2019

A Nuanced Look at Gender Interactions on Informal Employment and Income in Argentina and Uruguay

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submitted to

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by

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for

Senior Thesis

Spring 2019

April 29, 2019

Abstract

There are many existing studies characterizing the informal sector in Latin America, but the literature fails to fully examine the interactions between gender and disadvantaging factors on the probability of informal employment and its returns to wage. This analysis uses survey data from Argentina (2001) and Uruguay (2006) to examine the heterogeneous effects of number of children under 5, education, minority status, and migrant status on male and female informal employment and income. Being female interacts with number of children under 5 to create no effect on probability of informal employment, in contrast to a significant negative effect for men. Education has a greater negative effect on probability of informal work for females, while minority status and migrant status have a greater positive effect on the probability of being employed informally for females. Additionally, working informally is associated with a negative effect on wage for both females and males, but this effect is less for females. Number of children under 5 also negatively affects female wages, while there is no such effect for men.

Acknowledgements

This thesis would not have been possible without the help of Professor Jeffrey Flory, who not only helped me center my central question, sort through my analysis, and deal with problems, but provided me with some tidbits of life advice along the way. This entire process of writing my Senior Thesis has given me life skills that I was not expecting, such as being more precise with my spoken language and slowing down when explaining topics to others.

I want to thank Professors Heather Antecol and Yaron Raviv for their excellent teaching abilities and inspiring demeanors. I wouldn't have written my thesis on a labor economics topic (or economics in general) if I didn't think the classes Labor Economics and Statistics were fun. Somehow, they made those topics really fun.

My family and friends have also been extremely supportive during this last semester of undergraduate study. Thank you for sending me funny pictures and bringing me food while I was stressed and in the library.

Also, I want to acknowledge several iterations of past Teagan for slowly becoming open-minded to new topics in college and including economics as a dual major. Present-day Teagan thanks you for making her smarter and more interesting!

Table of Contents

1. Introduction

In most developing countries, the informal sector is an integral, if not the largest, segment of the economy, characterized by individuals working in small-scale, low-productivity jobs (Gasparini and Tornarolli, 2009). The informal sector primarily includes mostly poor workers, and participation in this sector is often associated with "low and volatile earnings," meaning that informal workers are often making less than the formal sector and have a less-than-steady stream of income (Gunther and Launov, 2012). Although scholars debate whether the relationship between informal work and income is causal (Maloney, 2004), there is a strong link between informal employment and poverty. This has made the informal sector a significant subject of research for those who are interested in poverty reduction (Beccaria and Groisman, 2008), entrepreneurship (Maloney, 2004), or policy changes to enable personal and economic growth (Chen, 2001).

There has been significant past research in measuring and defining the informal sectors of developing countries, specifically in Latin America. In a comprehensive analysis of the informal sectors of multiple Central American countries, Funkhouser (1996) finds that the informal sector is "the youngest, the oldest, the least educated, and female." Funkhouser also finds a high return to education on income and a higher male-to-female earnings differential in the informal sector than the formal sector. However, he finds that the disproportionate employment of women in the informal sector coupled with the lower earnings differential suggests that there are significant barriers to mobility within this sector for women.

Past research has looked at the informal sectors of Argentina and Uruguay specifically but has not deeply analyzed the influence of factors within their female populations, at most analyzing only the simple variable of gender on informal employment. Portes et. al. (1986) find that, at their time of research, the Uruguayan informal sector encompassed 20% of their survey respondents, and that the probability of informal employment was additionally influenced by race and sex, not just skill. Gasparini and Tornarolli (2009) found that the share of informal workers in the overall labor force in Argentina between 1995 and 2005 ranged between 41% and 46%, while proportion of informal workers from the adult female population ranged from 40% to 45%. In Uruguay, they found that the informal share of the workforce ranged from 35% in 1992 to 44% in 2003, with adult female proportions of 43% in 1995 and 1998 and 51% in 2003. Beccaria and Groisman (2008) find that Argentinian informal employees earn only 60% to 70% of income comparted to formal sector employees, suggesting a close relationship between the informal sector and poverty. However, they do not analyze the impact of gender within this sector.

Funkhouser (1996) does include interaction variables of gender and other qualities in his analysis of several Central American countries, but he focuses on the effects of the interaction between gender and marital status and its effect on the probability of informal employment. He also focuses on the earnings differential between men and women in the informal sector, noting that it is much larger than that of the formal sector, and states that this, compiled with disproportionate female employment in the informal sector found in his analysis, “suggests that barriers to mobility, and refuge employment in the informal sector, may be important for females.” Funkhouser does not look at the effects of other

potentially disadvantaging qualities and their interactions with gender to affect the probability of informal employment, despite the possibility that additional interaction variables could be significant in a similar analysis and help characterize the role of intersectionality in informal sector employment. Overall, the economic research that I was able to find did not delve far beyond the simple effect of only being female on the propensity to be informally employed.

The lack of nuance within the female portions of these analyses on informal employment suggests that there is room for further economic research on the compounding effects of gender and other disadvantaging factors in choosing informal work and the returns to income through this sector. Women are disproportionately employed in the informal sector globally, and informal sector work and poverty are often intertwined (Chen 2001). The concept of intersectionality suggests that gender can interact with other variables that characterize many informal sector employees, such as race and low education, to generate additional disadvantage and higher propensity of low-income, informal employment. Researchers in the fields of sociology and political science have examined women's participation in the informal sector in Latin America and attempted to examine the influences of individual and societal characteristics on the structure of the informal and formal labor markets (Cantu, 2017; Sautu 1980; Chen 2001). Evidence of compounding effects between gender and other characteristics on the individual level can contribute to the current debate surrounding the nature of informal work and whether women are choosing to be employed in the informal sector, or confined by barriers to the formal sector.

Heterogeneity of the informal sector is often emphasized in existing literature. Although this study attempts to identify trends and causal factors on informal employment and income, the informal sector in Latin America is not a homogenous block. In the past, the informal sector was characterized as individuals seeking insecure jobs as their only option to unemployment. However, recent research has emphasized that there is evidence of a more entrepreneurial portion of the informal sector (Caneiro, 2009; Maloney, 2004). Although the simple metric of informal/formal employment does not capture the nuance of the informal sector, evidence of intersectionality between gender and other disadvantaging characteristics in predicting informal employment can be indicative of barriers that exist to formal employment to these groups. Additionally, evidence of wage premiums for informal employees of certain groups could help shed light on whether these groups are voluntarily remaining informal sector employees.

This study finds evidence of heterogeneous effects of the number of young children, education, and minority and migrant status on females compared to males on probability of informal employment. Although males are more likely to work in the formal sector for each additional child under the age of 5, additional children under the age of 5 has no impact on the probability of informal work for women. The impact of a year of education, additionally, has almost double the negative impact on the probability of being informally employed on females compared to males. There is a significant impact of being a minority on the female population in increasing the probability of informal work, while there is an opposite or no effect for men. Migrant women are much more likely to be informally employed than migrant men by a gap of approximately 12 percentage points.

Additionally, this study finds that number of young children and participation in the informal sector have different effects on female income than on male income. Being an informal worker has a downward effect on wage for both men and women, but the effect is of a lesser magnitude for females. The interaction of being female and number of children under 5 has an additional negative penalty to wage, while number of children under 5 has no effect on men. The interactions between being female and minority status, as well as being female and migrant status, have no significant impact on wage. Minority status on its own, however, has a significant negative effect on income for both males and females.

2. Methods and Data

2.1 Methods

This study begins with several two-sample t-tests on differences between the male and female samples and the informal and formal worker samples. These simple means tests serve the purpose of identifying interesting trends, but other factors influence the probability of being informally employed. The study then moves to several OLS multivariate regression analyses in which the variables of interest are examined in the entire sample, in gender-separated samples, and in the entire sample with their interactions on gender included.

2.2 Data

The data used in this study are from the 2001 Argentina National Population, Households, and Dwellings Census (NPHDC), conducted by the National Institute of Statistics and Censuses, and the 2006 Uruguay Extended National Survey of Homes (ENHA), a probability sample conducted by the National Institute of Statistics. Both were accessed through the IPUMS International user database. The entire NPHDC dataset reflects 3,883,969 individuals, and the ENHA contains information on 256,866 individuals. These studies, while not the most recent available censuses, were chosen on the basis that they included information on the size of place of employment, a key variable used to define inclusion in the informal sector. Both studies contain information on, among other variables, age, sex, marital status, educational attainment by year and by level, native-born status, head of household, and industry of employment. The NPHDC additionally contains information on country of birth, and the ENHA contains

information on race, indigenous status, and income. Due to the nature of the samples, not every respondent includes a response for each variable.

