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Iulia Traistaru, Christian Volpe Martincus

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Economic Integration and Manufacturing Concentration Patterns: Evidence from Mercosur*

Iulia Traistaru and Christian Volpe Martincus**

University of Bonn, Center for European Integration Studies (ZEI), Walter-Flex-Strasse 3, 53113 Bonn, Germany.

Abstract

Trade policy changes are likely to result in a reallocation of resources across sectors and space. Over the past two decades, Argentina, Brazil, Paraguay, and Uruguay have implemented unilateral trade liberalization programs and formed a regional bloc, Mercosur. The effects of these reforms on production structures in these countries have not received a great deal of attention. Have patterns of manufacturing concentration changed? What are their main determinants? This paper analyses relative manufacturing concentration patterns in Argentina, Brazil, and Uruguay over the period 1985-1998. The econometric evidence indicates that localization of demand and comparative advantages are the main driving forces of these patterns. The establishment of Mercosur seems to have played a role in the spatial distribution of manufacturing in the above three countries.

Keywords: Economic Integration, Concentration of Industries, Comparative advantage, Economic Geography, Mercosur.
JEL Classification: L60, F14, F15, C23.

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** Corresponding author. Tel.: +49-228-734031; Fax : +49-228-731809; E-mail: cvolpem@uni-bonn.de

1. INTRODUCTION

Over the past two decades, South American countries have implemented broad unilateral trade liberalization programs. They have also actively engaged in regional trade initiatives. In particular, Argentina, Brazil, Paraguay, and Uruguay signed a trade agreement in 1991, establishing *Mercosur* (Mercado Común del Sur). The consequent reduction of trade costs and markets expansion are likely to result in changes in the geographical distribution of specific economic activities and the existing spatial equilibrium. This raises the question whether and to what extent have patterns of economic activity concentration changed in the above countries following these trade policy changes. This question is important and policy relevant for at least three reasons.

First, the spatial distribution of economic activities has significant welfare implications. The way activities are organized across space affects the overall welfare an area can generate. The spatial distribution of activities also affects the geographical distribution of overall welfare (Ottaviano, 2002). Thus, by altering the locational pattern of economic activities, trade liberalization may promote changes in both the overall level of welfare and its distribution over space.

Second, as a consequence of the previous point, the spatial distribution of economic activities has important political economy implications. Economic integration may trigger a relocation of economic resources at the aggregate level. As a result, economic activity might become concentrated in a few regions. In such a case, immobile agents in the region experiencing delocation suffer both as consumers and as workers. As consumers, they suffer because the diversity of nearby goods and services decreases and, given the existence of trade costs, they must pay higher effective prices for those goods whose production is relocated to other regions. As workers, they suffer due to the fact that the matching process between workers and firms tends to worsen, so that unemployment spells rise (Martin, 2000). The implied level of interregional disparities may become politically unacceptable and might hurt the viability of the economic integration process (Martin and Rogers, 1994; Begg, Judgin, and Morris, 1996). This is especially true if low spatial labour mobility prevails and affected workers have a relatively large weight in government's objective function.

Third, the spatial distribution of economic activities has significant macroeconomic implications. Increased geographical concentration and thus inter-industry specialization imply diverging production structures across involved countries and consequently a higher probability of experiencing asymmetric shocks and a lower synchronization of business cycles (Kenen, 1969). Under such conditions, a greater bilateral exchange rate variability might be expected. This, in turn, might act as a channel of agglomeration of economic activities in the larger country within the bloc (Ricci, 1998) and might promote reversions in the integration process in the form of reinsertion of protectionist measures (Eichengreen, 1993; Fernández-Arias, Panizza, and Stein, 2002).

To date, empirical work on spatial patterns of economic activities in Mercosur is scarce. In particular, to our knowledge, there is no empirical evidence on manufacturing location patterns within the area constituted by Mercosur countries and how they have changed after the creation of this trade bloc.

This paper aims at filling this gap. First, using data for 1985-1998, we identify and discuss patterns of manufacturing concentration in three Mercosur countries, namely, Argentina, Brazil, and Uruguay.[2] Second, we uncover underlying determinants of these patterns on the basis of an econometric analysis suggested by existing international trade theories. More precisely, we address the following questions: How concentrated/dispersed are manufacturing activities? Have patterns of manufacturing concentration changed? What are the determinants of manufacturing concentration patterns? Did the establishment of Mercosur make a difference in the spatial distribution of manufacturing?

The remainder of this paper is organized as follows. Section 2 reviews the relevant theoretical literature with the purpose of formulating the set of hypotheses to be tested empirically. Section 3 presents the data set and the concentration measure we use in this paper and discusses the cross-sectional and time dimensions of concentration patterns. Section 4 discusses estimation results from our econometric analysis that aims at identifying the determinants of relative concentration patterns. The explanatory variables are suggested by international trade theory. The econometric evidence indicates that localization of demand and comparative advantages are the main driving forces of observed relative manufacturing concentration patterns. Moreover, the formation of Mercosur seems to matter for the location of manufacturing in Argentina, Brazil and Uruguay. Section 5 concludes.

[2] Paraguay could not be included in the analysis due to missing data.

2. THEORETICAL BACKGROUND

The factors explaining cross-sectional locational diversity and its dynamics can be classified into two broad groups: *first nature elements,* i.e., the physical geography and endowment of natural resources; and *second nature elements,* i.e., the geography of distance between economic agents (Krugman, 1993; Overman, Redding, and Venables, 2001). Relevant theoretical approaches can be differentiated depending on the weight they assign to the aforementioned factors. The traditional trade theory emphasizes the role of the first group of factors. The *new trade theory* builds upon a combination of both. Finally, the *new economic geography* concentrates on the second group of factors.

Patterns of economic activity location are frequently characterized in terms of their degree of concentration. One can distinguish between *absolute concentration* and *relative concentration*. One industry is *absolutely concentrated* if a few countries, independently of their sizes, account for very large shares of its overall activity (Midelfart-Knarvik, Overman, Redding, and Venables, 2000). In turn, one industry is *relatively concentrated* if the spatial pattern of its activity differs from the average spread of the total manufacturing activity across countries. Theoretical approaches can also be distinguished in terms of the predictions they yield. The traditional trade theory permits us essentially to derive clear-cut predictions about relative concentration but not for absolute concentration. The opposite is true for the *new economic geography*. Finally, the *new trade theory* makes possible drawing inferences about *relative* as well as *absolute* concentration (Haaland, Kind, Midelfart-Knarvik, and Torstensson, 1999).

This section reviews the assumptions and predictions of these theoretical approaches with the aim of identifying testable hypotheses for the empirical analysis carried out in the following sections.

2.1 The Traditional Trade Theory

The *traditional trade theory* assumes perfect competition, product homogeneity and constant returns to scale, and shows that location is exogenously determined by *first nature factors*, namely, the spatial distribution of technologies (Ricardo, 1817), natural resources, and productive factors (Heckscher, 1919; Ohlin, 1933).

In the *Ricardian model*, locational patterns are basically driven by relative differences in technology, observed as differences in relative labour productivity and, hence, as differences in relative production costs termed “comparative advantages”. *The higher the relative technology differences across countries, the higher the degree of relative concentration of industries.*

In the *Heckscher-Ohlin model*, the locational patterns are essentially determined by the interaction between country and industry characteristics (Venables, 2000). In the absence of underlying differences between countries in the world, firms producing in places in which they coexist with many partners face more intense competition both in product and in factor markets. Therefore, their profitability is lower than that of firms coexisting with less firms and facing less intense competition (Ottavino and Puga, 1997). Thus, the result is dispersion: economic activities distribute uniformly across the space. However, *if countries display pronounced differences in their inherent characteristics, i.e., a lumpy distribution of factor endowments prevails, then a more uneven spatial distribution of production emerges. Activities concentrate relatively in those countries with a matching comparative advantage, i.e., which are relatively abundant in the factors they use intensively*.

In this context, the spatial distribution of demand is essentially relevant for trade patterns, but not for locational patterns, unless trade costs are positive. In particular, if such costs are prohibitive, then the geographical configuration of industries mirrors that of demand (Brülhart, 2001).

What is the expected impact of trade liberalization on the location of economic activities? The traditional trade theory predicts that a general opening induces activities to relatively concentrate in countries with matching comparative advantages (Brülhart, 1998). This implies increased or decreased relative concentration depending on the spatial pattern of demand. If demand is more evenly spread over space than endowments, then the elimination of trade barriers will be associated with higher relative concentration and vice versa. In the case of a regional integration process, the influence of comparative advantages on the spatial dynamics has a specific aspect. In particular, *the launching of a trade agreement among developing countries with different comparative disadvantages relative to the rest of the world, which consists of a preferential reduction in tariffs would induce a relocation of manufacturing to the country that, even though it may have a comparative disadvantage relative to the world, has a comparative advantage within the newly created regional economic space, so that consumers in the integrating countries would be increasingly supplied with manufactures from that country* (Venables, 1999, 2000).

Although relevant, comparative advantage is not sufficient to explain the high concentration of economic activity observed in reality (Ottaviano and Puga, 1997). In particular, there are many regions without obvious natural advantages which develop into economic centres (Krugman, 1998). Which other factors can then explain the existing locational patterns? The *new trade theory* makes an important contribution in this sense.

