EICT Microsimulations for New Public Policy Initiatives for Mexico to tackle poverty

Araceli Ortega Díaz

Tecnológico de Monterrey

Sabbatical Researcher at Universidad Autónoma de Madrid
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araceli.ortega@itesm.mx

Escuela de Gobierno y
Transformación Pública
Tecnológico de Monterrey

- This paper estimates a Heckman correction equation to perform simulations of an earned income tax credit (EITC) program for single mothers, using an income and expenditure household survey to assess the poverty reduction.

- The results show that poverty decreases at least four percentage points more with this program than with the current cash transfer program "PROSPERA", and at half cost.

- In addition an income tax credit program fosters women formal employment, increase government revenue and may promotes skills, concluding that this is a better strategy for tackling extreme poverty in a sustainable way, and at lower public cost.

Motivation

- This study main´s motivation emerged from the fact that after 19 years of using cash transfers in Mexico, and not graduating people out of poverty it is necessary to move to programs that can effectively graduate them in a more sustainable and inclusive way.

- Developed countries like Canada, United States, Austria, Australia, Belgium, Finland, France, Finland, Germany, Greece, Italy, Netherlands, New Zealand and the UK have stablished programs with employments components that fight poverty more effectively than cash transfers due to their influence in generating sustainable income. One of these programs is the Earned Income Tax Credit (EITC), implemented since 1975 in United States, the New Zeeland´s Working for Families Tax Credit in 1984 and the UK´s Working Tax Credit in 1999. (Eissa, Kleven, & Kreiner, 2008b)

Why suggesting EITC and not more Cash transfers?

Graph 1. Mexican labor force by their employability status, millions of people
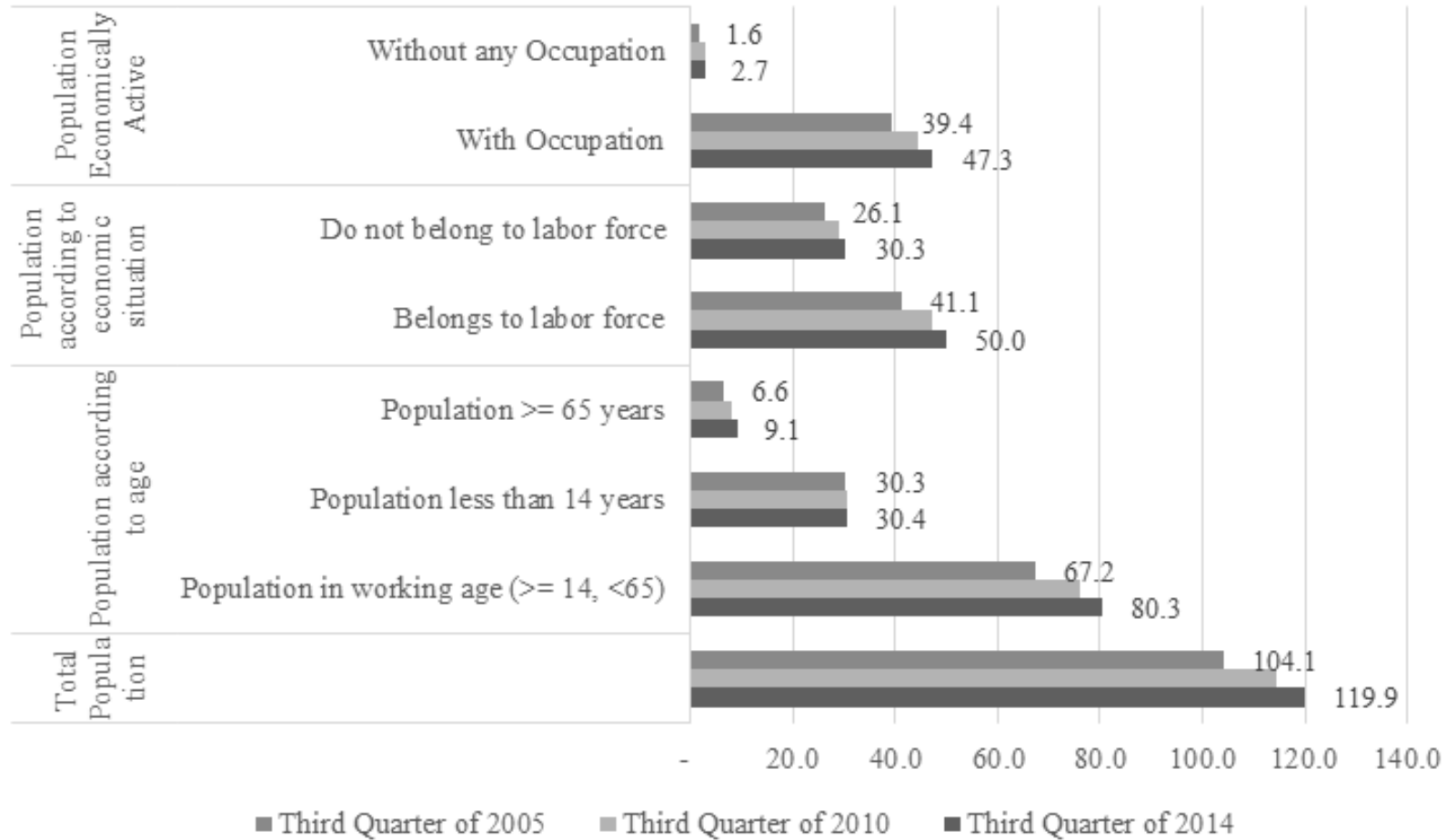
People do work in México, but they do it informally, more tan 60% of our labor force is informal.