2.3 Variable Definitions

This study uses categorization of workers by the "productivity" definition of the informal sector outlined in Gasparini and Tornarolli (2009) to define the informal sector:

> *Individuals are considered a part of the informal sector if he or she is unskilled self-employed, a salaried worker in a small private firm, or a zero income worker.*

This definition is consistent with the reasoning used in other microeconomic studies on the informal sector (Funkhouser 1996; Henley & Arabsheibani 2008). In this definition, unskilled self-employment implies that the individual is both not working for a well-established, productive firm and that he or she does not have superior education necessary to work as a professional or technician. According to Gasparini and Tornarolli (2009), small firms are often run by those who are self-employed, and are usually using primitive technology and operating at low productivity, which are considered defining characteristics of informal labor. The number cutoff in identifying small places of employment for the purpose of identifying informal workers can range depending on the survey, but are often defined as having 5 employees or less (Caneiro, 2009; Funkhouser, 1996). Due to differences in survey questions, small places of employment are defined as having between 1-5 employees in Argentina and 1-4 employees in Uruguay. The variable in the data that contains the size of work establishment includes only private sector employees and persons age 14 and over for both NHPDC and ENHA. Additionally,

skilled self-employment is implied if the individual has a tertiary degree; those who have completed university are, therefore, classified as formal workers.

Zero-income work, according to Gasparini and Tornarolli (2009), often indicates that the person works in a family-based enterprise and receives non-monetary compensation and other non-formal payment. This data set uses information on monthly income, in which zero-income work can also indicate the wage volatility that is often associated with informal employment. Because of this, a response of "0" for last month's income indicates informal employment. Individuals meeting criteria to be classified within one of these three defining categories are indicated as an informal worker in the variable *Informal (Inf).*

Labor force non-participants are removed from this metric. Labor force participation is determined in the NPHDC by asking if the individual either worked last week, or if they were looking for work in the last four weeks. Text information for the question on labor force participation in the ENHA was unavailable and unclear exactly what methodology was used to determine labor force participation from the survey; however, I assume that it was likely determined through indicators similar to those used in the NPHDC, as surveys often determine labor force participation through whether the individual worked or is looking for work.[1] For the purpose of simply excluding those who do not work from the informality metric, which is determined mostly by size of

[1] For example, the Uruguay 2011 census asks, "During the past week, did (Name) work for at least an hour? Did the [the respondent] do something outside the household, or helped in a business or collaborated in the care of animals, crops, or gardens that were not for self-consumption? Even though [the respondent] didn't work last week, does [the respondent] have some work or business that [the respondent] will surely return to? During the last four weeks, was [the respondent] looking for work or trying to establish a business?" The Uruguay 1996 census asks, "During the past week, did you work at least one hour?"

place of work, I chose to continue to use the ENHA labor force variable to define informal and formal workers.

Other variables of interest to be interacted with gender and control variables are a female dummy (*Female* or *F*), number of children under 5 years (*Children Under 5* or *N5*), age, education in terms of years of schooling (*Years of School* or *Yrs)* and educational level attainment (primary school, secondary school, etc.), race (*Minority* or *Min*), migration status (*Migrant* or *Mig*), head of household status, and income (*Income* or *Inc*). Number of children under 5 years reflects the number of the individual's own children that are under the age of 5.

Race, a variable available only from the ENHA, has been constructed into the dummy variable *Minority*, which indicates 0 as the Uruguayan racial majority (white) and indicates 1 as a non-white racial minority, including those of two or more races. *Migrant* is a dummy variable constructed from data on whether or not the person is a native, 1 indicating that they did not immediately live in their country of residence after birth. Information on migration was only collected during the 4th trimester of the ENHA survey, so the number of responses to the variable *Migrant* are limited in Uruguay.

Income data is also only available from the ENHA, and reflects the total amount of income earned for that individual from their highest-paying job last month in Uruguayan pesos. The conversion rate of Uruguayan pesos to dollars on December 31,

2006 was 24.37 pesos to 1 dollar,[2] which is used to contextualize the results with an approximate dollar value.

2.4 Summary Statistics

Table 1A

Summary: Entire Sample

VARIABLES	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max
Children under 5	3,883,969	0.160	0.472	0	9
Age	3,883,969	31.60	22.23	0	100
Yrs of School	3,682,864	7.376	4.668	0	18
Wage last month (Uruguayan pesos)	256,866	1,659	4,261	0	180,000
Racial Minority	255,978	0.126	0.332	0	1
Migrant	3,690,112	0.0419	0.200	0	1
Head of HH	3,883,969	0.281	0.450	0	1
Informal	729,096	0.506	0.500	0	1

Table 1B

Summary: Included in Informal Metric

VARIABLES	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max
Children under 5	729,096	0.260	0.564	0	7
Age	729,096	37.79	13.57	15	99
Yrs of School	729,091	9.536	3.950	0	18
Wage last month (Uruguayan pesos)	93,146	3,146	5,342	0	180,000
Racial Minority	92,824	0.119	0.323	0	1
Migrant	659,692	0.0584	0.235	0	1
Head of HH	729,096	0.505	0.500	0	1
Informal	729,096	0.506	0.500	0	1

[2] The historical conversion rate was found on www.xe.com/currencytables.

Table 1A displays the summary statistics for the entire combined sample of NPHDC and ENHA, while Table 1B contains the same summary statistics for the smaller sample of only those who do not have a "missing" value for the variable *Informal*. This is the sample used in the majority of analyses in this study. Several means change in the second table; the average number of children under five, age, average years of school, average wage last month, and proportion that are head of household all increase. However, these changes are all likely due to the removal of children under the age of 14 from the informality metric. The proportion of racial minorities in the sample decreases by 0.7 percentage points, or 5.55%, and the proportion of migrants as a share of the sample increases by 1.65 percentage points, or 39.38%. When a t-test is run on these differences in proportions, they are both found to be significant at the 1% level. [3]

Because the proportion of racial minorities only changes by around 5%, the magnitude of this change is not very concerning. However, the proportion of migrants in the sample increases by quite a large amount, becoming over a third larger. One possible reason for this increase is that migrants in the sample may tend to be working adults rather than children, so a smaller proportion of migrants compared to natives are removed from the sample when it is restricted to those who work in the informality metric. When a t-test is run on the average ages of the migrant sample versus the native sample, we find that the migrant sample is significantly older by an average of 18.17 years.[4] This implies that a higher proportion of the migrant population is in the labor force, and less migrants

[3] Results of this t-test are shown in Appendix Table 1.
[4] Results of this t-test are shown in Appendix Table 2.

are removed when the sample is restricted to this metric. This explains why this proportion of migrants in the informality metric is significantly higher.

Table 2

Proportions of All, Male, and Female workers in each industry by informal/formal sector

	All		Male		Female	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Informal	Formal	Informal	Formal	Informal	Formal
Agriculture, Fishing, Forestry	16.15	7.82	24.54	10.00	5.37	3.06
Mining	0.14	0.85	0.23	1.14	0.02	0.22
Manufacturing	9.40	20.98	12.38	24.45	5.58	13.38
Electricity, gas, water	0.33	1.56	0.48	1.86	0.13	0.89
Construction	5.18	4.39	9.05	6.09	0.22	0.65
Wholesale and Retail Trade	23.39	17.05	26.62	16.61	19.25	18.01
Hotels and Restaurants	3.29	3.98	3.15	3.48	3.47	5.06
Transportation, storage, and communication	5.59	10.42	8.66	12.96	1.65	4.85
Financial services and insurance	0.54	3.29	0.49	2.75	0.59	4.48
Public administration and defense	0.02	0.06	0.01	0.04	0.02	0.11
Real estate and business services	4.82	8.35	4.84	7.74	4.80	9.68
Education	0.81	5.61	0.30	1.71	1.47	14.17
Health and social work	1.63	6.01	0.49	2.76	3.10	13.14
Other services	4.54	4.60	4.60	4.28	4.45	5.30
Private household services	21.15	.45	1.52	.21	46.36	0.97

Table 2 shows the proportion of workers in each industry by gender and formal/informal sector. Almost half of women working in the informal sector (46.36%) are working in private household services, which is consistent with literature on labor markets of Latin American countries—women typically have the "worst" jobs in the informal sector, working in "precarious" domestic or household work, often for little or no payment (Abramo and Valenzuela, 2005). In contrast, the highest proportions of males working in the informal sector are working in wholesale and retail trade and agriculture.

