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Artículos científicos

Impacto de la desigualdad económica sobre el desarrollo: análisis de datos de panel a nivel estatal en México

Impact of income inequality on human development: Panel data analysis for a state analysis in México

Impacto da desigualdade econômica no desenvolvimento: análise de dados em painel em nível estadual no México

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Resumen

La desigualdad en México genera una serie de consecuencias que afectan la calidad de vida en el país, de ahí que sea necesario medir su impacto para intentar ofrecer mejores mecanismos redistributivos. Por tanto, el objetivo de este trabajo es analizar, a través de la aplicación de una metodología de datos de panel y con base en la Encuesta Nacional de Ingresos y Gastos de los Hogares, los efectos de la desigualdad del ingreso sobre el índice de desarrollo humano (IDH) en las 32 entidades federativas del país durante el periodo 2008-2018. Los resultados demuestran que existe una correlación inversa entre las variables, lo que indica que reducir la inequidad económica contribuye en la mejora de los niveles del índice de desarrollo humano. En conclusión, esta investigación demuestra que la correcta distribución del ingreso ayuda a incrementar la salud y la educación.

Palabras clave: desarrollo, bienestar, desigualdad, distribución del ingreso, México.

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Abstract

Inequality in Mexico leads to a series of consequences that affect the quality of life in the states of the country and it is necessary to measure the impact that this variable has on the well-being, to generate better public mechanisms. The objective of this research is to analyze the effects of the relationship between inequality, income and the human development index, through the application of a panel data methodology, in the 32 states of the country from 2008 to 2018, using data from the National Household Income and Expenditure Survey. The results show that there is an inverse correlation between the variables, therefore, the possible incidence of reducing inequality favors better levels of the human development index. In conclusion, the correct distribution of income contributes to improving health and education, that is, to improve living standards.

Keywords: Development, Well-being, Inequality, Income distribution, Mexico.

Resumo

A desigualdade no México gera uma série de consequências que afetam a qualidade de vida no país, por isso é necessário medir seu impacto para tentar oferecer melhores mecanismos redistributivos. Portanto, o objetivo deste trabalho é analisar, por meio da aplicação de uma metodologia de dados em painel e com base na Pesquisa Nacional de Receitas e Despesas Familiares, os efeitos da desigualdade de renda sobre o índice de desenvolvimento (IDH) nos 32 estados do país durante o período 2008-2018. Os resultados mostram que existe uma correlação inversa entre as variáveis, o que indica que a redução da desigualdade econômica contribui para melhorar os níveis do índice de desenvolvimento humano. Em conclusão, esta pesquisa mostra que a correta distribuição de renda ajuda a aumentar a saúde e a educação.

Palavras-chave: desenvolvimento, bem-estar, desigualdade, distribuição de renda, México.

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Introduction

Today Mexico is facing a fundamental historical crossroads regarding the direction it must take for the coming years. Its challenge is to reduce the inequalities that are pressing with singular urgency in all spheres (economic, political, environmental and social) (Ríos, 2021), which demands creative solutions that incorporate all the actors of society (Acemoglu and Robinson, 2019). The goal, therefore, must be focused on achieving an informed and participatory civil society, an academic community committed to objectivity and the social agenda (Pérez Fernández del Castillo, 2017), and co-responsible businessmen and promoters of regional development.

However, the study of inequality requires the observation and analysis of how current income is distributed among households, that is, a relational analysis that involves the assessment of high and low income. According to the Organization for Economic Cooperation and Development (OECD), the Gini coefficient is used to measure inequality, where the value 0 represents perfect equality, while an index of 1 constitutes perfect inequality. According to it, Mexico is the fourth most unequal country of its member countries, with a Gini index of 0.42 (OECD, September 12, 2022), which has negative consequences in the economic, social, and political spheres (Atkinson, 2015).

In this research work, therefore, we try to ask ourselves about the possibility of achieving better levels of development in the country and the adequate implementation of the international agenda at the municipal, state, regional, and national levels, since state capacity and coordination between the various levels of government are a fundamental piece in the social fabric and in the search for a fairer life (Pérez-Nájera, 2021).

