

Hope for the Children

A statistical study of the plight of migrant workers, street laborers, and their families in Guadalajara



Photograph courtesy of Josh Meltzer, The Roanoke Times

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CODENI A.C.

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Introduction

Migrant Workers and the Children of the Streets

As one passes through the streets it is hard not to notice them. They gather at busy intersections downtown, selling potato chips or candy out of cardboard boxes, hawking toys, balloons, and masks, or cleaning the windshields of cars stopped in traffic. Those who can will find work as maids or in construction. Some simply beg.



Photograph courtesy of Josh Meltzer, The Roanoke Times

They are the street laborers of Guadalajara. Many are migrants, coming from outside of the state of Jalisco, from villages with no running water or electricity, looking for whatever work they can possibly find. Many belong to indigenous ethnic groups. And they bring with them their children. The hundreds who are old enough take to the streets to work themselves, and those who are too young often accompany their parent as they work well past dusk. Because of the expenses associated with attending public school in Mexico, including registration and uniform costs, a large number of these children do not attend school.

About the CODENI program

CODENI A.C. was officially formed on in September of 2005 to protect and promote the rights of these marginalized children, beginning with their welfare and education. The organization offers educational programs and scholarships for disadvantaged children in Guadalajara to attend school rather than work on the streets. CODENI also works towards promoting research on these marginalized members of society by gathering data on the families involved in the program. Migrant workers often belong to ethnic minority groups for which accurate official statistics are virtually unavailable. For example, the official 2005 census indicated only 177 indigenous Otomí of age 5 or greater living in Guadalajara; however, there are nearly that number of Otomí involved in the CODENI program alone, suggesting that the census statistics on these minorities are quite far from the truth.¹ In this report we will endeavor to shed some light on the situation faced by these marginalized workers by analyzing data gathered by CODENI from 2005-08.

¹ Census statistics from *Población de 5 años y más* from the official *Conteo de población y vivienda 2005*, available at Instituto Nacional de Estadística y Geografía website <http://www.inegi.gob.mx/inegi/default.aspx>.

The Families in CODENI

There are 71 families who are involved in the CODENI program. The majority of these families belong to one of two main ethnic groups,² the Mestizos (28 families) and the indigenous Otomí (30 families). Mestizos, who generally identify as having a mixture of European and Amerindian ancestry, comprise the dominant ethnic group in Mexico, at roughly two thirds of the population. According the 2005 census statistics, which again we have good reason to believe may be incorrect by an order of magnitude, the ethnic Otomí represent about 0.69% percent of the population in Mexico and 0.01% of the population in Guadalajara. While most of the Mestizos who participate in CODENI were born in Guadalajara, all of the ethnic Otomí families who participate in CODENI's program immigrated to Guadalajara from Santiago Mexquititlán, a village in the state of Querétaro, Mexico. In this study, when we consider the role that ethnicity may have, we shall be comparing the Mestiza and Otomí families, as these are the groups for which we have a sufficiently large dataset to perform statistical analysis. However, the reader should be aware that there are many other ethnic minorities and indigenous peoples in Guadalajara who are in similar situations.

Of the 71 families in our dataset, roughly half of the families are nuclear (38 families), that is, they have both a mother and a father present, while the others are either monoparental (a single mother, 16 families) or of an extended form (aunts and children, grandparents and children, etc., 17 families). They average 4.0 children per family.

About this study

The purpose of this study is to shed light on the situation faced by migrant workers and their families as they come to Guadalajara, as well as native-born street laborers in situations of extreme poverty. In particular, we hope to understand the particular challenges that different groups face as they try to find better lives for themselves and their children. Specifically, we look for patterns of discrimination and other factors which the families and the children may be facing in order to better assess the challenges which need to be addressed and the progress that is or is not being made in helping the parents and children move themselves out of poverty.

We begin the study by examining the issue of education, both amongst parents and amongst the children of these families, in order to better understand the challenges and opportunities for the next generation. While our study reveals that the parents' generation has suffered high levels of inequality both along gender and ethnic lines, we find the encouraging result that neither ethnic nor gender differences appear to play a role in their children's educational achievement. Given that the children in both groups have much higher rates of school attendance than their parents, this finding suggests that increasing funding for the education of indigenous children can perhaps reduce the impact of discrimination and promote economic mobility. Nevertheless, dropout rates remain high—1 in 5 children of school age in our study drop out before reaching the secondary level—and there remains

² Of course we use the term 'ethnic group' somewhat loosely, as in particular the term 'mestizo' is primarily a cultural self-identification. However, such sense of self-identification and ethnicity remains strong in Mexican society.

much work to be done in increasing the level of education attained by the children of both migrant and native-born workers to ensure they have a better future.

We then examine the economic situation, beginning with a summary of the various jobs performed by our two ethnic groups, with particular attention to the role that gender or ethnicity plays in the kind of work street laborers find. We next analyze the incomes of both the Mestizo and Otomí populations, a task made challenging by the lack of records for the Otomí and the extreme poverty in which all of these families live. Our analysis reveals significant inequalities primarily along gender, but also along ethnic, lines, and we explore possible causes for these differences.

In the third section, we look at the domestic situation. Of the 54 families in our study where the husband was present, 24 of these families, or 44.4%, reported domestic violence and abuse. We explore the factors associated with domestic violence, as well as the stunning effect it appears to have on women's income.

We then consider what the situation in Guadalajara suggests about the situation in Mexico as a whole. We employ available census statistics to deduce that the situation in Guadalajara seems to be better than average compared to the rest of Mexico, where, for example, indigenous language speakers are twice as likely to be uneducated as in Guadalajara. It seems doubtless that much more work is needed to help the indigent and to address issues of discrimination for indigenous peoples across all of Mexico. Lastly, we reflect on the results on the study and conclude that despite the tremendous inequalities and challenging facing the current generation of parents, there is nevertheless hope for the children.

Education

Traditional Barriers and Hope for the Future

Pre-college schooling in Mexico consists of 6 years of primary education (grades 1-6), 3 years of secondary education (grades 7-9), and 3 years of college preparatory schooling (high school, grades 10-12). Amongst the migrant worker and street laborer parents in our study, almost none made it past the secondary level. Therefore we group the parents by those who have no schooling,³ those who have some primary schooling, and those who have at least some secondary education.