Small portions of informal workers are in industries that would often be considered formal lines of work, such as financial services and insurance, or public administration and defense. There are several explanations for why these workers could be considered informal: first, since an important aspect of the construction of the informality variable is simply the size of the place of employment, it is possible that several individuals working in small, formal places of employment are considered informal in this sample; second, the way that industry is determined in the sample is through the individual's description of their job, where it is then categorized into the assumed industry—it is possible that a disconnect between job description and actual job function led some individuals to be classified in a "formal" industry when they are not; lastly, individuals working in these sectors may still be informal, but may be sub-contractors to the formal sector (Funkhouser, 1996).

3. Analysis

3.1 Informality: Two-Sample Means Tests

This study begins analysis with a series of two-sample means tests between the male/female and native/migrant samples. Each test is testing against the null hypothesis that the means of the male and female samples or the native and migrant samples for that variable are equal.

Table 3A

T-test results for male & female mean comparisons

VARIABLES	(1) Male Mean	(2) Female Mean	(3) Difference
Percent informal	.456	.589	-.132*** (.001)
Percent informal if migrant	.444	.725	-.281*** (.005)
Percent informal if minority	.625	.714	-.088*** (.009)
Yrs of school if informal	8.181	8.569	-.388*** (.012)
Yrs of school if formal	10.100	12.169	-2.069*** (.014)

Table 3A shows the results of several t-tests comparing differences between the male and female populations. The differences between males and females for each variable above is significant at the one-percent level.

Overall, the proportion of women working in the informal sector is much greater than the proportion of men, with women being 13.2 percentage points, or 28.9%, more likely to be an informal worker. When looking at the migrant population, this difference

more than doubles, with migrant women being 28.1 percentage points, or 63.3%, more likely to be an informal worker than migrant men. This is driven by the large proportion of the female migrant population working in the informal sector, in which it jumps to 72.5% of migrant women from 58.9% of all women.

There are several possible reasons why migrant women may be more inclined to work in the informal sector than migrant men. First, women's reasons for migrating often center on their desire to better their family more than helping themselves (Pedraza 1991), which may lead them to be more accepting of "undesirable" jobs. Additionally, migrant women may lack language skills or years of schooling to compete with natives for formal sector jobs. To shed more light on this second hypothesis, Table 3B analyzes the difference in education between migrant and non-migrant female populations in this sample.

Table 3B

T-test results for years of school between natives and migrants

VARIABLES	(1) Native Mean	(2) Migrant Mean	(3) Difference
Females	10.247	9.116	1.135***
			(.032)
Males	9.363	8.957	.406***
			(.0274)

Note: The tests in this table are restricted to only individuals with a value for the informality metric.

The results in Table 3B show that native females have, on average, 1.135 more years of schooling than migrant females, and native males have, on average, 0.406 more years of schooling than migrant males. For both males and females, migrants have lower education than natives, but this trend is of a greater magnitude for females. Because

migrant women experience a greater educational gap compared to natives than their male counterparts, they may be facing more educational barriers to entering the formal sector, while migrant men may not have the same barriers.

In Table 3A, a similar trend appears when analyzing the difference between male and female minority workers. 71.4% of minority female workers are informal workers, again much higher than the overall proportion of women informal workers at 58.9%. However, in contrast to the proportion of male migrant workers, which was almost the same as the overall proportion of men in the informal sector, the proportion of minority men working in the informal sector is greater than the overall proportion of men in the informal sector at 62.5% compared to 45.6%. The difference between the proportions of minority female and male informal workers is then only an 8.8 percentage point difference, which is smaller than the gap between the overall populations of men and women. This suggests that being a racial minority affects men and women in similar ways, and has similar effects on the propensity to work in the informal sector. These differences suggest that there may be either racial discrimination in the formal workplace, creating a barrier to entry for minorities, or that racial minorities have other disadvantages that lead them to seek informal employment.

In the informal sector, males and females have similar levels of schooling at 8.181 years and 8.569 years of schooling, respectively. In contrast, men in the formal sector have, on average, 10.1 years of schooling, and women in the formal sector have 12.169 years of schooling. Both male and female informal workers have, typically, no secondary education, while male and female formal workers have at least some high school

education. However, the average female formal worker has a high school diploma, while the average male formal worker has only a few years of high school. This suggests that the educational barrier for entry into the formal sector may be higher for women, providing a possible explanation for why there is a greater proportion of women employed in the informal sector.

To explore this idea of different educational barriers in the formal sector for males and females, Table 3C shows the difference in informal sector participation at different educational milestones.

Table 3C

T-test results for informal participation by sex and education level

VARIABLES	(1) Male Mean	(2) Female Mean	(3) Difference
Zero Schooling	.590	.841	-.251*** (.008)
Less than Primary	.602	.820	-.218*** (.003)
Primary Completed	.509	.752	-.243*** (.002)
Secondary Completed	.401	.463	-.062*** (.002)

For all milestones of education below "Secondary Completed," women are significantly more likely than men to be working in the informal sector. Once primary school is completed, both men and women become slightly less likely to work in the informal sector, but the drop in probability is greater for men than women, causing the gap between percentage of males and females in the informal sector to rise to a 24.3

percentage point, or 47.7%, difference. However, once secondary school is completed, this gap greatly narrows to a 6.2 percentage point difference, and women become only 15.5% more likely to be working in the informal sector. This provides evidence for the idea that women have more barriers to working in the informal sector than men if they have less than a high school education.

3.2 Informality: Regression Analysis

Table 4 includes the results from several multivariate regressions of the control variables on the probability of being an informal worker. The regressions include either minority status, migrant status, or both in order to showcase the difference in coefficients within the varying sample sizes created by the availability of the variables *Minority* and *Migrant.* The three regressions are modeled by the equations:

(1) $Inf = \alpha + \beta_1 F_i + \beta_2 N5_i + \beta_3 Yrs_i + \beta_4 Min_i + \theta' Z + \epsilon_i$

(2) $Inf = \alpha + \beta_1 F_i + \beta_2 N5_i + \beta_3 Yrs_i + \beta_4 Mig_i + \theta' Z + \epsilon_i$

(3) $Inf = \alpha + \beta_1 F_i + \beta_2 N5_i + \beta_3 Yrs_i + \beta_4 Min_i + \beta_5 Mig_i + \theta' Z + \epsilon_i$

where the *i* subscript denotes the individual and $\theta'$is a vector containing the control variables age, marital status, head of household dummy, and province fixed effects.

Table 4			
Dependent variable: Informal=1, both genders			
VARIABLES	(1) Minority Included	(2) Migrant Included	(3) Minority & Migrant
Female	0.0807***	0.148***	0.0774***
	(0.00355)	(0.00135)	(0.00704)
Children under 5	-0.00172	-0.0188***	-0.0145**
	(0.00342)	(0.00108)	(0.00694)
Yrs of School	-0.0352***	-0.0358***	-0.0345***
	(0.000453)	(0.000156)	(0.000915)
Minority	0.00442		0.00287
	(0.00466)		(0.00926)
Migrant		0.0771***	0.0361*
		(0.00250)	(0.0214)
Constant	0.684***	0.689***	0.663***
	(0.00757)	(0.00341)	(0.0151)
Observations	92,819	659,690	23,732
R-squared	0.133	0.135	0.132

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The individuals in the Uruguay sample are 10.4% more likely to be informal workers, controlling for all other variables.[5] This suggests that there are likely structural qualities about the country of Uruguay that influence formal work opportunities and barriers for the entire population, but these qualities may be harder to observe or define in a household survey. Additionally, the coefficients for many provinces when controlling for location fixed effects are quite large, suggesting that there may be several omitted or unobserved variables relating to residents of different provinces.

For each of the analyses, female has a positive coefficient of at least .077,

[5] Full results of the regressions in Table 4, including a regression using "country" as a control in place of province fixed effects, are shown in Appendix Table 3. Full results of the regressions in Tables 5A and 5B are shown in Appendix Tables 4 and 5.

meaning that being female reasonably increases the probability of being an informal employee. This is in line with previous research, which has found that females are more likely to be working in the informal sector (Funkhouser, 1996; Henley and Arabshibani, 2008; Portes et. al., 1986). Each year of school is associated with a lower probability of working informally, which is in line with past research that finds that the informal sector tends to be less educated (Funkhouser, 1996; Portes et. al., 1986).

Being a racial minority does not significantly influence informal sector probability when included as a variable on its own in the total regression. Being a migrant, when on its own, is positively associated with an increase in probability of being an informal worker but, when minority status is also controlled for, becomes significant only at the 10% level. Also, when only minority status is controlled for, number of children under 5 no longer becomes significant, but becomes significant at the 5% level once migrant status is controlled for.

