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Still Looking for The Land of Opportunity: Regional Differences in Social Mobility in Mexico[1]

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Abstract

The present study documents the heterogeneity of intergenerational mobility among Mexico's 32 federative entities. Given the lack of information pertaining to regional disaggregation, two data sources that together cover the required information and representativeness were matched: the *ESRU Survey of Social Mobility in Mexico 2011* (EMOVI-2011) and the *National Nutrition and Health Survey 2012* (ENSANUT-2012). Mobility is measured with reference to a wealth index that is calculated using the Multiple Correspondence Analysis (MCA) method. The observed heterogeneity was found to be consistent with recent studies of the USA by Chetty *et al.* (2015). Such heterogeneity points to the existence of differences in opportunity among people in Mexico, not only at an urban-rural level, but also at the regional one. This result indicates the need for future surveys to collect primary information, in order to ensure the possibility of regionally disaggregating social mobility measures.

Key words: social mobility, wealth index, Mexico, regional disaggregation.

JEL Codes: D31;I30; J62; O18; R10

Resumen

Se documenta aquí la heterogeneidad de la movilidad intergeneracional en las 32 entidades federativas de México. Se combinaron dos fuentes de datos distintas para lograr alcanzar el nivel de representatividad estadística deseado: la *ESRU* Encuesta de Movilidad Social en México 2011 (EMOVI-2011) y la Encuesta Nacional de Salud y Nutrición (ENSANUT-2012). La movilidad se mide en base a un índice de riqueza que es calculado usando el Método de Correspondencias Múltiples. Se econtró que la heterogeneidad observada es consistente con estudios recientes para Estados Unidos realizados por Chetty *et al.* (2015). La heterogeneidad encontrada documenta que existen diferencias de oportunidadess entre la población mexicana, no sólo en el contraste rural-urbano, sino también a nivel regional. Este resultado muestra la necesidad de realizar encuestas a niveles subnacionales que recojan información relevante para poder medir la movilidad social..

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1. Introduction

Mexico is a country with two recognised problems in terms of social issues: high levels of poverty (approximately 50 per cent of Mexican households are poor), and high inequality (with a Gini coefficient of around 0.5). In such a context, the most recent evidence on Mexico reveals a country where relative intergenerational social mobility is low at the extremes of the socioeconomic distribution (Vélez, Campos and Huerta, 2013). That is, the options for leaving one's socioeconomic origin, if the latter lies at the low or high end of the distribution, are limited. That being said, a pending subject in the analysis of mobility is the identification of differences between the diverse regions of the country. To this end, Chetty et al. (2015) previously questioned whether or not the qualification of 'the land of opportunity' generically assigned to the United States was true. They argue and find empirically that the North American country is not a homogeneous place, but that it presents degrees of intergenerational mobility differentiated by its regions, where some of them effectively are the 'land of opportunity', but not all. It can be said that, due to its implications in contemporary literature, this regional disaggregation exercise carried out by Chetty and his co-authors constitutes a watershed in studies on intergenerational mobility.

The objective of the present work is to generate disaggregated measurements at the state level of Mexico, which then allow for the measurement of relative mobility between two generations in terms of a 'wealth index'. In Mexico, although there exists a tradition of generating information for the study of social mobility that began around half a century ago, there is still no inclusion of national measurements that include disaggregated comparability at the regional level. Given the historical dynamics of the subject as it has been studied, there emerged the need to expand representativeness on social mobility to the national level. Throughout this undertaking, however, the possibility of understanding regional and local characteristics was lost. In this sense, the research of Chetty and his co-authors invites the recovery of that possibility, but with a unique characteristic: that regional and local realities can be mutually compared. In this regard, performing an exercise similar to that of the United States is still a pending task. It should be noted that the Mexican case is different to the American one in the sense that economic development realities in these two countries are very different.

Given the lack of information containing the required representative characteristics, alternatives can be explored. The one chosen for the current exercise was the use of statistical tools to make estimates that would then allow the generation of regionally disaggregated results. To do so, two sources of data were matched: the *ESRU Social Mobility Survey in Mexico 2011* (EMOVI-2011) and the *National Health and Nutrition Survey 2012* (ENSANUT-2012). While the EMOVI-2011 survey enables the construction of a wealth index for two generations, it does not contain statistical representation beyond the national level. For its part, the ENSANUT-2012 survey can be disaggregated at the level of each of the 32 federative entities, but does not contain retrospective information with which to construct the wealth index for the households of origin of the adults interviewed. Thus, by harnessing both of these sources, and based on a simple

pairing exercise, results can be obtained as to the degree of relative mobility across Mexico's 32 states.

The wealth index was constructed based on information about tenure and access to household goods and services. Since we were not dealing with continuous variables, we opted for the Multiple Correspondence Analysis (MCA) method, following the approaches of Vélez, Vélez and Stabridis (2012) and Vélez and Stabridis (2013). The matching exercise between the two sources, undertaken in order to impute the wealth index of the generation of origin in the ENSANUT-2012, and thus to be able to disaggregate the estimates at the state level, was conducted on the basis of ranking, age and gender characteristics. As reported in the robustness tests, the comparison between the social mobility estimations undertaken using the EMOVI alone, and the ones obtained using the resulting database of the matching exercise, revealed that these estimations were similar.

The results show Mexico to be a country with heterogeneous intergenerational mobility patterns across its federative entities. For example, Oaxaca demonstrates an intergenerational persistence rate in the lowest wealth quintile, more than two times that observed at the national level. In contrast, this proportion is 0.39 for the state of Jalisco. With regard to the extent of upward mobility, the possibility of being born in the lowest quintile and then reaching the highest varies widely across the states. Thus, while in Mexico City (Distrito Federal) this proportion represents three times the national level, the state that follows it in this classification, Jalisco, demonstrates one that is two times less. Meanwhile, at the other extreme are states like Oaxaca and Chiapas, which do not reach a proportion beyond the national 0.2. The observed results are consistent with those obtained by Chetty et al. As well as in the American case, Mexico results in a country in which one's region of origin becomes a significant circumstance that differentiates individuals' life achievement options. As a result, a direct implication is the necessity to design and implement policies in order to eliminate the effect of such a circumstance. To do so, however, further research is needed to identify the mechanisms behind this process.

Regarding the characterisation of the results, although the rates of mobility were constructed in relative terms, when these were disaggregated at the state level they also captured an absolute component. This is due to the fact that the quintile thresholds were determined in terms of the national ones to ensure comparability between the federative entities. This has two implications. The first is positive, since relative mobility by federative entity was evaluated in relation to average national advances. On the other hand, the fact of establishing national thresholds engendered a loss of detail with regard to the degree of social fluidity in local dynamics. With regard to these local dynamics, however, it should be mentioned that the ENSANUT-2012 survey, which is the database that allows for state disaggregation, does not contain information by which to differentiate individuals by their migration condition (state of origin is not reported).[2]

The remainder of this paper is organised as follows. The next section provides a brief review of the literature on social mobility with regional disaggregation. The third section describes the prevailing situation of intergenerational social mobility in Mexico, as well as the primary data sources in the country that exist on this subject. Following this, the data sources to be used in the regional disaggregation exercise are presented, alongside the definition of mobility in terms of its size and type, and the methodology to be used. The fifth section presents the national and disaggregated results at state level. The robustness of the estimates is discussed in the sixth section. Finally, the paper is concluded and future recommendations for generating information and analysis are proposed.