In this section we will apply statistical methods to study the differences between the educational levels of the various groups in our dataset. As Figure 1 (right) illustrates, there were dramatic inequalities between certain subgroups. We will see that, at least for the current generation of parents, ethnicity gender were both serious limiting factors in terms of educational opportunities and advancement.

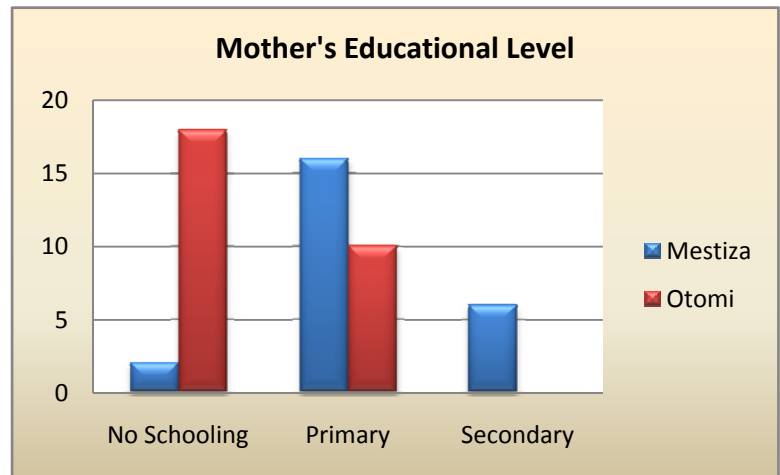


Figure 1

However, we will also see that amongst the children, there are no discernible differences along ethnic or gender lines, suggesting that, despite the fact that the dropout rate is still high, things may be improving for the next generation.

Methodology

In order to determine if there are statistical differences amongst different population groups, we employ a two-way contingency table and apply a chi-squared test for homogeneity. Homogeneity here means that we would expect that, for example, belonging to a particular ethnic group would have no effect on the likelihood of having a certain level of education, that is, the respective probabilities of each would be independent. The expected value then for the i th row and j th column is thus given by

$$E_{ij} = \frac{R_i C_j}{N},$$

where R_i denotes the total number of observations in the i th row, C_j the total number of observations in the j th column, and N denotes total size of the sample. The chi-squared statistic is computed by

³ Some of those whom we consider to have “no schooling” can still read and write; however they are without any formal schooling.

$$\chi^2 = \sum_{i,j} \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

where O_{ij} denotes the observed value in the i th row and j th column. We then compute the chi-squared value which corresponds to our desired confidence level $1 - \alpha$ and the number of degrees of freedom $v = (r - 1)(c - 1)$, where the table has r rows and c columns, and if our sample's chi-squared statistic exceeds this threshold, we reject the null hypothesis of homogeneity and conclude that there is a statistical difference between the two populations. We note that in order for a sample to be large enough for the chi-squared test to be conducted, the accepted rule of thumb amongst statisticians is that we require that $E_{ij} \geq 5$ for all expected values in the table. As our sample size is limited, there are some cases where this assumption is not true in our sample, and we will include where appropriate a discussion of why the test is or is not still reliable and what the results would be if the grouping was done to ensure large enough expected values.

Analysis

Mother's Educational Level

We begin by studying the mother's educational level for Mestiza and Otomí mothers in our sample. Notice that the figures for secondary education are small enough that the expected values are less than 5; so for comparison we could combine primary and secondary education and run the same test on this new table in order to ensure that statistical significance is still present, and in fact, doing so results in a χ^2 value of 17.09 versus a threshold value at the same confidence level of 6.63, so we can safely conclude that, at a 99% confidence level, there is a statistical difference between the two populations. A glance at the expected values (under the assumption of homogeneity) in the table reveals that in actuality there are significantly lower levels of education amongst the Otomí than the Mestiza women.

Mother's Education	No schooling	Primary	Secondary	Totals
Mestiza	2	16	6	24
<i>Expected</i>	9.23	12	2.77	
Otomí	18	10	0	28
<i>Expected</i>	10.77	14	3.23	
Totals	20	26	6	52

Computed χ^2 value: 20.0. Threshold χ^2 for $\alpha = 0.01$, $v = 2$: 9.21.

Father's Educational Level

We next examine the level of education for the fathers in our sample, including the data for fathers who are known but not present at home. The expected values for those with no schooling are less than 5, but unlike in the analysis of the mother's education level, our samples cannot be meaningfully regrouped and are genuinely too small to draw a conclusion at a high level of confidence. However, the computed chi-squared statistic is still rather close to the 95% threshold value, and this suggests that perhaps a difference exists, with Otomí fathers being more likely to lack education, but our sample is too small to reliably make that assessment.

Father's Education	No schooling	Primary	Secondary	Totals
Mestizo	1	14	6	21
<i>Expected</i>	3.5	12	5.5	
Otomí	6	10	5	21
<i>Expected</i>	3.5	12	5.5	
Totals	7	24	11	42

Computed χ^2 value: 4.33. Threshold χ^2 for $\alpha = 0.05$, $v = 2$: 5.99.

Parents' Education by Gender

We now directly compare the mothers and fathers, ignoring ethnic differences, in order to determine if gender alone plays any role. The results demonstrate a significant difference, allowing us to conclude that gender had a sizable effect on education during the parents' generation, with women being far more likely to have no schooling, and even those with schooling to be far less likely to have reached the secondary level.

Education	No schooling	Primary	Secondary	Totals
Fathers	7	24	11	42
<i>Expected</i>	12.1	22.3	7.60	
Mothers	20	26	6	52
<i>Expected</i>	14.9	27.7	9.40	
Totals	27	50	17	94

Computed χ^2 value: 6.82. Threshold χ^2 for $\alpha = 0.05$, $v = 2$: 5.99.

Parents' Education by Ethnicity

In our last test of the parents' educational level, we combine mothers and fathers and test only along ethnic lines. The results show an even more highly significant (99% confidence level) difference between the levels of schooling between the Mestizo and Otomí populations, with the Otomí showing substantially lower levels of schooling.

Education	No schooling	Primary	Secondary	Totals
Mestizo	3	30	12	45
<i>Expected</i>	12.9	23.9	8.14	
Otomí	24	20	5	49
<i>Expected</i>	14.1	26.1	8.86	
Totals	27	50	17	94

Computed χ^2 value: 21.1. Threshold χ^2 for $\alpha = 0.01$, $v = 2$: 9.21.