One barrier for women to enter labor force is the number of children.

Graph 2. Single women who work as a proportion of the total single women, 14 year old or more, according to the number of children born alive to them.
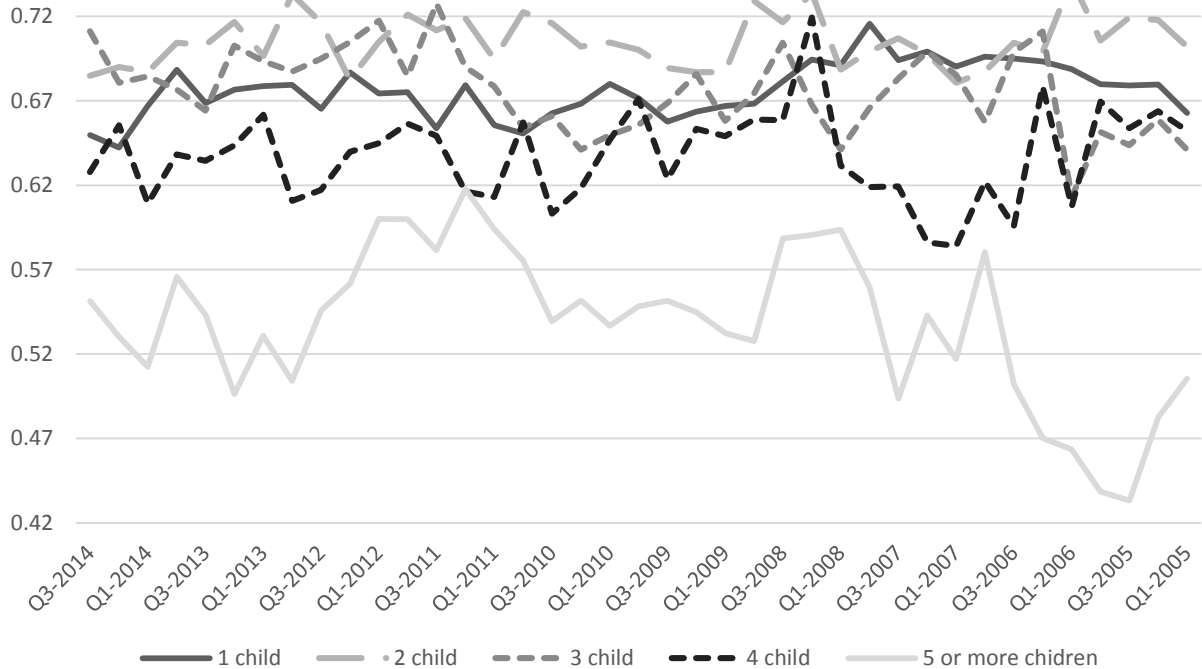
Source: Author´s own elaboration using ENOE quarterly data.