2. Studies on social mobility with regional disaggregation

In the literature on intergenerational social mobility containing regional comparisons, efforts have concentrated on two dimensions of analysis: education and income. In general, in the case of developing countries, such literature has been able to advance more in the education dimension, since statistics are more commonly available in this area. In particular, the studies that stand out most

[2] If thresholds were to be defined based on the own distribution of each state, the comparability of relative mobility across them would be lost. Relative mobility was estimated based on the wealth index for two generations for each of the 32 Mexican states, whereby lower intergenerational persistence was observed at the bottom of the distributions, while the opposite happened in the top quintiles.

are those of Ray and Rajareshi (2010) in the case of India, and those of Bonilla (2010) and Galvis and Meisel (2014) in the case of Colombia.

In the study on India, the authors analyse absolute intergenerational mobility among different castes and between different regions in the period 1993-2004. The authors find that, despite evidence of a general improvement in the average education of both parents and children throughout the analysis period, the differences between those in high and low social strata persisted. Moreover, in addition to the latter, in regional terms they find that the probability of children superseding their parents' education is much higher in the prosperous regions than in the poor, by almost 50 percentage points.

In the study on Colombia, and unlike that on India, Bonilla concentrates on analysing the differences between regions in terms of relative intergenerational mobility. The results show that the rates of educational mobility are higher in rural than in urban areas, which is explained by the fact that the initial average levels of education in the latter are higher and, therefore, absolute improvements by themselves do not necessarily translate (as in the rural case) into a better position. However, based on the research of Galvis and Meisel, when disaggregating them regionally for the period 2001-2011 the advances observed in the country's absolute mobility are characterised by great heterogeneity. In fact, a positive correlation is found between average education and educational mobility between the regions, which suggests a tendency towards polarisation in this dimension. In addition, given the outcomes of this study, it should be emphasised that when estimating a variable outcome regarding quality of life in order to then measure absolute mobility, there are high persistence rates at each end of the distribution, as well as a predominance of downward mobility in the middle part of the distribution.

With regard to a regionally disaggregated analysis in terms of income, this is an approach that has taken great hold in the study of intergenerational mobility in the North American case. It may be said that this has been made possible, among other elements, thanks to the availability of and access to administrative fiscal data, which then allows for following up with parents and children even when there are changes of residence. The major studies referred to are those of Chetty et al. (2014), Chetty et al. (2015), Chetty and Hendren (2015) and Chetty, Hendren and Katz (2016).

As for the type of intergenerational mobility these studies estimate, it is worth mentioning that they adopt a measure of relative mobility in terms of percentiles, making it possible to identify the probability with which children will reach a higher position than their parents at that particular level of disaggregation. In the first study, in 2014, the authors found that although mobility rates for the cohort born in the 1970s did not change in comparison to the later ones, there was an increase in inequality. This implies that birth order is important in terms of the distance to be travelled in order to achieve a better relative position on the socioeconomic ladder.

For their part, Chetty et al. (2015) find significant differences in the degree of intergenerational mobility across over 700 geographical areas of the country. In order to identify these differences, their analysis focuses on characteristics common in the literature: residential segregation, the quality of primary schools and income inequality, among others. The observed heterogeneity is significant. As the authors report, a child who comes from the lowest income quintile in San Jose, California, is three times more likely to reach the highest income quintile than a child from the same quintile of origin but born in Charlotte (12.9% versus 4.4%). Along the same lines, Chetty and Hendren (2015) also find that the longer one's exposure in better-off neighbourhoods, the greater the effects on life achievements, both for those native to the neighbourhood and those moving there. In the later work of Chetty, Hendren and Katz (2016), however, this last result is qualified, since they find that the positive effects apply to those who move before the age of 13 years.

3. Social mobility in Mexico: context and existing data sources

a. Social mobility in Mexico

Mexico is characterized by low levels of social mobility at the extremes of its socioeconomic distribution. This is illustrated by the *Report on Social Mobility in Mexico 2013: Imagine Your Future* (Vélez, Campos y Huerta, 2013), edited by the Espinosa Yglesias Research Centre (CEEY).[3]

[3] In 2014, an English version of this report was published and is available here: http://www.ceey.org.mx/reporte/report-social-mobility-mexico-imagine-your-future (12/30/2016).

On the structural causes of this national pattern, for example, Serrano and Torche (2010) argue that among the main barriers to upward mobility are child labor, coming from isolated rural areas, or the indigenous ethnic status itself. Campos and Vélez (2014), on the other hand, refer to gender differences in a context of low female labor participation.[4] From their results, it can be inferred that the household role model is transmitted from generation to generation; therefore, the condition of non-labor participation by the mothers of Mexican adults has an inhibiting effect on such participation of couples among these adults. Moreover, in the same sense, they find that the condition of non-labor participation of the mothers of adult Mexicans has negative effects on the equal allocation of resources by gender to the next generation, that of their children.

With regard to the educational dimension, Solís (2015) identifies differences in the probability of completing the entire educational cycle, depending on whether basic private and public education was attended. In short, this study finds that those attending basic public education are less likely to complete the entire educational cycle. In addition, among these Mexicans, the probability of achievement is lower for those attending the afternoon school shift. Given the above, one consequence of not eliminating barriers to social mobility is, for example, that the options for such mobility are reduced for the younger age groups (Behrman and Velez, 2015). More recently, and based on different sources of information, the *Mexico 2016 Human Development Report: Inequality and Mobility* (*Informe sobre desarrollo humano México 2016: desigualdad y movilidad*) (PNUD, 2016) reports that, although inequalities in aspects such as health and education have decreased, this has not happened in the context of income and, therefore, mobility in socioeconomic achievement has been limited.

b. Existing sources of information

In Mexico, there exists a whole tradition of information surveys that permit the analysis of social mobility. The survey coordinated in 1965 by Balán, Browning and Jelin (1977), the *Survey on Social Mobility and Geography in Monterrey*, can be considered the pioneering study on the subject in the country. As its title implies, the work is confined to a particular metropolitan area. With the passage of time, the coverage of this type of study expanded. Thus, in 1994, a module was included in the *National Survey of Urban Employment* (ENEU) which, as its name indicates, guarantees representativeness for the country's urban areas.[5] In 1998, the *Retrospective Demographic Survey* (EDER) was drawn up, which analyses the life histories of three Mexican birth cohorts (1936-1938, 1951-1953, 1966-1968), from a representative sample at the national level. In particular, the EDER aims to: "collect individual information on the temporal nature of the social and demographic processes experienced by Mexico during the second half of the twentieth century, as well as on the interrelationships between different demographic phenomena in people's life trajectories."[6] With a sample size similar to the previous one, but designed as a module of the *National Survey of Occupation and Employment* (ENOE), in 2011 the EDER survey was reactivated. On that occasion, the focus was on two of the three target birth cohorts of 1998, 1951-1953 and 1966-1968, in addition to those born in the period 1978-1980.