Tables 5A and 5B show the results of similar regressions to Table 4, but separately on the male and female samples to isolate the effects of the variables on the genders separately. The regressions are represented by the equations:

(4) (7) $Inf = \alpha + \beta_1 N5_i + \beta_2 Yrs_i + \beta_3 Min_i + \theta' Z + \epsilon_i$

(5) (8) $Inf = \alpha + \beta_1 N5_i + \beta_2 Yrs_i + \beta_3 Mig_i + \theta' Z + \epsilon_i$

(6) (9) $Inf = \alpha + \beta_1 N5_i + \beta_2 Yrs_i + \beta_3 Min_i + \beta_4 Mig_i + \theta' Z + \epsilon_i$

where the *i* subscript denotes the individual and θ' is a vector containing the control variables age, marital status, head of household dummy, and province fixed effects.

Table 5A			
Dependent variable: Informal=1, Males			
VARIABLES	(4) Minority Included	(5) Migrant Included	(6) Minority & Migrant
Children under 5	-0.00147	-0.0150***	-0.0139
	(0.00449)	(0.00133)	(0.00914)
Yrs of School	-0.0272***	-0.0266***	-0.0269***
	(0.000616)	(0.000203)	(0.00125)
Minority	-0.00167		0.00165
	(0.00617)		(0.0122)
Migrant		0.0206***	0.0323
		(0.00341)	(0.0298)
Constant	0.600***	0.613***	0.582***
	(0.00975)	(0.00438)	(0.0194)
Observations	55,450	413,204	14,132
R-squared	0.103	0.081	0.106

Table 5B			
Dependent variable: Informal=1, Females			
VARIABLES	(7) Minority Included	(8) Migrant Included	(9) Minority & Migrant
Children under 5	0.00416	-0.0170***	-0.00906
	(0.00525)	(0.00188)	(0.0107)
Yrs of School	-0.0460***	-0.0504***	-0.0448***
	(0.000659)	(0.000239)	(0.00133)
Minority	0.0144**		0.00338
	(0.00703)		(0.0140)
Migrant		0.141***	0.0315
		(0.00356)	(0.0301)
Constant	0.893***	0.994***	0.864***
	(0.0119)	(0.00529)	(0.0241)
Observations	37,369	246,486	9,600
R-squared	0.189	0.216	0.182

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

For females, the number of children becomes insignificant when controlling for

migrant and minority status, a trend also seen in the male sample but not in the sample with both genders. Years of school for females remains significant at a greater magnitude than for males; each increase of one year of education is associated with a 4.48 percentage point drop in probability of being an informal worker for females, while it is only associated with a 2.69 percentage point drop in probability for males.

Minority has a positive effect on probability of being informally employed for females only, increasing the probability of being informally employed by 1.44 percentage points. Migrant has a significant effect on the probability of being informally employed for both men and women, but while migrant men experience only a 2.06 percentage point increase in probability, women experience a staggering 14.1 percentage point increase in the probability of being informally employed.

For both males and females, neither minority nor migrant status becomes significant once both are controlled for. These effects, however, are likely due to the changes in sample size and inclusion of only individuals in Uruguay.[6]

Table 6 presents the results of four regressions on the probability of being informally employed, each with the inclusion of an interaction variable. The regressions are represented by the following equations:

$$(10) \qquad Inf = \alpha + \beta_1 F_i + \beta_2 N5_i + \beta_3 Yrs_i + \beta_4 F_i N5_i + \theta' Z + \epsilon_i$$

$$(11) \qquad Inf = \alpha + \beta_1 F_i + \beta_2 N5_i + \beta_3 Yrs_i + \beta_4 F_i Yrs_i + \theta' Z + \epsilon_i$$

$$(12) \qquad Inf = \alpha + \beta_1 F_i + \beta_2 N5_i + \beta_3 Yrs_i + \beta_4 Min_i + \beta_6 F_i Min_i + \theta' Z + \epsilon_i$$

[6] See Appendix Table 7 for results of regression on the restricted sample.

(13) $$Inf = \alpha + \beta_1 F_i + \beta_2 N5_i + \beta_3 Yrs_i + \beta_4 Mig_i + \beta_6 F_i Mig_i + \theta' Z + \epsilon_i$$

where the *i* subscript denotes the individual and θ' is a vector containing the control variables age, marital status, head of household dummy, and province fixed effects.

Table 6 includes the regressions for the entire applicable samples, but includes interaction variables for crosses between gender and number of children under 5, years of school, minority status, and migrant status. The interaction variables are separated in order to isolate the effects in the different sample sizes.

In this set of regressions, each interaction variable is significant at the 1% level. For number of children under 5, minority status, and migrant status, the coefficients are positive, suggesting that the interaction between being female and these variables increase an individual's probability of being employed in the informal sector. For the interaction between female and years of school, the coefficient is negative.

Table 6				
Dependent Variable: Informal=1, Includes Interactions				
VARIABLES	(10) Children Interaction	(11) Education Interaction	(12) Minority Interaction	(13) Migrant Interaction
Female	0.139***	0.368***	0.0759***	0.140***
	(0.00135)	(0.00306)	(0.00374)	(0.00138)
Children Under 5	-0.0240***	-0.0164***	-0.00174	-0.0187***
	(0.00122)	(0.00104)	(0.00342)	(0.00108)
Yrs of School	-0.0360***	-0.0271***	-0.0352***	-0.0356***
	(0.000149)	(0.000184)	(0.000453)	(0.000156)
Female*N5	0.0227***			
	(0.00216)			
Female*Yrs School		-0.0229***		
		(0.000283)		
Minority			-0.0106*	
			(0.00593)	
Female*Minority			0.0382***	
			(0.00931)	
Migrant				0.0211***
				(0.00330)
Female*Migrant				0.128***
				(0.00493)
Constant	0.693***	0.613***	0.686***	0.688***
	(0.00327)	(0.00339)	(0.00758)	(0.00341)
Observations	729,091	729,091	92,819	659,690
R-squared	0.139	0.147	0.133	0.135

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The first regression in Table 6 shows that the coefficient on *Children Under 5* has a significant negative effect of 2.4 percentage points on the probability of working informally, while *Female*N5* has a significant positive effect of 2.27 percentage points. This means that, for males, each additional child under 5 decreases their probability of informal employment by 2.4 percentage points, while, for females, the effect is canceled out and the net effect of each child under 5 on the probability of being informally employed is -0.13 percentage points. When we compare this result to the female-only regression in Table 5B, the effect of *Children Under 5* is not significant, indicating no

effect. This is surprising considering that, since women are typically the caretakers of small children, we might expect children to have a larger effect on employment decisions like formal or informal employment. However, this difference in coefficients may reflect that men have greater opportunity to move into the formal sector if they have more small children, whereas women lack this option. This could also be indicative of gender-defined barriers that exist for mothers of small children, that they have greater obstacles for seeking more stable forms of employment than fathers of small children.

For each additional year of schooling, the male probability of being an informal worker decreases by 2.7 percentage points. For females, this effect is even greater, with the coefficient on the *Female*Years of School* interaction term decreasing a woman's probability of being informally employed by an additional 2.3 percentage points. This net effect is that for each year of schooling, a woman's probability of being informally employed decreases by a total of 5 percentage points, a rather large effect. This shows that education level has a greater influence on which sector women work in than men, which supports the hypothesis considered earlier that women have greater educational barriers to entering the formal sector. As presented earlier, the mean education level of a female worker in the formal sector is 2.07 years greater than the mean education level of a male worker in the formal sector. Women with lower levels of education are either not selecting formal employment or limited in their opportunities. However, this coefficient also showcases the potential that increasing education has for expanding ability to enter the formal sector.

It is possible that formal sector employers may place higher standards when hiring

women, expecting them to have completed their secondary education, on average, to perform the job while not upholding the same standard for men. It is also possible that the types of the jobs in the formal sector that are more accessible to women require a higher level of education. As seen in Table 2, which displays the proportions of men and women working in different industries in the informal and formal sectors, the most frequent industry of employment for men in the formal sector is overwhelmingly manufacturing, capturing 24.45% of the male formal workforce. Formally employed women are around as likely to work in the education (14.17%) and health and social work (13.14%) industries as they are to work in manufacturing (13.38%), and they are most likely to work in wholesale and retail trade (18.01%). Because the education and health and social work sectors often require a higher level of education, or at least a secondary degree, this could help explain why education increases the probability of formal sector work more for women, and why it appears that women have more educational barriers to entering the formal sector.

It is unclear whether two of the types of industries that formally employed males typically work in—1. manufacturing and 2. transportation, storage, and communication—are less popular for women because women are excluded from these industries or that women choose not to work in these sectors. It is likely that it is a combination; both of these industries typically involve more physical labor than the sectors that formal female employees typically work in. For some women, an informal job that has fewer physical demands may be preferred to a more physically demanding formal sector job. Conversely, employers in the manufacturing and transportation, storage, and communication industries may judge women as being unfit for physical jobs, and societal

norms of industry gender roles may prevent women from seeking employment in these sectors in the first place.