Children's Educational Level and Dropout Rates

While educational differences are present along ethnic lines at the parental level, it seems that amongst the children of street laborers such divisions are not present. Of course, as children are still expected to be progressing in their education, it is impractical to try to compare relative educational levels, so instead we compare rates of dropout by computing for each family's children of school age how many are still in school versus how many never went to school or dropped out before finishing the primary level. Our sample size is now large enough to reliably apply a chi-squared test, and it turns out the

dropout rates are statistically indistinguishable between the ethnic groups, both being almost exactly 21.6%.

Children's Education	No Schooling or Dropout	Attending School	Totals
Mestiza	13	47	60
<i>Expected</i>	<i>13.37</i>	<i>46.63</i>	
Otomí	24	82	106
<i>Expected</i>	<i>23.63</i>	<i>82.37</i>	
Totals	37	129	166

Computed χ^2 value: 0.021. Threshold χ^2 for $\alpha = 0.05$, $v = 1$: 3.84.

Likewise, when we examine the dropout rates for boys and girls, we find no significant differences:

Children's Education	No Schooling or Dropout	Attending School	Totals
Boys	14	77	91
<i>Expected</i>	<i>14.71</i>	<i>76.29</i>	
Girls	13	63	76
<i>Expected</i>	<i>12.29</i>	<i>63.71</i>	
Totals	27	140	167

Computed χ^2 value: 0.090. Threshold χ^2 for $\alpha = 0.05$, $v = 1$: 3.84.

The results are remarkable for how close the observed and expected values are, that is, for how homogenous the results are.

A Note on Family Sizes and Children's Ages

While the data above might suggest to the reader that Otomí families are larger, in fact it is that there are more Otomí children of school age in our dataset, rather than that any difference in average family sizes exists. Otomí and Mestizo families (25 and 27 families, respectively) in our dataset have an average of 4.04 and 4.16 children, respectively, and a two-sample, two-tailed

heteroskedastic t-test on the number of children in Otomí and Mestizo families reveals no statistically distinguishable difference (p value of 0.83; for some background on t-tests see the Methodology in the Income study below). Of course, as we selected for children of school age in the above chi-squared test, the result is not sensitive to this aspect of the distribution of children's ages.

An end to discrimination?

While educational differences are present along both gender and ethnic lines at the parental level, it seems that, amongst the children, such divisions are not present.

Discussion

Amazingly, while statistically significant differences existed along both gender and ethnic lines during the parents' generation, no such differences are to be found amongst the current generation. This

suggests that progress has been made in providing equal opportunities to young children for education. However, this knowledge must be tempered by the sobering statistic that still,

1 in 5 of the children drops out before completing primary school.

Though opportunity seems to be available for children regardless of gender or ethnicity, we must intensify efforts to encourage families and children to take advantage of these opportunities and support them in their efforts to attain education. As a point of comparison, according to UNICEF, in Mexico City, 1 out of 25 children has dropped out by the age of 15, a comparable rate which is five times lower than the rate observed amongst the families in our study.⁴ In particular, these children need guidance which parents, especially uneducated parents such as most Otomí mothers, are often unable to provide themselves. Several programs offered by CODENI work towards closing this gap and offering children the hope they need to achieve greater goals for themselves, but more work still needs to be done to ensure that these children have the resources they need to escape from life on the streets and live dreams their parents could hardly have believed.

“I would like my daughter to be a doctor or teacher but in my heart I doubt it could happen. None of my family went to school so we can’t help her with her schoolwork.”

⁴ See http://www.unicef.org/infobycountry/mexico_30660.html.

The Economic Situation

Many families in our study display high levels of chronic stress and insecurity caused by the precarious nature of the informal sector in which they work. Since it was announced that Mexico would be hosting the Pan American games in 2011, the government has instituted a crackdown on street vendors who lack licenses, sending government inspectors into downtown Guadalajara to seize the supplies and issue fines to anyone caught selling without a license. A few of the families manage to pay a *tolerancia*, an unofficial payment to government officials that grants them no legal standing but allows them to open street stands with less fear of the local authorities. Yet even that, which is little more than a bribe and offers no real security, the overwhelming majority of our families cannot afford.

“I spend all day watching to see if the inspectors are going to come. I can’t take a break, because if I’m not watching, they can come and take away all of my supplies, and then my family won’t eat that week.”

The burden of the government’s policy falls most heavily on potato chip vendors, mostly Otomí women who sit on park benches or curbsides in front of department stores, selling their products from cardboard boxes. Speaking with these women, one can easily perceive the toll that this stress can take. “My life is hard,” says one Otomí mother. “I spend all day watching to see if the inspectors are going to come. I can’t take a break, because if I’m not watching, they can come and take away all of my supplies, and then my family won’t eat that week.” One hope expressed by all the mothers interviewed was that they wanted their children to have the ability to obtain employment in the formal sector, not only for the greater economic security, but also for the social legitimacy that it confers. “I want my children to have papers, to be able to get a job in the government or to work in an office,” says an Otomí mother of four.