In 2006, the Espinosa Rugarcía Foundation (ESRU) commissioned a survey to analyze intergenerational social mobility with national representation which, unlike the EDER, had a significantly larger sample size. In this way, from a sample of around 3200 people in the EDER-1998 survey, for the year 2006 the *ESRU Survey of Social Mobility in Mexico* (EMOVI-2006) attained 7288 valid interviews and was representative of male household heads. In addition, a second commitment established in the ESRU through the CEEY was to carry out comparable surveys over time. Thus, in 2011, and with the aim of also obtaining a representative sample for women, as in the case of the EDER, the sample reached 11001 valid interviews. It should be mentioned that in the case of the EMOVI-2011, the defined sub-strata of interest were men and women, and household heads and non-heads.[7]

In all the aforementioned cases, and related to the purpose of the current paper, the available data sources do not contain the possibility of measuring intergenerational social mobility in a way that enables regional

[4] In their study, these authors note that female labor participation is positively correlated with these females' parents' education level.

[5] At the time of writing the current paper, it was not yet possible to access the survey's databases.

[6] Taken from the survey site at: http://www.colef.mx/eder/ (08/30/2016).

[7] Details of the survey can be found in the appendix to the *Report on Social Mobility in Mexico 2013: Imagine Your Future* (Vélez, Campos and Huerta, 2013).

comparisons. As a result, and in order to undertake the EMOVI-2017 survey, the ESRU and CEEY agreed to conduct a representative survey of at least four major regions of the country (four or five), held during the months of May and June, 2017. It is here also worth mentioning that during the 2016 *National Household Survey* (ENH), the National Institute of Statistics and Geography (INEGI) of Mexico included a thematic module on intergenerational social mobility.[8] The ENH, among whose main objectives is understanding the living conditions of the Mexican population, is based on a nationally representative sample with geographical breakdown at the level of the federative entity (32 states). As far as information was available, the thematic module of mobility was applied in the field over two consecutive quarters, to a total of approximately 32 thousand homes and with an average of 1000 cases per federative entity. That being the case, it was necessary to await the publication of the database and the methodological documents of the ENH-2016 survey, announced around the middle of 2017, in order to ascertain the scope of regional disaggregation that the survey could offer.

4. Strategy and estimation steps

Since there currently exist no surveys of intergenerational social mobility that can be regionally disaggregated, we sought to do so using a combination of data sources that have some information in common and which, in short, include all that was required to carry out the desired exercise. Since the purpose of this work was to achieve state-level estimates, two data sources were combined: the ENSANUT-2012 survey, which guarantees state disaggregation, and the EMOVI-2011 survey, which includes retrospective intergenerational information. In order to make the estimates, wealth indices for two generations were calculated based on household assets and services, using the Multiple Correspondence Analysis (MCA) method.

This strategy was composed of three stages. The first involved the construction of a wealth index for the contemporary generation based on the survey with disaggregated representation, but without retrospective information—that is, ENSANUT-2012. Secondly, the same was done with the less disaggregated survey but with retrospective information, in this case the EMOVI-2011, with the addition of the construction of a wealth index for the respondents' parents' households (i.e., the previous generation). Finally, the third stage involved the matching of the two data sources based on the contemporary wealth index, so that the index of the previous generation could be imputed from the EMOVI-2011 to the ENSANUT-2012 survey. From there, it became possible to present descriptive statistics results, enabling the classification of the federative entities in terms of their levels of relative intergenerational mobility.[9]

a. The Multiple Correspondence Analysis Method (MCA)

In order to estimate the relative rates of mobility, wealth indexes were constructed for two generations. The wealth index was calculated based on household services and assets. In the literature, asset indices are considered approximations of households' permanent incomes. Thus, for example, Torche and Spilerman (2010) argue that an accumulation of wealth increases consumption and reduces the vulnerability of households. In the same way, Sahn and Stiffel (2003) argue that asset indices are good indicators of the dynamics of poverty, since the accumulation of these indicators adequately predicts the reduction of the latter. Having said that, it also has to be recognized that indices such as the one proposed here have their limitations. In particular, these types of indices do not necessarily capture the whole dimension of wealth.

The current wealth indices, constructed on the basis of household services and assets, were estimated using MCA. This method, according to Greenacre and Blasius (1994), was originally developed by the French statistician Jean Paul Benzécri. The technique, called correspondence analysis, was initially used in the study of contingency tables with two variables, but when extended to a greater number of variables was renamed to encompass multiple correspondences (Peña, 2002).

MCA is similar to other commonly used methods, such as Principal Components Analysis (PCA), but is more appropriate when only qualitative variables are available, whose values are defined as classes. In the case of the PCA, the maximization of variability among the variables is constructed using euclidean distances. However, when working with categorical values and, in the particular case

[8] For details on this national survey, please see: http://www.beta.inegi.org.mx/proyectos/enchogares/regulares/enh/2015/default.html (12/30/2016)

[9] These results are reported in the appendix.

of MCA, variability—in this case termed 'inertia'—this is obtained from the so-called Ji-square distance, which is based on the relative frequencies of each category of each variable (Greenacre, 2007).

When applying MCA, components termed 'dimensions' are generated from a linear combi-nation of variables (whereby variables adopt the values of 0 or 1). Each of these dimensions explains a proportion of variability. In the case of the selected method, such variability is termed 'inertia'. The number of dimensions to be included in an index will depend on the percentage defined as the minimum threshold of the explained inertia. For the present case, this minimum value was set as 80%.

Vélez, Vélez and Stabridis (2012) and Vélez and Stabridis (2013) have constructed estimates of intergenerational mobility in Mexico based on wealth indexes calculated using MCA. In the first study, the estimates were made based on the EMOVI-2006 survey data, with the second using EMOVI-2011 data as its source. In both cases and unlike the present study, the objective was to make estimates for the total national population without any territorial breakdown. The estimation methodology used in the current paper was drawn from both of these studies, in particular from the second, and is here reproduced.[10]

b. Data source characteristics

As previously mentioned, in order to carry out the disaggregation by state, it was necessary to combine two data sources containing the necessary characteristics to do so. Thus, ENSANUT-2012 data that contains state representation was first selected. The second source was EMOVI-2011 data which, despite not sharing this characteristic, can be seen as more advanced than the ENSANUT-2012 in the sense that it contains information enabling the construction of an index for the generation prior to that of the interviewees themselves. The ENSANUT-2012 is a survey carried out by the National Institute of Public Health, representative at national and state levels, which collects information on the health and nutrition status of the Mexican population, taking into account socioeconomic levels and geographical distribution. The survey includes information on the use of public health programmes, reproductive health, and diseases such as diabetes, hypertension and obesity. The information was collected in 50,528 households for 96,031 respondents from all of the federative entities, with differentiation between rural and urban areas.