2.2 The New Trade Theory

The *new trade theory* combines one *first nature element,* the market dimension, determined by the size of the workforce living in a particular country and the assumption of international labour immobility, and *second nature elements*, namely, the geographic distance between economic agents. In general, new trade models assume that the world consists of a big central country and a small peripheral country. The absolute factor endowment is larger in the central country but both countries have the same relative endowment.[3] In addition, these models assume that the production structure consists of two sectors: a perfectly competitive sector, which operates under constant returns to scale and whose output is costlessly traded, and a monopolistically competitive sector with firms producing differentiated products under increasing returns to scale, which are traded at a positive cost.

The typical result of such models is that increasing returns sectors concentrate in locations with better access to the markets of their respective products. This result derives from the interaction between scale economies and trade costs as follows. Under economies of scale, average costs fall as the level of production rises. Thus, producers have an incentive to spatially concentrate their activitiesso as to operate at a more efficient level. The presence of trade costs, in turn, induces firms to locate in the country with the larger market for their respective goods, since in this way they can avoid such costs on a larger fraction of their sales.

In summary, other things being equal, *industries tend to be more relatively concentrated, the more relatively concentrated the demand for the goods they produce*. Furthermore, *a higher degree of scale*

[3] Thus, there are no comparative advantages.

economies is associated with higher absolute levels of spatial concentration. However, *the theoretical prediction concerning the influence of increasing returns on relative concentration is ambiguous.*[4]

The locational consequences of falling trade costs hinge upon the interplay between market size and factor market considerations. Krugman (1980) and Krugman and Helpman (1985) find that, other things equal, *as trade costs fall towards zero, all increasing returns activities tend to concentrate in the larger country measured in terms of demand size*. Therefore, demand differences amplify differences in production structures. This basic analysis can be extended by including in the model a third country with the purpose of examining the consequences of a regional integration process, like in Torstensson (1995) and Brülhart and Torstensson (1996). Specifically, they assume two asymmetric countries with respect to size forming a customs union and a remaining one as the Rest of the World. They show that there is a U-shaped relationship between the share of increasing returns industrial production located in the large country of the customs union and the deepness of the integration.

However, when factor market considerations are conveniently introduced, as in Krugman and Venables (1990), *there exists an inverted U-shaped relationship between the degree of relative and absolute spatial concentration of industry in the central country and trade costs.* Thus, at intermediate levels of trade costs the number of manufacturing firms located in the large country due to its better market access is disproportionately large with respect to its share in world endowments (Amiti, 1998). The reason is that when trade costs are sufficiently high, location is mainly determined by product market competition, while when trade costs are sufficiently low the spatial result is fundamentally dictated by factor market competition (Ottaviano and Puga, 1997).

The new trade theory cannot be seen as a complete theory of economic geography. Indeed, it assumes rather than explains international differences in manufacturing shares (Neary, 2001). Concretely, one main question is left unanswered by this theory: Why *a priori* similar countries can develop very different production structures? The *new economic geography* helps understanding such real world developments.

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[4] The following numerical example illuminates this point. Let us consider three countries, *(A)*, *(B)*, and *(U)* and two industries *(1)* and *(2)*. First, let us assume that industry *(1)* has significant scale economies and is consequently highly absolutely concentrated, so that the shares of each country are: 0.15; 0.80; and 0.05, respectively. Second, suppose that industry *(2)* has low increasing returns and thus is absolutely dispersed with country shares equal to 0.45; 0.30; 0.25, respectively. Finally, assume that the overall geographical distribution of manufacturing activity is as follows: 0.70; 0.20; 0.10, respectively. It appears that the industry with weak increasing returns exhibits a more relatively concentrated pattern, because it shows the biggest share differences with respect to the whole industry. Thus, in this case, scale economies would be negatively correlated with relative concentration. Nevertheless, one could also construct a hypothetical example showing a positive correlation.

2.3 The New Economic Geography

The *new economic geography* extends the line of research initiated by the *new trade theory* showing that interregional demand differences are themselves endogenous (Amiti, 1998). Thus, even the market size is explained within the model by starting from a featureless locus (Brülhart, 2001).

In the presence of increasing returns and trade costs, firms and workers tend to locate close to large markets. Large markets are in turn those where more firms and workers locate (Baldwin, 1994; Ottaviano and Puga, 1997). Thus, there exists a sort of cumulative causation mechanism, which can lead to an endogenous differentiation process of initially similar regions. Therefore, in this case, *second nature factors* determine the locational pattern of economic activities (Brülhart, 1998; Venables, 1998). In particular, the *new economic geography* focuses on two main agglomeration mechanisms for modelling the cumulative causation process: interregional labour mobility (Krugman, 1991) and mobility of firms demanding intermediate inputs (Venables, 1996).

The basic idea postulated by Krugman (1991) is that if industrial workers are mobile across regions, the countervailing pressure against agglomeration exercised by the behaviour of factor markets would be eased, firms could exploit the demand linkages to each other's workers, and a persistent concentration would take place.[5]

Venables (1996) shows that agglomeration could be induced by input-output linkages among firms. When imperfectly competitive industries are linked through an input-output structure and trade costs are positive, the downstream industry forms the market for upstream firms and the latter are drawn to locations where there are relatively many firms of the former industry (demand linkage). Moreover, having a larger number of upstream firms in a location benefits downstream firms, which obtain their intermediate goods at lower costs by saving transport costs (cost linkages). The interaction of such linkages might result in an agglomeration of vertically linked industries (Amiti, 1998).

The above result implies that the degree of absolute concentration is positively related to the intensity of own production used as intermediate inputs.[6] However, the new economic geography does not allow us to predict unambiguously the impact of intra-industry linkages on relative concentration.[7]

[5] The crucial point is that for industry agglomeration to occur firms must be able to draw resources from elsewhere, so that the factors' supply becomes sufficiently elastic and thus large increases in factor prices are avoided (Puga, 1998).
[6] We should remark that the effect of intra-industry linkages on concentration is stronger the higher the degree of scale economies characterising the production in an industry (Krugman and Venables, 1996). Under similarity of

New economic geography models show that industry may agglomerate in one region when trade costs are reduced. However, this might be only the beginning of the process. When the induced dynamics in factor markets are considered, an inverted U-shaped pattern emerges (Venables, 1996; Ludema and Wooton, 1997; Puga 1998). Thus, *at early stages of integration, concentration forces dominate and industry tends to cluster, but further integration promotes a re-dispersion of industries towards the periphery, which offers lower factor costs.*

2.4 Summary of Testable Hypotheses

In the case of Mercosur, given the large size of Brazil, the analysis of absolute concentration patterns is of little interest. We therefore focus on relative concentration patterns. Previous sub-sections can be summarized in terms of the following testable hypotheses with respect to relative concentration:

Hypothesis 1: Relative concentration is an increasing function of relative technology differences across countries.

Hypothesis 2: Under lumpy distribution of factor endowments, relative concentration is an increasing function of relative factor use intensities.

Hypothesis 3: Relative concentration is an increasing function of relative expenditure concentration.

Hypothesis 4: Relative concentration is a decreasing function of trade costs according to the *traditional trade theory* (when demand is less concentrated than endowments) and the restricted version of the *new trade theory* (i.e., excluding factor market considerations) and maintains an inverted-U shaped relationship with respect to them according to the extended *new trade theory* (i.e., taking into account factor market considerations). Further, in the case of a regional trade agreement, relative concentration is positively related to external trade costs.

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intra-industry linkage intensities, the industry with higher increasing returns will be the most absolutely concentrated.

[7] An argument similar to that for scale economies applies. The following hypothetical situation described by Haaland, Kind, Midelfart-Knarvik, and Torstensson (1999) can be useful for illustrating this indeterminacy. Assume that there are two asymmetric countries and consider two industries with different factor intensities. Under these conditions, the industry in which the small country has a comparative advantage will be relatively more concentrated. If this industry has the weaker input-output linkages, the pattern prevailing in the absence of such linkages does not significantly change and thus the industry exhibits the higher relative concentration level. However, if firms in such an industry use intensively their own goods as intermediates and sell a considerable proportion of their products to firms belonging to the same industry, agglomeration forces related to these linkages tend to bias the location of the industry towards the larger economy. Depending on the relative strength of the interactions between comparative advantage and factor intensities and size and input-output linkages the industry may end up with a still higher or a lower degree of relative concentration than the other one. Amiti (2001) presents a model combining relative factor endowment considerations and input-output linkages.

Hypothesis 5: The impact of increasing returns and intra-industry linkages on relative concentration is ambiguous.

3. DATA, MEASUREMENT, AND DESCRIPTIVE EVIDENCE

3.1 The Data

In this paper, we investigate patterns and determinants of manufacturing concentration in Argentina, Brazil and Uruguay using a data set covering the period 1985-1998. Table 1 describes this data set.

Insert Table 1 about here

We identify manufacturing concentration patterns in the aforementioned countries using production data for 28 manufacturing branches (*ISIC Rev. 2 Classification* at 3 digits) over the period 1985-1998. These data are part of the *PADI* database produced by the Economic Commission for Latin America and Caribbean. It contains homogeneous statistical information for these variables.[8]

Determinants of manufacturing concentration are analysed using the following variables: imports and exports, value added, employment, number of establishments, qualification of workers, intermediate intensity, and tariffs. Import and export data, employment, and value added data for each country and for each manufacturing industry at the *ISIC Rev.2* at 3 digit-level are taken from the *PADI* database. Information on the number of establishments and thus on average establishment size as well as data on the qualification level of workers in each sector for the period 1985-1998 come from the *RAIS* database (Annual Social Information Report) and were kindly provided by the Brazilian Ministry of Works. Data on intermediate consumption intensity, from one's own sector and from the whole manufacturing sector, are derived from the Brazilian input-output tables published by *IBGE* (Brazilian Statistics Bureau). Finally, tariffs for each manufacturing sector in the period 1987-1998 are taken from Kume, Piani, and Braz de Sousa (2000).