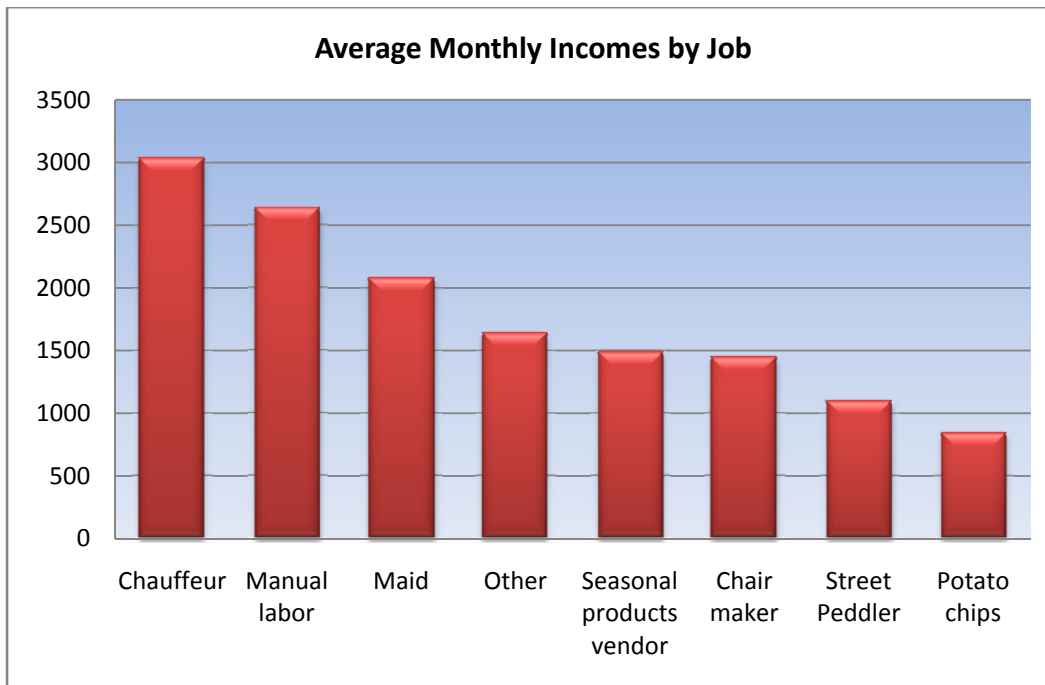
Jobs Available to Migrant Workers and Street Laborers

The youngest children of migrant workers are frequently taken along with their parents to their jobs. Inequality of opportunity amongst the parents’ generation is often clearly manifested in the divisions between the kinds of jobs they work. Below we list the job breakdown by ethnicity and gender:

	Mestiza	Otomí	Total
<i>Mothers</i>			
Potato Chip vendor	0	24	24
Maid	3	0	3
Seasonal products vendor	3	0	3
Street Peddler	11	0	11
Other	3	1	4
Unemployed	5	5	10

	Mestiza	Otomí	Total
<i>Fathers</i>			
Potato Chip vendor	0	8	8
Seasonal products vendor	10	0	10
Manual Laborer	4	3	7
Chair maker	0	3	3
Chauffeur	2	1	3
Other	1	1	2
Unemployed	4	0	4

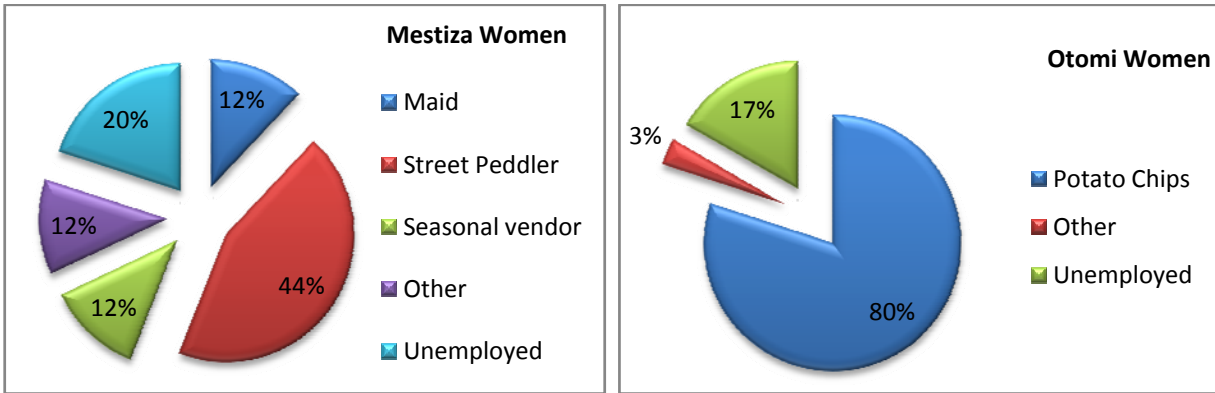
The average monthly incomes by job are graphed below:



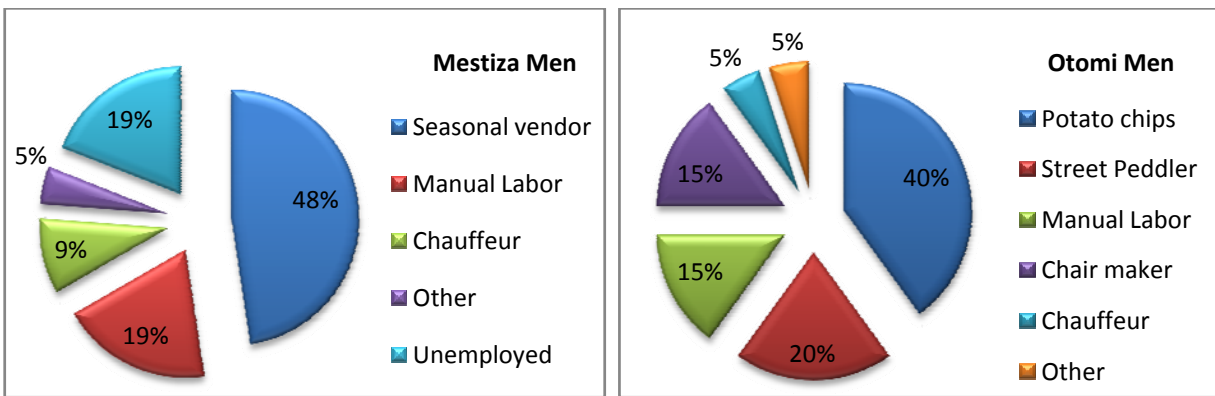
Notice that, in the three highest paying jobs on this list, 10 positions are held by men and 3 positions by women. Further, the lowest 4 job categories listed comprise the majority (59 of 92). Along ethnic lines, notice that only Mestizo families will peddle seasonal products: this type of work requires changing their product line as demand ebbs and flows, and generally produces higher income than the sale of a single main product. It also requires access to connections, such as suppliers, in Guadalajara, as well as a knowledge of what product lines would prove most profitable. Otomí families, on the other hand, work overwhelmingly as potato chip vendors, an occupation that requires access to few resources and whose materials can be purchased at local markets. The street peddler category refers to those vendors who sell products other than potato chips and seasonal products. For example, street peddlers may sell masks or flowers, but in general, their product lines remain the same all year round.