The second data source used, the EMOVI-2011 survey, is representative at the national level for men and women, household heads and non-heads, and for the age group 25-64 years. Due to the explicit design objective pertaining to the measurement of intergenerational social mobility in Mexico, and being a cross-section, the EMOVI-2011 survey includes both contemporary and retrospective information (the latter pertaining to when the respondent was 14 years old), which enables an understanding of the socioeconomic conditions both of the adult respondent's home of origin and their current one. The sample includes a total of 11,001 individuals. In spite of having these characteristics, and as previously mentioned, the limitation of EMOVI-2011 lies in its lack of possibilities for regional disaggregation, for which an alternative source—in this case, the ENSANUT-2012 survey—was required. The latter benefits from a larger sample size and the necessary representativeness to be able to disaggregate the results at the state level.

c. Wealth indices' components and imputation exercise

The wealth indices were composed of asset-holding variables and household services for two distinct generations. The ENSANUT-2012 contemporary index was based on 14 dichotomous variables: *owning another house, TV, cable TV, refrigerator, stove, washing machine, boiler, computer, internet, microwave, landline, mobile telephone, car, water tank and iron*. The same contemporary index, but based on the EMOVI-2011 survey, included the same variables except for cistern and iron, adding vacuum cleaner and toaster instead. Finally, the retrospective index for the EMOVI-2011 was based on 10 tenure variables: *stove, washing machine, refrigerator, TV, boiler, vacuum cleaner, toaster, domestic piped water, bathroom and electricity*.

The pairing of the ENSANUT-2012 and EMOVI-2011 surveys using the contemporary indexes was straightforward, and was conducted via three variables: the constructed index twentile, the birth year of the main informant,

[10] For further study of the methodological details of the multiple correspondence estimation applied in the current paper, the following studies can be reviewed: Vélez, Vélez and Stabridis (2012) and Vélez and Stabridis (2013). A methodological note on the estimation made by Vélez and Stabridis (2013) can be found in the annex of the *Report on Social Mobility in Mexico 2013: Imagine Your Future* (Vélez, Campos and Huerta, 2013). In particular, and in relation to the explained inertia mentioned in the text, a threshold of 80%, was also used.

and the sex of the same. Thus, for example, a person from the ENSANUT-2012 was paired with another from the EMOVI-2011 if both belonged to twentile 13 of the respective classification in their contemporary wealth index, were women, and were born in 1973. From there, the retrospective index information from the EMOVI-2011 survey was imputed into the ENSANUT-2012. This process yielded a total sample of 82,467 cases. Table 1 presents a summary of the statistics disaggregated at state level for the resulting merged contemporary variables used to estimate the wealth index.s[11]

[11] Annex 3 reports the results of the MCA estimation for both interviewees and their parents.

Table 1. Used Variables for the Contemporary Wealth Index. EMOVI-ENSANUT

State	stats	TV	TV-Cable	Refrig.	Stove	Boiler	Internet	Microwave	Cell Phone
AGS	Mean	0.9866	0.3395	0.9407	0.9864	0.5186	0.2550	0.5139	0.8008
	St. Dev.	0.1149	0.4736	0.2363	0.1157	0.4997	0.4359	0.4999	0.3995
BC	mean	0.9833	0.5295	0.9668	0.9786	0.5475	0.3874	0.6718	0.8745
	St. Dev.	0.1283	0.4992	0.1791	0.1446	0.4978	0.4873	0.4696	0.3314
BCS	mean	0.9736	0.6021	0.9680	0.9632	0.4160	0.3602	0.5863	0.8884
	St. Dev.	0.1603	0.4896	0.1760	0.1882	0.4930	0.4802	0.4926	0.3149
CAMP	mean	0.9472	0.5956	0.8585	0.8315	0.1323	0.2263	0.3657	0.7073
	St. Dev.	0.2237	0.4909	0.3486	0.3744	0.3389	0.4185	0.4817	0.4551
COAH	mean	0.9777	0.3865	0.9718	0.9769	0.5876	0.2507	0.6273	0.8268
	St. Dev.	0.1476	0.4870	0.1655	0.1504	0.4924	0.4335	0.4836	0.3785
COL	mean	0.9715	0.4316	0.9516	0.9591	0.3232	0.3379	0.5173	0.8066
	St. Dev.	0.1665	0.4954	0.2146	0.1980	0.4678	0.4731	0.4998	0.3951
CHIS	mean	0.8385	0.1938	0.6767	0.6649	0.0640	0.0670	0.1762	0.5563
	St. Dev.	0.3681	0.3954	0.4678	0.4721	0.2448	0.2501	0.3810	0.4969
CHIH	mean	0.9505	0.3811	0.9502	0.9540	0.7580	0.2910	0.7082	0.8032
	St. Dev.	0.2170	0.4858	0.2176	0.2095	0.4284	0.4543	0.4547	0.3977
DF	mean	0.9808	0.3543	0.9482	0.9881	0.7680	0.4480	0.6738	0.8428
	St. Dev.	0.1372	0.4784	0.2217	0.1085	0.4222	0.4974	0.4689	0.3640
DGO	mean	0.9795	0.3435	0.9470	0.9581	0.6922	0.2059	0.5590	0.7228
	St. Dev.	0.1417	0.4750	0.2240	0.2005	0.4617	0.4045	0.4966	0.4477
GTO	mean	0.9825	0.3052	0.8904	0.9615	0.5316	0.1914	0.4650	0.7221
	St. Dev.	0.1311	0.4606	0.3125	0.1924	0.4991	0.3935	0.4989	0.4481
GRO	mean	0.9031	0.2289	0.8249	0.7240	0.0872	0.1092	0.2104	0.4806
	St. Dev.	0.2959	0.4202	0.3802	0.4471	0.2822	0.3120	0.4077	0.4997
HGO	mean	0.9571	0.3399	0.8523	0.8890	0.5978	0.1894	0.3404	0.7055
	St. Dev.	0.2026	0.4738	0.3548	0.3141	0.4904	0.3919	0.4739	0.4559
JAL	mean	0.9924	0.4853	0.9634	0.9808	0.6165	0.3440	0.5528	0.8258
	St. Dev.	0.0869	0.4999	0.1878	0.1373	0.4863	0.4751	0.4973	0.3794
MEX	mean	0.9730	0.2526	0.8615	0.9547	0.6035	0.2548	0.4928	0.7440
	St. Dev.	0.1621	0.4346	0.3455	0.2079	0.4893	0.4358	0.5000	0.4365
MICH	mean	0.9814	0.4147	0.8918	0.9301	0.5220	0.2091	0.4415	0.7185
	St. Dev.	0.1352	0.4928	0.3107	0.2550	0.4996	0.4068	0.4967	0.4498
MOR	mean	0.9680	0.3765	0.9020	0.9347	0.4592	0.2600	0.4136	0.6746
	St. Dev.	0.1759	0.4846	0.2973	0.2471	0.4984	0.4387	0.4926	0.4686
NAY	mean	0.9638	0.4397	0.9348	0.9548	0.2799	0.2360	0.4491	0.7299
	St. Dev.	0.1868	0.4965	0.2470	0.2078	0.4490	0.4247	0.4975	0.4441
NL	mean	0.9621	0.3517	0.9493	0.9573	0.5195	0.3514	0.6659	0.7722
	St. Dev.	0.1909	0.4776	0.2195	0.2022	0.4997	0.4775	0.4718	0.4195
OAX	mean	0.8393	0.2479	0.7036	0.6964	0.1638	0.1004	0.2155	0.4744
	St. Dev.	0.3673	0.4319	0.4568	0.4599	0.3702	0.3007	0.4113	0.4994
PUE	mean	0.9305	0.2589	0.7432	0.8688	0.4661	0.2205	0.3508	0.6539
	St. Dev.	0.2543	0.4381	0.4369	0.3377	0.4989	0.4147	0.4773	0.4758
QRO	mean	0.9769	0.4903	0.9081	0.9638	0.5766	0.3253	0.5463	0.7999
	St. Dev.	0.1502	0.5000	0.2889	0.1868	0.4942	0.4686	0.4980	0.4002
QROO	mean	0.9534	0.5854	0.8859	0.8617	0.1851	0.2798	0.4243	0.7422
	St. Dev.	0.2107	0.4927	0.3180	0.3453	0.3885	0.4490	0.4943	0.4375
SLP	mean	0.9169	0.2872	0.8278	0.8281	0.3645	0.1644	0.3997	0.6728
	St. Dev.	0.2761	0.4525	0.3776	0.3774	0.4814	0.3707	0.4899	0.4693
SIN	mean	0.9700	0.4817	0.9598	0.9674	0.2390	0.2757	0.5664	0.8140
	St. Dev.	0.1706	0.4998	0.1965	0.1776	0.4265	0.4469	0.4957	0.3892
SON	mean	0.9754	0.4886	0.9613	0.9629	0.4565	0.3414	0.6670	0.8133
	St. Dev.	0.1549	0.5000	0.1930	0.1889	0.4982	0.4743	0.4714	0.3897
TAB	mean	0.9502	0.3860	0.9003	0.8887	0.0695	0.1562	0.3300	0.7418
	St. Dev.	0.2175	0.4869	0.2997	0.3146	0.2543	0.3631	0.4703	0.4377
TAMPS	mean	0.9756	0.3974	0.9469	0.9527	0.2874	0.2637	0.5182	0.7814
	St. Dev.	0.1542	0.4895	0.2242	0.2124	0.4526	0.4407	0.4998	0.4134
TLAX	mean	0.9668	0.3783	0.7781	0.9595	0.6570	0.1985	0.3421	0.7040
	St. Dev.	0.1791	0.4851	0.4156	0.1971	0.4748	0.3990	0.4745	0.4566
VER	mean	0.9417	0.2882	0.8495	0.8025	0.2383	0.1827	0.3275	0.6519
	St. Dev.	0.2344	0.4530	0.3577	0.3982	0.4261	0.3865	0.4694	0.4765
YUC	mean	0.9542	0.4535	0.8419	0.7663	0.1782	0.2068	0.3615	0.7124
	St. Dev.	0.2090	0.4979	0.3649	0.4233	0.3828	0.4051	0.4805	0.4527
ZAC	mean	0.9828	0.3824	0.9176	0.9822	0.6837	0.1786	0.5289	0.6682
	St. Dev.	0.1301	0.4861	0.2750	0.1324	0.4651	0.3831	0.4993	0.4710

