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Exposure to trade openness and intergenerational social mobility in education and occupation in Mexico: a regional approach

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Abstract

This article identifies a correlation between social mobility and trade openness, using a cohort analysis and a regional approach that divides the country in three regions according to their exposure to trade liberalization. Using the EMOVI-2011 data based constructed by the CEEY and through a rank-rank regression, it is identified different patterns of relative and absolute intergenerational social mobility in two dimensions: education and occupation. It is demonstrated that the high exposure region presents higher levels of relative mobility in the two dimensions, nonetheless, the magnitude of the mobility has an important variation, being the occupation the more mobile dimension.

Keywords: *Intergenerational social mobility, trade openness, cohort analysis, regions, Mexico.*

Resumen

Exposición a la apertura comercial y movilidad social intergeneracional en educación y ocupación en México: un enfoque regional

Este artículo identifica una correlación entre la movilidad social y la apertura comercial, utilizando un análisis de cohortes y un enfoque regional que divide al país en tres regiones según su exposición a la liberalización comercial. Utilizando los datos de EMOVI-2011 construidos por el CEEY y mediante una regresión de rangos, se identifican diferentes patrones de movilidad social intergeneracional relativa y absoluta en dos dimensiones: educación y ocupación. Se demuestra que la región de alta exposición presenta mayores niveles de movilidad relativa en las dos dimensiones, sin embargo, la magnitud de la movilidad tiene una variación importante, siendo la ocupación la dimensión más móvil.

Palabras clave: *Movilidad social intergeneracional, apertura comercial, análisis de cohortes, regiones, México.*

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I. Introduction

The debate of inequality of opportunities and outcomes seems to be one of the most important topics in public and academic discussions because the first one is considered to be a source of social instability (Behrman *et al,* 2001) and the last one because affects next generation's opportunities (Roemer, 2005; Corak, 2013; Atkinson, 2015). However, identifying the source of inequality is imperative, because if it is "*the reflection of the absence of opportunities for those with poor family backgrounds, society is likely to be viewed as less fair*" (Behrman *et al*, 2001). In this sense the concept of social mobility arrived at the debate of this phenomenon, being referred as the association between the origin and destination of individuals, this is, the change of status' position within a social group, as an indicator that can reflect the degree of inequality of opportunities that a society faces (Torche, 2011).

Recently, economic literature has increased its efforts to formalize the measurement and theoretical framework for the relationship between social mobility and other variables as poverty, inequality and aspirations (Ray, 2003, Genicot & Ray, 2009; Stiglitz & Kanbur, 2016), social networks (Chantarat & Barrett, 2011), credit market imperfections (Mookherjee & Napel, 2007, D'Amato & Di Pietro, 2013), desire for redistributive policies (Desdoigts & Moizeau, 2005) and location (Mookherjee, Ray, & Napel, 2010, Chetty et al, 2014). Likewise, the more availability of socio-economic information had made possible an increase in empirical research that attempts to measure this social phenomenon.

This is specially important for Mexico, because its society is characterized by a high social and wealth mobility in the middle sector and rigidity at the top and bottom of the distribution (CEEY, 2013). Nonetheless, the research for Mexico about social mobility has been focused in microeconomic explanations, without including structural changes in the analysis, that have affected the country at different stages of its development. One of these important changes was the crisis of 1982, that opened the debate on the need for a new development model, which, without

neglecting endogenous development, must be focused on industrial conversion: a competitive and export orientated one. This general context of crisis in Latin America attempted to replace economies based on the protectionism of their markets, by other economies based on models of openness to the rest of the world (Gutiérrez, 2005).

This economic openness and industrialization have affected class structures, institutional arrangements and individual's aspirations within a country. Also, this transformation may have had a different impact across regions, being more "macroeconomic beneficiated" globally competitive regions: with better infrastructure, location, and human capital. In addition to this, and as has been suggested by some recent studies, this regional impact can be also found in more complex socioeconomic interactions as social mobility.

In this sense, the present article aims to contribute to the identification of the interaction of the economic openness with the social mobility. As a proxy of this interaction, this work will propose a regional analysis based on the exposure to trade openness. The hypothesis behind this analysis is that the regions that are more exposed to the trade openness shows more social mobility, in two dimensions: education and occupation.