Below we depict the job breakdown by gender and ethnicity:

Mothers



Fathers



Studying the Income of Street Laborers

The job breakdown above already seems to confirm that inequalities will be present along gender and ethnic lines. For example, the concentration of potato chip vendors is exclusively amongst the Otomí, and greater amongst the Otomí women than men; and potato chip vendors have the lowest incomes of those recorded. Access to seasonal products seems to be restricted mostly to Mestizo men, as only one Mestizo man who works as a vendor is not engaged in the sale of seasonal products, while Mestiza women are much more likely to be street peddlers. However, before we present our statistical analysis and go over the differences in detail, we should pause to discuss how the figures for income were arrived at.

Gathering Data on Net Income

Studying the income of migrant workers in a meaningful way is more difficult than it might at first seem to be. As we noted above, street laborers, especially those who work as vendors, typically work without official licenses or permits. Their children often serve as lookouts for nearby police, and payments to such officers are often little more than bribes to look the other way. But an even more serious issue lies in the fact that, due to their poverty, these workers live hand-to-mouth and have no savings to show for, so a good sense of how much they might earn in, for example, a given month is typically quite lacking.

Further, there are seasonal fluctuations in sales and costs which are difficult to keep track of for vendors already living by the barest of means.

Thus, while we begin our dataset with the estimated monthly income queried from migrant workers, we must treat this data somewhat skeptically and perform a closer analysis to determine what is, in fact, the true net income versus the gross, particularly for street vendors whose sales often fluctuate wildly from day-to-day (see for example the quotation, inset right) and who must keep track both of their own expenses and their gross income. While this is not an issue for those who work in manual labor or other such jobs, this creates substantial difficulties for those who work as vendors, merchants, or otherwise have any substantial cost of sales involved in their job.

“There are times that I earn almost nothing all day, we don’t even live day to day but hour to hour.”

This problem is most pronounced amongst the Otomí potato chip vendors, both because working as a potato chip vendor is by far the most common occupation amongst the Otomí migrant workers, and because the Otomí are, as our statistical analysis above demonstrated, are the group most lacking in education and have the most trouble distinguishing between net and gross income and estimating their true incomes. Therefore, several of the Otomí potato chip vendors who seemed to keep the closest eyes on the associated supply costs were interviewed. They were in good accord as to the typical costs per day and per week, which we then converted to monthly rates and averaged together to calculate the following list:

Item	Average Total Expense
<i>Food</i>	<i>per month</i>
Potatoes	875
Doritos	186
Oil	660
Chile	167
Lemons	165
Bags	24
Napkins	43
Salt	5
<i>Transportation</i>	
Taxi	130
Gas	345
Bus	260
Total	2860

As we suspect that the reported monthly incomes will typically be overestimated because costs are not fully factored in, we can come up an estimate of how much the vendors could possibly be making per month and compare this to the average reported incomes of these selected vendors in order to determine a “markdown” factor for the real net income. Potato chip vendors work 6 of 7 days per week, and all reported daily sales were said to average between 100-150 pesos / day, with an occasional day that might be as high as 300 pesos, or as low as 50 or even nothing (when, for example, shut down by

the inspectors). Factoring in then 5 days at 125 pesos / day and a sixth day at 225 pesos each week, we arrive at sales of 3,683 pesos / month.

Quantity	Value
Sales / month	3683
Cost of Sales / month	2860
Estimated Real Net Income	823
Reported Monthly Income (average) ⁵	1650
Markdown	50%

Therefore, given all of the above factors, we decided to apply the following operations to the reported monthly incomes:

- The reported incomes of potato chip vendors are reduced by 45%.
- The reported incomes of other vendors are reduced at half this rate, 22.5%, as we expect some but not as much as overestimation and cost of sales for other vendors.

We emphasize here that this is a *conservative* change, because our tests will demonstrate that the indigenous Otomí (the majority of whom are potato chip vendors) in fact make *less* than the average income amongst the street workers in Guadalajara. Since the above expense figures are taken from some of the more price and cost-conscious vendors and the income estimate favors the upper bounds on the stated daily incomes, we expect *the real net income will typically fall below our estimated value*, and thus, if our test demonstrates that this possibly overestimated value is already below average, we can have confidence that the “true” figures are also certainly below average. As this will in fact be the case, believing that the true values are even lower makes our testing more conservative.

Methodology

We use employ a two-sample, two-tailed heteroskedastic (unequal variances) t-test to compare the mean incomes between different groups. The sample variances typically differed by a ratio only just large enough to warrant this more conservative test, versus the more common homoskedastic (equal variances) test. The null hypothesis is that there is no difference between the mean incomes of the different groups.

The t-test returns a *t* statistic for the difference of the means which is compared to an appropriate distribution to determine a *p* value. The *p* value, roughly speaking, gives us the probability that we would observe such a difference between the means from random sampling error, if in fact the populations did have the same mean, given a data set of this size and variance. Typically results for which $p < 0.05$ are considered to be statistically significant.

⁵ This average is the average of the report monthly incomes for those potato chip vendors later interviewed in detail regarding their expenses.

Analysis

Income Differences between Genders

While perhaps not surprising, our study comparing the incomes of women who work (rather than stay at home as housewives) versus the men in our program reveals a substantial, highly significant statistical difference at the $p < 0.01$ level.

Quantity	Value
Average Monthly Income, Mothers	1015.3
Average Monthly Income, Fathers	1612.5
Sample Size, Mothers	47
Sample Size, Fathers	40
p value	0.00547

These results leave no question that the almost 600 pesos / month difference between the income of mothers versus that of fathers is statistically significant.

Income Differences between Mestiza and Otomí Women

More interestingly, our analysis reveals a significant and substantial difference in women's incomes along ethnic lines. Again we compare the Mestiza and Otomí, and we find that the Mestiza mothers have incomes that are larger on average by 400 pesos / month.