Source: Authors' own calculation using EMOVI-11 and ENSANUT-12 data.

5. Results

Using the wealth indexes, transition matrices were constructed allowing for the capture of relative intergenerational mobility; that is, changes in the position occupied by one generation in relation to the other. In the present case, quintiles were defined for the two generations analyzed. Thus, as shown in table 2, at a national level 36.5% of those born in the lowest quintile (quintile 1) remained there, while 8.6% of those born in that circumstance managed to reach the higher wealth stratum (quintile 5). In the same way, at the other extreme, there can be observed a rate of intergenerational persistence in the highest quintile of 55.6%, while long-term downward mobility—hat is, those who were born in the highest quintile and ended up in the lowest—represents 2% of this population. In summary, when comparing the relative mobility patterns at each extreme end of the distribution, one can observe a greater persistence in the high part than in the low. In addition, it can be seen that the possibilities of falling a long way are lower than the possibilities of advancing in the same magnitude from the bottom end of the distribution. It should also be noted that while quintiles 2 and 3 of origin show high rates of mobility, quintile 4 has a 29.7% rate of upward mobility, which is greater than any other type of change or persistence in relation to the original position.

Mobility matrix of the household wealth index for two generations, as percentages, Mexico, EMOVI-ENSANUT
(row distribution)

Wealth index of home of origin	Current household wealth index: Quintile 1 (lowest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (highest)	TOTAL
Quintile 1 (lowest)	36.5%	20.7%	19.8%	14.5%	8.6%	100.0%
Quintile 2	25.1%	23.1%	16.9%	20.7%	14.2%	100.0%
Quintile 3	12.9%	16.2%	24.4%	24.9%	21.6%	100.0%
Quintile 4	6.7%	14.5%	23.1%	26.0%	29.7%	100.0%
Quintile 5 (highest)	2.0%	5.8%	9.3%	27.4%	55.6%	100.0%

Source: Authors' own calculation using EMOVI-11 and ENSANUT-12 data.

With regard to state-level results, sample weights were applied as in the national case. Likewise, in the case of state matrices, the defined quintile thresholds were taken from the national results. As mentioned in the introduction, this decision had certain implications. On one hand, setting the thresholds in this way permitted the comparisons of results across states in terms of how they were changing relative to what was happening at the national level. On the other hand, not measuring relative mobility in relation to the thresholds derived from the magnitude of the distances within each state but, rather, in relation to the national ones, caused the state measurement to capture an absolute component, associated with national levels and not only with the composition of the distribution of each of the federative entities. The ensuing result can be observed when comparing entities with significantly different national position compositions, such as Mexico City and Chiapas (see table 3).[12]

[12] Annex 1 presents the matrices for the 32 federative entities.

Table 3. Mobility matrix of the household wealth index for two generations, as percentages, in Mexico City and Chiapas
(row distribution)

MEXICO CITY

Wealth index of home of origin	Current household wealth index					
	Quintile 1 (lowest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (highest)	TOTAL
Quintile 1 (lowest)	13%	19%	16%	27%	25%	100%
Quintile 2	7%	16%	16%	35%	26%	100%
Quintile 3	7%	12%	16%	29%	36%	100%
Quintile 4	1%	8%	13%	25%	53%	100%
Quintile 5 (highest)	0%	2%	6%	24%	69%	100%

CHIAPAS

Wealth index of home of origin	Current household wealth index					
	Quintile 1 (lowest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (highest)	TOTAL
Quintile 1 (lowest)	64%	22%	8%	5%	1%	100%
Quintile 2	54%	21%	14%	10%	1%	100%
Quintile 3	46%	23%	18%	11%	3%	100%
Quintile 4	19%	33%	24%	13%	12%	100%
Quintile 5 (highest)	12%	12%	16%	32%	28%	100%

Source: Authors' own calculation using EMOVI-11 and ENSANUT-12 data.