The data for the last four variables (the number of establishments, qualifications of workers, intensity of use of intermediate inputs, and tariffs) were available only for Brazil. Similar statistical information

[8] In the case of Uruguay, available data correspond to the period 1971-1996. Data for 1997 and 1998 were obtained by applying sectoral variation rates calculated from a production database for Uruguay kindly provided by Marcel Vaillant.

for Argentina and Uruguay was not found. In the case of Argentina, data were available only for a few years.[9] A simple inspection of these data suggests that using the Brazilian data should not be, however, significantly misleading. For example, by comparing the establishment size between Argentina and Brazil, it turns out that the Spearman-rank correlation coefficient was 0.57 in 1985 and 0.66 in 1994, in both cases significant at the 1% level. On the other hand, the simple correlation between Argentinean and Brazilian external tariffs for the *ISIC* Classification at 4 digits was 0.68 in 1992 and 0.77 in 1994 (Sanguinetti and Sallustro, 2000).

The data on establishments, qualification levels, intermediate intensity, and tariffs are reported according to the *IBGE* sub-sector classification. In order to get comparable figures, we have mapped them into the *ISIC Rev. 2* Classification using a concordance table supplied by *IBGE*. Finally, our tariff data are available beginning with 1987. We assume that sectoral tariffs rates in 1985 and 1986 did not significantly differ from those in 1987.[10]

3.2 Measuring Relative Geographic Concentration of Manufacturing

Geographic concentration can be defined as the narrowness of the range of geographical units in which a certain activity is carried out. As already mentioned, it is possible to distinguish between *absolute and relative concentration*. In absolute terms, an activity is geographically concentrated if a few countries account for a large share of that activity. Absolute measures of geographic concentration are influenced by large units. In order to account for the different sizes, relative measures of geographic concentration are used. In this case, the spatial distribution of a particular activity is compared to the spatial distribution of the whole manufacturing sector.

Geographic concentration of manufacturing has been analysed using a variety of production data such as value added (WIFO, 1999), gross production values (Midelfart-Knarvik, Overman, Redding, and Venables, 2000), or manufacturing employment (Brülhart and Torstensson, 1996; Brülhart, 2001). In this paper, we use gross production values. The reference geographic unit is the country level. Formally, the production value of industry k in country i at time t is denoted by $x_{ik}(t)$. This value may be expressed as a share of the total production value in the industry k as follows:

[9] Information on the number of establishments is only available for the years 1985 and 1993 from the National Economic Census. Data on intermediate intensity exist only for 1985, 1993, and 1997.

[10] Kume, Piani, and Souza (2000) indicate that the Brazilian import policy at the starting year of their study, 1987, was essentially based on a tariff structure set in 1957.

$$s_{ik}(t) \equiv \frac{x_{ik}(t)}{\sum_{i=1}^{N} x_{ik}(t)} \tag{1}$$

and for all manufacturing,

$$s_i(t) \equiv \frac{\sum_{k=1}^{M} x_{ik}(t)}{\sum_{i=1}^{N} \sum_{k=1}^{M} x_{ik}(t)} \tag{2}$$

Geographic concentration measures relate to the distribution of the ratio given by *(1)* (absolute or normalized, for instance, by *(2)*) across countries for a given industry. In this paper, we use a relative concentration measure derived from those proposed by Amiti (1996) and Haaland, Kind, Midelfart-Knarvik, and Torstensson (1999). This index was firstly introduced by Florence (1948) and later used by Ellison and Glaeser (1997). Such an index is constructed on the basis of differences of shares (*(1)-(2)*).[11] Formally,

$$RC_k \equiv \sqrt{\sum_{i=1}^{N} \left(s_{ik} - s_i\right)^2 \Big/ N} \tag{3}$$

This index is equal to *0* when the spatial distribution of the industry under consideration coincides with that of the whole manufacturing industry, indicating maximum dispersion. The upper bound is one, indicating maximum concentration of the respective industry.

3.3 Descriptive Evidence

Figure 1 shows the evolution of relative concentration of manufacturing in Mercosur over the period 1985-1998 measured with the *RC Index* calculated following *(3)* on the basis of two year moving averages. One can notice that relative concentration displays an upward trend.

[11] This formula avoids some of the drawbacks of the Gini Coefficient. This index places implicit relative value on changes occurring in the middle part of the distribution. For a more detailed discussion of the statistical properties of the Gini Coefficient see Volpe Martincus (2002).

Insert Figure 1 about here

At a sectoral level, we find that beverages, tobacco, pottery, and leather are highly concentrated in relative terms, while industries such as glass, textiles, food products, and fabricated metal products are dispersed (Table 2).

Insert Table 2 about here

As shown in Table 3, overall, there are changes in the rankings of industries over time, as suggested by declining correlations between periods.

Insert Table 3 about here

In order to check the significance of variations in the concentration index for each industry we have regressed the natural logarithm of the index on a time trend. Table 4 presents these estimation results.

Insert Table 4 about here

A number of industries, such as leather, pottery, printing and publishing, transport equipment, non-electrical machinery, electrical machinery, and professional and scientific instruments show significant increases in the degree of concentration. A few industries, such as, food products, furniture, glass products, and fabricated metal products display decreases.

4. DETERMINANTS OF MANUFACTURING CONCENTRATION PATTERNS

In this section, we present the results of our econometric analysis testing the hypotheses identified in Section 2 about the driving forces of manufacturing concentration patterns. We discuss first our model specification, second estimation issues, and third our main findings.

4.1 Model Specification

Our econometric analysis aims at uncovering the determinants of relative concentration patterns in Mercosur. The dependent variable in our estimations is the relative concentration measure, the *RC Index.* The explanatory variables are discussed in details next.

Factor intensities

The *Heckscher-Ohlin theory* points out that, given a lumpy distribution of factor endowments, one should expect a positive relationship between the relative factor intensity of industries and their corresponding degree of relative concentration. This hypothesis can be tested using indices measuring the deviation of factor intensities from the mean (Amiti, 1997; Haaland, Kind, Midelfart-Knarvik, and Torstensson, 1999). Formally,

Labour intensity:

$$labint_k = \left| \frac{\sum_{i=1}^{N} L_{ik}}{\sum_{i=1}^{N} VA_{ik}} - \frac{\sum_{i=1}^{N}\sum_{k=1}^{M} L_{ik}}{\sum_{i=1}^{N}\sum_{k=1}^{M} VA_{ik}} \right| \quad (4)$$

Human capital intensity:

$$relskillint_k = \left| \frac{H_k}{L_k} - \frac{\sum_{k=1}^{M} H_k}{\sum_{k=1}^{M} L_k} \right| \quad (5)$$

where *L* represents employment, *VA* stands for value added, and *H* for workers with at least secondary school; *i=1,…,N* indicates countries, while *k=1,…,M* indicates industries.

In the above definitions, labour intensity is measured as the number of employees relative to value added, whereas human capital intensity is measured as the number of skilled workers relative to the total number of workers. The intensity measures take high values for industries differing substantially in their use of the factor in question from the average (i.e., they employ a factor either much more or much less than the mean). According to the theory, those industries would tend to be relatively concentrated.

Technology

The *Ricardian theory* highlights the role of technology differences across countries in explaining specialization and concentration of industries. Such differences in technology are captured by differences in labour productivity, defined as value added per employee (Torstensson, 1996; Haaland, Kind, Midelfart-Knarvik, and Torstensson, 1999). Formally,

Technology:

$$technology_k = \sqrt{\frac{1}{N}\sum_{i=1}^{N}\left[\frac{VA_{ik}/L_{ik}}{\left(1/N\right)\sum_{i=1}^{N} VA_{ik}/L_{ik}} - \frac{\sum_{k=1}^{M} VA_{ik}/L_{ik}}{\left(1/N\right)\sum_{i=1}^{N}\sum_{k=1}^{M} VA_{ik}/L_{kik}}\right]^2} \quad (6)$$

where *VA* and *L* have already been explained.

The first term within the brackets measures labour productivity in industry *k* in country *i* relative to average labour productivity in this industry across countries, whereas the second term measures average labour productivity in country *i* relative to the other countries. This index increases in cross-country disparities in relative productivity. In particular, this measure displays large values for those industries for which there are large differences among countries in productivity relative to the whole manufacturing sector. According to the *Ricardian theory*, significant relative productivity differences foster a high degree of cross-country specialization and relative spatial concentration.