Quantity	Value
Average Monthly Income, Mestiza Mothers	1243.7
Average Monthly Income, Otomí Mothers	845.0
Sample Size, Mestiza Mothers	21
Sample Size, Otomí Mothers	24
p value	0.0253

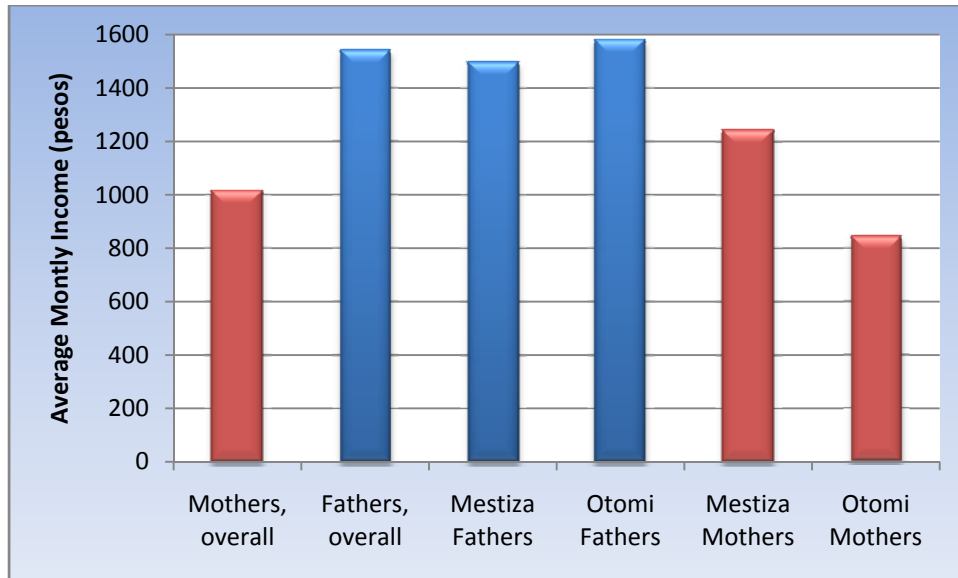
Incomes of Mestizo and Otomí Men

Remarkably in comparison to the mothers' incomes, the fathers' incomes show no difference along ethnic lines, and are, in fact, nearly statistically indistinguishable, having large and quite similar levels of variance (1,634,304 for Mestizo fathers and 1,089,942 for Otomí fathers; an F-test reveals these are not significantly different for a sample of this size, having a p value of 0.39).

Quantity	Value
Average Monthly Income, Mestizo fathers	1497.0
Average Monthly Income, Otomí Fathers	1580.9
Sample Size, Mestizo fathers	18
Sample Size, Otomí Fathers	20
p value	0.827

Discussion

In the chart below, we summarize the mean incomes for the different groups in our study.



One of the most fascinating aspects of these results is undoubtedly that:

While men's incomes are indistinguishable, incomes for women reveal a substantial divide along ethnic lines.

This is, in a sense, a startling result. One would expect that if ethnic discrimination is present, it would apply as well to the men as to the women, but this does not appear to be the case. For the most part the jobs taken by Mestiza and Otomí women seem to be on par. A handful of, relatively speaking, higher paying jobs amongst the Mestiza women as maids has an effect. If these women are removed, the difference falls to 270 pesos / month and a p value of 0.12, which suggests that the difference is statistically much weaker but perhaps still present. The exact source of this difference is hard to discern and may be attributable to many factors, for example, the higher educational levels amongst the Mestiza women or discrimination faced by Otomí women on the street.

Lastly, there is the equally serious, but perhaps less surprising, issue to address of women making substantially less on average than men do in our study. Again, it is impossible to prove by statistics alone what the cause of this difference is. Sexism, differences in education, and many other factors are surely involved. But we must also consider what effect the domestic situation may have on women's incomes. In the next section, we will explore through statistical analysis the high levels of domestic violence which women face as well as the effect it has on their incomes and their lives.

The Domestic Situation

In our analysis of the economic situation above, we discovered that there appeared to be serious inequalities confronting women, and the question was raised as to what role the domestic situation may play in this inequality. The data we have collected from the participants in our study has revealed high levels of domestic violence and abuse in the home, and the violence appears to be worse amongst the indigenous Otomí women:

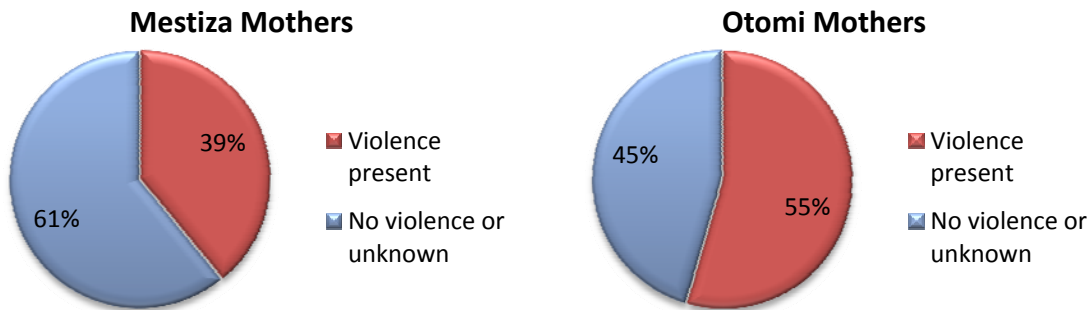


Figure 2. A comparison of domestic violence rates amongst Mestiza and Otomí women.

In this section we will explore what role ethnicity and education play or do not play in domestic violence, as well as the relationship between domestic violence and income.

Methodology

As above, in cases of population subgroups we will employ a two-way contingency table and a chi-squared test, and in studying income we will employ a two-sample, two-tailed heteroskedastic t-test as above.

Analysis

We begin by analyzing the possible effects of domestic violence and then examine the possible role of ethnicity and education.

The Quantitative Effects of Domestic Violence

Domestic violence has many and far reaching effects, but perhaps the most palpable and easily measured with the use of statistics is the effect it has on a woman's livelihood. Our data revealed that the average income of women experiencing violence at home was on average *roughly 400 pesos / month lower* than the income of women in our program not experiencing such abuse:

Quantity	Value
Mother’s average monthly income, domestic violence absent	1293.8
Mother’s average monthly income, domestic violence present	914.1
Sample Size, violence absent	18
Sample Size, violence present	18
<i>p</i> value	0.0566

The results are significant at approximately the 95% confidence level. The difference associated with the presence of domestic violence is roughly 30% of a woman’s average income in our study. While it is impossible to deduce from statistics alone if this difference is an effect of the abuse, or merely associated with abuse (because, for example, mothers with greater means might be able to leave abusers at higher rates), it is still clear that given the extreme poverty and difficult situations in which these families are already forced to live, the deleterious effects of spousal and child abuse cannot be overstated.

