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Regional employment and wages. The effects of transport costs and market potential. An application for Argentina*

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Resumen:

La actividad económica en Argentina muestra un alto grado de concentración, en 1993 casi un 46% del PBI fue generado en un área que representa tan solo el 0.14% del país. En el caso del sector manufacturero la concentración es aun mayor. Los modelos de la Nueva Geografía Económica desarrollados desde principios de los años noventa explican la localización de la actividad económica como el resultado de dos fuerzas contrapuestas, de aglomeración y de dispersión. A medida que los costos de transacción disminuyen la importancia relativa de estas dos fuerzas se ven afectadas, con los consiguientes efectos sobre la estructura regional de producción y salarios. El presente trabajo trata de contribuir al debate sobre cómo las políticas de liberalización comercial pueden afectar la estructura regional de salarios y empleos. La evidencia muestra que en el caso de Argentina la profundización de la liberalización comercial durante los años noventa pueden haber tenido un efecto reducido sobre la estructura regional de empleo y salarios, por lo menos en el corto plazo.

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Palabras clave: geografía económica, potencial de mercado, aglomeración espacial, rendimientos crecientes a escala, costos de transporte.

Clasificación JEL: F1, R1

Abstract:

Economic activity in Argentina shows a high degree of concentration, in 1993 almost 46% of GDP was generated in an area representing just 0.14% of the country. When looking at the manufacturing sector the concentration is still higher. The new economic geography models developed since the early nineties explain the location of economic activity across regions as the result of two opposite forces, centripetal and centrifugal. As trade costs are reduced, the relative strength of these two forces changes, such that we might also expect changes in the regional structure of production and wages. How trade liberalising policies might have affected the structure of production and wages across regions is the topic we try to make a contribution. The evidence points out that the further reduction of trade barriers during the nineties might have had a small effect on the regional structure of employment and wages across counties, at least in the short-run.

Key words: Economic Geography; Market Potential; Spatial agglomeration; Increasing returns; Transport costs

JEL Classification: F1 R1

I. Introduction

As Krugman and Livas Elizondo (1996) pointed out, many of the world's largest cities are now located in developing countries. They suggest that one reason for this behaviour is the policy of import substitution that many developing countries initiated in the second half of the past century. During this period there was an emergence of huge industrial centres, or at least a reinforcement of an already existing tendency, that resulted in a high concentration of manufactured production, which was mainly intended for domestic consumption.

On the other hand, since the middle of the 1970s, and mostly during the 1990s, many developing and less developed countries implemented, at least partially, policies more oriented to the external markets. How will this new business environment affect the economic structure of such countries? Will their industrial centres lose importance or will they remain unaffected?

In the case of Argentina, population is highly concentrated, according to 2001 figures, 31.6% of total population lived in the Federal District and its surrounding areas (known as Great Buenos Aires), these two areas represent just 0.14% of Argentina's land surface. However, it is possible to observe a reduction in concentration since 1970, between this year and 2001 the Gini coefficient fell from 0.637 to 0.599.

A similar picture emerges when looking at GDP and employment, both variables showing a higher degree of concentration than population, the Gini coefficients are in these two cases 0.689 (in year 2000) and 0.730 (year 1994) respectively. Manufacturing production is even more concentrated (0.771 in 2000). In contraposition to what happened with population, in the case of economic activity there has been a slight increase in the degree of concentration. This was not the case for manufacturing employment which shows the same tendency as population.

To our knowledge, and for the case of Argentina, there is a scarcity of studies on the consequences of trade liberalisation on the location of economic activity within a country. One exception is a recent research by Sanguinetti and Volpe Martincus (2004).[1] More interest has been drawn to the study of trade liberalisation and its impact on regional unemployment (Diaz Cafferata, *et al.* 1997 and 1998). Using data on manufacturing employment by provinces and sectors, Sanguinetti and Volpe Martincus (2004) analyse what variables influenced the regional pattern of manufactures in Argentina between 1985 and 1993. The explanatory variables they use are factor abundance, factor intensities of production, economies of scale, vertical linkages, and trade and fiscal policies. Their results show that the factors which had a statistically significant effect on industry location were factor abundance in the case of oil and mineral, vertical linkages in the case of downstream firms, and tax and trade policies. Regarding this last variable, a reduction of imports tariffs induced a relocation of firms away from the Great Buenos Aires.[2]

The objective of the present paper is to analyse the potential effects on the regional structure of employment and wages derived from the further reduction of import barriers that took place during the nineties. Since there is insufficient time-series data on wages and employment at

[1] A previous study is Sanguinetti *et al.* (1998).

[2] A problem with the methodology followed by Sanguinetti and Volpe Martincus (2004) is that "*regression analysis of industry concentration suggests that all major theoretical approaches are relevant. However they have not been used to assess relative merits of competing models across industries or countries*" (Brülhart, 1998, cited in Brakman *et al*., 2000).

the level of counties or provinces[3], we follow a less ambitious as well as less data-demanding strategy along the lines of Hanson (1998, 2004), Brakman *et al*. (2000, 2002) and Mion (2004). The strategy involves estimating transport costs effects in a cross-section of regional wage/employment data as a proxy for other trade barriers. Transport costs are assumed to be an increasing function of distance between the firm and the market. Using data at county level for the USA, Hanson (1998 and 2004) examines the spatial correlation between wages and consumer purchasing power to analyse whether regional product-market linkages contribute to spatial agglomeration[4]. He estimates a simple and augmented market-potential function, the second one based on Helpman (1998) version of Krugman (1991) model. The main result is that demand linkages between regions are strong and growing over time, but with a limited geographic scope.

In Brakman *et al*., (2000) a market-potential function is estimated with city-district data from post-unification Germany. They find that "*demand linkages are strongly localised and that the 'old' border still matters to the extent that economic interactions between western and eastern Germany are still limited compared to the situation within these two parts of Germany*". In Brakman *et al*., (2004), they follow Hanson (1998) and estimate alternative specifications of an augmented market-potential function based on Helpman (1998) model. The results support the existence of a spatial structure for wages and employment.

Mion (2004) assess the role of market linkages in the spatial distribution of earnings in Italy. Using a panel data he estimates a structural NEG model, paying particular attention to the endogeneity problem that arises when dealing with both structural models and spatial data. The results suggest that final demand linkages influence the location of economic activities; contrary to previous findings the effects are not negligible.

[3] At the moment of writing this document the data from the 2005 manufacturing economic census was not yet available. The absence of more recent data is not a surprise in this kind of analysis. For instance, Mion (2004) uses data for the period 1991-1998 for the case of Italy, while Hanson (2004) uses USA data for the years 1970, 1980 and 1990. In despite of the lack of more recent data, we believe the results reported here will help to have a better understanding of the forces that affect the regional structure of wages and employment in Argentina, especially the role of trade liberalization.

[4] Hanson (2004) working paper has been recently published in the Journal of International Economics 67 (2005). The first published paper applying Hanson (1998) methodology is Mion (2004).

II. The regional structure of wages and employment in 1993[5]

The latest detailed data on the regional distribution of economic activity dates from the 1993 Economic Census. In the case of manufactures, a clear example of the high degree of concentration is that, independently of the variable we look at, the Great Buenos Aires (GBA), which represents just 0.14% of the country area, has a share of 50.2% of gross production value, 57.6% of gross value added, and 58% of wage revenues.

Maps 1 and 2 show the regional patterns for different variables at the province level. As one would expect, the distribution of employment (*L/Km2*) resembles closely that of population, with the Federal District[6] and its surrounding areas showing a much higher density than the rest of the provinces. In second place it is possible to find those provinces located in the centre-east of the country (Tucumán, Santa Fe, Córdoba, Rest of Buenos Aires and Misiones). Two cases that deserve to be highlighted are Tierra del Fuego[7] and San Luis, which have an employment density lower than the national average, but which is almost three times higher than their relative population density. This behaviour is likely to be explained, to some extent, by the special tax treatment these two provinces are granted.

Regarding GDP per capita (GDPpc) and average wages, and as shown in Map 2, the regional patterns are relatively similar, with the highest values corresponding to the GBA and the Patagonian provinces, especially Tierra del Fuego. In the case of GDPpc, three other provinces show levels above the national mean, Neuquén, La Pampa and San Luis. In the case of average wage in manufacturing sectors it is possible to observe a lower dispersion across provinces, with eleven of them having values between 0.70 and 0.97 of the national average. In only two cases, Tierra del Fuego and the Federal District, the average wage is substantially higher than the national mean (58% and 32% respectively), while the Rest of GBA and Rest of Buenos Aires have values almost identical to the country as a whole. Finally, provinces located in the north and northwest of the country show the lowest levels.

[5] A more detailed and complete analysis would require making reference to regional disparities that exist across provinces and regions and how these disparities have evolved over the recent years, however this would increase not marginally the extension of paper. For this reason we leave this topic for another opportunity.