When the number of children increase from 2 to 3, 4 or 5 the female labor participation decreases .

araceli.ortega@itesm.mx

One condition to work is skills.

Table 1. Average years of schooling of single mothers[a] by size of locality according to contractual situation.

Employment status	Number of inhabitants			
	Less than 2 500	2,500 to 14,999	15,000 to 99,999	100,000 and more
Unemployed	4.0	4.7	6.6	9.6
Employed	6.0	7.8	8.2	10.6
Difference	2.1	3.1	1.7	1.0

a: Single mothers include unmarried, divorced and widow women without the presence of a male couple.
Source: Own estimation with data ENIGH 2014

Employed single/alone women with children in different geographical areas have more years of years of schooling on average. Whether it is a requirement to work or it is and effect of working is out of the scope of this papers, but it is observed that working women has at least 1 years of schooling more.

In fact there are women in poverty conditions that work

Table 2. Distribution of women by employment status and poverty

	Unemployed	Employed	Total
Food poverty			
Non-poor	85.0	85.7	85.5
Poor	15.0	14.3	14.5
Total	100.0	100.0	100.0
Capabilities poverty			
Non-poor	77.9	78.0	78.0
Poor	22.1	22.0	22.0
Total	100.0	100.0	100.0
Patrimony poverty			
Non-poor	53.0	55.2	54.6
Poor	47.0	44.8	45.4
Total	100.0	100.0	100.0

Source: Own elaboration with data from ENIGH 2014

Taking into account the widest definition f poverty (patrimony) , it is observed that whether women are employed of unemployed there is still poverty, therefore any alternative program to cash transfers that offers employment should be

Table 3. PROSPERA Beneficiaries

Population in 2012	115 million Mexicans
Poor	19.7% in food poverty (22.66 million people) 28% in capabilities poverty (32.2 million people) 52.3% in patrimony poverty (60.15 million people)
Beneficiaries	5.2 million Families (25 million people.)
Components	1. Enrolment and attendance: Primary, Secondary and Upper secondary. Higher education from September 2014. 2. Basic Health Services 3. Nutrition
Impacts	Increase in school enrolment and attendance, but low performance. Increase in terminal efficiency
No impact	Educational quality, employability and leave poverty