Market size

According to the *traditional trade theory*, the spatial distribution of demand has an impact on the spatial configuration of the manufacturing sector if trade costs are positive. In particular, if demand is more evenly spread over space than endowments, industry concentration correlates negatively with trade costs (Brülhart, 2001). Further, under the presence of prohibitive trade costs, the degree of industrial geographical concentration coincides with the geographical concentration of expenditure. Moreover, the *new trade theory* predicts that firms tend to concentrate in the country that has a demand bias for the good they produce. This implies that demand concentration induces production concentration. In other words, the higher the relative spatial concentration of the demand for a particular good, the higher the relative spatial concentration of the respective manufacturing activity.[12] Formally, relative expenditure concentration is measured as follows (Haaland, Kind, Midelfart-Knarvik, and Torstensson, 1999):

Market size:

$$relexpconc_k = \sqrt{\frac{1}{N}\sum_{i=1}^{N}\left(\frac{E_{ik}}{\sum_{I=1}^{N} E_{ik}} - \frac{\sum_{k=1}^{M} E_{ik}}{\sum_{I=1}^{N}\sum_{k=1}^{M} E_{ik}}\right)^2} \qquad (7)$$

where *E* denotes expenditure, defined as production plus imports minus exports (thus, including both final and intermediate consumption). The former expression indicates that the degree of relative

[12] The new economic geography demonstrates that the expenditure concentration pattern may be endogenous, i.e., it may depend on the industrial concentration pattern. Our econometric strategy accounts therefore for this endogeneity as will be shown later in the paper.

expenditure concentration is higher the larger the deviation of the expenditure share of each country on a given industry's goods with respect to their respective total expenditure shares.

Economies of scale

New trade theories do not provide any clear-cut guidance regarding the association between the intensity of increasing returns to scale and the level of concentration relative to other industries.

Even though the variable has *a priori* no defined impact in terms of the expected sign, the variable might have an influence on locational patterns. Scale economies are an important component of the effect of other variables like market size. Therefore, in order to investigate whether and to what extent economies of scale affect the relative concentration of industries and to account for the role they play in shaping the incidence of other relevant variables, we include this variable in the regression equation.

Economies of scale have been measured in different ways in the empirical literature. Brülhart and Torstensson (1996) use engineering estimates of minimum efficient scale. Haaland, Kind, Midelfart-Knarvik, and Torstensson (1999) employ the percentage reduction in average cost for each percent increase in output. Here, we follow Kim (1995) and Amiti (1997), and use the average establishment size as a proxy for this variable. Formally,

Scale economies:

$$scale_k = \frac{L_k}{EST_k} \tag{8}$$

where *L* corresponds to employment and *EST* symbolizes the number of establishments.

Input-output linkages

The *new economic geography* points out that, under increasing returns to scale and trade costs, input-output linkages tend to foster industrial agglomeration. In particular, the intensity of an industry's use of its own intermediate goods is positively correlated to its degree of absolute concentration. The *new economic geography* does not allow us, however, to draw clear conclusions with respect to the influence of intra-industry linkages on relative concentration. As already pointed out, the fact that the direction of the impact is not theoretically *a priori* determined does not necessarily imply that the variable has no impact on relative locational patterns. We therefore include in our regression analysis intermediate consumption from one's own sector and test its influence on relative concentration. Formally,

Inputs from own industry:

$$osint_k = \frac{INT_k}{PV_k} \quad (9)$$

where *INT* stands for intermediate consumption from one's own sector and *PV* for production value.[13]

An alternative specification will be based on an intermediate intensity variable for the whole manufacturing sector. The main idea is to test the significance of linkages among industries given the high concentration displayed by aggregate manufacturing activity in our sample countries. Formally,

Inputs from the whole manufacturing sector:

$$wmsint_k = \frac{\sum_{k=1}^{M} INT_k}{PV_k} \quad (10)$$

where *INT* and *PV* have been already explained.

Trade costs

Our literature review emphasizes that trade costs are an important factor in shaping the economic landscape. As discussed above, in the *traditional trade* framework, demand patterns affect locational patterns when trade costs are positive. In particular, the *neoclassical theory* predicts that, under a lumpy distribution of factor endowments, a reduction in trade costs will induce an increase in the degree of relative concentration. Furthermore, in the case of a regional trade agreement, industrial location may be biased towards the country with the least comparative disadvantage *vis à vis* the Rest of the World. On the other hand, in the *new trade theory* the relationship between relative and absolute concentration and trade costs is monotonically decreasing when factor market considerations are not

[13] One could argue that the information given by *osint* is already accounted for by the expenditure variable. In this respect, we should stress that, according to the *new economic geography*, input-output linkages not only have backward effectsi.e., they not only affect the market size for the industry), they also have forward effects in the sense that such linkages influence the production costs faced by firms. In short, the expenditure variable may capture in a gross way the spatial impact coming from demand linkages. However, this does not imply that one should disregard the variable *osint*, as it is needed to assess the incidence of cost linkages.

taken into account and non-monotonic when they are incorporated into the analysis. Similarly, in the *new economic geography* setting, market size and input-output linkages foster agglomeration due to the interaction between increasing returns and trade costs. More precisely, this latter theory suggests the existence of an inverted U relationship between trade costs and absolute concentration. However, the *new economic geography* does not provide any clear guidance regarding the sign of the correlation between trade costs and relative concentration.

Argentina, Brazil, and Uruguay implemented broad trade liberalization programs over the last fifteen years. In order to account for the effects associated with the developments in external trade policies, we proxy trade costs with tariff barriers with respect to the rest of the world for each manufacturing sector in the period 1985-1998. Formally,

Trade costs: $$np_k \qquad (11)$$

These countries also signed a regional trade agreement jointly with Paraguay, *Mercosur*. In order to capture the impact of regional trade liberalization we use time dummies and time dummies interacted with the variables of interest.

4.2 Econometric Issues

The dependent variable in our model is the relative concentration measure *RC* I*ndex* defined as in equation *(3)* and calculated with production value data. This index takes values within the interval [0,1], which implies that the variable to be explained is truncated. As a consequence, estimation with OLS will lead to biased results. We therefore redefine the dependent variable using a logistic transformation similar to Torstensson (1997). The dependent variable then becomes *ln[rc/(1-rc)]*, ranging in the interval $(-\infty,+\infty)$. We should note that, in the present case, the transformation does not require dropping out observations, since none of them takes the value zero.

The degree of relative concentration will be explained in terms of the variables previously described, namely, factor endowments, relative technology differences, relative market size, the significance of increasing returns, the intensity of input-output linkages, and the level of trade costs. Formally, the basic specification is the following :

$$ln\left(\frac{rc_{kt}}{1-rc_{kt}}\right) = \alpha + \beta\, labint_{kt} + \gamma\, relskillint_{kt} + \delta\, technology_{kt} + \sigma\, scale_{kt} + $$

$$+ \eta\, relexpconc_{kt} + \varphi\, osint_{kt} + \lambda\, np_{kt} + \mu_k + \varepsilon_t + \nu_{kt} \quad (12)$$

where *k*=311,…,390 (28 sectors), *t*=1985,…,1998, and μ_k , ε_t represent industry and time fixed effects.

The basic equation and some variants are estimated in the first place by OLS pooling over years, which produces LSDV (Least Square Dummy Variables), i.e. fixed effects estimations (Greene, 1997). The sample includes 28 industries and 14 years, so the estimation is based on 392 observations. Further, we condition on the standard deviations of the underlying variables in order to make comparisons across variables more appropriate. Thus, we report standardized coefficients. Finally, according to White's general test (Greene, 1997), there is evidence of heteroscedasticity in our sample. We estimate therefore White's heterocedastic consistent standard errors and use these consistent standard errors for hypotheses testing.

There are *a priori* reasons to presume that some of the core conditions required for the validity of OLS may not be met. In particular, the following concerns should be addressed: potential endogeneity problems and potential cross-section and auto-correlation.

The *new economic geography* shows that an agglomeration process may be induced by a circular causation mechanism, so that industrial location may be driven by expenditure location while at the same time the spatial distribution of manufacturing activity may influence the geographical pattern of spending. Hence, potential endogeneity problems might be anticipated. More precisely, there could exist a contemporaneous correlation between the error term and the market size variable. From a statistical point of view, this means that the regression equation does not correspond to a conditional expectation, so that the usual assumptions on the error term cannot be imposed (Verbeek, 2000). As a consequence, OLS estimations might be biased and inconsistent. In order to account for this possibility, we carry out several exercises and tests. First, we re-run the original regressions using only the initial value for the expenditure variable. Second, we estimate 2SLS regressions by instrumenting the variable in question by the respective one-period lag and then calculate the Hausman test statistics.

In addition, the first estimation assumes a relatively simple error term. In more concrete terms, the standard error component model assumes that the regression disturbances are homoscedastic with the same variance across time and across individuals, are not correlated across individuals, and that the only correlation over time is due to the presence of the same individual across the panel (i.e., the equicorrelation coefficient is the same no matter how far periods are in time). Undoubtedly, these are very restrictive assumptions. First, given the panel nature of the data, one can presume that there may be a specific pattern of disturbances associated with the presence of groups of observations. Specifically, cross-sectional units may be size-asymmetric and as a result may have different variations (Baltagi, 1995). Second, industries are not only tied to specific factors, they are also tied to common macroeconomic factors affecting the economy as a whole (Greene, 1997) and likely to differential repercussions across groups of sectors. Thus, it seems likely that disturbances could be correlated across industries. Third, an unobserved shock in the current period might affect the concentration patterns for at least some coming periods (Baltagi, 1995). Ignoring group-wise heteroscedasticity, cross sectional correlation and/or serial correlation when they are present results in consistent but inefficient estimates of the regression coefficients and biased standard errors (Baltagi, 1995; Greene, 1997). Therefore, we carry out relevant test statistics for identifying such data features and implement an appropriate econometric strategy.

4.3 Main Results

Table 5 shows estimation results from the LSDV regression including sequentially increasing subsets of explanatory variables with and without time dummies.

