Economics Bulletin

Volume 43, Issue 1

A note on ex-ante inequality of opportunity across Mexican regions.

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Abstract

In this paper, I provide the first set of estimates of ex-ante inequality of opportunity in access to economic resources at the regional level for the Mexican case. By employing a novel dataset and an extensive set of circumstances, I identify that at the national level, inequality of opportunity represents at least 48% of the total inequality in the distribution of economic resources observed in Mexico. The region with the highest lower bound is the Centre and Mexico City (43% and 45% of total inequality), while the North of the country is the region with the smallest one (33% of total inequality). This ordering is preserved through all cohorts under analysis. In all cases, the main factor in producing inequality of opportunity is the economic resources of the household of origin. Across all regions, ethnicity and skin colour play a statistically significant role.

The Centro de Estudios Espinosa Yglesias provided funding for this I am grateful for the comments on a previous version of this paper by Roberto Vélez-Grajales, Rocío Espinosa, Miles Corak and Gastón Yalonetzky. All remaining errors are my own. I am also grateful for the funding provided by the Centro de Estudios Espinosa Yglesias to conduct this research as part of the analysis of the results of the Encuesta ESRU de Movilidad Social en México 2017.

Citation: Luis Angel Monroy-Gómez-Franco, (2023) "A note on ex-ante inequality of opportunity across Mexican regions.", *Economics Bulletin*, Volume 43, Issue 1, pages 295-301

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Submitted: November 23, 2022. **Published:** March 30, 2023.

1. Introduction.

Regional income disparities in Mexico have persisted even when regional convergence in human capital has occurred (De la Torre and Vélez-Grajales, 2016)., which has led to relatively high levels of intergenerational mobility in education and occupation. However, both elements have not translated into a more mobile society in terms of economic resources (Vélez-Grajales and Monroy-Gómez-Franco, 2017). The convergence in human capital and high mobility rates in education would suggest that circumstances of origin have reduced their role in outcomes. This paper shows that this has not been the case for access to economic resources.

Although the economic study of inequality of opportunity has expanded, estimations of *ex-ante* inequality of opportunity at subnational levels remain scarce, particularly for developing economies that consider the role of circumstances such as skin color and ethnicity[1] (Roemer and Trannoy, 2016). This paper contributes to a growing literature on the role of intergenerational determinants of persistent inequality in Mexico (Vélez-Grajales, Monroy-Gómez-Franco and Yalonetzky, 2018; Campos-Vázquez and Medina-Cortina, 2019; and Monroy-Gómez-Franco, Vélez-Grajales and Yalonetzky, 2022).

1.1 Ex-ante inequality of opportunity

Ex-ante equality of opportunity implies that individuals from different social groups, defined by different combinations of circumstances,[2] will have the same expected outcome. This means that, before exerting any effort, there should not be any systematic differences in the expected outcome of individuals (Van der gaer, 1993). Following Ferreira and Gignoux (2011), this implies the following condition, in which T_k, is the set of individuals who share the vector of circumstances k while Π is the complete partition of the population according to circumstances

$$\mu^k(y) = \mu^l(y) \;\; \forall \;\; k, l \mid T_k, T_i \in \; \Pi \qquad (1)$$

In which $\mu^k(y)$ is the expected value of y for type k. Deviations from this condition imply inequality of opportunity. Thus, measuring inequality of opportunity is equivalent to estimating inequality between the mean outcomes of all types in the population. I estimate the mean outcomes through the following regression:

$$y_i = C\beta + u_i \; (2)$$

C corresponds to the vector of circumstances. In the case of variables such as an asset index, the R^2 of regression (2) constitutes an adequate indicator of the share of total inequality explained by circumstances (Ferreira, Gignoux, and Aran, 2011). I use the Shapley decomposition[3] to estimate the contribution of each circumstance to inequality of opportunity. As shown by Grömping (2007), the Shapley decomposition of the R^2 of a regression relies on the estimation of a marginal variance

[1] Plassot, Soloaga and Torres (2022) follow the *ex-post* methodology of estimation of inequality for Mexico and its regions but fail to include skin colour and ethnicity as circumstance variables. With respect the non cmparability of the ex ante and the ex post approaches, see Fleurbaey and Peragine (2013).

[2] Circumstances of origin are all factors outside the control of the person that influence her life outcomes.

[3] For explanations of the Shapley decomposition method see, among others Shorrocks (2013)

model. Because of this, the Shapley decompositions from the standardized and non-standardized models are equivalent. In the context of regional comparisons, this makes the regional Shapley decompositions comparable between themselves, as they are calculated taking as a reference the national distribution of the outcome and circumstance variables.

