14683)
R squared	0.24	0.32	0.33	0.31	0.19
Wald chi squared	304***	166***	2853***	424***	19191***
# observations	131424	131419	131418	131417	131830

[b] Estimation technique is Tobit to control for censored data. Figures in parenthesis are White-Robust standard errors. *** stands for significance at the 1 percent level; ** at the 5 percent level and * at the 10 percent level. For the four countries, all other coefficients are within two standard deviations of the results reported in the third column of Table 2. For the United States all other coefficients are qualitatively similar to the ones reported for the other four countries in Table 2 (with the exception of distance, which is insignificant).

Table 4: Bilateral export information spillovers for selected countries (dollars)[a]

EGYPT	ARGENTINA	CHINA	FRANCE	UK	GERMANY	HONG KONG	INDIA	JAPAN	SINGAPORE	USA
ARGENTINA		0.00000	0.00005	0.00001	0.00021	0.00000	0.00000	0.00001	0.00000	0.00007
CHINA	0.00001		0.00011	0.00014	0.00117	0.00225	0.00030	0.00683	0.00008	0.00031
FRANCE	0.00029	0.00002		0.00098	0.00175	0.00002	0.00002	0.00013	0.00002	0.00022
UK	0.00006	0.00007	0.00129		0.00142	0.00027	0.00039	0.00021	0.00065	0.00087
GERMANY	0.00289	0.00041	0.00388	0.00238		0.00006	0.00045	0.00149	0.00003	0.00083
HONG KONG	0.00000	0.00095	0.00002	0.00024	0.00004		0.00128	0.00105	0.00586	0.00018
INDIA	0.00003	0.00033	0.00011	0.00163	0.00105	0.00711		0.00071	0.00364	0.00044
JAPAN	0.00004	0.00110	0.00014	0.00021	0.00054	0.00078	0.00007		0.00114	0.00043
SINGAPORE	0.00000	0.00003	0.00002	0.00065	0.00002	0.00643	0.00129	0.00129		0.00012
USA	0.00059	0.00014	0.00035	0.00103	0.00042	0.00018	0.00020	0.00051	0.00013	

TUNISIA	ARGENTINA	CHINA	FRANCE	UK	GERMANY	HONG KONG	INDIA	JAPAN	SINGAPORE	USA
ARGENTINA		0.00000	0.00000	0.00003	0.00000	0.00011	0.00000	0.00010	0.00000	0.00004
CHINA	0.00000		0.00000	0.00004	0.00005	0.00000	0.00000	0.00001	0.00000	0.00011
FRANCE	0.00000	0.00000		0.00018	0.00149	0.00000	0.00000	0.00015	0.00000	0.00014
UK	0.00092	0.00003	0.00037		0.00280	0.00004	0.00005	0.02137	0.00065	0.00068
GERMANY	0.00006	0.00006	0.00242	0.00164		0.00021	0.00002	0.00407	0.00049	0.00114
HONG KONG	0.00043	0.00000	0.00000	0.00001	0.00003		0.00000	0.00000	0.00000	0.00037
INDIA	0.00003	0.00000	0.00000	0.00006	0.00005	0.00000		0.00002	0.00011	0.00004
JAPAN	0.00232	0.00001	0.00022	0.01575	0.00519	0.00001	0.00001		0.00022	0.00043
SINGAPORE	0.00001	0.00000	0.00000	0.00177	0.00215	0.00000	0.00013	0.00090		0.00038
USA	0.00027	0.00006	0.00010	0.00015	0.00045	0.00067	0.00001	0.00011	0.00002	