Source: Authors 'own elaboration

Graph 4. PROSPERA budget (right) and Families supported (left)
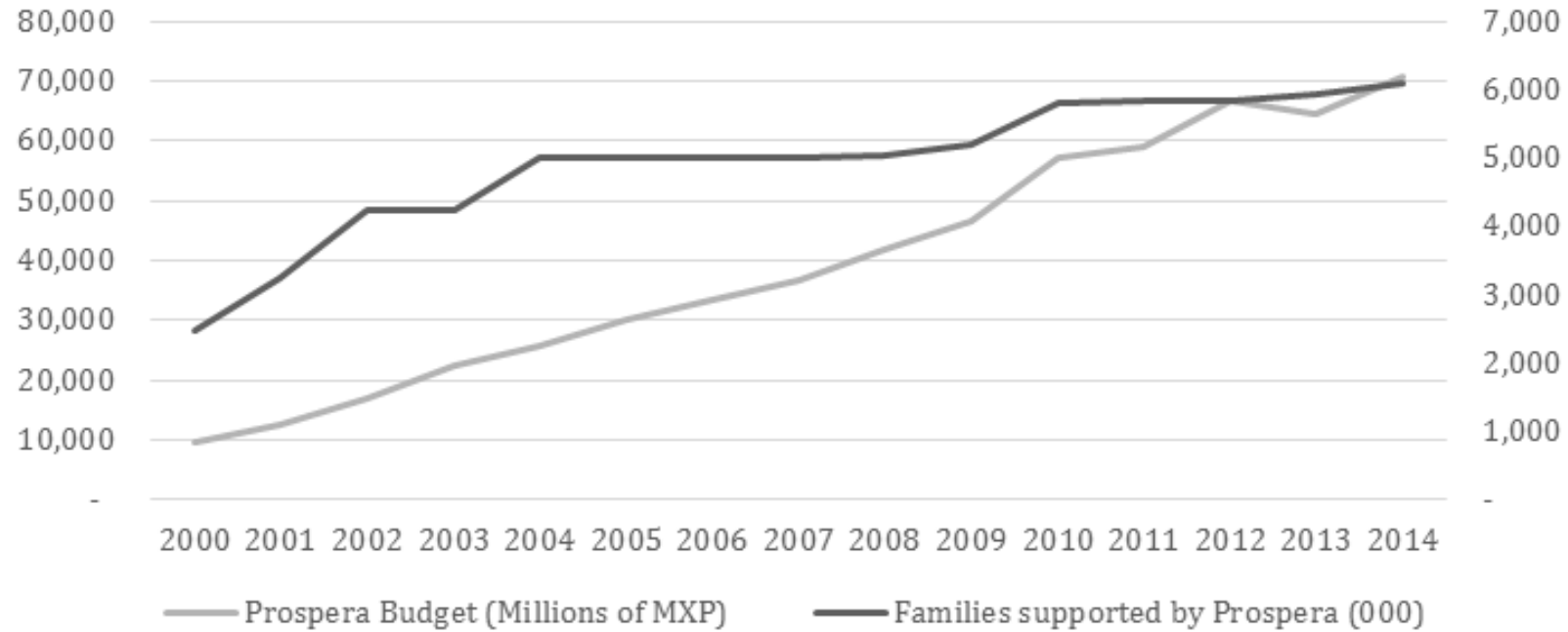
Source: Own elaboration using data from 2nd Government Report, 2013-2014.

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Graph 5: Effect of EITC and CCT on budget constrain

Phase out
w(1-t)

Flat region
w

Phase in
w(1+t)

C

B

A

u_1

u_0

0

Hours worked/ Leisure

Before EICT — After CCT — After EICT
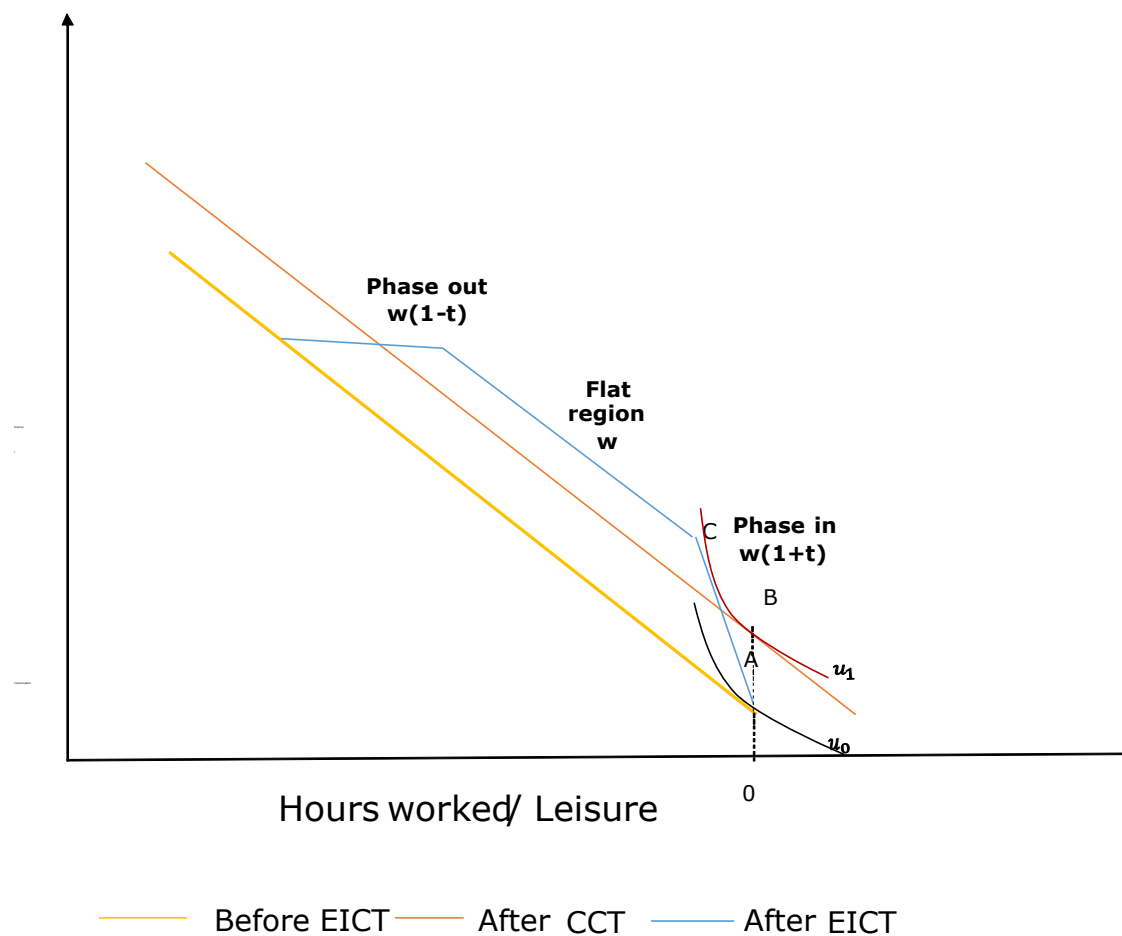
The methodology of (Eissa et al., 2008b) is followed to estimate an equation that identifies women with characteristics that are likely to be incorporated in the Mexican labour force, these characteristics are related to schooling level, experience, age, geographical area and number of children.