[6] Ciudad Autónoma de Buenos Aires where is the Federal District.

[7] The proper name is Tierra del Fuego, Antártida e Islas del Atlantico Sur.

Working at greater detail (county level[8]) we obtain also a very high degree of concentration (Maps 3 and 4).

III. THE NEW ECONOMIC GEOGRAPHY AND THE DISTRIBUTION OF ECONOMIC ACTIVITY

Does the promotion of international trade intensify or reduce regional disparities inside the country? The standard theoretical approach to this issue builds on the New Economic Geography (NEG) model introduced by Krugman (1991), in which there is a tension between centripetal and centrifugal forces.

On the one hand, centripetal forces arise from increasing returns to scale in one sector (manufacturing) combined with transport costs between regions/countries. The introduction of increasing returns to scale (IRS) changes the optimal location decisions. In this case, firms will try to have as few plants as possible, with the scale of production of each of them being as large as possible. If transport costs are positive, firms will have an incentive to locate in those regions where markets are larger in order to minimise the burden of trade costs on as large a fraction of sales as possible.

On the other hand, centrifugal forces are generated through the assumption of a CRS sector (i.e. agriculture) which employs an immobile factor of production (peasants), as in Krugman (1991) or an exogenously given proportion of the labour force, as in Krugman and Venables (1995), or from congestion or commuting costs that rise with regional population like in Helpman (1998), Fujita et al. (1999), Alonso-Villar (2001) and Murata and Thisse (2005).

Changes in trade costs, both within a country as well as with the rest of the world, affect the strength of centripetal and centrifugal forces such that an equilibrium with a different distribution of footloose activities might arise.

[8] Argentina has three administrative levels. The federal government and the province or state governments are the first two levels. In the case of the third level it depends on the province or state we look at. In most cases each province is divided in counties which have a single local government, while in other cases (i.e. Province of Córdoba) cities or towns within each county have their own local governments.

The way how centrifugal forces are modelled play a key role on the how changes in transport costs affects the location of economic activities across regions.

Under Krugman (1991) framework there exist in each region a sector employing a sector-specific immobile labour force (farmers) to produce a good that is homogeneous, freely tradable and produced under constant returns to scale (CRS). These assumptions mean that there is a region-specific demand which attracts footloose activities (manufactures) in order to supply this demand. As transport costs are reduced it becomes easier to supply these region-specific demands thorough exports, such that an equilibrium with manufacture production agglomerated in a single region may become stable.

On the other hand, in Helpman (1998) dispersion forces are generated through a non-tradable good (like housing services) that is produced with an exogenously distributed sector specific capital under CRS. Under these assumptions, a reduction of transport costs means it becomes cheaper to import manufactures from the other regions, such that the cost of "*housing*" services becomes more important for consumers when deciding where to locate, with a dispersed equilibrium becoming stable for transport costs low enough.

Following Krugman (1991), Monfort and Nicolini (2000), Paluzie (2001), Crozet and Koening-Soubeyran (2002) all use models with an immobile factor of production (peasants) , and find that trade liberalization increases regional concentration. In these cases, as trade costs are reduced, the strength of dispersion forces fall at a higher rate than agglomeration forces, with the core-periphery outcome becoming a stable equilibrium as trade costs fall enough. The opposite outcome is achieved if transport costs are higher than a critical value. Alonso-Villar (2001), considers a model with congestion costs, finding the opposite outcome.

The difference in the results arising from the two ways dispersion forces are generated is clearly explained by Alonso-Villar (2001), "*The two centrifugal forces, congestion costs and the immobile demand represented by farmers, have different effects on concentration and it should be emphasised that the effects of other parameters, such as transport costs, can differ depending on the kind of centrifugal force one considers. By considering immobile farmers, concentration is more likely when transport costs are low, because in that case firms do not increase their benefits by moving closer to the dispersed farmers. Conversely, by* *considering congestion costs, when transport costs between locations decrease concentration is more difficult, since more citizens will want to move to a smaller city where congestion is lower, without paying much for transport costs when delivering goods*".

IV. Econometric Specification and Data

As pointed out by Hanson (1998), one of the earliest tools to analyse the role of market access on the spatial distribution of economic activity is Harris' (1954) concept of "*market potential*". This concept is based on the idea that there is a positive relationship between the level of economic activity in any location and the proximity to the markets for its goods. Let us define Z as the variable of interest, then the value taken by Z in region i (Z_i) can be expressed as a function of the demand from all regions Y_k (including region i) and the distance between region i and any other region k (D_{ik}):

(1) $$Z_i = \sum_{k \in K} Y_k f\left(D_{ik}\right)$$

Assuming an open economy, equation (1) could be expressed as:

(2) $$\ln\left(Z_i\right) = \alpha_1 + \alpha_2 \ln\left[\sum_{j \in J} E_j e^{-\alpha_3 D_{ij}} + \sum_{f \in F} E_f e^{-\alpha_4 D_{if}}\right] + \eta_i$$

where J refers to the set of domestic regions, F is the set of foreign regions, Z_i is, alternatively, the wage rate or employment (by km^2) in region i, and E measures the income/demand of region j (f). Following what is usual in the literature, transport costs are assumed to be of the Samuelson's iceberg type, such that for each unit shipped from region i only a fraction $v_{ij} = e^{-\alpha Dij}$ arrives to region j, if transport costs are measured by the share that melts in transit these are equal to $TC_{ij} = 1\text{-}e^{-\alpha Dij}$. η is an error term.

Regarding the interpretation of the coefficients in equation (2), and as Hanson (1998) points out, α_2 measures the effect of purchasing power of domestic and foreign demands on economic activity (wages/employment) in location i. The coefficient is expected to be positive which means a higher demand in location i's markets raises demand for labour in region i. On the other hand, α_3 and α_4 measure the effect of distance from consumer markets (domestic and foreign) on labour demand in location *i*.

One important drawback of equation (2) is the lack of a specific model behind it. This weakness has been partially overcome by the recent development of the so-called new economic geography models which stress the importance of market access as a key determinant of labour demand, such that other things equal nominal wages are higher in regions that are closer to large markets. Following Helpman's (1998) model, but extending it to a three regions setting, with two regions belonging to the same country and the third one playing the role of the rest of the world (ROW), and assuming housing rent is appropriated by absentee landlords, and exports to foreign regions are also subject to transport costs, the equilibrium conditions are given by the following equations:

(3) $$E_i = w_i L_i$$

(4) $$H_i = \frac{\beta E_i}{P_i}$$

(5) $$\frac{w_i}{P_i^{\beta} I_i^{1-\beta}} = \frac{w_j}{P_j^{\beta} I_j^{1-\beta}} \qquad i \neq j \text{ and } i, j \in J$$

$$I_i = \left[\sum_{j \in J} \lambda_j \left(w_j e^{tD_{ij}} \right)^{1-\varepsilon} + \sum_{f \in F} \lambda_f \left(w_f e^{\tau D_{if}} \right)^{1-\varepsilon} \right]^{1/(1-\varepsilon)}$$

(6) $$\lambda_j = \frac{n_j}{\sum_{j \in J} n_j + \sum_{f \in F} n_f}, \; \lambda_f = \frac{n_f}{\sum_{j \in J} n_j + \sum_{f \in F} n_f}$$

(7) $$w_i = \alpha \left[\sum_{j \in J} (1-\beta) E_j \left(I_j e^{-tD_{ij}} \right)^{\varepsilon - 1} + \sum_{f \in F} (1-\beta) E_F \left(I_f e^{-\tau D_{if}} \right)^{\varepsilon - 1} \right]^{1/\varepsilon}$$

Equation (3) says that expenditure in region *i* is equal to labour income. Equation (4) is the equilibrium condition for the housing market in region i, where H_i is the stock of housing, and P_i is the price of housing. Equation (5), and because of the assumption of labour being perfectly mobile among domestic regions, establishes that in equilibrium real wages in all domestic regions must be equal. Equation (6) is the price index for manufactured varieties consumed in region i, n_j (n_f) is the number of manufactured varieties produced in domestic (foreign) region i (f). Finally, equation (7) is the inverse demand of labour in region i.

As pointed out by Hanson (1998), one problem to estimate equations (3)-(7) is the absence of data on housing and manufactures price indices. To overcome this difficulty, Hanson (1998) uses equations (4) and (5) such that (7) becomes:

$$(7')^{9} \quad \ln(w_i) = \alpha + \frac{1}{\varepsilon}\ln\left[\begin{array}{l}\sum_{j\in J}(1-\beta)E_j^{\left(\varepsilon+\frac{1-\varepsilon}{1-\beta}\right)}H_j^{\left(\frac{(\varepsilon-1)\beta}{1-\beta}\right)}w_j^{\left(\frac{\varepsilon-1}{1-\beta}\right)}e^{-t(\varepsilon-1)D_{ij}} \\ +\sum_{f\in F}(1-\beta)E_f\left(I_f e^{-\tau D_{if}}\right)^{\varepsilon-1}\end{array}\right] + \rho_i$$

To estimate equation (7') would still require data on consumer price indices for manufactures in foreign regions, and this information is also not available.