One way of identifying differences between the federative entities was to undertake a comparison of upward mobility and immobility rates at the bottom part of the distribution. To do so, and in order to establish the national value as a frame of reference, the ratios of state mobility in relation to the national one were calculated for two cases: (1) the persistence rate in the bottom quintile of each federative entity divided by the same rate at the national level; (2) the rate of upward mobility from the lowest to the highest quintile (long-range upward mobility) divided by the same rate at the national level.

As can be seen in figure 1, the rate of persistence in the lower part of the distribution ranges from 0.39 to 2.16 times the national rate, where one observed characteristic is that historically more disadvantaged states have the highest persistence rates: Oaxaca, Chiapas, Guerrero, Veracruz and Puebla. On the other hand, the lowest persistence rates—that is, where a lower proportion of people born in the lower quintile remained there—are concentrated in states such as Jalisco, Baja California, Mexico City, Baja California Sur, Coahuila, and Aguascalientes. At this end of the classification, what stands out is the fact that these are historically more developed states with a significant urbanization component.

Figure 1. State persistence rates in the lowest wealth quintile
National level = 1

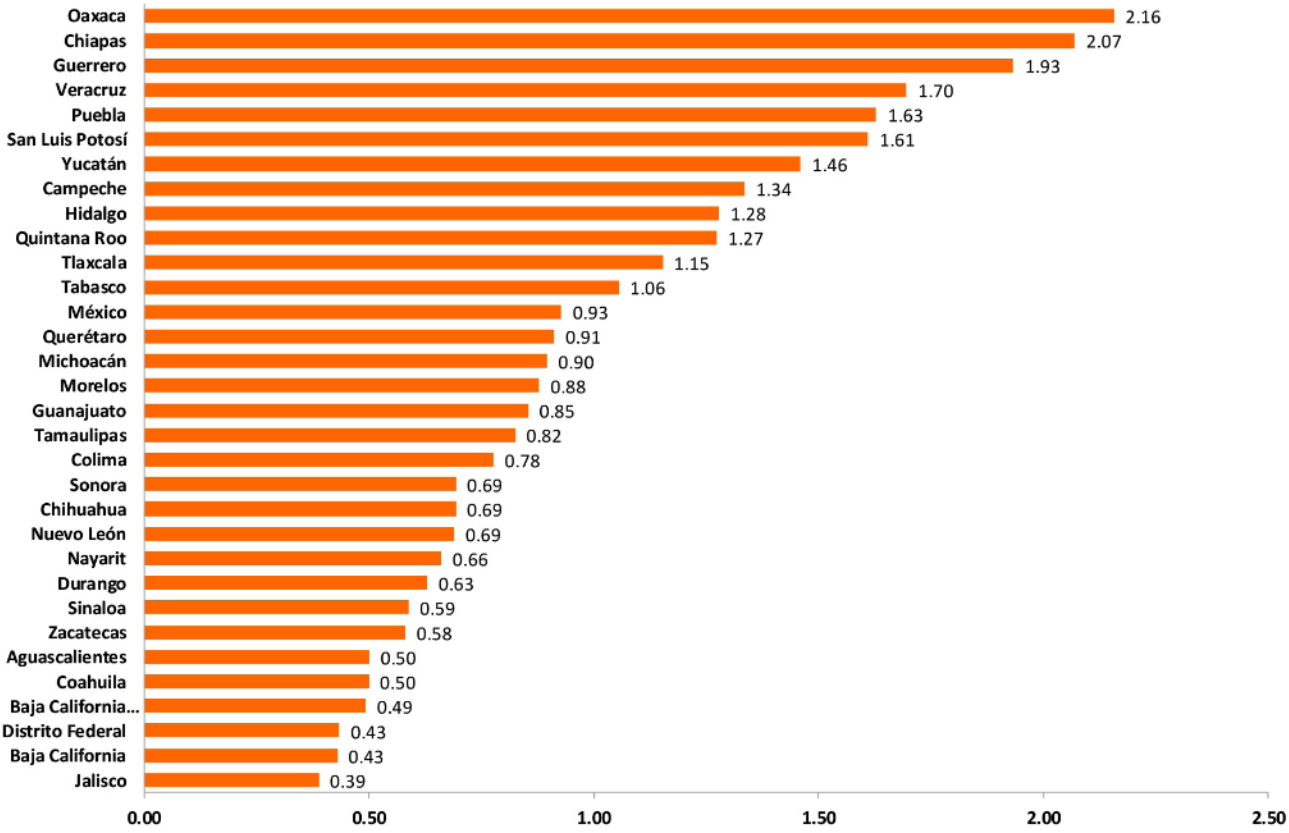
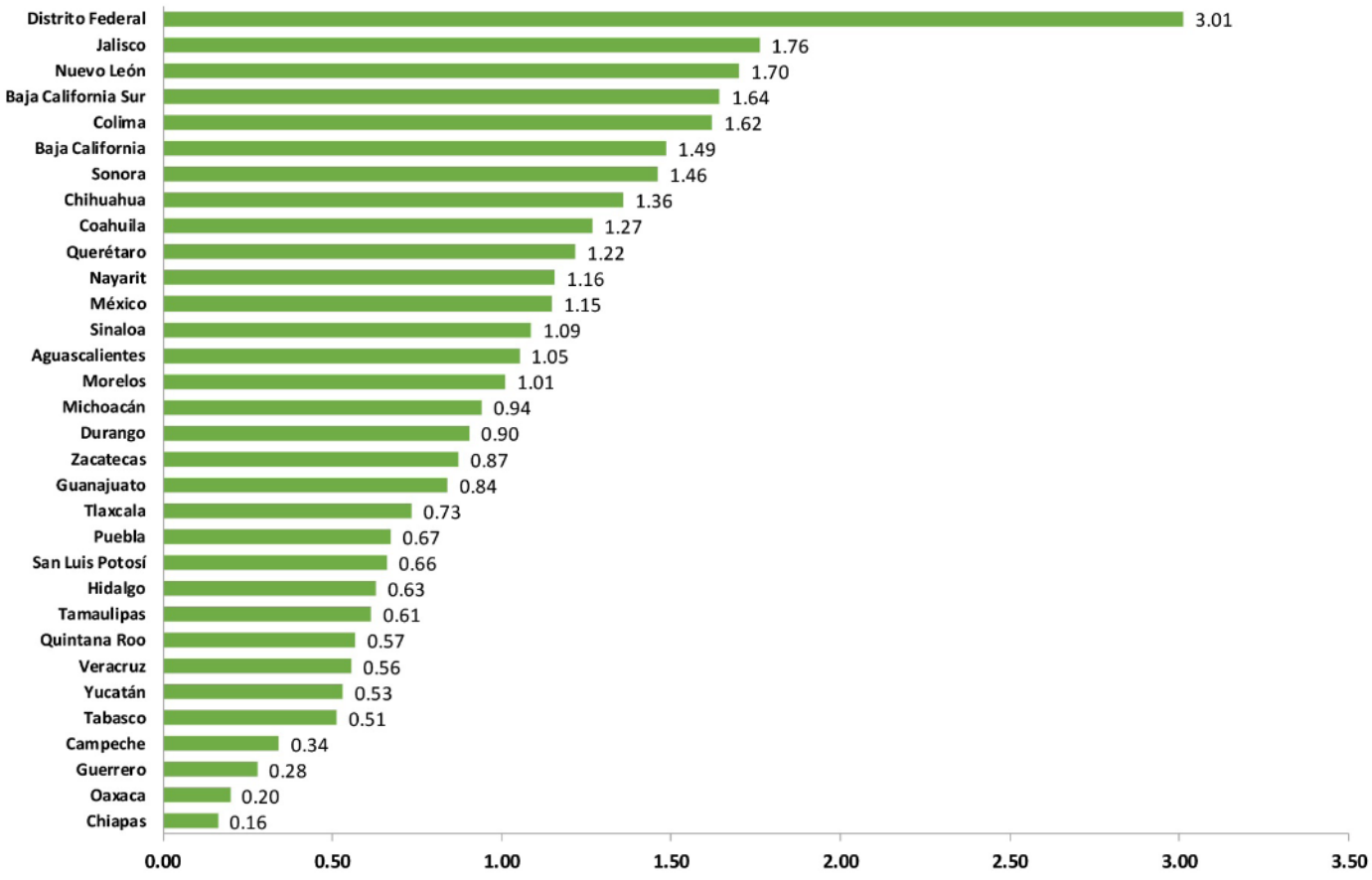