The effect of being a minority on informal employment for men is negative, which is not the expected sign. However, it is relatively small, decreasing the probability by only 1 percentage point, and significant at only the 10% level. *Minority* was not significant when regressed in the male-only sample, so it is likely that this effect is weak. For women, however, this effect is much larger, positive, and significant at the 1% level. Females that are non-white have a net increase of 2.8 percentage points on the probability of informal employment, while men do not share this same trend. To test the robustness of this result, I ran a regression where the interaction variable between female and years of school is also included. The effect of the interaction between female and minority status remains around the same level and significant at the 5% level.[7]

Minority status may affect women differently because racial discrimination may exacerbate existing barriers to entry that women already experience to formal sector entry. Prejudice against racial minorities could also affect the way that they are hired for jobs that require secondary school completion, which likely make up many of the jobs in the formal sectors that women are most frequently employed in.

For the interaction of gender on migrant status, the results from Table 6 are almost the same as in the male and female split regressions in Tables 5A and 5B. Both the coefficients of *Migrant* and *Female*Migrant* are their expected sign, positive, and significant at the 1% level. While migrant men experience only a 2.11 percentage point

[7] Results from this regression are shown in Appendix Table 9.

increase in probability of being informally employed (a large increase in itself), migrant women are 14.9 percentage points more likely to be informally employed than non-migrant women.

This result goes along with earlier mean comparisons and previous literature that show that migrant women are more likely than non-migrants and migrant men to be informally employed. As mentioned earlier, women often have different reasons for migration than men, centering on betterment of their family rather than their own personal betterment, and women typically migrate rather than men for better work opportunities in Latin America. This may lead them to accept more precarious employment in the informal sector, often in private household services, where there is a high demand for labor (Cantu, 2017).[8] The informal sector can serve as an opportunity for migrant women to receive better opportunity for employment than in their home country. However, there are also likely barriers to working in the formal sector, such as legal working status and language, that can compound on the existing barriers that women face from moving into the formal sector and make it difficult for migrant women to secure formal employment. In this way, informal employment may serve as a "last resort" for migrant women that are currently in the labor force and have few other employment options.

3.3 Income: Regression Analysis

After looking at the interactions of gender on number of young children,

[8] Female migrants in Argentina specifically are often from Paraguay and Bolivia, and the proportion of domestic workers that are migrants in Argentina grew from 13.8% in 1995 to 40.1% after 1996 (Cantu, 2017).

education, minority status and migrant status on probability of being informally employed, we now turn to look at how these factors might influence wages. Table 7 shows the results of several regressions on wage of these factors, as well as the factor of being informally employed in itself, on wage. The regressions are in the forms of:

(1) $Inc = \alpha + \beta_1 Inf_i + \beta_2 F_i + \beta_3 N5_i + \beta_4 Yrs_i + \beta_5 Yrs_i^2 + \beta_6 Min_i + \theta' Z + \epsilon_i$

(2) $Inc = \alpha + \beta_1 Inf_i + \beta_2 F_i + \beta_3 N5_i + \beta_4 Yrs_i + \beta_5 Yrs_i^2 + \beta_6 Min_i + \beta_8 F_i Inf_i + \beta_9 F_i N5_i + \beta_{10} F_i Yrs_i + \beta_{11} F_i Min_i + \theta' Z + \epsilon_i$

(3) (5) (6) $Inc = \alpha + \beta_1 Inf_i + \beta_2 F_i + \beta_3 N5_i + \beta_4 Yrs_i + \beta_5 Yrs_i^2 + \beta_6 Min_i + \beta_7 Mig_i + \theta' Z + \epsilon_i$

(4) $Inc = \alpha + \beta_1 Inf_i + \beta_2 F_i + \beta_3 N5_i + \beta_4 Yrs_i + \beta_5 Yrs_i^2 + \beta_6 Min_i + \beta_7 Mig_i + \beta_8 F\text{-}_i Inf_i + \beta_9 F_i N5_i + \beta_{10} F_i Yrs_i + \beta_{11} F_i Min_i + \beta_{12} F_i Mig_i + \theta' Z + \epsilon_i$

where the *i* subscript denotes the individual and $\theta'$is a vector containing the control variables age, marital status, head of household dummy, and province fixed effects. Regressions 1 and 2 are run without the variable *Migrant* to show the coefficient estimates in the larger sample. Regressions 3, 5, and 6 use the same model, but are run on the total, male, and female samples, respectively, to estimate the effects of the non-interaction variables on different samples. Additionally, the samples used in these regressions is only from the Uruguay ENHA, as wage data was not available in the NPHDC.

Initial iterations of the regressions show a high level of heteroscedasticity. To help remedy this, robust standard errors are used.

Table 7	Dependent Variable: Income (Uruguayan Pesos)					
VARIABLES	(1) With Minority	(2) With Minority & Interactions	(3) With Minority & Migrant	(4) With Interactions	(5) Males	(6) Females
Informal	-4,536***	-5,177***	-4,765***	-5,411***	-5,395***	-3,723***
	(29.23)	(41.47)	(57.88)	(82.67)	(82.10)	(74.88)
Female	-765.5***	-810.4***	-772.4***	-1,076***		
	(34.93)	(114.7)	(68.47)	(227.3)		
Number of Children under 5	-10.17	69.29	16.44	175.8*	106.5	-156.0**
	(38.24)	(50.78)	(74.34)	(104.7)	(109.9)	(78.38)
Yrs of School	-180.1***	-190.8***	-175.2***	-182.6***	-279.8***	-123.9*
	(28.08)	(27.28)	(57.04)	(55.28)	(89.81)	(67.45)
Yrs of School^2	21.33***	25.13***	20.39***	23.26***	28.60***	15.98***
	(1.847)	(1.989)	(3.738)	(3.991)	(6.083)	(4.168)
Minority	-168.5***	-197.6***	-97.92	-183.3*	-131.8	-48.76
	(34.46)	(48.92)	(69.34)	(94.89)	(95.90)	(94.98)
Migrant			598.6	960.2	985.9	3.100
			(437.1)	(765.0)	(763.0)	(262.0)
Female*Informal		1,697***		1,710***		
		(58.93)		(114.7)		
Female*N5		-194.9***		-413.0***		
		(67.04)		(124.9)		
Female*YrsSchool		-116.9***		-82.98***		
		(15.86)		(31.43)		
Female*Minority		52.36		194.6		
		(62.93)		(131.5)		
Female*Migrant				-923.5		
				(807.5)		
Constant	5,695***	5,890***	5,946***	6,177***	6,646***	4,370***
	(113.3)	(109.7)	(231.6)	(224.5)	(342.3)	(290.9)
Observations	92,819	92,819	23,732	23,732	14,132	9,600
R-squared	0.263	0.272	0.272	0.280	0.266	0.301

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Not surprisingly, the coefficient on Informal is negative in all cases and of the magnitude of at least 3,700 Uruguayan pesos (approximately 152 dollars) per month. This means that if an individual works in the informal sector, despite accounting for education, number of young children, and minority and migrant status, their income is still expected to be much lower than that of formal sector employees. This result is very similar to past analyses on the wages of informal sector employees (Funkhouser, 1996; Beccaria and Groisman, 2008). This reason is one of several why we care about identifying factors that predict propensity to work in the informal sector: if women of disadvantaged backgrounds have an increasingly higher probability of being employed in the informal sector, they then have a much higher probability of earning lower wages. In this analysis, being female is also associated with lower wages, which is consistent with previous literature on male-female wage differentials (Funkhouser, 1996).

However, despite informal and female both having negative coefficients, the coefficient on the interaction between being female and an informal worker is positive, meaning that informally employed women have less of a wage penalty on their informal employment than do informally employed men. This same trend can be seen in the gender-specific regressions—the coefficient of *Informal* in the male regression is -5,395 pesos, while the coefficient in the female regression is of a lesser magnitude at -3,723 pesos. This could be an explanatory factor for why a higher percentage of men are employed in the formal sector—the wage penalty for being an informal employee is higher for men than for women, which could incentivize more men to seek employment in the formal sector. However, the magnitude of the wage penalty is still high for women, suggesting that there would still be an incentive for women to seek employment in the

formal sector for higher wages. The fact that there is still a much higher proportion of women working in the informal sector than men supports the idea that there are barriers to women moving to formal sector work (Funkhouser, 1996).