Insert Table 5 about here

The first column corresponds to a pure *traditional trade model*, since only relative factor intensities (*Heckscher-Ohlin theory*) and relative technology differences (*Ricardian theory*) are considered. Notice that all estimated coefficients have the expected sign and are significant at conventional levels. Thus, relative concentration increases with relative factor intensities and relative technological differences. In particular, as expected under a lumpy distribution of factor endowments, the higher the absolute discrepancy between the individual labour and human capital intensities and the respective averages, the higher the level of relative concentration. Analogously, larger differences across countries between the individual relative labour productivity and the aggregate one are associated with higher relative concentration. The incorporation of the trade costs variable (column 2) does not substantially alter the results: the estimated coefficient on this variable is not significant.

In the next columns, 3 - 4 and 7 – 8, we included variables highlighted by the *new trade theory*, namely, scale economies and relative expenditure concentration. The estimated coefficient for scale economies is negative and significant in 3 out of 4 specifications, indicating that high increasing returns were associated with low relative concentration levels. Such a result can be explained in terms of the arguments previously raised when discussing the expected influence of scale economies. More precisely, from a theoretical point of view, the intensity of increasing returns may be linked *a priori* either to higher or lower relative concentration. Further, as we demonstrated in the numerical example, the link may be negative under certain specific locational patterns. On the other hand, one could argue that the proxy for economies of scale, the average establishment size, is not appropriate[14]. In order to assess this possibility, we used an alternative definition for this variable, namely, the position of each industry in the ranking of activities according to their degree of increasing returns presented by Pratten (1988).[15] Estimation results are qualitatively the same[16].

The estimated coefficient on relative expenditure concentration is positive and significant, suggesting that relative concentration of spending tends to favour relative concentration of manufacturing activity. This finding is consistent with both the *new trade theory* and the *Heckscher-Ohlin theory* in the presence of positive trade costs. We should stress that this turns out to be the most important determinant of industrial location.

Note that, compared with the estimation results from the pure traditional trade model, the coefficient on trade costs becomes significantly positive. Hence, higher external tariff barriers with respect to the Rest of the World tend to foster increased relative concentration of industries within the trade bloc. This result coincides with the theoretical conclusion derived by Venables (2000) regarding the locational impact of customs unions. The combination of relatively high external barriers and internal trade liberalization may induce the spatial concentration of economic activity within the bloc.

[14] Establishment size is a good proxy for economies of scale only under particular conditions. Further, using average size may hide significant intra-industry variations, i.e., an industry with a few large firms and many small firms and an industry with all mid-size firms may have the same average size.

[15] Brülhart and Torstensson (1996) uses this variant in different correlation analyses of concentration patterns for the European Union. In the present context, its use might be criticized on the ground that it is based on estimations from information coming exclusively from developed countries. Further, those estimates were carried out in the 1980s and thereafter significant changes in technology and production techniques have taken place (Haaland, Kind, Midelfart-Knarvik, and Torstensson, 1999).

[16] The results are available from the authors upon request.

Columns 9 - 16 report estimation results when input-output linkages are taken into account. High intermediate consumption intensity, from one's own sector as well as from the whole manufacturing sector, is positively correlated with relative concentration, but in a non-significant way in most specifications.

Tables 6 and 7 report estimations from alternative econometric strategies dealing with potential endogeneity. Note that the resulting patterns remain essentially the same. According to the Hausman statistic the null hypothesis of no contemporaneous correlation between the expenditure variable and the error term cannot be rejected. Therefore, endogeneity does not seem to be a severe problem.

Insert Tables 6 and 7 about here

Further, we calculated relevant test statistics for detecting non-spherical disturbances. The modified Wald statistic for groupwise heteroscedasticity in residuals (Greene, 1997) suggests that the null hypothesis of homoscedasticity across panels should be rejected. In addition, the Breusch-Pagan LM test (Greene, 1997) indicates that the null hypothesis of independence of errors across panels should also be rejected. Finally, the Baltagi-Li LM test (Baltagi, 1995) for first order serial correlation in a fixed effects model points out that the null hypothesis of no autocorrelation should be rejected, too. Henceforth, an alternative estimation method is needed. In particular, one can remove the autocorrelation from the data by means of the Prais-Winsten transformation (Greene, 1997) and, since the number of cross sectional units is substantially larger that the number of time periods (28 vs. 14), one can then use OLS but replacing OLS standard errors with panel-corrected standard errors accounting for heteroscedasticity and contemporaneous correlation across panels (Beck and Katz, 1996). Results obtained by using such a procedure are reported in Table 8. They basically confirm the previous findings.

Insert Table 8 about here

Given the endogeneity and autocorrelation issues, we have also explored the robustness of our results in a dynamic panel setting. Thus, we performed GMM estimations using the procedure developed by Arellano and Bond (1991). Again estimation results are essentially in line with those above.

Insert Table 9 about here

4.4 Does Mercosur Make a Difference?

The previous estimations pooled across the 14 sample years, which implies the assumption that the parameters in the regression equation are stable over time. One interesting question in this respect is whether the underlying system has a different behavioural pattern after the creation of Mercosur. In order to provide a first answer to this question, we include a dummy variable for the Mercosur period. It takes a value of 1 for the years over the period 1991-1998 and 0 otherwise. This dummy variable is then interacted with the explanatory variables used before. The joint significance of such interactions is assessed through the Wald test. The test statistic leads to the rejection of the null hypothesis that parameters are stable over the whole sample period for almost all specifications.[17] Therefore, the relative importance of relative concentration determinants seems to have changed after the establishment of Mercosur.

One natural additional question that arises is what those changes look like. The answer can be found in Table 10, which presents estimation results for the periods 1985-1990 and 1991-1998 with and without fixed time effects. Several remarks are in order.

Insert Table 10 about here

The estimated coefficients on labour intensity and on relative skill intensity evolve from being not significantly different from zero in the first sub-period to being significantly positive in the second sub-period. Relative factor intensities and hence relative factor endowments seem to play a more important role in relative concentration patterns within the trade bloc. This is precisely what one would expect according to the *Heckscher-Ohlin theory*.

The estimated coefficient on relative technology differences decreases from the first to the second sub-period. Further, in the specification including time dummies, this coefficient turns to be not-significantly different from zero. This result could be explained in terms of a technological convergence across countries as a consequence of the opening of the economies.[18]

The coefficient on scale economies is positive and significant in the first sub-period and negative and insignificant in the second one. Thus, high increasing returns favoured high relative geographical

[17] Detailed results can be obtained from the authors upon request.

[18] The variable capturing technology differences across countries can be considered a valid proxy for the relevant theoretical concept if wages do not significantly differ across countries (Torstensson, 1996). Thus, it might alternatively be argued that the variable loses its significance due to an increased divergence in this respect. By looking at the evolution of wages in dollars in Argentina after the implementation of the Convertibility Plan in 1991, this possibility should not be disregarded.

concentration of manufacturing activity before the constitution of Mercosur, when relatively high internal trade barriers segmented the market, but they lost explanatory power after the start of the unilateral and regional trade liberalization programs between considered countries. In order to understand this result, we should remember that during the 1970s and 1980s, Argentina, Brazil, and Uruguay signed bilateral agreements aimed at removing several trade barriers.[19] Hence, even though high, intra-regional barriers were to some extent already lower than extra-regional ones. In such a case, Brülhart and Torstensson (1996) show that, if the rest of the world is large, smaller countries within the region experience a competitiveness gain in increasing returns activities due to the improved access to a larger market that exceeds the competitiveness loss with respect to the country with the larger home market. Therefore, we should expect increased relative concentration for those activities in this first phase of trade liberalization. Now, as regional integration deepens as in the Southern Cone during the 1990s, the competitive advantages of larger countries within the bloc in sectors with economies of scale increase and become dominant. As a consequence, dispersion of production in these sectors is reversed. Such activities again tend to be concentrated. Precisely, this reversion amounts to a decreased significance in the association between increasing returns and relative concentration, which is what we observe in the second period.

The estimated coefficient on relative expenditure is positive and significant at the 1% level across sub-periods, but it decreases in size in the second period. In fact, relative labour intensity seems to be taking over the position as the most influential determinant of locational patterns.

The remaining variables are, in general, not significantly different from zero. However, we should mention that the estimated coefficient on intensity in intermediate inputs (from one's own sector as well as from the whole manufacturing sector) increases. In other words, after regional trade liberalization, relative concentration levels seem to be more sensitive to the degree of intensity in the use of manufactured inputs. In particular, a positive relationship seems to be arising. One possible explanation is that, as expected from the *new economic geography*, industries that intensively use intermediate goods are becoming markedly more absolutely concentrated in the larger countries and, in particular, significantly, more than the manufacturing sector as a whole.

[19] These agreements include, among others, CAUCE (1974) between Argentina and Uruguay; PEC (1975) between Brazil and Uruguay; and PICE (1986), the "Treaty for Integration, Cooperation, and Development" (1988), and the Buenos Aires Act (1990) between Argentina and Brazil.

In summary, with the establishment of Mercosur, relative factor intensities become more relevant in the explanation of relative concentration levels, while other variables like technology, economies of scale, and relative expenditure lost relative importance. Overall, these results seem to confirm the main insights from the *Heckscher-Ohlin theory*: trade liberalization increases the locational influence of factor endowments, since it induces industries to settle in countries with matching comparative advantages.