An important point about equation (7') is that it assumes that real wages equalise across regions, such that the underlying regional distribution of nominal wages is a long-run equilibrium (Brakman *et al.*, 2000)[10]. The same does not apply to equation (2).[11] Also, equation (7') means we are assuming a specific form regarding consumer preferences and market structure, the Dixit-Stiglitz monopolistic competition model, which "*in a qualitative sense* [...] *is very suggestive, but hardly provides an adequate description of the real world*" (Brakman *et al.*, 2000). An alternative option would be to estimate an equation such as (7'') which closely resembles equation (7') but without assuming any specific model structure.

$$(7'') \qquad \ln(w_i) = \gamma_1 + \gamma_2 \ln\left[\sum_{j\in J} E_j^{\gamma_3} H_j^{\gamma_4} w_j^{\gamma_5} e^{-\gamma_6 D_{ij}} + \sum_{f\in F} E_f e^{-\gamma_7 D_{if}}\right] + \rho_i$$

9 Hanson (1998) derives $\sum_{j\in J}(1-\beta)E_j^{\left(\varepsilon+\frac{1-\varepsilon}{1-\beta}\right)}H_j^{\left(\frac{(\varepsilon-1)\beta}{1-\beta}\right)}w_j^{\left(\frac{\varepsilon-1}{1-\beta}\right)}e^{-t(\varepsilon-1)D_{ij}}$ assuming a closed economy model.

10 The model also assumes full employment.

11 (Brakman *et al.*, 2002) derive an estimable equation for a closed economy without real wages equalisation.

Econometric issues

In order to estimate equations (2) and (7”) some technical obstacles need to be tackled. If county sizes vary greatly, it is possible that the variance of the error terms differs across counties. To control for this problem, robust standard errors are reported.

A second problem could be that error terms are correlated with the regressor function. As Hanson (1998) explains, “*in equation* (2)*, shocks to wages in one region affect income in that region, which by hypothesis affect wages in other regions. In equation* (7”)*, wages in other regions appear directly as independent variables in the regressor function for a given county*”. Hanson’s (1998) procedure to reduce the potential problem of endogeneity is: (i) to measure the dependent variables at the finest possible detail (counties) so as to minimise the importance of county-specific shocks; (ii) to aggregate independent variables at state level, so that they are less likely to be affected by shocks to individual counties; (iii) to subtract own-county values from state-level values to avoid the introduction of simultaneity into the regressors; and (iv) both equations are specified using time differences in order to control for unobserved factors that are constant across time but differ across counties.

Average wages across locations also vary in part because worker characteristics vary across locations. If these variations reflect the presence of unobserved location-specific shocks to wages that are correlated with changes in demand for locally produced goods, a simultaneity bias problem may arise. To control for this potential problem, in a more recent version of his 1998 paper Hanson (2004) instruments for changes in market potential using historical data on county population growth. Additionally, since other forces than market access may affect the spatial structure of employment and wages, Hanson (2004) introduces as independent variables a set of location-specific variables.

In the present case, due to data restrictions, we make use only of tools (i) and (ii), as well as of location-specific variables. Regarding tool (iii), subtracting the own county GDP from the GDP of the province it belongs to, the fact that regional GDPs are only available at the province level prevent us for following this strategy, also since data is available for only one year time differences cannot be used. Table 1 describes the variables used.

Data

In the case of equation (2), we use as dependent variables average annual wage and employment by square kilometre, in both cases considering only manufactured sectors. In equation (7") the dependent variable is the average annual wage. Both variables, wages and employment, come from the 1993 Economic Census and are measured at county level.

With respect to independent variables, expenditure in domestic locations is measured at a more aggregated level, using provinces' GDP. In the case -of Buenos Aires this is divided between those counties that belong to the GBA and the Rest of the Province. Foreign expenditures (E_f) are measured at country level (Bolivia, Chile, China, Egypt, Iran, Hong Kong, Japan, and Venezuela) or economic blocks (EU, NAFTA and MERCOSUR).[12] Alternative measures are used (see Table 1).

Internal distances are measured by geodesic distance between counties and provinces centres.[13] Distances to foreign markets are between counties' centres and the capital city of each foreign country. In the case of economic blocks, the distance is a weighted average between the centre of each county and the capital cities of the countries that belong to the block. Argentina's total exports to each country in the block are used as weights. Using geodesic distances means we might lose information regarding other aspects than distance that might affect how easily goods are transported between regions, such as the availability of highways or secondary roads, as well as their physical conditions. Brakman *et al.*, (2000 and 2002), for instance, use as a measure of distance the travel time by car. Hanson (1998), besides using direct distance, uses Hub-and-Spoke distances. Under this assumption, goods transported between any two locations *i* and *j*, must be first transported form county *i* to a transportation hub located in county's *i* province, secondly goods are transported between the provinces' transportation hubs where counties *i* and *j* are located, finally, goods are transported to county *j* from the province's transportation hub county *j* belongs to. When both counties belong to the same province the second step is not required.

[12] The choice of these countries/blocks is dictated because these were the main foreign markets for Argentina's exports in 1993.

[13] We calculate great-circle distances between two points (the shortest distance over the earth's surface) assuming a spherical earth (ignoring ellipsoidal effects).

The inverse of population density is used as proxy for the housing stock.

Three different sets of control variables are used, but not simultaneously. Firstly we use two dummy variables, one for the province of Tierra del Fuego and the other for provinces benefiting from industry promotion schemes. The second set of control variables consists of five regional dummies. Provinces are grouped following the regionalisation of the National Institute of Statistics and Census (INDEC). Since both equations, (2) and (7"), include a constant term, a dummy for the sixth region, Great Buenos Aires, is not included. The third set of control variables includes the share of male population and of population with different levels of formal education. In all cases shares are calculated at province level.

With respect to the sample size, all counties with a share in national manufacturing employment equal to or less than 0.1% are dropped. This leaves us with a sample of 143 counties. Since all counties in the province of Santa Cruz have a share in manufacturing employment less than 0.1%, the province is included as a single unit, in this way the sample size is 144.[14]

Finally, the fact that both specifications, equations (2) and (7"), are not linear in some of the coefficients introduces the problem if the estimated coefficients correspond to a global maximum since non-linear least squares need to be used. In order to check for the reliability of the results, all regressions were run using EViews (version 3.0) as well as Stata (version 9.0), no important differences were found[15].

IV. Results[16]

Table 2 shows the results for the market potential function (equation 2), when the dependent variable is employment by squared kilometre

[14] The 144 observations represent 95% of salaried workers in manufactures and 28.9% of Argentina's land area. The total number of counties in 1993 was 503, only for 425 there is data for all variables.

[15] McCullough (1999) compares the reliability of four alternative softwares: Eviews 3.0, LIMDEP 7.0, SHAZAM 8.0 and TSP 4.4. While in the case of linear model the results do not vary greatly, this is not the case for nonlinear models.

[16] For reasons of space the results for the control variables are not reported here, they are available upon request.

(L/km2). Since we use five alternative variables as a proxy for foreign expenditure (E_f) and three different sets of control variables, there are twenty estimated outcomes (we also run a specification without including any of the control sets). As we can see in Table 2, coefficient α_2 is always positive and statistically different from zero at the usual levels of significance. As pointed out before, α_2 measures the effect of purchasing power of domestic and foreign demands on economic activity (wages/employment) in location *i*. A positive value for α_2 means a higher demand in location *i*'s markets raises the demand for labour in location *i*. Regarding the effects of distance between domestic locations (coefficient α_3) or between a domestic location *i* and a foreign location *f* (coefficient α_4), both coefficients are always positive, with most of them being statistically significant. As pointed out by Hanson (1998), while the sign of coefficients α_3 and α_4 are easily to be interpreted, their magnitudes are not. We deal with this issue later below.

In Table 3 we report the results from equation (2) when the dependent variable is the average wage rate (w). In this case, we also have that coefficient α_2 is always positive and statistically different from zero. However, coefficient α_3 is mostly negative, while for α_4 this is always the case.

If the Akaike Information Criterion is used to choose among the different specifications, when *L/Km2* is the dependent variable the best models are those with regional dummies and with E_f being measured by Argentina's total exports or foreign countries' imports of manufactures. When w is the dependent variable, the best model is the one using Argentina's total exports as a proxy for E_f and when the set of controls includes the share of male population and of population with different levels of formal education. The same models would be chosen if the adjusted R-squared were used as the selection criterion. Looking only at these three models we have that the only coefficient with the "wrong" sign is α_4 when the dependent variable is w.