A surprising result in these regressions is that, for each, the coefficient on years of school is negative, significant at the 1% level. For the male and female separate regressions, the coefficient on males is -279.8 and the coefficient on females is -123.9, meaning that, for each additional year of school, men are expected to earn 279.8 pesos (approximately 11.50 dollars) less per month, and women are expected to earn 123.9 pesos (approximately 5 dollars) less per month. The coefficient on years of school squared pushes back on this trend, but only increases the coefficient by the magnitude of around one dollar for each additional year of schooling, still leaving a rather significant negative impact. Additionally, when looking at the interaction between being female and years of school, the coefficient is negative when other interaction variables are controlled for. This means that, despite separate male and female regressions showing a great negative return to education for men, when other factors are included, women are experiencing a greater negative return to education.

This result goes against the intuition behind investing in education. In a basic human capital investment model, investment in an increased unit of education in the present translates into higher earnings in the future than if no investment in education had been made (Acemoglu). Other studies on informality and returns to education on wages have found positive effects of increased education on income (Funkhouser, 1996; Portes et. al. 1986). The reason why this trend is present in the data is unclear; it is theoretically

possible, but highly unlikely, that education does not translate into higher wages in Uruguay. It is also possible that wages are low and variable for the majority of the population, and that this is in tandem with low average education.

If the sample is restricted to those only with 12 years of schooling or higher (a high school diploma), the mean monthly wage becomes 4842.65 pesos and the standard deviation becomes 8451.12 pesos. This shows that, at high levels of education, wage is very variable. This trend is the same if the sample is restricted to those with at least 12 year of schooling and a value in the informality metric—mean wage becomes 5610.95 pesos a month while the standard deviation is 9440.16 pesos. Even among those who are in the labor force, variation in wage is high at high levels of education, which is likely why the model shows the effect of education to be negative. It is unclear why so many individuals that are in the labor force have a relatively high level of education and low earnings. Some possible explanations are that some individuals are engaged in work where they are receiving nonmonetary compensation, or that there are many people working only a few hours a week.

Although the number of children under 5 has no effect on wage for men, it has a significantly negative effect on wage for women, especially once other interaction variables are controlled for. As women tend to be primary caretakers of young children, this result makes sense. Women who are primary caretakers of young children likely have less time to devote to their jobs, which likely causes them to earn less per month from work. Although this analysis does not have data on hours worked, women with young children may be cutting their work hours to have additional time for caretaking.

When migrant status is not controlled for, minority status has a significantly negative effect on wage for both men and women. However, there is no significant effect of the interaction term between being female and being a minority, suggesting that the effect of being a minority on wage is relatively the same for both men and women. When migrant status is included, *Minority* no longer becomes significant in most of the regressions, except for the interaction regression, where *Minority* remains significant at the 10% level. However, this is likely due to the change in sample when *Migrant* is factored in, as this same effect takes place when the same sample is regressed without including the variable *Migrant*.

Migrant status has no significant effect on wage for either men or women. This is not surprising, as *Migrant* is only included in the regressions where *Minority* is also included, and these two variables also canceled out each other's effects in the regression on probability of informal work. We would expect migrants to have lower wages because they may have different levels of education, or may be working in more informal work environments. However, because these factors are also included in the regression, these effects are likely captured in the significant coefficients of *YrsSchool* and *Informal*.

4. Discussion

4.1 Reverse Causality

Reverse causality is possible with many of the variables included in this regression. For whether the individual is a head of household, reverse causality is less likely because this is usually the male or husband of the house, which is determined by societal norms. For marital status and number of children under 5, it is possible that the stability and increased income of a formal job increases the probability marriage and impacts fertility decisions in how many children one can afford to have. It is also possible that being an informal employee allows more flexibility to care for more children.

Formal or informal employment could also influence education levels in a similar fashion. On one hand, a formal employee may be incentivized to obtain higher levels of education to be eligible for higher rates of pay or promotions. Formal employees, earning more on average, may also be more likely to afford to pay for increased levels of education, but may also experience higher opportunity costs for taking time off to pursue education. Someone with a more flexible informal job may have more time to devote to obtaining higher education, although this explanation is likely less prevalent given the lower average education of those in the informal sector.

4.2 Omitted Variable Bias

Several potentially causal factors for probability of informal employment are missing from this analysis. Some of these variables are difficult or impossible to observe in a household survey or census, such as individual motivation, cultural norms, societal norms, discrimination, and level of choice involved in employment decisions. This study

omits several observable variables that could influence informal work, such as languages spoken, experience, and spousal and children's wages. This model also does not discern between those who are part-time workers, and those that are full-time. For this reason, this model does not account for all possible influencing factors on propensity to be informally employed and income.

Additionally, the large coefficients on the fixed effects for province and country suggest that there are omitted variables that influence the labor market and employment trends in specific areas. Some examples of potential missing variables are number of companies in area, gross income of area, urban or rural status, or even weather.

4.3 Bias within the Sample

For regressions that included the variables *Minority* and *Migrant*, the sample size became more restricted as the regression became limited to only those individuals who had values for those variables, with *Minority* being available only in the ENHA and *Migrant* only available in 4th trimester data from the ENHA, together creating a much smaller sample. However, this smaller sample was still collected at random, suggesting that there is no selection bias.

It is possible that the metrics *Informal* and *Income* are biased due to underreporting. Informal workers that are engaging in illegal and/or "under-the-table" work may be incentivized to report themselves as labor force non-participants or zero-income workers to survey authorities to avoid taxes or legal repercussions, which would bias the proportion and income of informal employees downward.

Income data from the ENHA was extremely variable and regressions on income were found to be heteroskedastic. The returns on income from increased education were found to be negative, which is likely not representative of the actual impacts of education on income. This could be due to underreporting by those looking to avoid taxes in the informal sector, by overreporting in the formal or informal sectors of those who want to appear more successful or include other family members' incomes in their report, or misestimation of income by both formal and informal sector employees.

4.4 Minority, Migrant, and Loss of Significance

With *Minority* and *Migrant*, initial regression analysis may at first suggest that neither variable is actually significant, as significance appears to disappear once the other variable is controlled for. However, the reduction in sample size is assumed to be much, if not most, of the reason why the significance of migrant status disappears, as its significance also disappears when the sample size is restricted but minority status is not included in the regression.[9] Because of this, the regressions within the less restricted sample sizes are presumed to have a better explanation of the relationships between minorities, migrants, gender, and informal work. Minorities and migrants have been shown to have a higher likelihood of being employed in the informal sector in the literature (Portes et. al. 1986; Cantu, 2017), so it would be surprising to find no significant effect of these qualities in any of the regressions.

For minorities, this study showed evidence of women having a higher likelihood of employment in the informal sector if they were non-white. As mentioned earlier, being

[9] Results of the regression with *Migrant* on the restricted sample are shown in Appendix Table 8.

non-white may exacerbate attitudes of "inferiority" that formal employers display towards women looking to enter the formal sector, or this may also interact with lower levels of education that minority women tend to have to prevent them from entering higher-skill formal sectors of employment.

It is possible that the effect of being a migrant is heterogeneous between Argentina and Uruguay. Argentina is known for being "an immigrant receiver" and the main destination for migrants from other South American nations (Berg et. al., 2006). The significance of *Migrant* and the corresponding interaction term *Female*Migrant* may reflect an effect that is present in Argentina, which makes up the majority of the larger sample that the interaction term is regressed in. Once *Minority* is included in the regression, the sample is then only restricted to those in Uruguay, and the effect may simply be less present in that country, especially if there is less of a pervasive presence of migrants. Although the "migrant" question was only asked of a small portion of the respondents in the ENHA, the proportion of migrants of the respondents is much smaller than the proportion of migrants in the NPHDC, at only 1.86% compared to 4.23%.

If *Minority* and *Migrant* in themselves have no significant impact on probability of being informally employed, this is likely because being a member of these groups is conflated with other qualities that predict probability of being informally employed, such as low educational attainment or other omitted variables.

5. Conclusion

The goal of this study was to observe the interaction effects between gender and number of children under 5, education, minority status, and migrant status on the probability of being informally employed and personal income to determine if there are heterogeneous effects for men and women. Females are, in themselves, more likely to be informal sector employees, a finding that supports previous research.

The interaction between gender and number of children under 5 showed evidence of an effect of the number of children under 5 on men, but not for women in being informally employed. For males, each additional child under 5 lowered the probability of informal employment by 2.4 percentage points, while each additional child had no effect in the female-only regressions and the interaction term with gender virtually canceled out the effect for males. This suggests that men have the option to seek more stable employment in the formal sector with the addition of young children, but women with young children face similar barriers to entering the formal sector as women without young children and are unable to move sectors as a response.

For the interaction between gender and education, females were found to have a greater effect of a one-year increase in schooling on lessening their probability of being informally employed. From the informal regression (11), the effect of one year of additional schooling had an additional effect of 2.3 percentage points on decreasing the probability of informal employment for women compared to men. This result supports the hypothesis that there are greater educational barriers for women entering the formal

sector, but also provides evidence that schooling can have a large impact on expanding women's employment opportunities.