To predict the labour income of those that do not work a wage equation in logs using Heckman (1979) selection equation is estimated. Estimating this equation corrects the bias caused by the decision of participating in the labour force.

Based on Heckman, the first stage consists in estimating a Probit model of labor participation:

$$Prob(S_i = 1 \mid Z_i) = \Phi(Z_i\gamma)$$

S equals one for those who work, and Z is a vector of socioeconomic variables that determine whether the person would work or not. In the second stage consist in estimating the amount of wage.

$$E(Y_i \mid X_i, Z_i, S_i = 1) = X_i\beta + \rho\lambda(Z_i\gamma), \text{ con } \lambda(Z_i\gamma) = \frac{\phi(Z_i\gamma)}{\Phi(Z_i\gamma)}$$

For those who do not work we assume a distribution of the error with zero mean and variance equal to the variance of the error of people that work.

The simulation consists in four consecutive stages

First. Once the person works, the taxable income and the amount of tax that each person should pay is calculated because the EITC is based on the wage and the rest of the taxable income.

Table 4 shows the two official definitions of taxable income by two Mexican government institutions: the Treasury (SHCP) and the National Council of Evaluation of the Social Policy (CONEVAL), the latter is the institution in charge of calculating the official poverty measures, and for that duty, it has to calculate an official income measure of the households. Therefore, the net income of households I calculated according to CONEVAL, and the tax rates calculated using the SHCP official laws.

Net income	Gross income	Investments income
CONEVAL		
Monetary income plus the non monetary income, minus the gifts given by the household.	Monetay income plus the non monetary income.	Interests from fixed terms investments, interests from loans, interests from saving accounts and yields from bonds and warrants.
SHCP		
Labor income from professional activities and rentals, income from corporate activities and interests, (pp.96).	Labor income, income from professional activities and rentals, income from corporate activities, interests and contributions to social security, (pp 95).	Interest on fixed maturities, from savings accounts and loans, (pp. 97).

The simulation consists in four consecutive stages

The **second step** consists in calculating the annual amount of credit to be reimbursed to those female workers that accomplish the EITC requirements based on age, number of children and income.

In the **third stage**, once net income and the income tax to be paid are calculated, the amount of tax credit is estimated and the beneficiaries of the program identified.

There are two strong assumptions.

First, that there exists labour demand for women who want to work.