The source of information used in this article is the ESRU Survey on Social Mobility in Mexico 2011 (EMOVI - 2011) carried out by a Mexican think tank (Centro de Estudios Espinosa Yglesias, CEEY). To analye the information, is used a rank-rank regression, that are applied by region and by cohort that allow us to observe the rank-rank slope, which measures the association between the position of the child in the distribution and that of his father in his respective distribution. Additionally, it is included a rank-rank regression for the percentile 25^{th} of the distribution, that shows the absolute upward mobility.

The present article is divided in five parts, being the present introduction the first section. The second section is dedicated to make a review of the concept of social mobility, its dimensions and the different measurements of this social phenomenon.

In addition, it is examined the empirical evidence for other countries and the studies that have been done for Mexico. In the third section, it is shown the details of the region that is used in this article. Also, in the same chapter it is described the method used in the present work. Also it is exposed the detailed description of the EMOVI-2011 survey used here. In section, fourth the results of relative and absolute upward mobility for education and occupation are shown, by regions and cohorts. To conclude, the fifth section highlights the principal findings, the limits of the article and the lines for future research.

II. Literatura review social mobility

Social mobility refers to the association between the origin and destination of individuals, this is, the change of status position within a social group, as a phenomenon that can reflect the degree of inequality of opportunities that a society faces. According to Beller & Hout (2006) and Vélez Grajales et al (2012), depending on the availability of the information, this can be analysed throughout the individual's adult life (intragenerational mobility), or, measured as the difference between the status of a person and their family of origin (intergenerational mobility). In addition, research on the subject has been divided mainly into two approaches: 1) the sociological one that uses indicators such as social class and occupational status and 2) the economic one that focuses mainly on earnings and income (Torche, 2015).

In one of the pioneering works on the subject, Social Mobility of A. Sorokin (1959) is emphasised the importance of considering the difference between the absolute and relative mobility. On the one hand, absolute mobility indicates the percentage of those who go upward, downward or stay and that is influenced by the effects derived from a range of circumstances (economic, technological and demographic) that are determined exogenously (Miles, 1999, Erikson & Goldthorpe, 2008). On the other hand, relative mobility, shows the change of the position in the socioeconomic category of an individual in relation to the position in the category of origin, this is,

it indicates the movement upwards or downwards in the socioeconomic scale in relation to their starting point (Isaacs et al, 2008; DeLeire & Lopoo, 2010).

Both types of mobility are processesthat occurs over time, because of individual actions or their interactions with the social environment (Barber, 1957). This can result in bidirectional movements, between the highest and lowest social classes, in addition, it should be noted that absolute mobility does not imply that there will be relative mobility, or vice versa. However, and due to the multidimensionality of the phenomenon, it is necessary to ask: mobility of what? To answer this question, you must define a variable (or series of variables) that characterize the situation of the people which determine the dimension of mobility that is being studied. In the literature it can be found aspects as education and occupation (Vélez Grajales et al, 2012).

First, education is considered an engine of upward social mobility, if and only if it translates into greater well-being (material and non-material) derived from the achievements of the person in the labour market, due to the acquisition of new qualifications and human capital (De Hoyos et al, 2010; CEEY, 2018). Second, occupation is considered as a determinant of class positions (Erikson & Goldthorpe, 2002), because the occupational status captures material (income) and symbolic (status) dimensions of social life (CEEY, 2013). However, it is not recommended to use this as an approximation of income mobility since the latter vary significantly, even if their jobs share the same occupational category (Beller &Hout, 2006).

To conclude, two mechanisms that produce social mobility can be identified, one associated with social origin and the other with individual merit. The first refers to the factors, social and family characteristics with which the individual is born and does not control, while the second refers to the mechanisms associated with achievement, effort and decisions that a person takes over time (Triano Enríquez, 2012). If the association of mobility with the factors of origin is weak, the opportunity for success or failure is open to all regardless of their social origins (Torche, 2014). This is why the analysis of social mobility is important, because it

offers a way that illustrates the interaction between phenomena such as stratification, polarization and exclusion of a society, which, in turn, reflect the inequality of opportunities and outcomes (Vélez Grajales & Monroy, 2017).

Empirical review

Empirical studies on this topic emerged in the late 1960s, focusing mainly on class and occupational status. Lipset & Zetterberg (1959), pioneers in comparing dozens of occupational mobility tables in different countries, conclude in their study that industrialized societies reflected similar levels of intergenerational mobility, regardless of their rate of growth.

For United States, it has been observed an increase in occupational absolute mobility, where this has augmented substantially for cohorts born in the first half of the twentieth century, however, it decreased for later generations (Hauser et al, 2000).