In this sense, it is important to highlight that objective number 10 of the 2030 agenda for sustainable development proposes to reduce inequality within and between countries. However, it is not new to point out that the southern states of the country are one of the most inequitable regions in the world (Lustig, 2020), which has intensified due to the covid-19 pandemic (Cervantes Martínez and Villaseñor Becerra, 2022; Chávez-Almazán et al., 2021; Tadesse and Muluye, 2020). For this reason, it is necessary to take creative measures that are consistent with the great challenges we are facing at this juncture, especially those related to inequality of monetary income. (Atkinson, 2015).

The issue of inequality is a central axis in economic analysis, particularly due to its relationship with well-being and development management (Bernasconi et al., 2019), which is why in recent years it has played a preponderant role in the global discussion (Milanović, 2018). In this

paper, we conceptualize economic inequality as the difference in the distribution of income and well-being among the population.

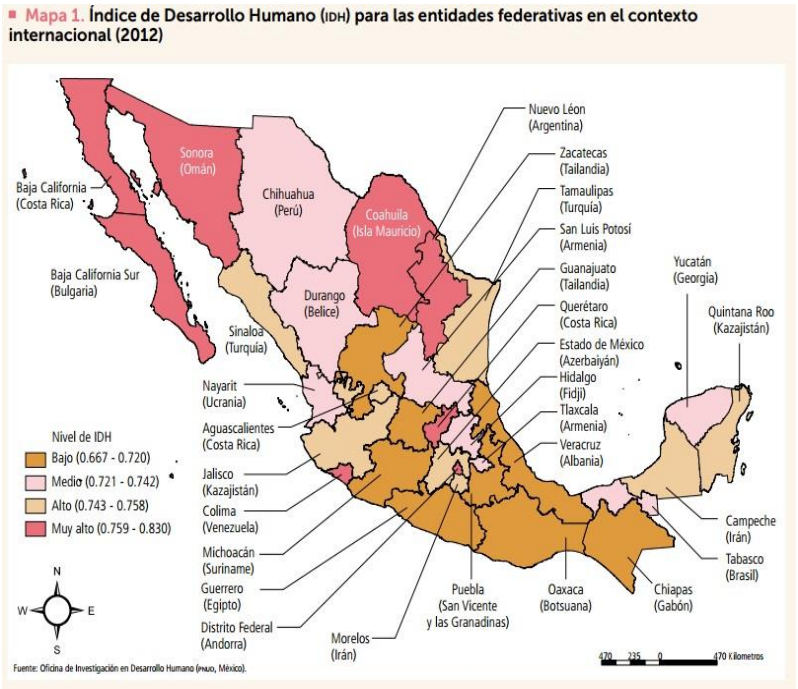
In the case of Mexico, its geography and the socioeconomic characteristics of the states show great differences, which is reflected in the very low HDI in the south and the highest in the north (figure 1). Therefore, it is possible to recognize that both development (Sen, 2016) and inequality are complex and multifactorial conditions, which must be addressed with good education and health services to correct the problem (Carmona Guerrero and Caamal Olvera, 2018).

Inequality, logically, affects the possibilities of economic growth, especially in the long term (Berg et al., 2018), since this situation undermines the rule of law (Acemoglu and Robinson, 2019), democratic institutions (Estrada Rodríguez et al., 2022) and generates negative externalities in the environment and well-being (Castells et al., 2019).

However, the obligation to reduce inequalities while preserving the environment is not the exclusive task of the public sector, since today more than ever the business sector and civil society must incorporate monitoring, surveillance and participation structures to accompany projects and public policies or monetary transfers (Pérez-Nájera and Rendón-Hernández, 2022). It should be noted that coverage has improved in our country, but there is still work to be done about the quality of education (Clara Zafra and Vega Zárate, 2021).

The HDI is a "synthetic" indicator to assess development in the medium term; It considers three dimensions that allow for the incorporation of long and healthy life expectancy, years of schooling, and income, making it a very useful tool for identifying patterns of well-being (Sen, 2016). For example, to contextualize the characteristics of heterogeneity of the entities of the country, if we compare the states of the Mexican Republic in the international context, we can observe the low levels of well-being in the entity (figure 1).