The previous analysis has shown that there are significant differences in the role played by the alternative determinants of relative manufacturing concentration patterns across periods with different average levels of openness. In this sense, we know from the trade liberalization program established in the *Asunción Treaty* that the degree of trade openness within the bloc has increased progressively during the 1990s. One interesting question then is whether the behavioural relationship between relative concentration and the explanatory variables remains the same over the second period, 1991-1998. In particular, do estimated coefficients remain stable from 1991 to 1998? One natural way to address this issue is to split this period into two time intervals according to the evolution of Mercosur can be divided: the transition period (1991-1994) and the customs union period (1995-1998). We create a dummy variable taking the value of 1 for the second sub-period and proceed as before. The test statistics indicate that the interactions between the dummy variable and the explanatory variables are jointly significant and henceforth that the null hypothesis of constant parameters should be rejected.[20] Thus, the relative importance of the determinants of relative concentration seems to have varied as trade integration deepened in the region.

We, therefore, ran separate regressions for each sub-period. Estimates are presented in Table 11. Again several points deserve being mentioned.

Insert Table 11 about here

We can observe that the coefficient on relative labour intensity increases over time. In the second sub-period, it is positive and significant at the 1% level. Hence, as expected from the *Heckscher-Ohlin theory,* industries with labour intensities substantially different from the average are becoming more relatively concentrated as trade costs fall.

[20] Detailed results can be obtained from the authors upon request.

In contrast to labour intensity, skill intensity seems to be losing explanatory power. More precisely, the estimated coefficient on this variable is positive and significant for period 1991-1998, but its effect is strongly present only from 1991-1994 (see Tables 10 and 11). By looking at the scores for individual industries, we can detect that the variability of relative skill intensity across sectors increases over the period 1991-1995 and decreases thereafter. Thus, activities have converged in terms of their human capital intensity towards the end of the period. Given the multivariate definition of economic geography, this fact may help us understand the decline in the coefficient on relative skill intensity.

The estimated coefficient on technology shows a strong downward trend, while the coefficient on economies of scale remains not significantly different from zero over the analysed period.

Further, the coefficient on relative expenditure is positive and significant and remains largely constant in size.

Our results confirm the upward trend of the coefficient on intermediate consumption intensity. This coefficient becomes positive and significant in the second sub-period for the 4 specifications considering total manufactured inputs and for 2 out of 4 specifications taking into account only inputs from one's own sector. Thus, input-output linkages gain relative influence in the determination of concentration patterns as trade becomes freer. As already noticed, this result is in line with theory's predictions.

In summary, we find that economic integration deepening within Mercosur seems to be associated with an increasing influence of one typical element stressed by the *Heckscher-Ohlin theory*, namely, relative labour intensity, and a rather stable relative importance of one central factor underlined by the *new trade theory*, namely, expenditure concentration. In addition, production linkages have become relatively more important in explaining observed locational patterns.

5. CONCLUDING REMARKS

South American countries increased substantially the trade ties among themselves and with the rest of the world thanks to both general unilateral and regional trade liberalization initiatives, such as Mercosur. According to international trade theory, one should expect such trade policy changes to be associated with important changes in the economic landscape of the integrating area. In addition, these locational shifts, due to their welfare, political economy, and macroeconomic implications, are highly relevant from an economic policy point of view. Yet, to date, there are only a few empirical studies investigating the spatial implications of trade liberalization in countries belonging to Mercosur.

This paper aimed at filling this gap. On the basis of a descriptive analysis of relative concentration patterns and several econometric exercises focused on the period 1985-1998, we attempted to provide an answer to the following questions: How concentrated/dispersed are industries? Have concentration levels changed significantly over time? What are the factors driving the observed relative concentration patterns? Did the establishment of Mercosur have an impact on the relative importance of these explanatory factors?

Our main findings indicate that certain industries, such as beverages, tobacco, pottery, and leather are highly concentrated in relative terms, while industries such as glass, textiles, food products, and fabricated metal products are dispersed. With respect to the dynamic story, we find that, on average, relative concentration increased over the sample period. In particular, leather, pottery, printing and publishing, transport equipment, non-electrical machinery, electrical machinery, and professional and scientific instruments show significant increases, while industries such as food products, furniture, glass products, and fabricated metal products display decreases.

With the aim of uncovering determinants of relative concentration patterns, we reviewed relevant existing international trade theories and derived model specifications to be estimated. We thus regressed relative concentration measures on measures of technological and relative factor intensities (*traditional trade theory*), scale economies and exogenous market size (*new trade theory*), input-output linkages (*new economic geography*), and, to account for trade reforms, on external nominal tariffs and time dummies. Our results suggest that localization of demand and comparative advantages are the main driving forces behind the observed relative concentration patterns. In addition, we find that the establishment of Mercosur played a significant role in shaping the changing patterns of relative concentration.

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APPENDIX

Table 1

Data availability				
Variable	**Aggregation**	**Country coverage**	**Period**	**Source**
Production value	ISIC. Rev. 2, 3digits	Argentina, Brazil, Uruguay	1985-1998	PADI/ECLAC
Employment	ISIC. Rev. 2, 3digits	Argentina, Brazil, Uruguay	1985-1998	PADI/ECLAC
Value added	ISIC. Rev. 2, 3digits	Argentina, Brazil, Uruguay	1985-1998	PADI/ECLAC
Exports	ISIC. Rev. 2, 3digits	Argentina, Brazil, Uruguay	1985-1998	PADI/ECLAC
Imports	ISIC. Rev. 2, 3digits	Argentina, Brazil, Uruguay	1985-1998	PADI/ECLAC
Number of establishments	IBGE Subsector Classification	Brazil	1985-1998	RAIS/Ministry of Works
Workers qualification	IBGE Subsector Classification	Brazil	1985-1998	RAIS/Ministry of Works
Intermediate inputs	IBGE Subsector Classification	Brazil	1985, 1990-1998	IBGE
Tariffs	IBGE Subsector Classification	Brazil	1987-1998	Kume, Piani, Souza (2000)

Figure 1

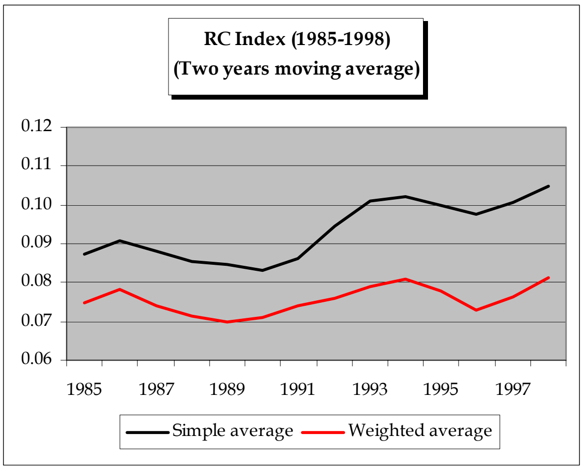

Table 2

Relative concentration - RC Index (1985-1998)				
Sector/Year	**1985-1990**	**1991-1994**	**1995-1998**	**III/I**
Food products	0.05	0.02	0.02	-0.022
Beverages	0.20	0.21	0.19	-0.006
Tobacco	0.20	0.19	0.22	0.020
Textiles	0.03	0.02	0.02	-0.010
Wearing apparel, except footwear	0.08	0.08	0.07	-0.016
Manufacture of leather and leather products	0.13	0.16	0.26	0.131
Footwear	0.12	0.13	0.12	0.001
Wood products	0.07	0.09	0.08	0.008
Furniture	0.08	0.05	0.04	-0.041
Manufacture of paper and paper products	0.01	0.03	0.05	0.036
Printing and publishing	0.03	0.07	0.07	0.037
Industrial chemicals	0.03	0.05	0.03	0.007
Other chemicals products	0.01	0.02	0.00	-0.005
Petroleum refineries	0.19	0.18	0.17	-0.018
Miscellaneos products of petroleum and coal	0.10	0.11	0.10	0.000
Rubber products	0.06	0.08	0.09	0.031
Plastic products	0.06	0.07	0.08	0.014
Pottery, china, and earthenware	0.16	0.22	0.23	0.063
Manufacture of glass and glass products	0.02	0.04	0.00	-0.020
Other non-metallic minerals	0.04	0.04	0.05	0.012
Iron and steel	0.04	0.06	0.04	-0.004
Non-ferrous metals	0.10	0.12	0.13	0.036
Fabricated metal products	0.06	0.05	0.03	-0.024
Non-electrical machinery	0.14	0.16	0.17	0.030
Electrical machinery	0.10	0.09	0.13	0.032
Transport equipment	0.02	0.05	0.06	0.045
Professional and scientific instruments	0.14	0.16	0.18	0.042
Other manufacturing industries	0.16	0.19	0.20	0.034
Simple average	**0.09**	**0.10**	**0.10**	**0.015**
Weighted average	**0.07**	**0.08**	**0.08**	**0.004**
Standard Deviation	**0.06**	**0.06**	**0.07**	**0.015**
Skewness	**0.54**	**0.53**	**0.60**	**0.054**
Kurtosis	**-0.82**	**-1.04**	**-0.80**	**0.028**

Table 3

Relative concentration - RC Index (1985-1998)			
	Spearman Correlations		
	1985-1990	**1991-1994**	**1995-1998**
1985-1990	1.000	0.923	0.887
1991-1994		1.000	0.950
1995-1998			1.000