Studies in Great Britain have found in the educational case, (Machin,2004) that although the educational coverage for the cohorts between 1958 and 1970 has expanded remarkably, during this time the intergenerational mobility decreased.

Although there is no study that measures the regional impact of trade liberalization and its correlation with social mobility patterns, two types of study can be found: one that observes the impact of globalization on social mobility and another that observes the differentiated patterns of intergenerational social mobility by regions. In the first case, it can be cited the work of Sato & Arita (2004) who study the effects of globalization on the social mobility of the middle classes, old and new, in Japan and South Korea, through the change in administrative and managerial practices. They find that globalization has destabilized the mobility of the "old" middle classes much more than the "modern" middle classes, however, this effect is not significant. In the second, thanks to the more availability of administrative data, Chetty et al (2014) using fiscal data from the cohort born between 1980 - 1982, the rank-rank " regression technique and "commuting zones" finds a substantial variation in absolute and relative mobility through the identified

geographical areas in United States, where some areas had mobility even as high as the more mobile countries: Canada and Denmark.

The analysis in Latin America is more recent, due to the limited availability of information that exists for this type of analysis in the region. In the first place, we can mention the work of Behrman *et al* (2001) and that of Dahan and Gaviria (2001), where both study the correlation of educational results. The first one analyses this association between parents and children for Brazil, Colombia, Mexico and Peru, while the second one does it between brothers for 16 Latin American countries. In both, there is an intergenerational persistence greater than that of the United States. These results have been confirmed for Mexico with more recent studies, such the work of Puga and Solís (2010), where they identify that in this country the educational achievement of parents has a greater impact on the educational achievement of the children and as it transits to educational level with lower coverage (for example high school or univiersities), the economic conditions of the household of origin acquire greater weight in determining the success of the transition to these levels (Torche, 2010; De Hoyos *et al* , 2010; Solís, 2015) .

Similarly, Cortés and Escobar (2005, 2007) find that, in Mexico, job opportunities have been narrowed for younger individuals, especially for the children of parents who are at the top of the occupational classification. For the cohort of children under 26 years of age, there was a fall in occupational mobility in general. This effect has been concentrated on those who were at the ends of the distribution.

Mexico has not developed a literature that looks at the impact of trade liberalization on regional social mobility, however, there have been some that observe these correlations separately. In the case of the impact of the change of economic model, Cortés & Escobar (2005) find that from 1988 onwards, there is a considerable decrease in the opportunities of all the occupational strata to ascend to the highest position or to remain in it. In addition, this decrease is greater among those that come from the urban working classes and agricultural than in the rest of the distribution. Solís & Cortés (2009) find that the specific

processes of economic change only affect the absolute mobility of the generations, caused by a productive restructuring, without having relevant effects on the relative mobility of occupations. A similar finding is observed by Toro (2015) which seeks to identify the impact of neoliberal structural and political changes through labour cohorts, estimating that " people with equal educational achievement and from comparable social origins, but from different historical cohorts, have started their careers in occupations whose status does not differ substantially".

In the case of social mobility by regions, the UNDP (2016) analyses mobility at the federal level in the dimensions of income, health and education, and finds that, although all states have experienced upward mobility and they have reduced the gaps between states in terms of education and health, this has not occurred in the income dimension. Vélez-Grajales et al (2017) estimate intergenerational mobility rates in wealth by state in Mexico. The pattern found by the authors is that, in the poorer states of the country, there are also lower mobility rates. Consistent with this, Delajara & Graña (2017), using a rank-rank regression and dividing the country into four regions, find that both absolute and relative social mobility is greater in the North and North-Centre regions in almost all dimensions.

III. Methodology
Regionalization

The present article will use the regionalisation proposed by Aguilera & Castro (2016) because they analyse a more recent period (2005-2011) that coincides with the period of the Social Mobility Survey ESRU built in 2011 that is used in the present work to measure social mobility. Also, this regionalization includes more variables that determine the chain of economic activities, allowing to obtain a more accurate picture of the recent and differentiated impact that the globalisation process has had on Mexico. As in Dejalara & *Graña.* (2017), this regionalisation of the territory (in three areas) provides a large number of observations per region, being relevant,

especially with the source of information that is used, because, as discussed below, has national representation. The regions to be considered are the following:

1. High Exposure: Aguascalientes, Baja California, Chihuahua, Coahuila de Zaragoza, Mexico, Guanajuato, Querétaro de Arteaga, Nuevo León, Puebla, San Luis Potosí, Sonora and Tamaulipas;