Figure 1. Human development index (HDI) by state



Source: United Nations Development Program (UNDP, 2022)

Conceptually, the Human Development Index (HDI) "is an indicator that monitors the progress of nations with an instrument that combines the longevity of people, their education, and the level of income necessary for a dignified life" (UNDP, 2022. Para. 1), and is made up of three dimensions: the education index “measures the relative progress of a country or a state taking into account the average years of schooling and the expected years of schooling”; the income index “is included as a substitute for all other aspects of human development that are not reflected in a long and healthy life or the knowledge acquired”; and the health index "measures the relative achievement of a country or a state concerning a minimum international standard of 20 years of life expectancy at birth, and a maximum of 83.4" (UNDP, June 18, 2021. p. 8).

It is essential to seek to monitor the indicators of sustainability, well-being and inequality in Mexico since they are an empirical alternative to evaluate state governments (Duflo, 2021). However, it must be recognized that many of the actions undertaken in public policies can be observed in periods after their application, that is, the measurement of the results could be quantifiable years later. Therefore, it is possible to affirm that this type of study contributes to the discussion of proposals that affect the well-being of society from the academic field and emphasizes the importance of implementing measures that reduce inequality to benefit the levels of education and health, especially in historically forgotten regions (Quiroz Reyes, 2020).

It should be noted that the correlation allows us to resume empirical and documentary research on the indicators in the 32 states of the country, so it is desirable to use mixed research techniques that compare what the data shows with the situation and perceptions of economic agents (entrepreneurs, women, men, young people, informal workers, indigenous people, etc.) because they are in contact with realities every day. In this way, comparisons can then be made with previous studies, such as those by Aguilar Ortega (2019) and Ortiz et al. (2020).

Explaining the above, this research aimed to analyze the effects that could be seen by reducing inequality in the Mexican states. To achieve this, a panel data analysis was carried out that considered the subnational human development index (SHDI) as a variable dependent on inequality and income. The results provide econometric evidence to establish that the reduction of the Gini coefficient by each state would increase the quality of life (in terms of the HDI components) of Mexicans.

The document is divided into the following sections: this introductory part followed by the methodological section, where the modeling and data series used are detailed. Then the results obtained are stated, which are discussed in a separate section. At the end of the document, the conclusions are presented.

Materials and methods

To analyze the relationship between inequality and development in Mexico, a correlational and panel data study was applied to a data set of the 32 states in Mexico in the period 2008-2018. For this purpose, a complex vector model was built according to equation 1:

$$SHDI_{it} = \alpha D_{it} + \alpha PIBE_{it} + \varepsilon_{it} \quad \ldots \text{Equation 1}$$

As $SHDI_{it}$ is the human development index of each state i at time t and Dit is inequality, measured through the Gini coefficient in state i at time t. GDPeit corresponds to the gross domestic product of a federal entity i at time t. The parameter Ɛ allows for the possibility of fixed state effects while indicating the estimated residuals.

Equation (1) is estimated using the FGLS (Feasible Generalized Least Squares) panel data method, which fits linear panel data models using feasible generalized least squares. (Wooldridge, 2010).

Data

Descriptively, the data used incorporates the results of the National Survey of Household Expenditure and Income from 2008 to 2018. This survey is carried out every 2 years, so the years included were 2008, 2010, 2012, 2014, 2016 and 2018 for the 32 entities of the country.

In the case of the subnational human development index (SHDI), that is, by entities, it averages the subnational values of three dimensions: education, health, and standard of living. These data derive from the database developed by Smits and Permanyer (2022). For the income (GDP) of the entities, the biannual data of the study period were used, and the data were obtained from the statistics available from the National Institute of Statistics and Geography (Inegi), GDP by federal entity, base 2013, which "allows know annually the behavior and composition of the economic activities of the states" (INEGI, 2023, párr. 1). The descriptive statistical characteristics of the data series are exhibited in Table 1:

Table 1. Data descriptive statistics

Variable	Obs	Media	Dev Sta	Min	Max
SHDI	192	0.758	0.034	0.66	0.833
D	192	0.469	0.039	0.362	0.59
PIBE	192	494 464	510 267	78 954	3 126 460

Source: Own calculations

Results

Table 2 shows the results of the correlation between the dependent variable and the explanatory variables. It is observed that the independent variables have a low correlation concerning the SHDI. In addition, inequality (D) measured with the Gini coefficient has an expected negative relationship, since a percentage increase in inequality in the states would decrease the SHDI, while income yields a small but positive correlation.