As said before, while the signs of α_3 and α_4 are easy to be interpreted, their magnitudes are not. In order to assess the potential effects across regions from trade liberalisation, the following partial equilibrium experiment is performed: we measure the effects on the dependent variables that follow from an increase of foreign demand (measured by a 100% increase in exports). Additionally, when the dependent variable is *L/Km2* a second experiment is performed, in which we look at the effects produced by a 1% reduction in the distances to foreign markets.[17] In order to carry out the experiment we use models from Tables 2 and 3 which have the lowest Akaike coefficients. Graphs 1 and 2 show the results from these two experiments. In the Y-axis we have, for each county included into the sample, the elasticity or the change in the dependent variable. Along the X-axis we measure the values of the dependent variables or the county's average distance to foreign markets. If there were a well defined regional structure we might expect changes in wages and employment to show a clear relationship. However, as shown in Graphs 1, this is not the case when employment is the dependent variable.

In the case of wages, as Graph 2 shows, the effects produced by an increase in exports shows a dual pattern. On the one hand, counties with lower wage rates have a higher elasticity with respect to exports; this means that as exports increases there is a convergence in relative wages. On the other hand, if we look at how much wage rates change in terms of money, increasing sales to foreign markets produce a divergence of wages, raising the gap between regions with high and low wage rates. These opposite outcomes arise because the differences in elasticities across counties are not large enough to compensate for differences in the initial wages rates. Finally, an increase in foreign demand benefits counties located further away from foreign markets relatively more, both in relative and absolute terms.

The results from these exercises show that in the case of wages, and despite the clearer pattern emerging from Graph 2, either as a function of original wages or of distances from foreign markets, increasing exports do not appear to have an appreciable effect on the regional structure of labour returns. The wage elasticity to changes in exports shows a quite low variability across counties (coefficient of variation 0.09). When looking at the changes in wages rates, the variability across regions is higher but still small (coefficient of variation 0.37). This outcome is confirmed when looking at the variability of counties' wages before and after the increase in exports, which as shown in Table 4 remains almost unchanged. In the case of the distribution of employment across counties, the effects produced by an increase in exports are of a much lower magnitude than that on wages, but showing a greater variability. Despite this, and as was

[17] As pointed out by Hanson (1998), the short-run nature of these two experiments is because they do not take into account for the second order effects produced by changes in the regional pattern of purchasing power, which would lead to further changes in wages and employment.

the case with wages rates, the regional distribution of employment is not much affected (see Table 4).

As pointed out by Hanson (1998 and 2004), an important drawback of the market potential function (equation 2) is that it fails to control for the variation in prices of traded goods across locations. On the other hand, the model summarised by equations (3)-(7) "*controls for the fact that demand for goods coming from surrounding locations depends not just on income and transport costs to these locations but also on the prices of other traded goods available in these locations*" (Hanson, 2004).

Equation (7") takes into account the effects on w_i of changes in the prices of traded goods produced in other regions, which are a function of the wage rate. In this case we would expect γ_5 to be positive.[18]

Table 5 reports the results from equation (7"). Similarly to equation (2), γ_2, which measures the effect of purchasing power of domestic and foreign demands on labour demand in location *i*, is always positive. This mean that a higher demand in location *i*'s markets raises demand for labour in location *i*. This effect is statistically significant in all cases. Regarding the effects of transport costs, with domestic (γ_6) and foreign (γ_7) regions, the estimations confirm those obtained previously, with both coefficients being negative, the opposite to what we would expect. A possible explanation for this finding is that despite the use of some control variables we were still not able to properly control by region-specific characteristics. A straightforward way to deal with this would be to use time differences, as in Hanson (1998 and 2004), however as said before the lack of data stop us following this strategy.

Finally, in contraposition to the outcomes from equation (2), in this case it is not possible to observe a clear pattern across counties (see Graph 3). Also, the effect on wages from changes in foreign demand are much lower, as well as showing a higher variability. Despite this larger variability and similarly to what was the case for equation 2, the wage structure across counties remains almost unchanged after the increase in exports (Table 6).

[18] This is indeed the case.

VI. Summary and Conclusions

Economic activity in Argentina shows a high degree of concentration. In 1993, approximately 46% of GDP was generated in an area of just 3,880 square kilometres (0.14% of the continental Argentina's land area), the concentration is even higher when looking at manufactures.

The New Economic Geography, developed since the early nineties after Krugman's (1991) seminal paper, explains the location of economic activity across regions as the result of two opposite forces, centripetal and centrifugal. As trade costs are reduced, the relative strength of these two forces changes, such that we might also expect changes in the regional structure of production and wages. The notion of market access stresses the idea that wages and employment should be higher in locations nearer to large markets, where final and intermediate demands are higher. One potential effect from the reduction of trade costs with foreign markets is that it would change the relative importance of domestic and foreign markets. If this change is large enough we might expect that some diseconomies associated with large populated areas would become relevant enough such that some production activities would relocate away from large populated areas.

The evidence presented in section 5, using 1993 data, shows that the reduction of trade barriers during the nineties might have had a small effect on the regional structure of employment and wages across counties, at least in the short-run. This result is in line with the findings of Sanguinetti and Volpe Martincus (2004) for the period 1985-1993. A potential explanation for this outcome is that, to some extent, Argentina's labour market may be characterised as relatively segmented from a regional perspective. Of course this is a hypothesis that needs to be properly tested.

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REFERENCES

Alonso-Villar, O. (2001). "Large metropolises in the Third World: an explanation". *Urban Studies* 38 (8), pp.1359-1371.

Brakman, S; H. Garretsen and M. Schramm (2000). "The Empirical Relevance of Economic Geography: testing for a spatial wage structure in Germany". Center for Economic Studies & Ifo Institute for Economic Research (CESifo), Working Paper No. 395.

Brakman, S; H. Garretsen and M. Schramm (2002). "The Spatial Distribution of Wages and Employment: Testing the Helpman-Hanson model for Germany". Mimeo.

Brülhart, M., (1998). "Economic Geography, Industry Location and Trade: The Evidence". *World Economy 21* (August), pp. 775-802.

Crozet M. and P. Koening-Soubeyran (2002). "Trade liberalization and the internal geography of countries". *CREST Discussion Paper* Nº 2002-37.

Díaz Cafferata, A. M., A. J. Figueras, E. Capmourteres and P. E. Moncarz (1997). "Regional unemployment under open and closed trade regime in Argentina". In *Structural transformation in Latin America and Europe* (M. Recalde Ed.). EUDECOR.

Díaz Cafferata, A. M., A. J. Figueras, E. E. Capmourteres and P. E. Moncarz (1998). "Labor Force Indicators: A Regional Analysis: Argentina 1980-1996". Paper presented at the *54º Congress of the International Institute of Public Finance*, Córdoba (Argentina).

Fujita, M., P. Krugman and A. Venables (1999). *The Spatial Economy. Cities, Regions And International Trade.* The MIT Press.

Hanson, G. H. (1998). "Market Potential, Increasing Returns and Geographic Concentration". *NBER Working Paper* 6429.

Hanson, G. H. (2004). "Market Potential, Increasing Returns and Geographic Concentration". Mimeo.

Hanson, G. H. (2005). "Market potential, increasing returns and geographic concentration"; *Journal of International Economics* 67: 1 –24.

Harris, C. D. (1954). "The Market as a Factor in the Localization of Industry in the United States." *Annals of the Association of American Geographers* 44: 315-348.

Helpman, E. (1998). "The size of regions". In D. Pines, E. Sadka and I. Zilcha (Eds.), *Topics in Public Economics. Theoretical and Applied Analysis*, Cambridge University Press.

Krugman, P. (1991). “Increasing returns and economic geography”. *Journal of Political Economy*, Vol. 99(3), 483-499.

Krugman, P. and R. Livas Elizondo (1996). “Trade policy and Third World metropolis”. *Journal of Development Economics*, Vol. 49, 137-150.

Krugman, P. and A. Venables (1995). “Globalisation and the inequality of nations” *Quarterly Journal of Economics*, Vol. 110(4), 857-880.

McCullough, B. D. (1999). “Econometric Software Reliability: EViwes, LIMDEP, SHAZAM and TSP”. *Journal of Applied Econometrics*, Vol. 14(2), 191-2002.

Mion, G. (2004). “Spatial externalities and empirical analysis: the case of Italy”. *Journal of Urban Economics* 56: 97–118

Monfort, P. and R. Nicolini (2000). “Regional convergence and international integration”. *Journal of Urban Economics* 48, pp. 286-306.

Murata, Y. and Thisse, J-F. (2005), ‘A simple model of economic geography à la Helpman-Tabuchi’. *Journal of Urban Economics*, 58, 137-155.

Paluzie, E. (2001). “Trade policies and regional inequalities”. *Papers in Regional Science* 80, pp. 67-85.

Sanguinetti, P., M. Kumar J. Posadas (1998). “Trade liberalization, transport costs, and regional adjustment in manufacturing employment: Theory and applications for Argentina”. *Annual Conference of the Asociación Argentina de Economía Política*, Mendoza.