Figure 2 shows the state classification in terms of long-range upward mobility; that is, the ratio of the mobility rates of the lower quintile (quintile 1) to the upper quintile (quintile 5). In this case, the mobility ratio moves in a greater range than the previous one, from 0.16 to 3.01. At one extreme—the one with the greatest mobility—the case of Mexico City is more than significant, since the next state along with the highest rate of long-range upward mobility, Jalisco, has a value of 1.76. On this same side of the classification, and following Jalisco, are Nuevo León, Baja California Sur and Colima. Here, it is worth noting that the classification at this end of the distribution is not a mirror of persistence at the bottom. Thus, for example, although Nuevo Leon does not present one of the country's lowest rates of persistence, it does constitute one of the entities with a higher proportion of individuals originating in the bottom part of the distribution who reach the top. It is also worth noting that both Mexico City, alongside Baja California and Baja California Sur, reappear as the best placed entities in the state classification.

Figure 2. Upward mobility from bottom to top quintile
National level = 1



At the other extreme, although there is no perfect mirror of the persistence rates shown in figure 2, Chiapas, Oaxaca, and Guerrero—with rates that are significantly distant from those of the great majority of states—occupy the worst classification places. In this part of the distribution, it should be noted that the first state not belonging to the south-southeast region of the country appears to come in 9th place starting from the tail (24th position and descending). Likewise, there are cases such as that of Puebla, which goes from being located in a very unfavourable position with regard to a persistence rate in the lower quintile, to scaling up to 21st place with regard to upward mobility. Analyzing Puebla's conditions highlights the fact that it contains an important metropolitan area, connected to the most dynamic markets in the central area of the country.

As these results are the first of their kind for this dimension of analysis at this level of disaggregation in the case of Mexico, it is not possible to compare them with others. In any case, the observed regional heterogeneity is consistent with the results obtained by Delajara and Graña (2017) for four Mexican macro-regions. In the latter, these authors estimate intergenerational mobility by using the method of rank-to-rank regression for three different dimensions: wealth, occupation and education. In particular, and as in the current analysis, they find there to be lower upward mobility in the southern region of Mexico.

6. Robustness of estimates

In order to analyze the quality of the estimations, an initial robustness test involved comparing the resulting national mobility matrix (reported in table 2) with the one constructed using the original EMOVI-2011 data. As shown

in the upper panel of table 4, in general the results are consistent: there is a high level of persistence at the extremes of the distribution and more fluidity in the middle quintiles. The bottom panel shows the difference in percentage points between the EMOVI-ENSANUT data. Here, the results show a cell-by-cell difference going from 0.1 to 5.5% (in absolute terms). Based solely on this comparison, it is clear that there still exists a margin for improving the quality of the database matching exercise.

Table 4. Mobility matrix of the household wealth index for two generations, EMOVI-2011 and Difference with EMOVI-ENSANUT Dataset
(row distribution)

EMOVI-2011

Current household wealth index

Wealth index of home of origin	Quintile 1 (lowest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (highest)	TOTAL
Quintile 1 (lowest)	35.2%	26.3%	17.4%	11.5%	9.7%	100.0%
Quintile 2	27.3%	25.5%	18.0%	17.4%	11.8%	100.0%
Quintile 3	13.5%	20.9%	20.1%	24.6%	20.9%	100.0%
Quintile 4	5.9%	15.0%	19.7%	29.2%	30.1%	100.0%
Quintile 5 (highest)	1.9%	5.1%	11.4%	23.5%	58.1%	100.0%

Difference between EMOVI-ENSANUT and EMOVI-2011

Current household wealth index

Wealth index of home of origin	Quintile 1 (lowest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (highest)
Quintile 1 (lowest)	1.3%	**-5.5%**	2.4%	3.0%	-1.2%
Quintile 2	-2.2%	-2.4%	-1.1%	3.3%	2.4%
Quintile 3	-0.6%	-4.7%	4.3%	0.3%	0.7%
Quintile 4	0.8%	-0.5%	3.3%	-3.3%	-0.4%
Quintile 5 (highest)	**0.1%**	0.6%	-2.1%	3.9%	-2.6%

Source: Authors' own calculation using EMOVI-11 and Table 2.

On the other hand, and due to the state level estimations, there are some limitations. Of these, two in particular can be highlighted. The first refers to the fact that, due to the need to maintain comparability across the estimates, national thresholds were adopted for defining the quintiles, rather than the thresholds derived from the distribution of each of the federative entities. As a result, the mobility measured is not purely relative, since the national thresholds in themselves constitute 'absolute lines', such as those of poverty. It should be noted, however, that the advantage of eliminating intergenerational anonymity remains.

Secondly, a potentially important limitation is that of the absence of information regarding individuals' entity of origin. In that sense, state measures do not capture the migratory effect. For example, a hypothesis about the positive-negative selection of the immigrant population in a state such as Mexico City, which shows a significantly higher rate of upward mobility than the other states,

cannot be checked. In the same sense, moreover, it is not possible to isolate the effects of international migration on the intergenerational mobility experienced in each of the federative entities. In other words, in the measurement of entities from which there is a high rate of emigration, a part of the population that was born there cannot be located because it has already migrated to the United States. This last case is a challenge not only for exercises of this type, but also applies to the design of social mobility surveys in countries with migration dynamics that are as significant and heterogeneous in geographical terms as those of Mexico.

Having said that, a simple way of analyzing the quality not of the estimation but of the database resulting from the imputation, is by carrying out tests of difference between variables of the same and another survey with representativeness disaggregated at the state level. In order to do so, we used the Socioeconomic Conditions Module (MCS) of the *National Survey of Household Income and Expenditure* (ENIGH) conducted in 2010. As can be seen in table 5, referring to the comparison between national samples, the tests of differences in means were performed for both variables included in the estimation of the wealth indices and others. In particular, as can be observed at the national-level case, for all selected variables the null hypothesis of the equality of means was not rejected.