2. Intermediate Exposure: Baja California Sur, Mexico City, Durango, Hidalgo, Jalisco, Michoacan de Ocampo, Morelos, Tlaxcala, Veracruz de Ignacio de la Llave and Zacatecas;

3. Low exposure: Campeche, Chiapas, Colima, Guerrero, Nayarit, Oaxaca, Quintana Roo, Sinaloa, Tabasco and Yucatan.

Measurement of social mobility

- RELATIVE MOBILITY

The relative mobility tries to observe the results of the children that come from families of low social strata, compared with those coming from high strata. This analysis has generally used the measures of elasticity, specifically those of income, comparing the children with their parents, to what is called the Intergenerational Income Elasticity (IGE) However, these measures may be limited due to the type of data and the representativeness of the sample, and they are also very sensitive to the treatment of zeros and small incomes (Chetty *et al*, 2014). Dahl and DeLeire (2008) have developed an alternative measure of relative mobility: the correlation between the ranks of parents and children.

$$(1)\ R_i = \alpha + \beta P_i + \varepsilon_i$$

Where Ri denotes the percentile *i* of the child ranked in the distribution of income of the children and P_i is the percentile *i* of the father ranked in the distribution of the parents. When the regression of the rank of the children (R_i) is made with that of the parents (P_i), a coefficient $\rho PR = Corr(P_i, R_i)$ is obtained, which is called the rank-rank slope , which measures the association between the position of the child

in the distribution of income and that of his father in his respective distribution. It is necessary to highlight that the regression coefficient is equal to the correlation coefficient because the rank of the children and parents follow a uniform distribution by construction. Also, this solves the additional linearity, the zero-income problem, and provides more stable estimates.

- ABSOLUTE MOBILITY

The measurement of absolute mobility seeks to observe the performance of children, compared to their parents, responding to questioning: are they better or worse? Chetty et al. (2014) consider three measures of absolute intergenerational social mobility:

1. Absolute upward mobility, which is the average rank, in the national distribution of the child's income, of those parents who were in the 25th percentile of the distribution. At the national level, this measure is mechanically related to the slope "rank-rank", however, when the analysis is performed by sub-areas, it is an absolute result, because the revenue in a given area has little effect on national distribution.
2. The probability of moving from the lowest quintile to the highest quintile of the distribution. This type of analysis can be useful when measuring in areas of smaller size to the national total.
3. The probability that the child of a family that was in the 25th percentile, pass the poverty line.

As the author mentions (Chetty et al., 2014), it is necessary to consider different measures of mobility, since each of the tools has a subjective component that can give a specific result.

Methodology for analysis

As mentioned above, the analysis through the rank-rank regressions allows us to avoid problems of the size of the sample. Also, this type of analysis can be extended to other dimensions, such as occupation and education, as long as they are in

continuous variables and can be ranked. Also, this category of tool is useful for the regional analysis because the same regression allows calculating absolute mobility measures.

Therefore, and due to the nature of the regional analysis of this article, it was decided to follow the rank-rank regression methodology to calculate relative mobility and absolute upward mobility, through Ordinary Least Squares (OLS) since they provide more robust specifications and are statistically suitable for comparisons between areas (Delajara & Graña, 2017). For region *c* and family *i,* the linear relationship is defined as:

$$(2)\ R_{ic} = \propto_c + \beta_c P_{ic} + \varepsilon_{ic}$$

Where R_{ic} is the percentile rank occupied by the child of a *i* family and *c* region in the national distribution of the present generation, and P_{ic} is the percentile rank occupied by the father of *i* family and the *c* region in the national distribution of the previous generation. The intercept will vary by region, so it will be understood that the degree of relative intergenerational mobility will be the difference between the expected percentile rank (in its respective distribution) of the children born in the highest percentile and the lowest of the national distribution. of the previous generation: $\overline{R_{100,c}} - \overline{R_{0,c}} = 100\beta_c$. In general terms, if the result is closest to cero means that expected percentile rank of the parent "defines less" the expected percentile rank of the child.

Additionally, the absolute mobility of the *p*-percentile of origin refers to the mean of the rank in the national distribution of the present generation that the children of those parents who were in the *p*-percentile of the national distribution of the previous generation and who have achieved a movement given by: $\overline{R_{p,c}} = \propto_c + \beta_c p$. Specifically, we will refer to "upward absolute mobility" as the expected range in the distribution of the present generation of those parents who were below the

median of the distribution in the previous generation, represented by the 25th percentile: $\overline{R_{25,c}} = \propto_c + \beta_c 25$.