Sanguinetti, P. and C. Volpe Martincus (2004). “Trade Policy and Manufacturing Location Patterns: Evidence from Argentina”. Paper presented at the 6th ETSG Conference, Nottingham (united Kingdom).

Table 1

Description of Variables

Equation (2)

Type	Description	Source	Year	Geographical Unite
Dependent Variable:	Annual average wage	INDEC	1993	County
	Annual average employment per Km2	INDEC	1993	County
Independent Variables:	GDP of provinces	INDEC	1993	Province
	GDP of Foreign countries/blocks	WDI 2001	1993	Country
	Foreign countries/blocks' imports (total and of manufactures)	WDI 2001	1993	Country
	Argentina's exports (total or of manufactures)	INTAL	1993	Country
	Dummies for provinces benefiting from Industrial Promotions schemes (Catamarca, San Luis and La Rioja)			
	Dummy for province of Tierra del Fuego			
	Regional dummies (Northwest, Northeast, Pampeana, Patagonia and Cuyo) (1)			
	Share of male population by province	INDEC	1991	Province
	Shares of population with primary, high and superior education (complete or incomplete) by province	INDEC	1991	Province
	Geodesic Distance (kms)	Own		

Table 1 (continued)
Equation (7”)

Type	Description	Source	Year	Geographical Unite
Dependent Variable:	Annual average labour payment in manufactures	INDEC	1993	County
Independent Variables:	GDP of provinces	INDEC	1993	Province
	Argentina’s Exports (total or of manufactures) weighted by counties’ share in manufacturing employment	INTAL	1993	Country
	Inverse of population density (2)	INDEC	1991	Province
	Dummies for provinces benefiting from Industrial Promotions schemes (Catamarca, San Luis and La Rioja)			
	Dummy for province of Tierra del Fuego			
	Regional dummies (Northwest, Northeast, Pampeana, Patagonia and Cuyo) (1)			
	Share of male population by province	INDEC	1991	Province
	Shares of population with primary, high and superior education (complete or incomplete) by province	INDEC	1991	Province
	Geodesic Distance (kms)	Own		

WDI: World Development Indicators, World Bank.

INDEC: Instituto Nacional de Estadísticas y Censos (National Institute of Statistics and Census)
INTAL: Instituto para la Integración de América Latina y el Caribe (Institute for the Integration of Latin America and the Caribbean)
(1) NORTHWEST: Catamarca, Jujuy, La Rioja, Salta, Santiago del Estero and Tucumán; NORTHEAST: Chaco, Corrientes, Formosa, and Misiones; PAMPEANA: Córdoba, Entre Ríos, La Pampa, Santa Fe and Rest of Buenos Aires; PATAGONIA; Chubut, Neuquén, Río Negro, Santa Cruz and Tierra del Fuego; CUYO: Mendoza, San Juan and San Luís.
(2) The inverse of population density is used as a proxy for housing stock.

Table 2
Results equation (2). Dependent Variable: Ln(Employment by Km2)

	(1)	(2)	(3)	(4)	(5)
M. Potential (α_2)	0.7227	0.7882	0.8273	11.419	23.726
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Domestic T. Cost (α_3)	0.0397	0.0793	0.0807	0.0370	0.0411
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Foreign T. Costs (α_4)	0.0060	0.0032	0.0028	0.0031	0.0010
	[0.000]	[0.001]	[0.003]	[0.000]	[0.017]
Adj. R-squared	0.454	0.555	0.560	0.523	0.553
Durbin-Watson	1.575	1.844	1.855	1.724	1.704
Akaike IC	3.942	3.737	3.727	3.807	3.741

	(1) (*)	(2) (*)	(3) (*)	(4) (*)	(5) (*)
M. Potential (α_2)	0.7830	0.9996	10065	22.532	24.138
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Domestic T. Cost (α_3)	0.0396	0.0804	0.0823	0.0385	0.0441
	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]
Foreign T. Costs (α_4)	0.0057	0.0024	0.0022	0.0016	0.0012
	[0.000]	[0.005]	[0.010]	[0.002]	[0.015]
Adj. R-squared	0.448	0.573	0.577	0.559	0.585
Durbin-Watson	1.555	1.950	1.974	1.790	1.900
Akaike IC	3.967	3.710	3.700	3.743	3.681

	(1) (**)	(2) (**)	(3) (**)	(4) (**)	(5) (**)
M. Potential (α_2)	0.7673	0.4786	0.4658	0.6309	0.6260
	[0.012]	[0.056]	[0.061]	[0.008]	[0.012]
Domestic T. Cost (α_3)	0.0096	0.0638	0.0651	0.0368	0.0393
	[0.015]	[0.008]	[0.008]	[0.005]	[0.005]
Foreign T. Costs (α_4)	0.0056	0.0030	0.0029	0.0035	0.0032
	[0.002]	[0.147]	[0.184]	[0.008]	[0.024]
Adj. R-squared	0.582	0.595	0.594	0.594	0.595
Durbin-Watson	2.014	1.975	1.974	1.942	1.948
Akaike IC	3.708	3.677	3.679	3.679	3.677

	(1) (***)	(2) (***)	(3) (***)	(4) (***)	(5) (***)
M. Potential (α_2)	0.6245	0.6498	0.6575	19.325	31.331
	[0.009]	[0.000]	[0.000]	[0.001]	[0.001]
Domestic T. Cost (α_3)	0.0402	0.0790	0.0797	0.0408	0.0429
	[0.009]	[0.000]	[0.000]	[0.000]	[0.000]
Foreign T. Costs (α_4)	0.0056	0.0034	0.0032	0.0016	0.0006
	[0.003]	[0.007]	[0.012]	[0.004]	[0.000]
Adj. R-squared	0.519	0.582	0.581	0.562	0.576
Durbin-Watson	1.705	1.951	1.952	1.809	1.818
Akaike IC	3.842	3.703	3.704	3.749	3.715

(1) Using foreign countries' GDP. (2) Using Argentina's total exports. (3) Using Argentina's exports of manufactures. (4) Using foreign countries' total imports. (5) Using foreign countries' imports of manufactures (Iran is excluded). (*) Using dummies for Tierra del Fuego and provinces benefiting form Industrial Promotion schemes. (**) Using dummies for regions. (***) Using shares of male population and with different education levels. (N) In all cases province GDPs are included. P-values between brackets.

Table 3
Results equation (2). Dependent Variable: Ln(wage)

	(1)	(2)	(3)	(4)	(5)
M. Potential (α_2)	26.169	16.692	16.697	55.810	59.038
	[0.000]	[0.002]	[0.010]	[0.000]	[0.000]
Domestic T. Cost (α_3)	-0.0024	0.0081	0.0081	-0.0024	0.1221
	[0.000]	[0.007]	[0.002]	[0.000]	[0.986]
Foreign T. Costs (α_4)	-0.0002	-0.0003	-0.0003	-0.0004	-0.0003
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Adj. R-squared	0.238	0.341	0.333	0.298	0.120
Durbin-Watson	1.698	1.783	1.765	1.885	1.673
Akaike IC	0.405	0.260	0.272	0.322	0.549

	(1) (*)	(2) (*)	(3) (*)	(4) (*)	(5) (*)
M. Potential (α_2)	25.087	32.909	33.709	5.608	53.865
	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]
Domestic T. Cost (α_3)	0.0421	-0.0012	-0.0010	-0.002	-0.0018
	[0.998]	[0.007]	[0.031]	[0.000]	[0.001]
Foreign T. Costs (α_4)	-0.0002	-0.0005	-0.0005	0.000	-0.0004
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Adj. R-squared	0.229	0.276	0.270	0.291	0.184
Durbin-Watson	1.693	1.845	1.831	1.886	1.739
Akaike IC	0.430	0.367	0.375	0.346	0.487

	(1) (**)	(2) (**)	(3) (**)	(4) (**)	(5) (**)
M. Potential (α_2)	12.678	22.022	22.866	51.104	45.433
	[0.083]	[0.024]	[0.046]	[0.002]	[0.027]
Domestic T. Cost (α_3)	-0.0040	-0.0021	-0.0020	-0.0027	-0.0024
	[0.002]	[0.005]	[0.010]	[0.000]	[0.000]
Foreign T. Costs (α_4)	-0.0005	-0.0006	-0.0006	-0.0004	-0.0004
	[0.017]	[0.000]	[0.000]	[0.000]	[0.000]
Adj. R-squared	0.310	0.315	0.311	0.324	0.280
Durbin-Watson	1.845	1.920	1.917	1.958	1.941
Akaike IC	0.339	0.332	0.337	0.318	0.381

	(1) (***)	(2) (***)	(3) (***)	(4) (***)	(5) (***)
M. Potential (α_2)	25.355	15.728	23.492	47.184	47.184
	[0.005]	[0.012]	[0.003]	[0.000]	[0.000]
Domestic T. Cost (α_3)	-0.0022	0.0065	-0.0016	-0.0025	-0.0025
	[0.001]	[0.005]	[0.001]	[0.000]	[0.000]
Foreign T. Costs (α_4)	-0.0003	-0.0003	-0.0006	-0.0004	-0.0004
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Adj. R-squared	0.299	0.375	0.303	0.325	0.325
Durbin-Watson	1.796	1.853	1.794	1.891	1.891
Akaike IC	0.348	0.234	0.343	0.309	0.309

(1) Using foreign countries' GDP. (2) Using Argentina's total exports. (3) Using Argentina's exports of manufactures. (4) Using foreign countries' total imports. (5) Using foreign countries' imports of manufactures (Iran is excluded). (*) Using dummies for Tierra del Fuego and provinces benefiting form Industrial Promotion schemes. (**) Using dummies for regions. (***) Using shares of male population and with different education levels. (N) In all cases province GDPs are included. P-values between brackets.