Unless the complete theoretical set of circumstances is employed, estimates of inequality of opportunity will be downward biased due to an underestimation of the share of variation explained by circumstances. Thus, the estimates in this paper should be considered a lower bound of the true value. Similarly, the Shapley decomposition should be interpreted only in a suggestive manner, as the incompleteness of the circumstance vector can produce multicollinearity in the coefficients of the underlying regression for the calculation of inequality of opportunity. Table I shows the vector of circumstances employed.

Table I: Circumstance vector

Variable	Description	Variable	Description
Origin household asset index	Described in the following section	Origin neighborhood conditions	Presence of a park, school, healthcare center, access to public transportation and public lighting in the neighborhood,
Skin color	Operationalized through the PERLA scale (Telles, 2014)	Urban community of origin	A community is considered urban if it has more than 2,500 inhabitants
Indigenous status	Defined as one parent being an indigenous tongue speaker, binary	Maximum parental educational attainment	Categorical variable with six categories: No formal education; less than primary education; primary school; lower secondary school; upper secondary school; college or more.
Sex of respondent	Self-reported, binary	Mother was an agricultural worker	Self-reported, binary
Father was an agricultural worker	Self-reported, binary		

2. Data.

I use the ESRU Survey on Social Mobility in Mexico (EMOVI 2017) for the analysis. The survey focuses on information about the present living conditions of the respondent and those in which she inhabited when she was 14 years old. To that end, the survey includes retrospective questions about the characteristics of the household inhabited when she was 14 years old, her skin color, and her parents' educational attainment, ethnicity, and occupation. The survey's sample comprises 17,692 interviewees and represents the Mexican population (all genders) between 25 and 64 years old, both at the national and regional levels[4].

[4] The regions are composed as follows: north region consists of Baja California, Sonora, Chihuahua, Coahuila, Nuevo León and Tamaulipas; north west consists of Baja California Sur, Sinaloa, Nayarit, Durango and Zacatecas; the center north region is form by Jalisco, Aguascalientes, Colima, Michoacán and San Luis Potosí; the center region is formed

The retrospective questions limit themselves to asking about the ownership of assets to diminish t the effect of recall bias. For the same reason, the survey does not ask about parental income. To circumvent this limitation, I construct a household asset index for the origin and current households. This type of index has been widely used in the development literature to analyze the distribution of economic resources in developing countries, where it is more common to lack information on income (Poirier et al., 2019).

As the survey only records asset ownership, the corresponding variables are binary. Multiple Correspondence Analysis (MCA) is the most appropriate method for constructing the asset index. MCA uses relative frequencies across binary variables to identify an underlying component of economic status that allows me to rank individuals from those with the least resources to those with the most resources. Table II presents the variables employed in constructing the asset indexes.

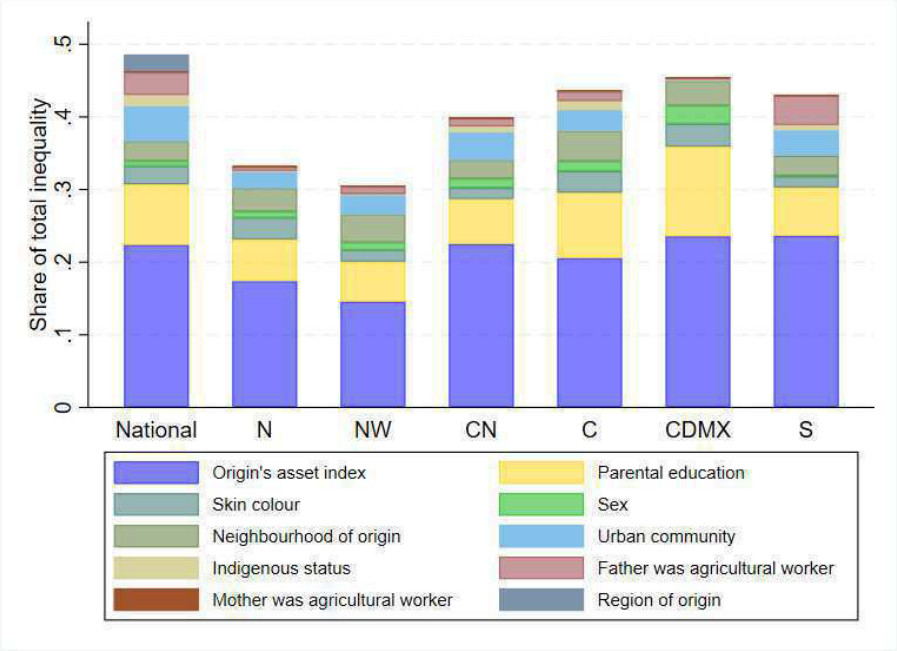
Table II: Components of the asset indexes.