As Chetty *et al*. (2014) mention in their work, the rank- rank relationship is approximately linear, since the ranks of each parent and child average are 0.5 per construction in the national distribution.

In summary, the present research will use the rank-rank regressions, since they allow obtaining estimates not only of relative mobility but also of absolute mobility that can be compared between geographical areas of the country. The latter is critical, due to the regional approach according to the exposure to trade openness, which can affect both types of mobility in the country differently.

Data

The ESRU Survey on Social Mobility in Mexico 2011 (EMOVI - 2011), used in this article, is representative for women and men between 25 and 64 years of age, with a total of 11,001 individuals (4,990 women and 6,011 men). It contains information on the sociodemographic characteristics of the interviewees, schooling, employment, income and household assets. It also collects retrospective information on the part of the interviewees about education, jobs and household assets of their parents, when the interviewees were 14 years old.

Also, the survey reveals the region of origin and the current region of residence, which may differ due to internal migration. For the present analysis, the current residence region is used, because it is assumed that the economic structure of this location has an essential influence on adult life, especially for the choice of occupation. Therefore, the analysis results and the differences between regions in absolute upward mobility will be allocated to the region where the individual currently resides.

The original data reported by the survey for education and occupation are presented in categorical variables, which does not allow an analysis through regressions. For this reason, we follow the methodology used by Velez Grajales & Behrman. (2015)

to transform the discrete variables into continuous variables, which is described below:

- **Education:** Academic grades are converted into full years of schooling per individual, according to what the respondent answered in the survey. The interviewees who did not respond or did not remember the degree of their parents' studies were eliminated; this is why the number of observations is less than the total of the respondents.

Occupation: The International Socioeconomic Index of Occupational Status (ISEI) proposed by Ganzeboom et al. (1996) is used, which performs an occupational classification based on the skills and attributes required to complete the activities of the jobs. This is based on the International Standard Classification of Occupations (ISCO-88) "which is a classification of four levels. The first level distinguishes nine major groups, within which there are three subsequent levels, 28 sub-major groups, 116 smaller groups and 390 unitary groups " (Velez-Grajales & Berhman, 2015). Because the survey contains the ISCO-88 classification to perform the occupational analysis, it is used the ISCO-ISEI conversion tool developed by Ganzeboom *et al*. (1992) and adapted for Stata by Hendrickx (2002). Following the work of Velez Grajales & Behrman (2015), the analysis is done only for the men, because about half of the women report as housewives and the comparisons are made for individuals between 31 and 53 years of age because young people change their occupation more frequently.

IV. Results

In this section, the results of relative mobility and absolute upward mobility in two dimensions are estimated: education and occupation. The relative intergenerational social mobility at the national level and by regions of interest are calculated and described. After, the same is done by each cohort.

It should be noted that employment rates were calculated only for the male population because most of the women had unpaid household occupations. The analysis by cohort is done dividing the sample into two groups, under the assumption that individuals enter the labour market when they reach the age of majority in Mexico (18 years):

1. The cohort that at the time of the interview was between 25 and 41 years old, composed by individuals born between 1970 and 1986, and who entered the labour market between the years 1988 and 2004. This cohort corresponds to the years of liberalization and consolidation of dynamics of international trade.

The cohort that at the time of the interview was between 42 and 65 years old, composed by individuals who were born between 1946 and 1969, and who entered the labour market approximately in the years 1964 and 1987, prior to the period of trade opening.

IV.1 Education

In Table 1, it is identified the behaviour of intergenerational education mobility. Relative intergenerational mobility represents the difference in the expected percentile rank between the children of the richest and the poorest families in the national distribution of the current generation (Chetty *et al*, 2014; Delajara & Graña, 2017). At the national level, it can be observed that there is a mobility of 43.77 points, having the least mobility rate the low exposure region, with a score above the national level (46.40 points), and being the region of high exposure the one that shows the greatest intergenerational mobility in education, with a difference of 0.98 points compared with the country level.