Table 4

Regressions on a time trend

Sector/Period	1985-1998
Food products	-0.108550*** (0.028848)
Beverages	-0.001031 (0.007165)
Tobacco	0.003338 (0.009738)
Textiles	-0.060433 (0.038818)
Wearing apparel, except footwear	-0.015395 (0.010782)
Manufacture of leather and leather products	**0.064973***** **(0.015134)**
Footwear	0.007238 (0.007052)
Wood products	0.013218 (0.013080)
Furniture	-0.160677*** (0.048200)
Manufacture of paper and paper products	0.1076900 (0.068452)
Printing and publishing	**0.084678**** **(0.034141)**
Industrial chemicals	0.029848 (0.028696)
Other chemicals products	-0.094339 (0.056940)
Petroleum refineries	-0.008994 (0.005571)
Miscellaneos products of petroleum and coal	0.003499 (0.010095)
Rubber products	**0.045588***** **(0.008449)**
Plastic products	**0.026222**** **(0.011437)**
Pottery, china, and earthenware	**0.038380***** **(0.007072)**
Manufacture of glass and glass products	-0.169083** (0.067163)
Other non-metallic minerals	0.022425 (0.039768)
Iron and steel	-0.012784 (0.025643)
Non-ferrous metals	**0.031050***** **(0.006330)**
Fabricated metal products	-0.056068*** (0.015465)
Non-electrical machinery	**0.024314***** **(0.004350)**
Electrical machinery	**0.023664*** **(0.012127)**
Transport equipment	**0.149203***** **(0.041134)**
Professional and scientific instruments	**0.026476***** **(0.006463)**
Other manufacturing industries	**0.020486***** **(0.003757)**

Note: The firts row reports the estimated coefficient and the the second row indicates the standard error.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5

Basic regresions

	(1) Inrc	(2) Inrc	(3) Inrc	(4) Inrc	(5) Inrc	(6) Inrc	(7) Inrc	(8) Inrc	(9) Inrc	(10) Inrc	(11) Inrc	(12) Inrc	(13) Inrc	(14) Inrc	(15) Inrc	(16) Inrc
labint	0.300	0.272	0.373	0.291	0.371	0.376	0.204	0.213	0.360	0.279	0.333	0.250	0.206	0.217	0.183	0.192
	(0.130)**	(0.142)*	(0.118)***	(0.129)**	(0.150)**	(0.150)**	(0.131)	(0.132)	(0.113)***	(0.125)**	(0.117)***	(0.130)*	(0.131)	(0.132)	(0.132)	(0.133)
relskillint	0.283	0.317	0.166	0.247	0.258	0.251	0.327	0.316	0.161	0.241	0.146	0.227	0.314	0.299	0.297	0.285
	(0.102)***	(0.115)***	(0.077)**	(0.081)***	(0.112)**	(0.111)**	(0.091)***	(0.090)***	(0.076)**	(0.079)***	(0.079)*	(0.082)***	(0.088)***	(0.087)***	(0.093)***	(0.092)***
technology	0.123	0.134	0.100	0.136	0.280	0.293	0.096	0.113	0.102	0.138	0.101	0.137	0.099	0.119	0.118	0.138
	(0.029)***	(0.033)***	(0.025)***	(0.030)***	(0.062)***	(0.066)***	(0.050)*	(0.054)**	(0.025)***	(0.030)***	(0.025)***	(0.030)***	(0.050)**	(0.055)**	(0.057)**	(0.062)**
scale			-0.079	-0.168			-0.242	-0.234	-0.072	-0.161	-0.081	-0.171	-0.228	-0.215	-0.232	-0.223
			(0.052)	(0.055)***			(0.064)***	(0.066)***	(0.052)	(0.055)***	(0.053)	(0.057)***	(0.067)***	(0.070)***	(0.064)***	(0.066)***
relexpconc			0.370	0.374			0.389	0.393	0.367	0.372	0.366	0.370	0.385	0.389	0.379	0.383
			(0.061)***	(0.062)***			(0.069)***	(0.069)***	(0.060)***	(0.061)***	(0.061)***	(0.062)***	(0.069)***	(0.067)***	(0.070)***	(0.069)***
osint									0.308	0.291			0.210	0.258		
									(0.196)	(0.191)			(0.213)	(0.219)		
wmsint											0.151	0.153			0.136	0.144
											(0.086)*	(0.085)*			(0.094)	(0.095)
np		0.032		0.112		0.085		0.114		0.110		0.112		0.129		0.121
		(0.038)		(0.038)***		(0.072)		(0.068)*		(0.038)***		(0.038)***		(0.072)*		(0.069)*
Obs.	392	392	392	392	392	392	392	392	392	392	392	392	392	392	392	392
Adj. R2	0.78	0.78	0.82	0.82	0.78	0.78	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Ind. Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Effects	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes

Note: * significant at 10%; ** significant at 5%; *** significant at 1%

Robust standard errors in parentheses.

Table 6

Addressing endogeneity 1 (Regressions with relexpconc in initial year)								
	(1) **lnrc**	**(2)** **lnrc**	**(3)** **lnrc**	**(4)** **lnrc**	**(5)** **lnrc**	**(6)** **lnrc**	**(7)** **lnrc**	**(8)** **lnrc**
labint	0.206	0.217	0.183	0.192	0.280	0.288	0.237	0.243
	(0.131)	(0.132)	(0.132)	(0.133)	(0.148)*	(0.149)*	(0.149)	(0.150)
relskillint	0.314	0.299	0.297	0.285	0.276	0.266	0.243	0.235
	(0.088)***	(0.087)***	(0.093)***	(0.092)***	(0.102)***	(0.101)***	(0.104)**	(0.104)**
technology	0.099	0.119	0.118	0.138	0.249	0.264	0.281	0.295
	(0.050)**	(0.055)**	(0.057)**	(0.062)**	(0.056)***	(0.062)***	(0.063)***	(0.069)***
scale	-0.228	-0.215	-0.232	-0.223	-0.215	-0.206	-0.220	-0.214
	(0.067)***	(0.070)***	(0.064)***	(0.066)***	(0.069)***	(0.072)***	(0.066)***	(0.069)***
relexpconc	0.385	0.389	0.379	0.383				
	(0.069)***	(0.067)***	(0.070)***	(0.069)***				
relexpconciy					0.948	0.950	0.896	0.886
					(0.135)***	(0.134)***	(0.125)***	(0.126)***
osint	0.210	0.258			0.353	0.387		
	(0.213)	(0.219)			(0.234)	(0.241)		
wmsint			0.136	0.144			0.255	0.261
			(0.094)	(0.095)			(0.099)**	(0.100)***
np		0.129		0.121		0.089		0.080
		(0.072)*		(0.069)*		(0.077)		(0.076)
Obs.	392	392	392	392	392	392	392	392
Adj. R2	0.82	0.82	0.82	0.82	0.78	0.78	0.78	0.78
Ind. Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: * significant at 10%; ** significant at 5%; *** significant at 1%

Robust standard errors in parentheses.

The industry dummy i2 was supressed from the regression with relexpconc in the initial year due to collinearity.

Table 7

Addressing endogeneity 2 (Regressions with relexpconc instrumented with its own one lag value)

	(1) lnrc	(2) lnrc	(3) lnrc	(4) lnrc	(5) lnrc	(6) lnrc	(7) lnrc	(8) lnrc
labint	0.214	0.206	0.225	0.217	0.189	0.183	0.197	0.192
	(0.101)**	(0.101)**	(0.101)**	(0.101)**	(0.102)*	(0.102)*	(0.102)*	(0.102)*
relskillint	0.310	0.314	0.296	0.299	0.291	0.297	0.280	0.285
	(0.097)***	(0.097)***	(0.097)***	(0.097)***	(0.098)***	(0.098)***	(0.099)***	(0.098)***
technology	0.116	0.099	0.135	0.119	0.136	0.118	0.154	0.138
	(0.069)*	(0.067)	(0.070)*	(0.068)*	(0.071)*	(0.069)*	(0.072)**	(0.070)**
scale	-0.226	-0.228	-0.214	-0.215	-0.231	-0.232	-0.222	-0.223
	(0.080)***	(0.080)***	(0.080)***	(0.080)***	(0.079)***	(0.079)***	(0.079)***	(0.079)***
relexpconc	0.341	0.385	0.347	0.389	0.338	0.379	0.344	0.383
	(0.065)***	(0.046)***	(0.065)***	(0.046)***	(0.065)***	(0.046)***	(0.065)***	(0.046)***
osint	0.226	0.210	0.272	0.258				
	(0.209)	(0.208)	(0.211)	(0.210)				
wmsint					0.149	0.136	0.156	0.144
					(0.099)	(0.097)	(0.099)	(0.097)
np			0.124	0.129			0.117	0.121
			(0.081)	(0.081)			(0.080)	(0.080)
Obs.	392	392	392	392	392	392	392	392
Adj. R2	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hausman		0.94		0.85		0.81		0.72
Ind. Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: * significant at 10%; ** significant at 5%; *** significant at 1%
Standard errors in parentheses.
Relexpconc was instrumented with ist own one lag value.
(1),(3),(5),(7): OLS; (2),(4),(6),(8): IV

Table 8

Addressing panel correlations (PW-regressions with panel corrected standard errors)

	(1) lnrc	(2) lnrc	(3) lnrc	(4) lnrc	(5) lnrc	(6) lnrc	(7) lnrc	(8) lnrc
labint	0.229	0.232	0.219	0.222	0.298	0.298	0.287	0.291
	(0.139)*	(0.139)*	(0.140)	(0.141)	(0.141)**	(0.140)**	(0.141)**	(0.141)**
relskillint	0.244	0.238	0.235	0.229	0.228	0.227	0.203	0.207
	(0.100)**	(0.099)**	(0.101)**	(0.100)**	(0.083)***	(0.083)***	(0.081)**	(0.083)**
technology	0.074	0.082	0.086	0.093	0.125	0.131	0.140	0.146
	(0.056)	(0.057)	(0.058)	(0.059)	(0.052)**	(0.052)**	(0.055)**	(0.055)***
scale	-0.114	-0.114	-0.122	-0.120	-0.157	-0.150	-0.155	-0.151
	(0.058)**	(0.058)*	(0.060)**	(0.060)**	(0.063)**	(0.063)**	(0.065)**	(0.066)**
relexpconc	0.457	0.460	0.452	0.455	0.542	0.547	0.538	0.544
	(0.064)***	(0.064)***	(0.064)***	(0.064)***	(0.071)***	(0.071)***	(0.072)***	(0.072)***
osint	0.374	0.391			0.253	0.286		
	(0.252)	(0.251)			(0.241)	(0.240)		
wmsint			0.158	0.161			0.163	0.156
			(0.089)*	(0.089)*			(0.068)**	(0.068)**
np		0.098		0.091		0.112		0.093
		(0.074)		(0.074)		(0.081)		(0.078)
Obs.	392	392	392	392	392	392	392	392
Ind. Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: * significant at 10%; ** significant at 5%; *** significant at 1%

Panel corrected standard errors in parentheses (correction for cross sectional correlation and autocorrelation).