Table 4
Standard Deviation of Normalised Variables (*)
(Equation 2)

Variable	Before Increase in Exports	After Increase in Exports
w_i	4.45956	5.31007
$w_i/\bar{w}$	0.34081	0.33717
$\left(L/Km^2\right)_i$	126.23354	126.25795

Variable	Before Reduction In D_{if}	After Reduction in D_{if}
$\left(L/Km^2\right)_i$	126.23354	126.23357

(*) Variables are normalised by subtracting their mean value.

Table 5
Results equation (7"). Dependent Variable: Ln(wage)

	(1) (*)	(2) (*)	(3) (*)	(4) (*)
M. Potential (γ_2)	0.15831	0.15961	0.1660	0.13715
	[0.000]	[0.000]	[0.000]	[0.000]
Domestic T. Cost (γ_6)	0.01285	0.01322	0.0168	0.01587
	[0.002]	[0.007]	[0.002]	[0.001]
Foreign T. Costs (γ_7)	-0.00041	-0.00037	-0.0018	-0.00211
	[0.464]	[0.545]	[0.028]	[0.007]
Adj. R-squared	0.445	0.439	0.469	0.453
Durbin-Watson	1.730	1.740	1.838	1.802
Akaike IC	0.107	0.132	0.096	0.119

Table 5 (continued)

	(1) (**)	(2) (**)	(3) (**)	(4) (**)
M. Potential (γ_2)	0.1584	0.1599	0.1663	0.1378
	[0.000]	[0.000]	[0.000]	[0.000]
Domestic T. Cost (γ_6)	0.0128	0.0132	0.0167	0.0157
	[0.002]	[0.007]	[0.002]	[0.001]
Foreign T. Costs (γ_7)	-0.0004	-0.0004	-0.0017	-0.0020
	[0.475]	[0.560]	[0.033]	[0.010]
Adj. R-squared	0.445	0.438	0.469	0.452
Durbin-Watson	1.729	1.739	1.836	1.796
Akaike IC	0.108	0.133	0.097	0.121

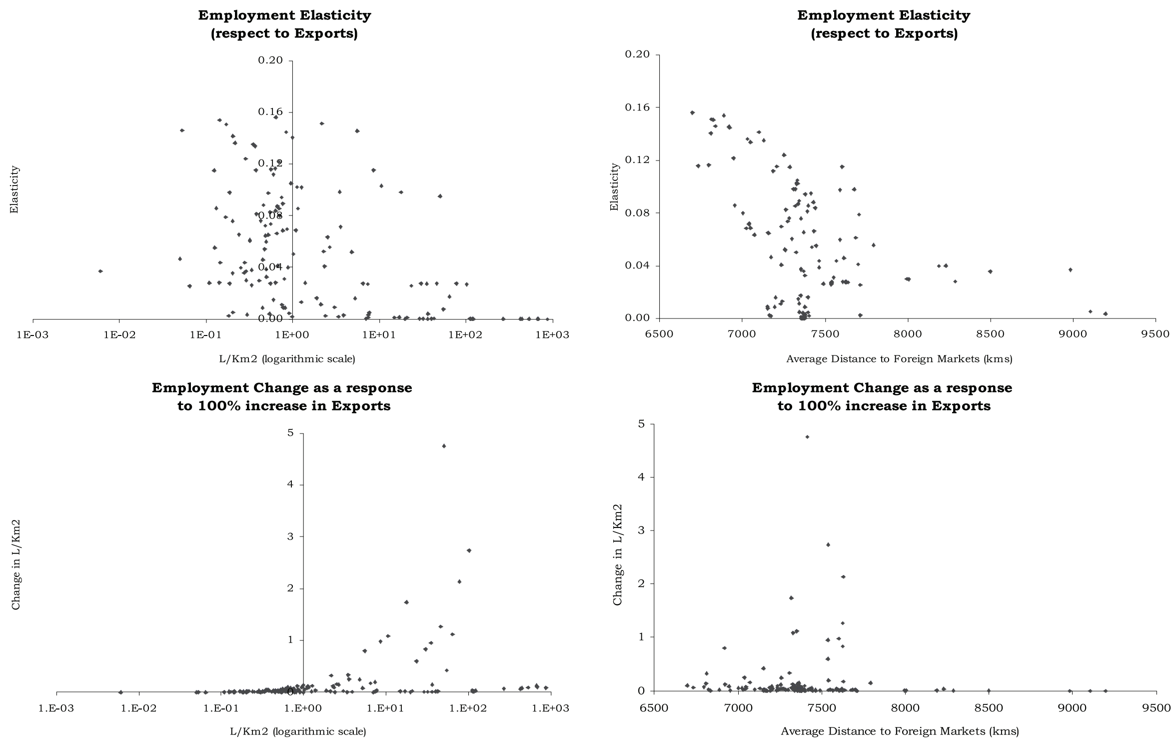
(1) Basic equation. (2) Using dummies for Tierra del Fuego and provinces benefiting form Industrial Promotion schemes. (3) Using dummies for regions. (4) Using shares of male population and with different education levels. (*) Using Argentina's total exports weighted by counties' share in manufacturing employment. (**) Using Argentina's exports of manufactures weighted by counties' share in manufacturing employment. (N) In all cases province GDPs are included. P-values between brackets.

Table 6
Standard Deviation of Normalised Variables (*)
(Equation 7''')

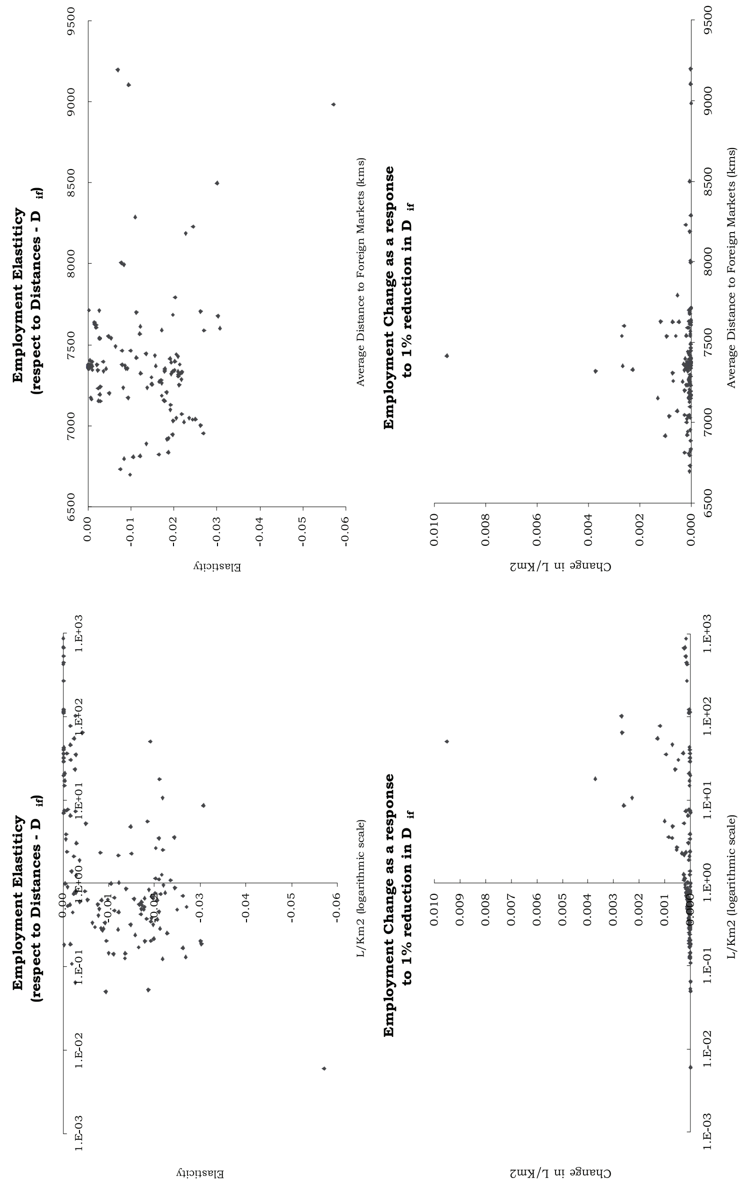
Variable	Before Increase in Exports	After Increase in Exports
w_i	4.459559	4.458829
$w_i/\bar{w}$	0.34081	0.34014

(*) Normalised by subtracting the mean value.