Table 1. Linear Relation between Child and Parent Ranks: Education, 2011

Region	Alpha (α)	Beta (β)	R^2	t of β	Relative Mobility (r100-r0)	Absolute Upward Mobility (r25)	Obs
Population Aged 25 - 65 years old							
Mexico	25.28*** (0.384)	0.44*** (0.007)	0.27	59.25	43.77	36	9493.00
High	25.30*** (0.586)	0.43*** (0.010)	0.27	39.04	42.79	36	4187.00
Intermediate	25.76*** (0.645)	0.44*** (0.012)	0.28	35.75	43.59	33	3295.00
Low	24.53*** (0.829)	0.46*** (0.018)	0.26	26.40	46.40	39	2011.00
Population Aged 42 - 65 years old							
Mexico	20.33*** (0.550)	0.44*** (0.014)	0.23	31.57	43.99	20	3423.00
High	20.34*** (0.858)	0.43*** (0.021)	0.22	20.40	43.02	20	1467.00
Intermediate	22.03*** (0.914)	0.45*** (0.023)	0.24	19.47	44.61	21	1203.00
Low	17.83*** (1.152)	0.44*** (0.032)	0.21	13.94	44.05	30	753.00
Population Aged 25 - 41 years old							
Mexico	30.83*** (0.532)	0.38*** (0.009)	0.22	41.28	37.91	39	6070.00
High	30.82*** (0.801)	0.37*** (0.013)	0.22	27.39	36.99	39	2720.00
Intermediate	30.23*** (0.917)	0.39*** (0.015)	0.23	24.90	38.58	39	2092.00
Low	31.49*** (1.135)	0.40*** (0.022)	0.21	18.49	39.95	39	1258.00

Source: Own elaboration with data from the EMOVI 2011
*** = Significant at the 0.01 level | ** = Significant at the 0.05 level | * = Significant at the 0.10 level

When the analysis is done by cohort, it can be observed that the generation born between 1946 and 1969 presents a slightly lower relative intergenerational mobility (43.99 points), while the generation born between 1970 and 1986 reports greater mobility, standing at 37.91 points. Additionally, for both cohorts, the region with the highest mobility is the high exposure to trade openness region (43.02 and

36.99), located above the national score. Also, it is detected that while for the cohort from 42 to 65 years, the region with the least relative mobility is the intermediate exposure region (44.61 points), for the youngest cohort (25 to 41 years) the region of low exposure presents the least mobility, with 39.95 points.

The absolute mobility is analysed by calculating the expected percentile rank of those children from parents who were located in the 25th percentile of their distribution. In this sense, it can be found a progress of 11 percentiles for the interviewees (36 percentile), showing the low exposure region the highest upward absolute mobility (39 percentile), followed by the high exposure region (36 percentile). However, the analysis by cohort reveals interesting results, because for the youngest cohort (25 to 41 years old) the same upward absolute mobility in education is observed in all the regions and at the national level, going from the 25 rank of the parents to the 39 for the children. This result reveals that there is a limit to absolute upward mobility, with an advance of 14 percentiles, suggesting that the obligatory nature of the basic education (primary and secondary) had had an important and homogeneous effect in the country, at least at statistical levels.

The above does not happen for the cohort from 42 to 65 years. The expected percentile for children from parents who were in the 25th is lower, ranking in the 20th percentile nationwide. The only region that presented an absolute upward mobility is the low exposure to trade liberalization region, with an expected 30 percentile rank, while the intermediate and high exposure regions were similar to the national average (20 and 21 respectively). This does not mean that the children will have a lower level in years of schooling because the analysis reflects the expected rank, no the completed years. In other words, although they may have a greater number of educational years compared with their parents, their position in the distribution inside their own generation is lower, suggesting that, in this cohort, the greatest mobility was due to individuals positioned at higher levels of the distribution.

Exposed these results, it can be inferred that indeed, the region of high exposure to trade openness has a greater relative intergenerational mobility in the

educational dimension, however, the difference with the rest of the regions is not very significant (0.8 points compared with the intermediate exposure region and 4.01 points with the low exposure region). However, absolute upward mobility reflects interesting results, because the region with the greatest mobility is the region of low exposure. This can be explained due to the expansion of primary and secondary education, especially in states that had an important educational gap, which coincide with the states that compose the region of least exposure to international trade. The pattern for relative mobility followed in the present regionalisation is similar to the one found in the work of Delajara and Graña (2017). Nonetheless, in the case of absolute upward mobility, an inverse behaviour is found, with the low exposure region presenting the biggest change, that corresponds, approximately, to the south region considered in their work.