Minority women also had a significantly higher propensity to be employed in the informal sector, while being a minority had an insignificant or weakly significant negative effect on informal employment for men. Being a non-white increased the probability of a woman being employed in the informal sector by 3.8 percentage points, suggesting that race and negative prejudice against non-whites may conflate with existing barriers to women looking to enter the informal sector.

Migrant women have a 14-15 percentage point increase in their probability of being an informal sector employee, compared to migrant men, who have only a 2 percentage point increase in their probability of working in the informal sector. This is evidence of the gendered structure in Latin America—women often migrate instead of men for opportunities—and indicative of the demand for migrant women in private household services, the most common sector of employment for female informal workers. While this sector may be providing women from other countries the chance to find better work opportunities than they have at home, it may be one of the only options for them once they arrive, as language, discriminatory, and legal barriers compound with existing barriers for females to create significant difficulties to moving into the formal sector.

In the evidence from the regressions on wage, employment in the informal sector results in significantly lower wages, even when controlling for other factors. Women in the informal sector still receive a negative penalty on their wages, but less so than men.

This may suggest that men have an increased monetary incentive to move away from the informal sector, which may be enabled by the nature of the formal sectors that hire men, like manufacturing, and their lesser barriers for entry.

The interaction of female on number of children under 5 had an additional negative penalty to wage, while it had no effect on men, suggesting that more young children significantly influences the number of hours or level of work that a woman is able to engage in, but not men. The interactions between female and minority status, as well as female and migrant status, had no significant impact on wage. Minority status on its own had a significant negative effect on income, suggesting homogeneous effects for both women and men.

Both sets of regressions support this notion that there are heterogeneous impacts of personal characteristics on the propensity to be informally employed for men and women. Although other fields of study have focused on the intersectionality of women's informal employment, economics has tended to sail past further characterization of the sector and explore more macro-scale questions, such as whether the informal sector is necessarily one of refuge employment. However, women are a heterogeneous group in themselves, and a deeper study into the nuance behind women's informal labor and how it is impacted by additional factors can help explain the barriers that exist in the formal labor market, and inform this ongoing conversation about whether the informal sector employment is really where women and men are "choosing" to work in Latin America.

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6. Appendix

Appendix Table 1					
Unpaired t-test results for differences in total and *Informal* metric samples					
VARIABLES	Total N	Informal N	(1) Total Sample Mean	(2) Informal Metric Mean	(3) Difference
Racial Minority	255,978	92,824	.1259	.1187	.0072*** (.0013)
Migrant Status	3,690,112	659,692	.0419	.0584	-.0165*** (.0003)

Appendix Table 2			
T-test results for differences in age for migrant and native samples			
VARIABLE	(1) Native Mean	(2) Migrant Mean	(3) Difference
Age	30.633	48.802	-18.169*** (.057)

Appendix Table 3

Dependent variable: Informal=1, both genders

VARIABLES	(1) Country Control	(2) Province Control	(3) Minority Included	(4) Migrant Included	(5) Minority & Migrant
Uruguay	0.104***				
	(0.00183)				
Age	0.00176***	0.00195***	0.00424***	0.00159***	0.00484***
	(5.36e-05)	(5.34e-05)	(0.000138)	(5.67e-05)	(0.000274)
Female	0.141***	0.143***	0.0807***	0.148***	0.0774***
	(0.00129)	(0.00128)	(0.00355)	(0.00135)	(0.00704)
Number of Children under 5	-0.0138***	-0.0173***	-0.00172	-0.0188***	-0.0145**
	(0.00104)	(0.00104)	(0.00342)	(0.00108)	(0.00694)
Married	-0.0470***	-0.0482***	-0.0301***	-0.0478***	-0.0297***
	(0.00139)	(0.00138)	(0.00435)	(0.00144)	(0.00869)
Consensual Union	-0.0550***	-0.0512***	-0.0377***	-0.0591***	-0.0404***
	(0.00402)	(0.00400)	(0.00485)	(0.00772)	(0.00961)
Separated	-0.0170***	-0.0167***		-0.0147***	
	(0.00366)	(0.00364)		(0.00366)	
Divorced	-0.0422***	-0.0370***	-0.0157**	-0.0359***	-0.0275*
	(0.00318)	(0.00316)	(0.00789)	(0.00338)	(0.0157)
Widowed	0.000204	0.000983	-0.00109	0.00419	-0.0158
	(0.00382)	(0.00379)	(0.0106)	(0.00399)	(0.0209)
Yrs of School	-0.0386***	-0.0360***	-0.0352***	-0.0358***	-0.0345***
	(0.000145)	(0.000149)	(0.000453)	(0.000156)	(0.000915)
Head of HH	-0.0416***	-0.0398***	-0.0358***	-0.0412***	-0.0383***
	(0.00138)	(0.00137)	(0.00380)	(0.00144)	(0.00756)
Minority			0.00442		0.00287
			(0.00466)		(0.00926)
Migrant				0.0771***	0.0361*
				(0.00250)	(0.0214)
Constant	0.791***	0.691***	0.684***	0.689***	0.663***
	(0.00252)	(0.00327)	(0.00757)	(0.00341)	(0.0151)
Observations	729,091	729,091	92,819	659,690	23,732
R-squared	0.126	0.139	0.133	0.135	0.132

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Column 1 uses “country” for location, while Columns 2-5 use “province” indicators.

Appendix Table 4

Dependent variable: Informal=1, Males				
VARIABLES	(1) Without	(2) Minority Included	(3) Migrant Included	(4) Minority & Migrant
Age	0.00280***	0.00510***	0.00248***	0.00562***
	(6.92e-05)	(0.000182)	(7.35e-05)	(0.000362)
Number of Children under 5	-0.0136***	-0.00147	-0.0150***	-0.0139
	(0.00129)	(0.00449)	(0.00133)	(0.00914)
Married	-0.0767***	-0.0745***	-0.0758***	-0.0710***
	(0.00192)	(0.00658)	(0.00199)	(0.0132)
Consensual Union	-0.0735***	-0.0703***	-0.0835***	-0.0745***
	(0.00518)	(0.00693)	(0.00994)	(0.0138)
Separated	-0.0600***		-0.0571***	
	(0.00541)		(0.00544)	
Divorced	-0.0396***	-0.0150	-0.0418***	-0.0290
	(0.00464)	(0.0124)	(0.00492)	(0.0252)
Widowed	-0.0489***	-0.0210	-0.0503***	-0.0502
	(0.00682)	(0.0199)	(0.00715)	(0.0399)
Yrs of School	-0.0267***	-0.0272***	-0.0266***	-0.0269***
	(0.000195)	(0.000616)	(0.000203)	(0.00125)
Head of HH	-0.0415***	-0.0154***	-0.0442***	-0.0186
	(0.00194)	(0.00588)	(0.00202)	(0.0117)
Minority		-0.00167		0.00165
		(0.00617)		(0.0122)
Migrant			0.0206***	0.0323
			(0.00341)	(0.0298)
Constant	0.603***	0.600***	0.613***	0.582***
	(0.00422)	(0.00975)	(0.00438)	(0.0194)
Observations	454,711	55,450	413,204	14,132
R-squared	0.092	0.103	0.081	0.106

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 5

Dependent variable: Informal=1, Females

VARIABLES	(1) Without	(2) Minority Included	(3) Migrant Included	(4) Minority & Migrant
Age	0.000168**	0.00271***	-0.000196**	0.00341***
	(8.28e-05)	(0.000212)	(8.77e-05)	(0.000421)
Number of Children under 5	-0.0151***	0.00416	-0.0170***	-0.00906
	(0.00180)	(0.00525)	(0.00188)	(0.0107)
Married	-0.00322	0.0102	-0.00367*	0.00684
	(0.00211)	(0.00642)	(0.00220)	(0.0128)
Consensual Union	-0.0283***	-0.00672	-0.0322***	-0.00558
	(0.00624)	(0.00734)	(0.0120)	(0.0146)
Separated	0.00550		0.00668	
	(0.00476)		(0.00479)	
Divorced	-0.0279***	-0.00802	-0.0266***	-0.0168
	(0.00419)	(0.0101)	(0.00450)	(0.0199)
Widowed	0.0173***	0.0183	0.0196***	0.00794
	(0.00454)	(0.0126)	(0.00477)	(0.0249)
Yrs of School	-0.0509***	-0.0460***	-0.0504***	-0.0448***
	(0.000227)	(0.000659)	(0.000239)	(0.00133)
Head of HH	-0.0135***	-0.0219***	-0.0123***	-0.0275**
	(0.00225)	(0.00618)	(0.00237)	(0.0123)
Minority		0.0144**		0.00338
		(0.00703)		(0.0140)
Migrant			0.141***	0.0315
			(0.00356)	(0.0301)
Constant	1.009***	0.893***	0.994***	0.864***
	(0.00502)	(0.0119)	(0.00529)	(0.0241)
Observations	274,380	37,369	246,486	9,600
R-squared	0.211	0.189	0.216	0.182