Asset	Origin index	Current index	Asset	Origin index	Current index
Inhouse plumbing	X	X	Television	X	X
Stove	X	X	Refrigerator	X	X
Electricity	X	X	Washing machine	X	X
Refrigerator	X	X	Landline telephone	X	X
Personal computer	X	X	VHS/DVD	X	X
Microwave	X	X	Cable T.V.	X	X
Owner of another dwelling	X	X	Automobile	X	X
Bank account	X	X	Credit card	X	X
Water heater	X	X	Paid domestic service	X	X
Vacuum cleaner	X		Inhouse bathroom	X	
Owner of business premises.		X	Dwelling with a dirt floor		X
Internet service		X	Owner of a tractor		X

3. Results.

by Guanajuato, Querétaro, Hidalgo, Estado de México, Morelos, Tlaxcala, and Puebla; CDMX: Mexico City; the south region is formed by Guerrero, Oaxaca, Chiapas, Veracruz, Tabasco, Campeche, Yucatán y Quintana Roo

Figure 1: Inequality of opportunity in access to economic resources.



Note: The outcome variable is the current household asset index. Each component represents the share of the total R^2 explained by the circumstance in question according to the Shapley decomposition. Circumstances are detailed in Table 1.

.Figure 1 shows the lower bound of inequality of opportunity in Mexico and its regions. First, at the national level, inequality of opportunity represents at least 48% of total inequality in the asset index. This is six percentage points higher than the estimate by Monroy-Gómez-Franco, Vélez-Grajales, and Yalonetzky (2022). Secondly, the north and northwest have a lower bound of inequality of opportunity, ten percentage points smaller than the capital (Mexico City) and the South. This difference is because the economic resources of the origin household have a smaller role in the first two regions. This is consistent with the evidence on social mobility at the regional level (Delajara, Campos-Vázquez, and Vélez-Grajales, 2022).

The aggregate effect of an urban community of origin and better availability of public services in the neighborhood represents an influence comparable with parental educational attainment. This highlights the high degree of inequality in the availability of community resources inside Mexican regions. The secondary role of educational attainment suggests that intergenerational transmission of human capital plays a smaller role in generating inequality than the effect of the resource availability (public or private) in the household of origin. Ethnicity and skin color play a significant role in all regions, having a larger influence in the north, center, and Mexico City.

Table III: Inequality of opportunity estimates by cohort and regions.

Region	Total	25-35	35-45	45-55	55-64

National	0.486 (0.012)	0.578 (0.018)	0.513 (0.020)	0.496 (0.017)	0.455 (0.025)
North	0.332 (0.020)	0.404 (0.038)	0.396 (0.033)	0.430 (0.033)	0.273 (0.047)
North West	0.305 (0.028)	0.461 (0.038)	0.316 (0.060)	0.412 (0.052)	0.342 (0.055)
Center North	0.396 (0.022)	0.486 (0.039)	0.460 (0.036)	0.453 (0.043)	0.452 (0.039)
Center	0.437 (0.028)	0.542 (0.047)	0.487 (0.049)	0.432 (0.046)	0.525 (0.050)
CDMX	0.454 (0.023)	0.573 (0.039)	0.483 (0.036)	0.477 (0.043)	0.440 (0.059)
South	0.430 (0.028)	0.589 (0.036)	0.508 (0.036)	0.430 (0.034)	0.380 (0.047)

Table III shows inequality of opportunity by region and cohort. As expected, inequality of opportunity is lower for the oldest cohort than for the younger ones. This is because circumstances of origin have less weight on current outcomes the farther away they are from the present. Nevertheless, with the exemption of the north, inequality of opportunity represents at least more than a third of total inequality, even in the cohort where circumstances of origin are supposed to exert their lowest influence. Moreover, in all cohorts, the north is the region where circumstances play the smallest role, the center and capital are the regions with the largest influence.

4. Conclusion.

My results shed light on the regional heterogeneity of inequality of opportunity in Mexico. At the national level, inequality of opportunity represents at least half of total inequality; in contrast, it represents less than a third of total inequality in the north. In the capital, in contrast, the situation is more similar to that of the national aggregate. The main driver of inequality of opportunity is the differences in the economic resources of the household of origin, followed by the educational attainment of the parents and the availability of public services in the neighborhood of origin. Skin color and ethnicity play a significant role in all regions, but it is more pronounced in the country's north and center.

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