On the father’s side, it appears that income has little association with domestic violence:

Quantity	Value
Father’s average monthly income, domestic violence absent	1780.4
Father’s average monthly income, domestic violence present	1485.4
Sample Size, violence absent	21
Sample Size, violence present	17
<i>p</i> value	0.448

While there is a difference of roughly 300 pesos / month between the two averages, there is a much larger variance in the individual incomes (roughly three times the variance seen amongst the figures for the mother’s income, with a range twice as large), and the high *p* value of 0.448 is indicative of this difference being due merely to random chance and not indicative of any difference between the two groups.

These results suggest that *the association between domestic violence and a lower average monthly income for the mother is not merely due to the more difficult economic situation*, as a lower income on the father’s side appears to have no effect. Thus we are left to speculate that the lower income is due to the increased difficulty for a mother of more limited means to leave an abuser, to the harmful effect that the violence has on the mother’s work, or some combination thereof.

Ethnicity and Domestic Violence

We begin our analysis of the social factors potentially associated with domestic violence by exploring the relationship between ethnicity and domestic violence. Figure 2 above seems to suggest that the domestic violence is present at higher levels amongst the indigenous Otomí, however, the statistics are inconclusive due to the small size of our dataset:

Domestic Violence	Violence Present	Violence not present or unknown	Totals
Mestiza	9	14	23
<i>Expected</i>	10.7	12.3	
Otomí	12	10	22
<i>Expected</i>	10.3	11.7	
Totals	21	24	45

Computed χ^2 value: 1.07. Threshold χ^2 for $\alpha = 0.05$, $v = 1$: 3.84.

The p value for our χ^2 statistic above is 0.30, which suggests that the apparent differences may be due merely to the small size of our dataset. More research is needed to determine if any relationship exists.

Education and Domestic Violence

We first compare the mother's education to the presence of domestic violence. One might suspect that with higher levels of education, women will be less likely to put up with domestic violence, and largely this appears to be true:

Mother's education	No schooling	Primary	Secondary	Totals
Violence Present	10	7	5	22
<i>Expected</i>	8.1	10.5	3.3	
No violence/unknown	7	15	2	24
<i>Expected</i>	8.9	11.5	3.7	
Totals	17	22	7	46

Computed χ^2 value: 4.65. Threshold χ^2 for $\alpha = 0.10$, $v = 2$: 4.61.

The results are significant at the 90% confidence level, with the caveat that there are two entries in the table with expected values less than 5. If these entries are removed, the result is a table with a value for χ^2 of 2.84 against a threshold of 2.71 for the 90% confidence level. The small values lie in the secondary education level, where there are too few mothers to draw a reliable conclusion. As the table reveals, we see substantially less violence amongst mothers with a primary level of education versus mothers without education. The mothers at the secondary level would appear to have a higher-than-expected level of violence, but again this should be attributed to the extremely small numbers at that level. The results at the no schooling and primary levels are statistically significant and allow us to conclude that *increased education amongst women appears to be associated with reduced the levels of domestic violence.*

In contrast, it seems that the educational level of the father has little association with the levels of domestic violence present:

Father's education	No schooling	Primary	Secondary	Totals
Violence Present	4	11	5	20
<i>Expected</i>	2.9	10.7	6.3	
No violence/unknown	2	11	8	21
<i>Expected</i>	3.1	11.3	6.7	
Totals	6	22	13	41

Computed χ^2 value: 1.34. Threshold χ^2 for $\alpha = 0.10$, $v = 2$: 4.61.

Again we have an issue with low expected values for one column of the table (No schooling), however, in this case, removing the offending values has no result on the significance ($\chi^2 = 0.81$ and a threshold of 2.71). We can conclude that there appears to be no relationship between the father's educational level and the presence of domestic violence in our sample.

Discussion

The high levels of abuse (and overall average of 44% of the families in our dataset reported ongoing violence; the true rate may be even higher) and the negative effects and factors associated to this abuse point to the need for increased education as a means of protecting women from intrafamilial violence. The analysis demonstrating that women with some education in general showed lower levels of abuse offers hope that the increased equality in the education of female children in our sample will, in the future, result in some decrease in domestic violence in the next generation of parents.

“My husband drinks all the time and does drugs. He goes away for months at a time. Each time he leaves, my children suffer great pain. I feel desperate, I don't know what to do.”

“When my husband doesn't live with me, he helps me more.”

However, the lack of a correlation between domestic violence and the father's education or income suggests the roots of the problem are multifaceted. For example, in light of the higher rate of domestic abuse observed within the Otomí

community, the role of social marginalization in producing high rates of violence against women should be explored, as well as the impact of migration on the rates of domestic violence. There are also several social factors which are likely to be at play, such as traditional gender roles and high substance abuse rates in economically disadvantaged communities. Anecdotal evidence suggests that drug and alcohol abuse plays a substantial role in violence against women. One woman in the study was left paralyzed and wheelchair bound after her husband, in a drunken rage, pushed her out of the window of their apartment. Several of the women in our study confirmed that when their husbands are sober, they offer economic assistance and social support, but when their drinking and drug use relapses, the violence begins anew and there are high rates of abandonment.

Guadalajara and the rest of Mexico

The situation for indigenous language speakers in Mexico

Guadalajara is, of course, unique in several respects in the broader context of Mexico. But as we observed in the introduction, accurate statistics for ethnic minorities across Mexico are of limited availability and the 2005 census statistics seem to vastly ignore the marginalized groups such as the indigenous Otomí. Nevertheless, we can attempt to make use of the 2005 census statistics for indigenous language speakers in general to attempt draw a comparison between the situation for indigenous language speakers in Guadalajara (amongst whom the minorities in our study are included) with the situation for indigenous speakers in other parts of Mexico in a similar manner as was done above.⁶

The results reveal that the educational gaps which were demonstrated in our study above seem to be even wider in the broader context of Mexico, suggesting that in fact the situation is even more dire in this larger context.

Analysis

The Situation in Guadalajara

The census statistics for Guadalajara leave little doubt as to the trend which we observed on our dataset above, that speaking an indigenous language has a highly significant negative effect on the level of schooling.