KOREA	ARGENTINA	CHINA	FRANCE	UK	GERMANY	HONG KONG	INDIA	JAPAN	SINGAPORE	USA
ARGENTINA		0.00000	0.00000	0.00050	0.00007	0.00214	0.00002	0.00187	0.00000	0.00067
CHINA	0.00004		0.00005	0.00082	0.00098	0.00002	0.00000	0.00022	0.00062	0.00179
FRANCE	0.00000	0.00000		0.00047	0.00378	0.00000	0.00000	0.00038	0.00000	0.00034
UK	0.00068	0.00004	0.00034		0.00214	0.00003	0.00004	0.01415	0.00004	0.00048
GERMANY	0.00014	0.00015	0.00502	0.00354		0.00051	0.00004	0.00852	0.00188	0.00239
HONG KONG	0.00820	0.00001	0.00000	0.00009	0.00058		0.00000	0.00003	0.00000	0.00601
INDIA	0.00079	0.00000	0.00000	0.00191	0.00176	0.00000		0.00032	0.00065	0.00093
JAPAN	0.00242	0.00001	0.00025	0.01490	0.00499	0.00001	0.00001		0.00002	0.00041
SINGAPORE	0.00001	0.00021	0.00002	0.00019	0.00547	0.00000	0.00009	0.00012		0.00095
USA	0.00292	0.00055	0.00089	0.00152	0.00454	0.00736	0.00007	0.00123	0.00053	

MALAYSIA	ARGENTINA	CHINA	FRANCE	UK	GERMANY	HONG KONG	INDIA	JAPAN	SINGAPORE	USA
ARGENTINA		0.00000	0.00000	0.00032	0.00005	0.00135	0.00001	0.00116	0.00000	0.00044
CHINA	0.00004		0.00006	0.00094	0.00114	0.00003	0.00000	0.00025	0.00063	0.00221
FRANCE	0.00000	0.00000		0.00047	0.00379	0.00000	0.00000	0.00037	0.00000	0.00035
UK	0.00063	0.00004	0.00035		0.00202	0.00002	0.00004	0.01272	0.00003	0.00046
GERMANY	0.00015	0.00016	0.00474	0.00329		0.00052	0.00005	0.00754	0.00158	0.00225
HONG KONG	0.00370	0.00000	0.00000	0.00004	0.00030		0.00000	0.00001	0.00000	0.00272
INDIA	0.00136	0.00000	0.00000	0.00290	0.00261	0.00000		0.00051	0.00097	0.00147
JAPAN	0.00230	0.00001	0.00025	0.01421	0.00478	0.00001	0.00001		0.00002	0.00041
SINGAPORE	0.00004	0.00067	0.00007	0.00060	0.01733	0.00000	0.00029	0.00037		0.00300
USA	0.00197	0.00044	0.00072	0.00109	0.00318	0.00443	0.00006	0.00080	0.00039	

[a] The value in each cell indicates the additional export value in dollars to the row-country (in italics) due to an extra one-dollar increase in exports to the column-country. For example, an additional dollar of Egyptian exports to India, will generate an increase of 0.00129 dollars to Hong Kong and 0.00039 dollars to the UK.

Table 5: Total Exports information spillovers by market[a]