IV.2 Occupation

To perform the occupation analysis, it should be noted that due to the elimination of people who did not have an occupation (both interviewed and their parents), as those who did not remember the work of their parents, as well as the concentration of this article only in the male population (because more than half of the women were housewives or had an unpaid employment), the sample is importantly reduced, obtaining only 3,822 observations for the whole country. Nevertheless, the results can provide interesting information and can open the lines of research for future studies, with broader databases.

Table 2. Linear Relation between Child and Parent Ranks: Occupation, 2011

Region	Alpha (α)	Beta (β)	R^2	t of β	Relative Mobility (r100-r0)	Absolute Upward Mobility (r25)	Obs
Male Population Aged 25 - 65 years old							
Mexico	34.11*** (0.778)	0.27*** (0.014)	0.08	18.34	26.50	44	3822.00
High	39.44*** (1.305)	0.17*** (0.023)	0.03	7.47	17.28	28	1624.00
Intermediate	32.67*** (1.310)	0.29*** (0.024)	0.10	12.03	29.03	44	1332.00
Low	29.80*** (1.442)	0.36*** (0.030)	0.14	11.77	35.52	48	866.00
Male Population Aged 42 - 65 years old							
Mexico	32.41*** (1.248)	0.27*** (0.026)	0.08	10.59	27.38	36	1241.00
High	37.01*** (2.082)	0.25*** (0.040)	0.07	6.21	24.83	46	511.00
Intermediate	33.10*** (2.067)	0.22*** (0.0424)	0.06	5.15	21.83	30	431.00
Low	26.97*** (2.361)	0.33*** (0.060)	0.09	5.57	32.84	31	299.00
Male Population Aged 25 - 41 years old							
Mexico	35.36*** (0.999)	0.25*** (0.018)	0.07	14.25	25.30	46	2581.00
High	40.99*** (0.136)	0.14*** (0.029)	0.02	4.71	13.57	26	1113.00
Intermediate	32.64*** (1.694)	0.31*** (0.029)	0.11	10.51	31.39	47	901.00
Low	32.07*** (1.823)	0.35*** (0.035)	0.14	9.73	34.50	46	567.00

Source: Own elaboration with data from the EMOVI 2011
*** = Significant at the 0.01 level | ** = Significant at the 0.05 level | * = Significant at the 0.10 level

In the first place (Table 2), regarding relative intergenerational mobility, it can be highlighted that the persistence in this dimension is less than in education (43.77) being the association at national level about 26.50 points for occupation. It can be seen that the region having the higher mobility is the region of high exposure, with only a degree of association of 17.28 points below the national level, followed by the region of intermediate exposure (29.3) and low exposure (35.52), in other

words, there is a very low influence of parent's employment regarding the kind of occupation that will have their children in the region of high exposure to trade liberalization, contrary to the region of low exposure, where the labour situation of the household of origin determines to a greater extent the occupational position of the individual. Through the analysis by cohort, it is possible to identify that this behaviour is mainly derived from the most recent generation (25 - 41 years), where a very low association (high relative intergenerational mobility) is observed in the high exposure region, with only 13.57 points, with a marked difference with the nearest region (intermediate exposure) that has an association of 31.39 points. For the cohort of 42 to 65 years, the region that had a greater mobility (lower degree of association) is the intermediate exposure with 21.83 points compared with the region of high exposure that has a lower relative mobility (24.83 points) for this generation.

Despite the region of high exposure has greater relative intergenerational mobility; this behaviour differs when we refer to absolute upward mobility. In this case, it can be observed that, at the national level, the expected percentile rank is 44 for the population that has its household of origin in the 25th percentile. However, for the high exposure region the expected percentile rank is 28, only three percentiles above. The region with the highest absolute upward mobility is the region of low exposure, with an expected percentile rank of 48, that is, an advance of 23 percentiles. For the oldest cohort (42-65 years) the progress is lower, with an expected rank of 36 (only 11 percentiles above). Here it is necessary to highlight that, for the high exposure region, in this generation, the improvement is important, because here the expected rank is 46 (21 percentiles above) and even more than the national average for the cohort, while the intermediate region only presents an advance of 5 percentiles (rank 30). The picture changes when the analysis is performed for the youngest cohort, because here, the absolute progress is much lower for the high exposure region, advancing only one percentile (26), while for the intermediate exposure region the development is substantial, being in the 47th percentile.