Second, it is assumed that the costs of participating in the labour force are zero, this is an strong assumption and is extensively discussed in (Eissa et al., 2008b).

If women is selected to work, the household labour income is the sum of workers wage and the amount of EITC received.

Table 9. Heckman selection model

Variable	Natural logarithm of annual wage per hour	Indicator person working
Schooling	0.109	0.003
	(15.29)**	-0.3
Experience	-0.009	
	-0.61	
Experience squared	0	
	-1.48	
Indicator rural areas	-0.265	0.146
	(3.54)**	-1.64
Age		0.2
		(7.88)**
Age squared		-0.003
		(9.19)**
Annual labour income realized by other household members		0
		-0.77
Other income recipients		-0.605
		(4.84)**
Widow		-0.368
		(2.86)**
Separated or divorced		-0.117
		-1.11
Children with disabilities		0.194
		-1.2
Children from 0 to 2 years		-0.345
		-1.85
Children 3 to 5 years		-0.105
		-0.74
Children from 6 to 12 years		0.005
		-0.06
Members with 65 years or more		0.058
		-0.37
Number of household members		0.271
		(4.50)**
Constant	2.01	-2.597
	(9.72)**	(4.83)**
Observations	2144	2144

t statistics in parentheses

* significant at 5%; ** significant at 1%

Table 8. Women alone, widow, single and divorce

Civil Status	Member type		Total
	Head	Alone	
Divorced	1,970,777	240,199	2,210,976
Widow	989,435	176,080	1,165,515
Single	827,253	291,712	1,118,965
Total	3,787,465	707,991	4,495,456

Source: Own elaboration using ENIGH 2014

This paper focus on single mothers, this means women in working age that are single, widow or divorced and there is not a male partner in the household that provides income for them, and their low income made them eligible to be EICT beneficiaries.

In the case of eligible women that do not work, the labour participation probability is used to select them, if it is higher than 0.5 the person is assumed to enter the labour force $Prob(S_{EITC} = 1) \geq 0.5$, and receive EITC.

araceli.ortega@itesm.mx

Table 10. Results of simulation for employment

Employment Status before EICT	Persons	Percentage	
Women not working	1,222,590	27.2%	
Women working	3,272,866	72.8%	
without payment**	888,111		27.1%
with payment	2,384,755		72.9%
Total	4,495,456	100%	

Employment Status after EICT	Persons	Percentage	
Women not working	737,362	16.4%	
Women working	3,758,094	83.6%	
without payment**	888,111		23.6%
with payment	2,869,983		76.4%
non- beneficiaries of EICT	79,052		2.8%
beneficiaries of EICT	2,790,931		97.2%
Total	4,495,456	100%	
Inserted to labour force	485,228	10.8%	

** There is a variety of cases of women who declare working and received
No payment this category should be studied further.

Finally, the net income of the family is calculated.

This calculation is done for four simulations;

   1) for the family non-receiving neither PROSPERA nor EITC,
   2) receiving just PROSPERA,
   3) receiving EITC and
   4) receiving both.

Table 11. Poverty measures with and without transfers

Net Income calculation	Income Poverty Measure		
	Food	Capabilities	Patrimony
Without CCT nor EITC	16.3%	23.9%	46.4%
With Prospera	14.5%	22.0%	45.4%
With EITC	10.7%	16.1%	32.3%
With Prospera and EITC	9.0%	14.6%	31.3%

Source: Author´s own elaboration.

The population of single mothers and women alone have a total poverty of 46.4%, PROSPERA would only decrease 1 percentage point their poverty, whereas EITC would decrease in 14.1 percentages points the poverty. And if both are combined poverty would decrease 15.1 percentage points.

6. Results

EITC could be a better option for the government to tackle poverty than a then current cash transfer program Prospera, mainly for the following reasons:

Cost less than Prospera

Poverty reduction is faster and decrements are higher (14.1 percentages points).

It is more sustainable as is people acquire more skills while working, as well as social benefits because they work in the formal sector.

Workers contribute to tax and the pensions system, making it more sustainable.

May create sense of pride by being productive and actively participating in the country's economy and diminishes stereotypes.