Exporter/	Egypt		Tunisia		Korea		Malaysia	
Market	Total return of 1 extra dollar to:	Share of top 4 receivers from:	Total return of 1 dollar to:	Share of top 4 receivers from	Total return of 1 dollar to:	Share of top 4 receivers from	Total return of 1 dollar to:	Share of top 4 receivers from
ARGENTINA	0.1215	*69.74%*	0.0768	*64.6%*	0.9898	*77.1%*	0.6161	*79.0%*
AUSTRALIA	0.0247	*66.38%*	0.0199	*75.9%*	0.1950	*76.1%*	0.2292	*75.2%*
AUSTRIA	0.0461	*95.16%*	0.0558	*94.3%*	0.0610	*90.2%*	0.0606	*90.0%*
BANGLADESH	0.0431	*90.51%*	0.0222	*93.8%*	0.1521	*87.2%*	0.2430	*87.9%*
BELUX	0.0284	*91.62%*	0.0643	*96.0%*	0.0661	*90.0%*	0.0623	*88.8%*
BOLIVIA	0.0242	*85.37%*	0.0156	*77.1%*	0.2541	*88.4%*	0.1396	*89.6%*
BRAZIL	0.0453	*78.38%*	0.0612	*88.6%*	0.1976	*70.3%*	0.1470	*77.5%*
CANADA	0.0202	*93.78%*	0.0128	*90.4%*	0.0834	*93.8%*	0.0646	*92.2%*
CHILE	0.0885	*78.96%*	0.0485	*72.4%*	0.7363	*81.0%*	0.4467	*82.4%*
CHINA	0.0045	*71.29%*	0.0021	*68.7%*	0.0352	*87.4%*	0.0378	*84.3%*
COLOMBIA	0.1323	*61.14%*	0.0757	*62.9%*	1.2123	*60.0%*	0.6070	*58.2%*
COSTA RICA	0.0343	*78.70%*	0.0172	*72.3%*	0.2888	*80.2%*	0.1570	*79.6%*
DENMARK	0.0348	*88.57%*	0.0409	*87.0%*	0.0939	*88.1%*	0.0937	*87.4%*
ECUADOR	0.0179	*78.42%*	0.0137	*79.5%*	0.1544	*83.0%*	0.0733	*78.0%*
EGYPT			0.1882	*95.5%*	0.6677	*96.7%*	0.7849	*96.9%*
SPAIN	0.0360	*40.60%*	0.0444	*59.5%*	0.1671	*27.0%*	0.1174	*27.7%*
FINLAND	0.0681	*94.83%*	0.0789	*94.4%*	0.1919	*96.4%*	0.1914	*96.5%*
FRANCE	0.0789	*51.53%*	0.0939	*59.4%*	0.1848	*47.7%*	0.1786	*46.0%*
UK	0.0479	*46.32%*	0.0513	*53.0%*	0.1650	*45.5%*	0.1817	*47.7%*
GERMANY	0.0629	*42.10%*	0.0772	*44.1%*	0.1739	*33.3%*	0.1734	*34.1%*
GREECE	0.0113	*68.70%*	0.0163	*62.9%*	0.0263	*56.8%*	0.0273	*57.7%*
GUATEMALA	0.0228	*70.70%*	0.0128	*67.2%*	0.2028	*74.4%*	0.1138	*70.9%*
HONG KONG	0.1159	*55.50%*	0.0548	*58.6%*	0.7307	*55.8%*	1.1317	*58.6%*
HONDURAS	0.0128	*66.64%*	0.0077	*65.4%*	0.1222	*73.0%*	0.0663	*71.4%*
INDONESIA	0.0026	*83.86%*	0.0012	*72.4%*	0.0181	*89.4%*	0.0242	*91.9%*
INDIA	0.1836	*88.39%*	0.0680	*88.5%*	0.4561	*84.2%*	0.6513	*84.5%*
IRELAND	0.0237	*98.20%*	0.0310	*98.7%*	0.0667	*98.1%*	0.0610	*98.0%*
ISRAEL	0.0036	*72.28%*	0.0068	*78.9%*	0.0129	*65.3%*	0.0122	*65.7%*
ITALY	0.0354	*48.58%*	0.0553	*66.3%*	0.0928	*39.5%*	0.0870	*38.5%*
JAPAN	0.0355	*62.95%*	0.0180	*59.9%*	0.1653	*63.6%*	0.3434	*66.4%*
KOREA	0.0041	*88.63%*	0.0016	*82.2%*			0.0463	*96.1%*
KUWAIT	0.0522	*82.77%*	0.0627	*88.0%*	0.2582	*79.7%*	0.3391	*80.5%*