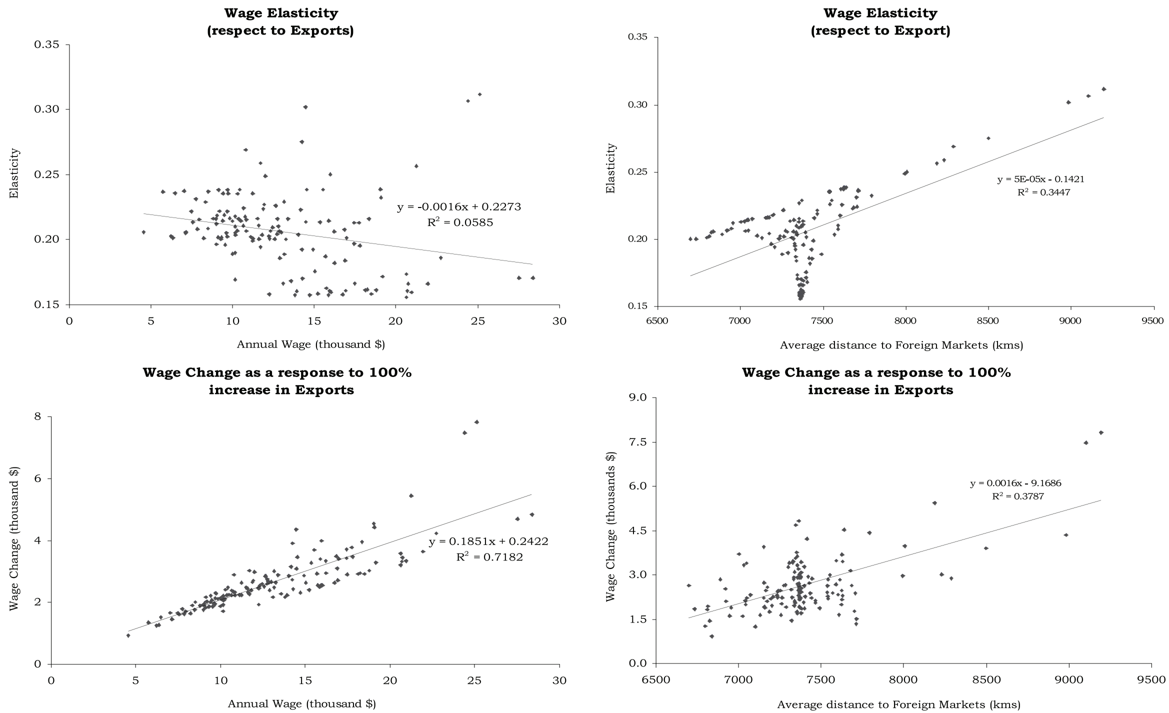
Graph 1
1.a) Employment response to changes in Foreign Demand



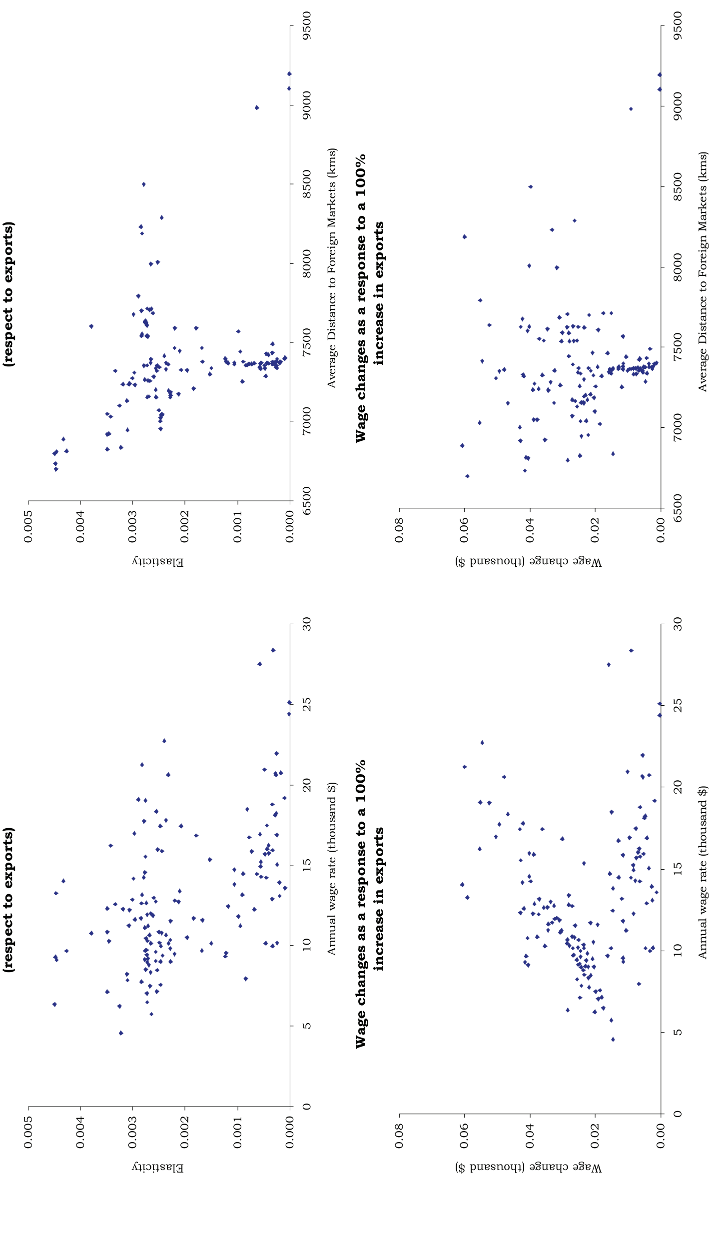
1.b) Employment response to changes in Foreign Transports Costs



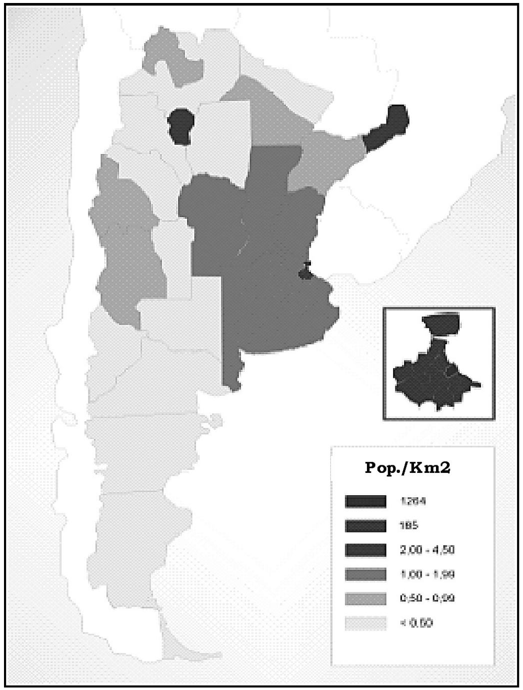
Graph 2
Wage response to changes in Foreign Demand (Equation 2)

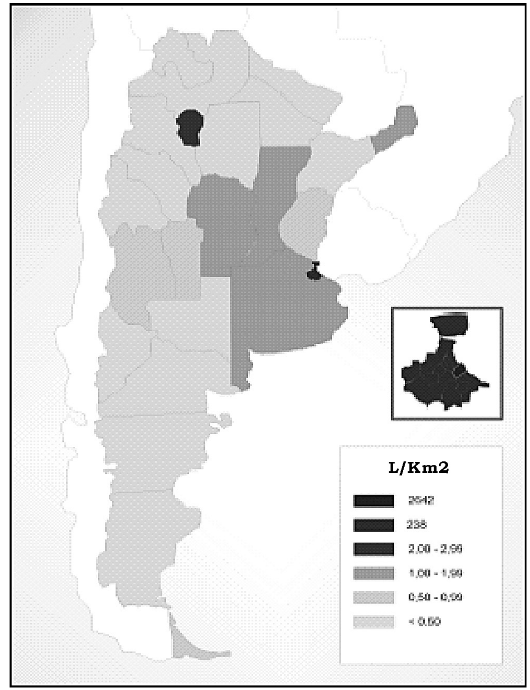


Graph 3
Wage response to changes in Foreign Demand (Equation 7´´)