Guadalajara	Little or no schooling	Completed Primary	Secondary or more	Totals
Speak indigenous language	6,416	4,668	6,535	17,619
<i>Expected</i>	5,616	4,514	7,489	
Do not speak indig. lang.	957,888	770,438	1,279,457	3,007,783
<i>Expected</i>	958,688	770,592	1,278,503	
Totals	964,304	775,106	1,285,992	3,025,402

Computed χ^2 value: 242.3. Threshold χ^2 for $\alpha = 0.01$, $v = 2$: 9.21.

The Situation outside of Guadalajara

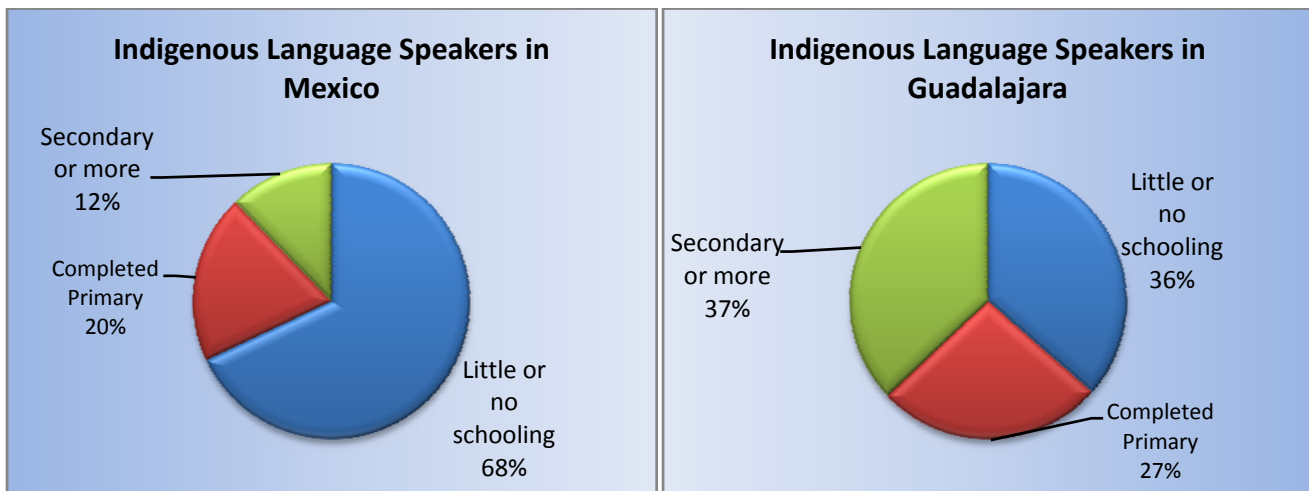
The most fascinating fact revealed by the census statistics is that outside of Guadalajara, not only are the same differences present and highly statistically significant, but the inequalities present are in fact of a far greater magnitude:

⁶ Data for *Población de 5 años y más in Censo de población y vivienda 2005*, available at <http://www.inegi.gob.mx/inegi/default.aspx>.

Mexico (excepting Guad.)	Little or no schooling	Completed Primary	Secondary or more	Totals
Speak indigenous language	4,056,520	1,183,832	729,768	5,970,120
<i>Expected</i>	<i>2,522,558</i>	<i>1,417,527</i>	<i>2,030,035</i>	
Do not speak indig. lang.	30,458,917	18,211,779	27,046,622	75,717,318
<i>Expected</i>	<i>31,992,879</i>	<i>17,978,084</i>	<i>25,746,355</i>	
Totals	34,515,437	19,395,611	27,776,390	81,687,438

Computed χ^2 value: 1,946,420.2. Threshold χ^2 for $\alpha = 0.01$, $v = 2$: 9.21.

The proportional differences are even better illustrated if we view them side-by-side:



Notice that there is almost a *twofold jump* in the levels of little or no schooling.

Discussion

Reliable statistics on ethnic minorities in the whole of Mexico are hard to come by and more research is certainly needed. The 2005 census statistics tested above seem to imply that while the situation may be difficult for poor and indigenous people in Guadalajara, in fact there is good reason to believe that the situation across Mexico as a whole is even worse. CODENI is currently expanding its efforts to reach poor workers outside of Guadalajara as well, and as the numbers suggest, there appears to be great need.

Closing remarks

Before discussing the results of this study revealed through subdivision and analysis, let us begin these remarks by recalling the most basic statistics which encompass all of the families working on the streets, and of which we must not lose sight:

- The overall average income for a street laborer was a mere 1,290 pesos / month.
- 29% of the parents in our study had no education, 53% have some schooling at the primary level, and only 18% had any schooling at the secondary level.
- The average family had 4 children, of whom 1 in 5 dropped out of school before reaching the secondary level of education.
- Only 53% of the families had both parents present, 23% were families with a single mother, and 24% were of an extended type.
- 44% of families with both parents present reported domestic violence.

But despite these dismal numbers, the statistic analysis we have conducted in this report also offers hope that programs designed to increase educational opportunities for poor children are having an effect:

- Gender and ethnic discrimination, though pervasive in the parents' generation, seems to be absent in the educational opportunities of the new generation of school children (at least with respect to school attendance), leading to the hope that efforts to provide education for these children can and will pay off, and as this happens, that the remaining ethnic and gender barriers can someday be eliminated as well.
- Children's general educational levels are rising in comparison to their parents: although 1 in 5 children drop out before reaching secondary school, this also means that 4 in 5 children are still in school, there is good reason to hope that at least 3 in 5, or 60%, of this generation will reach at least the secondary level, in comparison to their parents' 18%. *This would be a threefold increase in the basic levels of education.*
- Lower levels of education have been found amongst women, whose lower income may be a result of the jobs they therefore choose. With increased levels of education amongst young women, there is hope that they will find better jobs and income inequalities will be reduced.
- With higher education, women are less likely to be experiencing domestic violence, so there is reason to hope that as education increases and opportunity equalizes, fewer women in the next generation will experience abuse.

Despite the tremendous problems facing the current generation of migrant workers and street laborers in Guadalajara, through programs like CODENI that promote the protection and education of children there are increasing signs of hope that one day the inequalities, violence, and poverty that plague Mexico's poor can be reduced.