SRI LANKA	0.0442	*88.30%*	0.0209	*90.3%*	0.1535	*84.2%*	0.2382	*79.5%*
MOROCCO	0.0191	*87.65%*	0.0676	*96.9%*	0.0656	*90.0%*	0.0668	*89.5%*
MEXICO	0.0331	*48.25%*	0.0237	*46.4%*	0.3150	*54.0%*	0.1579	*54.6%*
MALAYSIA	0.0253	*93.86%*	0.0112	*93.0%*	0.1850	*95.5%*		
NICARAGUA	0.0174	*81.95%*	0.0090	*78.7%*	0.1619	*85.7%*	0.1073	*86.7%*
NETHERLANDS	0.0305	*50.92%*	0.0347	*55.8%*	0.0650	*39.9%*	0.0684	*39.3%*
NORWAY	0.0295	*92.34%*	0.0338	*92.0%*	0.0794	*92.9%*	0.0792	*92.5%*
NEW ZEALAND	0.0204	*92.77%*	0.0182	*96.5%*	0.1716	*94.1%*	0.2007	*94.2%*
OMAN	0.0501	*89.83%*	0.0695	*94.4%*	0.2678	*91.5%*	0.3428	*90.0%*
PAKISTAN	0.1038	*93.70%*	0.0327	*90.8%*	0.1787	*79.0%*	0.2598	*75.2%*
PANAMA	0.0057	*66.82%*	0.0038	*69.2%*	0.0476	*66.7%*	0.0262	*67.6%*
PERU	0.0286	*72.13%*	0.0209	*73.0%*	0.2528	*80.8%*	0.1310	*76.5%*
PHILIPPINES	0.0172	*91.13%*	0.0061	*87.8%*	0.1069	*93.3%*	0.1521	*94.0%*
PORTUGAL	0.0238	*86.74%*	0.0259	*86.1%*	0.1090	*93.2%*	0.0748	*90.2%*
PARAGUAY	0.0186	*88.98%*	0.0135	*86.4%*	0.1768	*95.1%*	0.1066	*93.8%*
SAUDI ARABIA	0.0303	*82.52%*	0.0384	*88.5%*	0.1489	*78.3%*	0.1958	*77.9%*
SINGAPORE	0.0476	*71.45%*	0.0183	*68.7%*	0.3150	*77.0%*	0.2251	*69.6%*
SLOVENIA	0.0140	*71.80%*	0.0084	*64.5%*	0.1470	*79.3%*	0.0793	*80.0%*
SWEDEN	0.0516	*91.71%*	0.0591	*90.4%*	0.1388	*93.3%*	0.1387	*93.5%*
SWITZERLAND	0.0540	*70.99%*	0.0691	*78.5%*	0.0975	*57.3%*	0.1028	*54.9%*
THAILAND	0.0163	*63.01%*	0.0068	*61.9%*	0.0699	*53.3%*	0.1003	*59.8%*
TRIN. & TOB.	0.0027	*93.90%*	0.0018	*91.5%*	0.0135	*90.5%*	0.0100	*88.7%*
TUNISIA	0.0119	*91.03%*			0.0509	*93.8%*	0.0496	*93.4%*
TURKEY	0.0060	*85.93%*	0.0066	*80.8%*	0.0099	*78.1%*	0.0101	*77.7%*
TAIWAN	0.0091	*89.64%*	0.0037	*86.1%*	0.0879	*95.5%*	0.1110	*96.0%*
URUGUAY	0.0532	*91.65%*	0.0371	*88.4%*	0.4747	*93.6%*	0.3005	*94.6%*
USA	0.0209	*30.46%*	0.0175	*33.9%*	0.1369	*32.1%*	0.0997	*25.2%*
VENEZUELA	0.0207	*75.54%*	0.0177	*76.0%*	0.1533	*75.1%*	0.0798	*73.6%*

[a] For each exporting country, the first column gives the value of additional exports to the rest of the world due to a one-dollar increase in exports to each market. The second column gives the share of the 4 largest receivers of information spillovers from each of these markets. In the case of Egypt, for example, an extra dollar exported to Argentina provides 0.1215 dollars of additional exports to the rest-of-the-world and 68.74 percent of these additional exports are concentrated in the four largest receivers of Argentina's information spillovers.