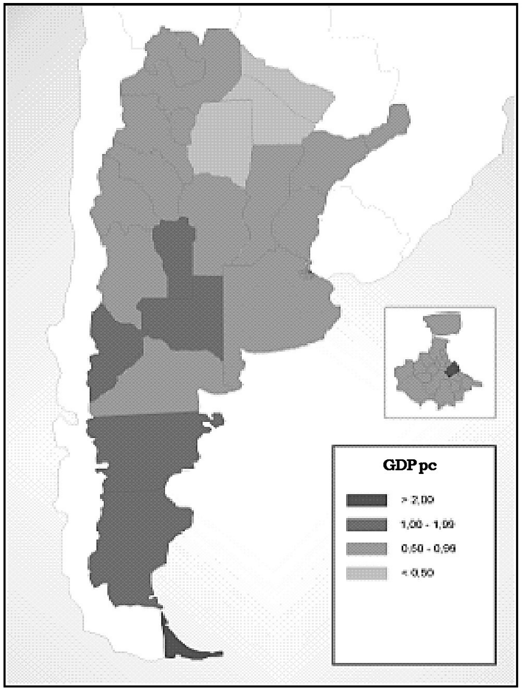
Map 1
Population and employment density (*) (**)

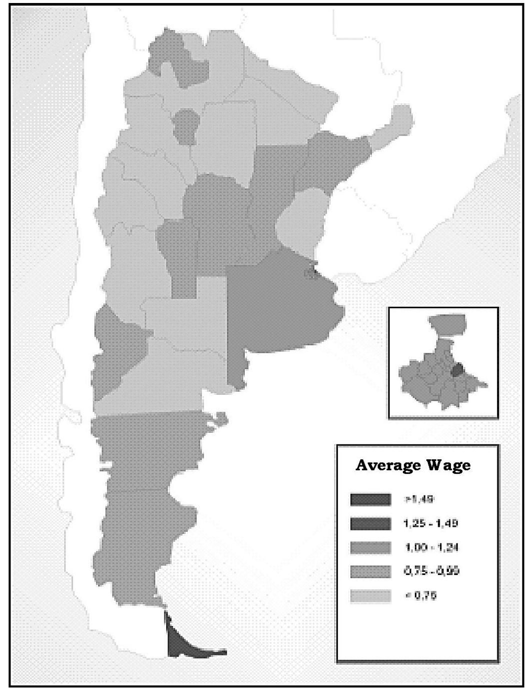




(*) All values are calculated relative the national average. (**) L/Km2 only for manufactures.

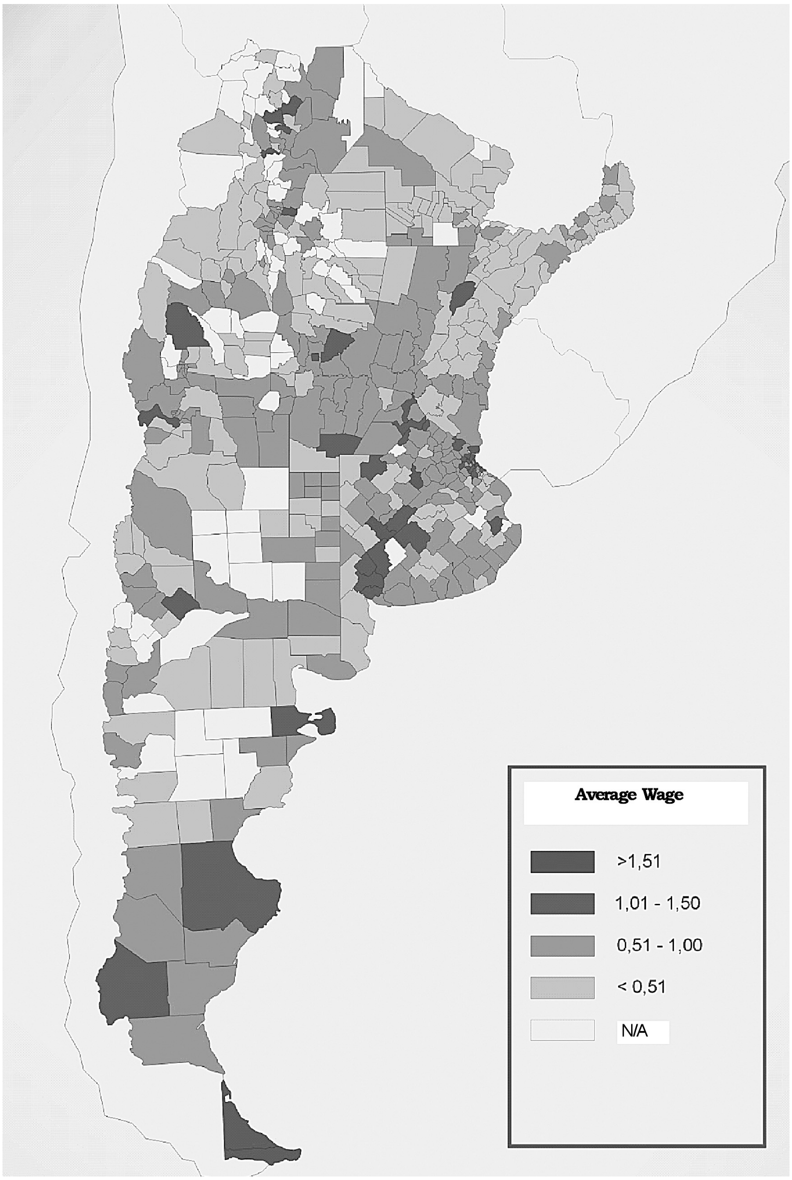
Map 2
GDP per capita and average wages (*) (**)





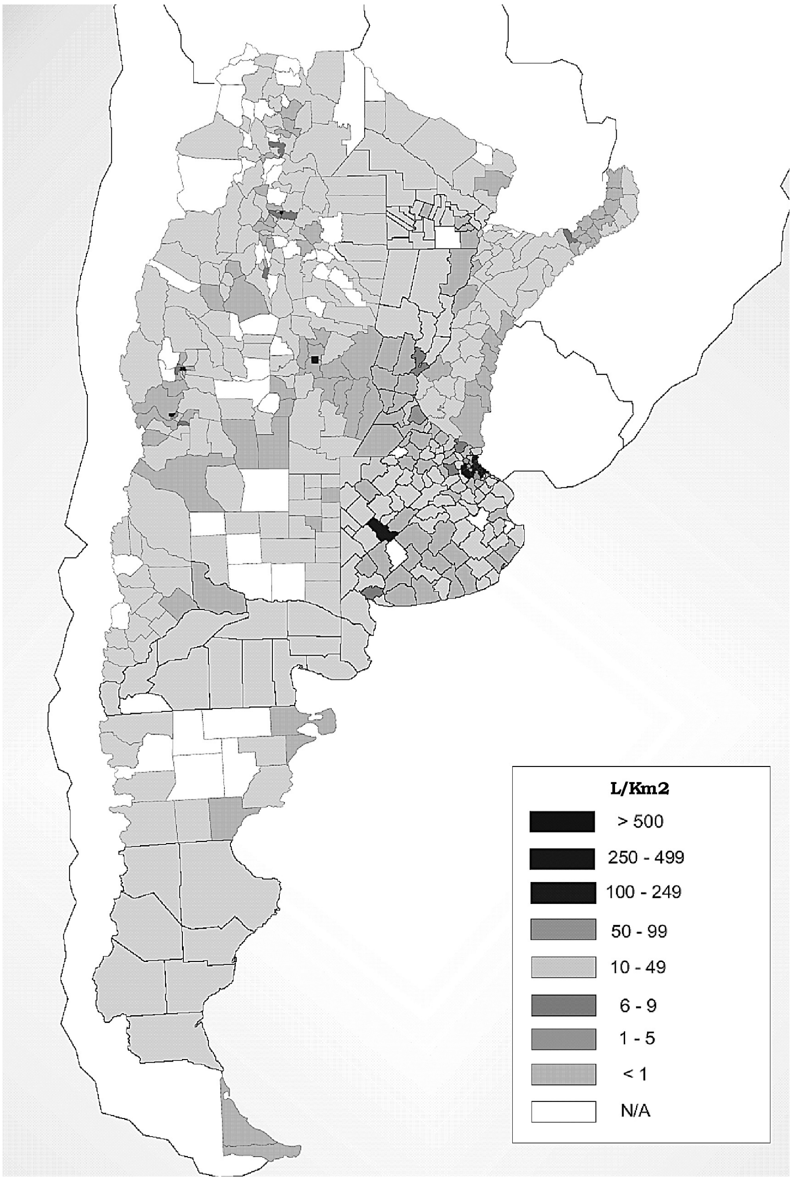
(*) All values are calculated relative the national average. (**) Average wage only for manufactures.

Map 3
Manufactures: average wage (*)



(*) All values are calculated relative the national average.

Map 4
Manufactures: employment density (L/Km2) (*)



(*) All values are calculated relative the national average.

Map 5
Argentina: political-administrative districts