Table 5. Testing of means differences, National

Variable	Medium		Standard error		Change in incidence rate	Standard error of difference	Z Statistics	Significance level of difference (two-tailed)	Conclusion on the significance of the difference[1]	Coefficient of variation ENSANUT - EMOVI[2]	Coefficient of variation MCA[2]
	ENSANUT - EMOVI	MCA	ENSANUT - EMOVI	MCA	$P_{MCA} - P_{ENSANUT/EMOVI}$						
Water tank	0.55486	0.54826	0.01006	0.00407	-0.00659	0.01085	-0.60735	0.54362	Not significant	1.81303	0.74256
Electricity	0.99147	0.99335	0.00108	0.00071	0.00188	0.00129	1.44991	0.14708	Not significant	0.10923	0.07133
Earth floor	0.02898	0.03207	0.00208	0.00147	0.00308	0.00254	1.21259	0.22529	Not significant	7.16826	4.57061
Van	0.20928	0.20533	0.00581	0.00277	-0.00395	0.00644	-0.61344	0.53959	Not significant	2.77510	1.34955
Car	0.29112	0.28100	0.00694	0.00343	-0.01012	0.00775	-1.30619	0.19149	Not significant	2.38534	1.22179
PC/laptop	0.32120	0.31359	0.00751	0.00331	-0.00761	0.00821	-0.92736	0.35374	Not significant	2.33873	1.05671
Stove	0.90806	0.90383	0.00469	0.00280	-0.00423	0.00547	-0.77407	0.43889	Not significant	0.51674	0.31030
Cable TV	0.34240	0.33393	0.00747	0.00374	-0.00846	0.00835	-1.01322	0.31096	Not significant	2.18215	1.11885
Internet	0.24329	0.25808	0.00734	0.00326	0.01479	0.00803	1.84170	0.06552	Not significant	3.01619	1.26261
Landline	0.41070	0.40814	0.00856	0.00383	-0.00256	0.00938	-0.27307	0.78480	Not significant	2.08484	0.93808
Household members	4.61467	3.94931	0.04802	0.01348	-0.66536	0.04988	-13.34021	0.00000	Significant	1.04059	0.34135

[1] Statistical significance at 0.05.

[2] The coefficient of variation is multiplied by 100.

The latter result is not maintained when the tests of difference between means are performed for each of the 32 federative entities (see Annex 2). In this situation, the null hypothesis of the equality of means is rejected for, on average, 29% of the 11 contrasted variables, in a range extending from 1 to 7 of the same. Here, clearly, there is a significant margin for improvement that later exercises should attempt to resolve.

7. Conclusions

Recently, much of the discussion relating to the measurement of social mobility has turned to solving the potential problems presented by regionally disaggregated estimates, such as those undertaken by the research team of Raj Chetty and his colleagues, whose work has been cited in the introduction and literature review section of this paper.[13] Likewise, for example, Mazumder (2015) argues that due to the sample composition used by these authors in relation to the moment that captures of the labor trajectories of parents and children, in addition to the recessive economic moment faced by the latter, the estimates of social mobility are greater than conventionally observed in literature on the North American case.

Having said this, it should be mentioned that not all national cases are located in the same moment of academic discussion. In fact, in cases like the present, where the work of Chetty and his co-authors constituted the motivation to carry out a disaggregation exercise pertaining to Mexico, the challenge for researchers is more basic: to

[13] This discussion became evident during the *2016 Social Mobility Summit* organised by the Espinosa Yglesias Study Center during the month of November in Mexico City. Details of the event's conference speakers and papers can be found here: http://socialmobility-summit.org/ (12/30/2016).

find information containing the characteristics required to make estimates about intergenerational mobility, which then allows for the disaggregation of this information in geographical terms without impairing the representativeness of the samples used.

Hence, the first task to be performed in the current paper after the literature review was to identify the data sources that meet the required characteristics to perform this type of exercise. In this sense, given Mexico's administrative records to date, the possibility of matching parents' and children's fiscal information has not yet been identified, as it has been in the North American case. On the other hand, as far as surveys are concerned, although there exist surveys focused on the measurement of intergenerational social mobility, none of these include the possibility of undertaking regional disaggregation that are representative of the 32 federative entities. Therefore, the solution adopted was to perform a pairing of two sources with central variables in common which, combined, covered all the information and representativeness needs of the current analysis. Thus, owing to containing common information regarding the household assets and services of the adults interviewed, the ENSANUT-2012 survey was chosen for its state representation, and the EMOVI-2011 survey for including among its variables retrospective information about respondents' conditions of origin referring, once again, to services and household assets.

Based on the above and following a couple of previous studies undertaken by Vélez, Vélez and Stabridis (2012) and Vélez and Stabridis (2013), wealth indices with a battery of variables on access and ownership of assets and household services were constructed, using the MCA method. The matching of the sources was very straightforward, based on the contemporary index (the home of the interviewed adult), which was common to both of the data sources used. This was done in order to be able to impute the retrospective wealth index of the EMOVI-2011 respondents in the database, with the possibility of this being disaggregated at the state level, in this case, the ENSANUT-2012 survey.

The results of the estimation show heterogeneous patterns of intergenerational mobility across Mexico's 32 federative entities. In particular, two observed differentiators are those that refer to the geographic location and the degree of urbanization of the state in question. The study, however, is far from conclusive. There is a variety of scope for improvement. First, and in terms of the selected estimation method, the MCA, several exercises were performed with diverse combinations of variables until the one that yielded the greatest explanatory power was found. However, a sensitivity exercise employing alternative methods remains pending. Secondly, and based on the analysis presented in the section on the robustness of the results, there is a need to perform a more accurate matching exercise in order to avoid the problems of measurement error that can be attributed to the composition of the resulting sample.

As to the limitations of the mobility measures used, three have been mentioned in the text. Firstly, the simple fact of using national thresholds in the construction of quintiles for all federative entities avoids the possibility of fully capturing the mobility dynamics relative to the interior of each state, in addition to incorporating an absolute component to the measurement in relation to the country as a whole. Secondly, it should be recognized that the ENSANUT-2012 survey does not include information on the in interviewees' place of origin, meaning that it was not possible to control for the possible effects of migration between states on the rates of mobility in each of them. In addition to the above, it should not be forgotten that the Mexican case is one of an international migratory dynamic, occurring on such a scale that it cannot be ignored in an exercise of territorial disaggregation such as the present one. Thirdly, even though assets and services indices are an accepted proxy of wealth, it needs to be recognized that this type of information does not necessarily capture the whole dimension of study.

Finally, and as far as building on the current study is concerned, in addition to themes for future research derived from the above, contrasting the results obtained with other state variables of interest remains to be done; these other state variables include poverty, inequality in one or several dimensions, ethnic composition, population density, and economic growth, among others. In addition, with regard to the information used and the impossibility of accessing administrative records enabling the measurement of intergenerational mobility at the level of disaggregation presented here, this study has confirmed the importance of designing surveys with a degree of representativeness that allows for regional comparisons.

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