Table 2. Correlation matrix

	SHDI	D	Y
SHDI	1.0000		
D	-0.1373	1.0000	
PIBE	0.2268	0.1214	1.0000

Source: Own calculations

The Brush Pagan test indicated that the application of panel data methods will have a better fit than the application of a methodology based on ordinary least squares (OLS). Likewise, according to the Hausman test, the panel of fixed effects is the most appropriate due to its statistical significance.

The panel does not present autocorrelation problems, but it does present heteroscedasticity problems, so it is necessary to correct it. The standard correction model was applied together with the FGLS model; however, the feasible generalized least squares method is more robust and the results are presented in Table 3:

Table 3. Results of the FGLS panel data

	Coef.	SD
D	-0.1529823	0.0225438
PIBE	0.0095336	0.0009395
_cons	0.7019227	0.0116843
Prob > chi2	=	0.0000
Wald chi2(1)	=	160.52
Number de obs.	=	192
Number of groups	=	32
Periods	=	6

Source: Own calculations

The results show the negative relationship between the SHDI and inequality and, in turn, the positive relationship between GDP growth (as a control variable) and the SHDI, which contributes to being able to discuss some previous research on the subject in the next section.

Discussion

The previous literature, beyond the empirical results, has a fundamental theoretical foundation for the analysis of well-being not only as a dimension of GDP but following with health and education. This involvement allows us to start developing studies on other important aspects that make up the so-called economic development in convergence with personal, community, and social well-being (Rojas and Charles-Leija, 2022).

Studies such as that of Ortiz et al. (2020) exclusively analyze a linear regression with data from 1990 and 2018, where a negative correlation is demonstrated that agrees with what was found in the present study; however, the panel data methodology allows for better statistical modeling. Other approaches recommend increasing the health and education systems (both considered in the HDI) as an alternative to get out of the poverty trap and reduce inequality, especially in less developed states (Salgado-Vega and Zepeda-Mercado, 2012).

Authors such as Aguilar Ortega (2019) argue that inequality has remained at the same levels, especially in rural areas due to the neoliberal model; however, the present study uses a more rigorous methodology to identify the need for redistributive public policies that contribute to social mobility (Campos-Vázquez et al., 2022). This, therefore, is a fundamental contribution for later studies in the medium-term or international comparisons.

Ideologically, the relationship between inequality and economic growth or development seems obvious; however, there are publications still presuppose that inequality is part of a natural process or a phase of GDP growth, to subsequently distribute resources more equitably. For this reason, the discussion remains open to conjunctural situations of time-space or specific territorial regions (Qiu et al., 2018) and robust statistical methodologies in data, which show similar results. (Parsons, 2023).

Conclusions

Based on the results of this research, we can indicate that a panel data model provides greater econometric robustness to analyze the relationship between inequality, human development, and income in statistical correlation models.

In addition, we can point out, empirically, the importance of reducing income inequality to improve health and education levels as well-being indicators, as expressed in the existing literature. In this sense, the results indicate that the percentage increase of the human development indicator in the Mexican states is linked to the reduction of the Gini coefficient.

Likewise, incorporating the state gross domestic product (GDP) into the model as a control variable helps to determine other relative weights in this relationship, since —as mentioned in the introduction— both development and income inequality are multifactorial and highly variable phenomena. complexes. For this reason, public policies focused on reducing economic inequality are essential, particularly in the most unequal regions.

Future lines of research

Education and health are essential elements in the quality of life of society. Therefore, reducing inequality and promoting economic growth must be the fundamental pillars to achieve a society with a dignified and full life. In this situation, the debate remains open for future research where it is possible to economically segment the regions of the country for a better understanding of the relationships between education, health (IDH), inequality (Gini), and economic growth (GDP). In this way, it will be possible to determine the importance of economic growth with a correct distribution of income (and wealth) in social welfare. Likewise, it is recommended to incorporate other socioeconomic indicators into the econometric model to determine if there are any that could be easy to manipulate to increase the HDI in the country's entities.

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