The behaviour described above is consistent with the structural change in employment in Mexico caused by the trade liberalization, which concentrated Foreign Direct Investment only in certain states of the country, affecting differently generations and regions. The results in relative intergenerational mobility are congruent with what was expected, since it is in the high exposure region where major changes in the productive structure occurred, opening new job opportunities, with no significant relationship with the activities that previous generations performed in that region. In addition, normally these types of industries tend to have more competitive mechanisms for human resource selection, where the skills and knowledge of individuals have greater weight. Contrary with what happened in the region of low exposure, which was left with a different structure in its economy, less productive and with less added value, as well as with a more rigidity in the labour market.

However, it can be observed that, for the older generation, absolute mobility in the region of high exposure to trade openness was greater, which may be due to the development of some industries, without having so much contact with the international market, but that were caused by the transition from agricultural to industrial activities in Mexico during the period of Import Substitution. A different story reflects the younger generation, where there is almost zero absolute mobility, which may reflect two situations: 1) the absolute progress that the previous generation had was such that in the last cohort there was no possibility of going any further, 2) the new labour structure only allowed more relative mobility, but the position of the available positions did not really change.

V. Conclusions

The analysis of social mobility refers to the association between the origin and destination of individuals, in other words, the change of status position within a social group. The main objective of this article was to identify the interaction of economic openness and social mobility, using a regional analysis that could capture both. Specifically, it was attempted to find heterogenous patterns of absolute and

relative intergenerational social mobility across regions and age cohorts, that were sectioned according to its relationship with trade liberalization. This article uses the rank-rank regression approach, which, according to the evidence, is more stable compared to other measures as the intergenerational income elasticity or the intergenerational regression coefficient. However, these conclusions are based in works using panel data or parental income information, different from the data used in this work (Emran & Shilpi, 2019).

The analysis was made for two dimensions of social mobility: education and occupation. Firstly, it was observed that the region of high exposure to trade openness has a greater relative intergenerational mobility in the educational dimension, nonetheless, the differences among regions were not important. Additionally, absolute upward mobility showed interesting results, because, the region with the greatest mobility is the region of low exposure. Also, for the cohort analysis, the youngest generation presented a slightly higher relative mobility. This can be explained due to the expansion of primary and secondary education, especially in states that had an important educational gap, which coincide with the states that compose the region of least exposure to international trade.

Finally, occupation presents also a similar patter, however, the difference among regions is more important: for example, the high exposure region presents a degree of association between parents and children of 17 points while the low exposure region presents an association of 36. If it is observed by cohorts, it can be realized that this is driven by the youngest generation. Additionally, for the absolute upward mobility, it can be observed that the high exposure region presents the less movement, going from 25 to 28, while the low exposure region goes from 25 to 48. The behaviour described above is consistent with the structural change in employment in Mexico caused by the trade liberalization, which concentrated Foreign Direct Investment only in certain states of the republic, affecting differently generations and regions. In addition, normally these type of industries tend to have more competitive mechanisms for human resource selection, where the skills and knowledge of individuals have greater weight. Contrary with what

happened in the region of low exposure, which was left with a different structure in its economy, less productive and with less added value, as well as with a more rigidity in the labour market.

Although this work cannot determine a causal relationship, the results identify an important correlation between the trade openness and social mobility, finding a clear pattern of higher mobility in all the dimensions in the high exposure region and also, more mobility for the youngest cohorts. These regions are determined more by geographical characteristics, without considering other factors, as its relationship with the trade openness. Additionally, for cohort analysis, and as Yalonetzky (2015) highlights, there is a monotonic increase in the educational mobility for all the cohorts, non-interrupted, but with different dimensions for the youngest generation. Also, for occupation mobility, it should be noted that even if there are different patterns of mobility by cohorts, it would be necessary to include controls by education to determine if this difference is only by economic structure or by other characteristics (Toro, 2015).

This article provides useful and interesting information for regional and cohort analysis in Mexico, the impact of trade liberalization in socioeconomic variables others than growth rate, poverty and wage dispersion, and finally, a deepest research of social mobility that considers the location and its economic characteristics. This works opens a line of research that can extend the interaction between social mobility and other macroeconomic variables, that can affect differently specific locations. It should be noted that this work may be limited due to the number of observations of the data and the problem of recall bias of the respondents because large part of the survey information is retrospective. However, the findings encourage the production of new bigger and state representative data bases in this topic, that can allow to identify a more specific trend in this area through spatial econometrics analysis, for example, considering more specific interactions in cities or smaller regions, that combined with administrative data, can control for other determinants like the specific sectors where the parents and children were employed.

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