(1)-(4): Common autocorrelation coefficient; (5)-(8): Panel specific autcorrelation coefficient.

Table 9

Dynamic panel estimations		
	(1) **lnrc**	**(2)** **lnrc**
lnrc(-1)	0.385	0.391
	(0.053)***	(0.056)***
labint	0.397	0.415
	(0.231)*	(0.232)*
relskillint	0.327	0.323
	(0.179)*	(0.176)*
technology	0.092	0.086
	(0.050)*	(0.047)*
scale	-0.165	-0.186
	(0.128)	(0.136)
relexpconc	0.331	0.319
	(0.140)**	(0.137)**
osint	0.629	
	(0.463)	
wmsint		0.405
		(0.263)
np	-0.019	0.001
	(0.101)	(0.103)
constant	-0.026	-0.020
	(0.034)	(0.034)
Obs.	336	336
S	22.760	16.310
M_2	-1.460	-1.330

Note: * significant at 10%; ** significant at 5%; *** significant at 1%
The table reports one-step estimations with robust standard errors
S is the Sargan test statistics of over-identifying restrictions (based on two-step estimations)
M2 is the Arellano-Bond test statistics for second order autocorrelation
Relexpconc is treated as endogenous

Table 10

Subperiods regressions (1985-1990 and 1991-1998)

	1985-1990								1991-1998							
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**
	lnrc	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**
labint	-0.088	-0.094	-0.084	-0.090	0.051	0.070	0.052	0.072	0.477	0.480	0.447	0.452	0.420	0.422	0.423	0.426
	(0.116)	(0.123)	(0.116)	(0.120)	(0.138)	(0.140)	(0.136)	(0.138)	(0.189)**	(0.188)**	(0.184)**	(0.181)**	(0.213)**	(0.217)*	(0.211)**	(0.215)**
relskillint	-0.241	-0.184	-0.231	-0.177	-0.331	-0.304	-0.328	-0.288	0.146	0.144	0.152	0.147	0.227	0.227	0.212	0.211
	(0.309)	(0.411)	(0.330)	(0.438)	(0.427)	(0.429)	(0.469)	(0.463)	(0.087)*	(0.090)	(0.090)*	(0.090)	(0.102)**	(0.101)**	(0.101)**	(0.100)**
technology	0.217	0.215	0.220	0.218	0.407	0.416	0.408	0.419	0.086	0.085	0.080	0.077	0.011	0.011	0.010	0.011
	(0.044)***	(0.048)***	(0.038)***	(0.039)***	(0.067)***	(0.068)***	(0.073)***	(0.071)***	(0.027)***	(0.028)***	(0.024)***	(0.024)***	(0.073)	(0.073)	(0.072)	(0.073)
scale	0.264	0.246	0.255	0.239	0.296	0.351	0.295	0.343	-0.065	-0.060	-0.093	-0.080	-0.118	-0.119	-0.126	-0.127
	(0.127)**	(0.143)*	(0.129)**	(0.148)	(0.186)	(0.190)*	(0.197)	(0.203)*	(0.061)	(0.066)	(0.074)	(0.075)	(0.077)	(0.079)	(0.082)	(0.084)
relexpconc	0.687	0.678	0.689	0.680	0.731	0.752	0.732	0.753	0.400	0.399	0.392	0.390	0.431	0.432	0.416	0.418
	(0.098)***	(0.104)***	(0.095)***	(0.100)***	(0.110)***	(0.108)***	(0.108)***	(0.108)***	(0.071)***	(0.072)***	(0.070)***	(0.071)***	(0.078)***	(0.079)***	(0.075)***	(0.076)***
osint	0.016	0.030			0.017	0.102			0.298	0.303			0.276	0.271		
	(0.552)	(0.570)			(0.535)	(0.492)			(0.382)	(0.379)			(0.385)	(0.378)		
wmsint			-0.032	-0.026			0.000	-0.000			0.519	0.537			0.461	0.463
			(0.066)	(0.073)			(0.085)	(0.086)			(0.285)*	(0.283)*			(0.309)	(0.313)
np		0.018		0.017		0.122		0.118		-0.026		-0.069		0.043		0.078
		(0.044)		(0.041)		(0.086)		(0.087)		(0.099)		(0.084)		(0.222)		(0.218)
Obs.	168	168	168	168	168	168	168	168	224	224	224	224	224	224	224	224
Ind. Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Effects	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes

Note: * significant at 10%; ** significant at 5%; *** significant at 1%

(1)-(8): OLS regressions with panel corrected standard errors;(9)-(16): P-W regressions with panel corrected standard errors.

Table 11

Subperiods regressions (1991-1994 and 1995-1998)

	1991-1994								1995-1998							
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**
	lnrc	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**	**lnrc**
labint	0.189	0.170	0.169	0.154	0.154	0.128	0.144	0.119	0.854	0.891	0.865	0.948	0.998	1.000	1.033	1.020
	(0.100)*	(0.084)**	(0.095)*	(0.082)*	(0.081)*	(0.094)	(0.081)*	(0.093)	(0.249)***	(0.287)***	(0.239)***	(0.293)***	(0.353)***	(0.351)***	(0.344)***	(0.339)***
relskillint	0.331	0.382	0.368	0.399	0.472	0.494	0.477	0.499	0.172	0.182	0.006	0.011	0.224	0.221	0.061	0.082
	(0.139)**	(0.158)**	(0.152)**	(0.168)**	(0.161)***	(0.150)***	(0.171)***	(0.162)***	(0.082)**	(0.086)**	(0.105)	(0.104)	(0.088)**	(0.087)**	(0.113)	(0.125)
technology	0.050	0.063	0.057	0.069	0.196	0.190	0.203	0.198	-0.100	-0.112	-0.073	-0.100	-0.200	-0.200	-0.208	-0.205
	(0.030)	(0.026)**	(0.030)*	(0.028)**	(0.076)***	(0.075)**	(0.075)***	(0.074)***	(0.065)	(0.068)	(0.070)	(0.075)	(0.079)**	(0.079)**	(0.087)**	(0.081)**
scale	-0.004	-0.058	-0.016	-0.062	-0.039	-0.029	-0.039	-0.029	-0.131	-0.010	-0.159	0.052	0.164	0.166	0.157	0.140
	(0.086)	(0.121)	(0.095)	(0.122)	(0.121)	(0.120)	(0.122)	(0.121)	(0.151)	(0.157)	(0.172)	(0.177)	(0.242)	(0.243)	(0.238)	(0.233)
relexpconc	0.672	0.684	0.647	0.667	0.675	0.676	0.667	0.668	0.679	0.670	0.657	0.645	0.692	0.691	0.670	0.674
	(0.044)***	(0.046)***	(0.046)***	(0.045)***	(0.051)***	(0.050)***	(0.055)***	(0.055)***	(0.152)***	(0.142)***	(0.158)***	(0.138)***	(0.147)***	(0.147)***	(0.144)***	(0.141)***
osint	-0.331	-0.346			-0.284	-0.291			2.023	2.089			1.545	1.541		
	(0.194)*	(0.198)*			(0.197)	(0.192)			(1.065)*	(1.053)**			(1.261)	(1.272)		
wmsint			0.120	0.037			-0.040	-0.032			2.166	2.422			2.297	2.388
			(0.168)	(0.166)			(0.182)	(0.190)			(0.639)***	(0.765)***			(0.713)***	(0.771)***
np		0.063		0.061		-0.049		-0.046		0.093		0.172		-0.014		0.112
		(0.034)*		(0.039)		(0.037)		(0.039)		(0.114)		(0.134)		(0.103)		(0.088)
Obs.	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112
Ind. Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Effects	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes

Note: * significant at 10%; ** significant at 5%; *** significant at 1%

(1)-(8): OLS regressions with panel corrected standard errors;(9)-(16): P-W regressions with panel corrected standard errors.

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Zentrum für Europäische Integrationsforschung
Center for European Integration Studies
Rheinische Friedrich-Wilhelms-Universität Bonn

Walter-Flex-Strasse 3
D-53113 Bonn
Germany

Tel.: +49-228-73-1732
Fax: +49-228-73-1809
www.zei.de