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 6

Dependent Variable: Informal=1, Includes Interactions

VARIABLES	(1) Children Interaction	(2) Education Interaction	(3) Minority Interaction	(4) Migrant Interaction
Age	0.00194***	0.00185***	0.00424***	0.00163***
	(5.34e-05)	(5.32e-05)	(0.000138)	(5.67e-05)
Female	0.139***	0.368***	0.0759***	0.140***
	(0.00135)	(0.00306)	(0.00374)	(0.00138)
Children under 5	-0.0240***	-0.0164***	-0.00174	-0.0187***
	(0.00122)	(0.00104)	(0.00342)	(0.00108)
Married	-0.0485***	-0.0514***	-0.0299***	-0.0479***
	(0.00138)	(0.00138)	(0.00435)	(0.00144)
Consensual Union	-0.0512***	-0.0524***	-0.0373***	-0.0593***
	(0.00400)	(0.00398)	(0.00485)	(0.00771)
Separated	-0.0171***	-0.0255***		-0.0155***
	(0.00364)	(0.00362)		(0.00366)
Divorced	-0.0370***	-0.0392***	-0.0154*	-0.0359***
	(0.00316)	(0.00315)	(0.00789)	(0.00337)
Widowed	0.00165	-0.0218***	-0.000661	0.00314
	(0.00379)	(0.00379)	(0.0106)	(0.00399)
Yrs of School	-0.0360***	-0.0271***	-0.0352***	-0.0356***
	(0.000149)	(0.000184)	(0.000453)	(0.000156)
Head of HH	-0.0381***	-0.0379***	-0.0366***	-0.0407***
	(0.00138)	(0.00137)	(0.00381)	(0.00144)
Female*Children under 5	0.0227***			
	(0.00216)			
Female*Yrs		-0.0229***		
		(0.000283)		
Minority			-0.0106*	
			(0.00593)	
Female*Minority			0.0382***	
			(0.00931)	
Migrant				0.0211***
				(0.00330)
Female*Migrant				0.128***
				(0.00493)
Constant	0.693***	0.613***	0.686***	0.688***
	(0.00327)	(0.00339)	(0.00758)	(0.00341)
Observations	729,091	729,091	92,819	659,690
R-squared	0.139	0.147	0.133	0.135

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 7				
Dependent variable: Informal=1, Females				
VARIABLES	(1) Without Minority & Migrant	(2) With Minority	(3) With Migrant	(4) With Minority & Migrant
Children Under 5	0.00443	0.00416	-0.00903	-0.00906
	(0.00524)	(0.00525)	(0.0107)	(0.0107)
Yrs of School	-0.0462***	-0.0460***	-0.0448***	-0.0448***
	(0.000654)	(0.000659)	(0.00132)	(0.00133)
Minority		0.0144**		0.00338
		(0.00703)		(0.0140)
Migrant			0.0316	0.0315
			(0.0301)	(0.0301)
Constant	0.898***	0.893***	0.865***	0.864***
	(0.0118)	(0.0119)	(0.0237)	(0.0241)
Observations	37,369	37,369	9,600	9,600
R-squared	0.189	0.189	0.182	0.182

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*The table above shows the female informality regressions only on individuals that have a value for *Minority* to show the effects of running the regressions on just the smaller sample. This sample includes only respondents from Uruguay. In this smaller sample, *Minority* is significant on its own at the 5% level, *Migrant* is not significant on its own, and neither are significant when included together in the sample. In the larger sample (Table 6 in body), *Minority* is significant at the 10% level when included on its own, *Migrant* is significant at the 1% level when on its own, yet neither are significant when included together.

Migrant is much more significant in the larger sample, which is the sample that also includes Argentina. The reason why the sample is so small for the migration metric in Uruguay is that the migration questions were only asked in the fourth trimester of the survey. Data was still collected at random and have respondents from all localities, but it is a far smaller sample of respondents. Because the sample decreases so greatly and *Migrant* is not significant in the small sample at all, it is inferred that the loss of significance when both minority and migration status are controlled for is partially caused by this drop in sample size.

Appendix Table 8			
Dependent variable: Informal=1, Includes Interactions			
VARIABLES	(1) N5 & Yrs Only (Whole Metric Sample)	(2) Migrant Included	(3) Migrant & Minority Included
Female	0.363***	0.371***	0.213***
	(0.00308)	(0.00330)	(0.0171)
Children under 5	-0.0235***	-0.0243***	-0.0264***
	(0.00121)	(0.00125)	(0.00850)
Yrs of School	-0.0272***	-0.0266***	-0.0275***
	(0.000184)	(0.000192)	(0.00118)
Female*N5	0.0241***	0.0228***	0.0339***
	(0.00215)	(0.00225)	(0.0131)
Female*Yrs	-0.0229***	-0.0237***	-0.0162***
	(0.000283)	(0.000297)	(0.00173)
Migrant		0.0256***	0.0348
		(0.00329)	(0.0289)
Female*Migrant		0.108***	-0.00650
		(0.00491)	(0.0427)
Minority			7.67e-05
			(0.0118)
Female*Minority			0.00501
			(0.0186)
Constant	0.615***	0.611***	0.606***
	(0.00339)	(0.00354)	(0.0163)
Observations	729,091	659,690	23,732
R-squared	0.147	0.144	0.136

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*The table above shows the regressions with multiple interaction variables on the probability of being an informal worker, in order of restricting sample size. The first regression contains the sample without *Minority* or *Migrant*, the second contains *Minority*, and the third contains both *Migrant* and *Minority*. In this regression, both *Female*N5* and *Female*Yrs* interactions remain significant in all regressions, and their magnitude remains relatively similar, with the same signs. However, *Female*Migrant* is no longer significant once *Minority* is controlled for. Based on the sample size of those that include both *Minority* and *Migrant* and the fact that it only represents a small portion of the entire Uruguay sample, it is likely that this significance of *Migrant* and *Female*Migrant* becomes no longer significant due to this change in the sample size.

Appendix Table 9	
Dependent variable: Informal=1	
VARIABLES	(1) Interactions with Education and Minority
Age	0.00427***
	(0.000138)
Female	0.225***
	(0.00852)
Number of Children under 5	-0.000522
	(0.00341)
Married	-0.0342***
	(0.00435)
Consensual Union	-0.0401***
	(0.00484)
Divorced	-0.0199**
	(0.00788)
Widowed	-0.0175*
	(0.0106)
Yrs of School	-0.0280***
	(0.000584)
Head of HH	-0.0326***
	(0.00380)
Female*Yrs	-0.0169***
	(0.000863)
Minority	-0.00363
	(0.00593)
Female*Minority	0.0204**
	(0.00934)
Constant	0.625***
	(0.00819)
Observations	92,819
R-squared	0.137

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*This table reports the result of a regression on *Informal* with the inclusion of *Female*Minority*, *Minority*, and *Female*YrsSchool*. It shows that *Minority* no longer is significant, but *Female*Minority* remains significant at the 5% level when *Female*YrsSchool* is controlled for.

Appendix Table 10	
Dependent variable: Informal=1	
VARIABLES	(1) All Variables and Interactions
Age	0.00483***
	(0.000274)
Female	0.213***
	(0.0171)
Children Under 5	-0.0264***
	(0.00850)
Married	-0.0324***
	(0.00869)
Consensual Union	-0.0403***
	(0.00962)
Divorced	-0.0300*
	(0.0157)
Widowed	-0.0312
	(0.0210)
Yrs of School	-0.0275***
	(0.00118)
Head of HH	-0.0332***
	(0.00760)
Female*N5	0.0339***
	(0.0131)
Female*Yrs	-0.0162***
	(0.00173)
Migrant	0.0348
	(0.0289)
Female*Migrant	-0.00650
	(0.0427)
Minority	7.67e-05
	(0.0118)
Female*Minority	0.00501
	(0.0186)
Constant	0.606***
	(0.0163)
Observations	23,732
R-squared	0.136

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*The table above shows the results of the regressions on *Informal* when all of the

interaction variables are included together. The interactions *Female*Children Under 5* and *Female*Yrs of School* remain significant, while *Female*Minority* and *Female*Migrant* are no longer significant. This reduction in significance is likely related to the decrease in sample size, as other tables in this Appendix show a reduction in significance on *Minority* when sample is restricted, but *Migrant* is not controlled for.