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Evidence from Barbados and Jamaica

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Abstract

This paper analyzes gender earnings gaps in Barbados and Jamaica, using a matching comparisons approach. In both countries, as in most of the Caribbean region, females' educational achievement is higher than that of males. Nonetheless, males' earnings surpass those of their female peers. Depending on the set of control characteristics, males' earnings surpass those of females by between 14 and 27 percent of average females' wages in Barbados, and between 8 and 17 percent of average females' wages in Jamaica. In the former, the highest earnings gaps are found among low-income workers. Results from both countries confirm a finding that has been recurrent with this matching approach: the complete elimination of gender occupational segregation in labor markets would increase rather than reduce gender earnings gaps. The evidence is mixed regarding segregation by economic sectors. Occupational experience, in the case of Barbados, and job tenure, in the case of Jamaica, help to explain existing gender earnings gaps.

JEL classifications: C14, D31, J16, O54

Keywords: Gender, Ethnicity, Wage gaps, the Caribbean, Barbados, Jamaica, Matching

1. Introduction

The Caribbean is generally an understudied region, and in terms of labor market issues the pool of existing empirical research is small. This paper attempts to fill this dearth in the literature and examines gender wage gaps for Barbados and Jamaica, two large economies by Caribbean standards but ones with diverse labor market, social and economic issues.

The paper focuses on Barbados and Jamaica for a number of reasons, but two of them stand out. First, both countries have a reliable source of data for representative samples of workers at the national level. Second, the countries have a cornucopia of similar and different social, economic and labor market issues, which augurs well for the analysis. Examining gender wage gaps for these two Caribbean countries will illuminate any peculiarities within the national labor market and thereby allow for conjectures on whether the presence of female pay disadvantage is an endemic feature of Caribbean labor markets, as in the rest of the labor markets of Latin America and the world.

While the empirical literature on gender wage gaps is copious (see Weichselbaumer and Winter-Ebmer, 2005; Blau and Kahn, 2003), only a limited number of studies have examined this theme for Caribbean countries.¹ In a few studies (Scott, 1992; Terrell, 1992; Hotchkiss and Moore, 1996; Coppin, 1996; Olsen and Coppin, 2001; Sookram and Watson, 2008) gender issues in labor markets are investigated for Barbados, Jamaica and Trinidad and Tobago.

Scott (1992) finds women earnings are on average 58 percent of the earnings of men in the Jamaican labor market. In a later study for Jamaica, Hotchkiss and Moore (1996) report mean earnings for females of 80 percent of male earnings. Both studies are based on different data sources from the same period (the late 80's) which reveals the great deal of heterogeneity in results that this sort of studies may achieve. While Scott (1992) uses the Labor Force Survey data in the analysis, Hotchkiss and Moore (1996) use a special dataset compiled for a one-time Jamaica Tax project. Notwithstanding, the discrepancy in the magnitude of the gender wage gap, both Scott (1992) and Hotchkiss and Moore (1996) finds the bulk of the gender wage differential is unexplained by differences in individual characteristics.

¹ The studies in the edited text of Psacharopoulos and Tzannatos (1992) provide evidence of gender earnings differentials in Latin America and the Caribbean. Of the 21 studies in the text, one provides a discussion for the Caribbean country of Jamaica. This again points to the void in the literature on the labor market issues in general and more specifically matters relating to gender earnings in the Caribbean.

Coppin (1996) investigates the gender wage gap for Barbados using the 1994 Continuous Household Sample Survey (CHSS) and finds female–male earnings ratio of 87 percent.² Olsen and Coppin (2001) utilize the 1993 Continuous Sample Survey of the Population (CSSP) to estimate the gender wage gap for Trinidad and Tobago. In Terrell (1992) reference is made to the female-male earnings ratio of 87 percent for Haiti, derived from a 1987 survey of large-scale enterprises in the capital city, Port-au-Prince.³

The evidence from the literature on the gender earnings gap generally indicates that there is a gender disadvantage in pay, with female employees in Caribbean countries earning less on average than males. Similarly, in an international meta-analysis of the raw gender wage gap for 63 countries over a 30 year timeframe, Weichselbaumer and Winter-Ebmer (2005) show that gender pay gaps are a global phenomenon, but over time the raw gender wage gap has declined from about 65 percent to 30 percent.

This paper adds to the existing literature on gender wage gaps for the Caribbean. The paper uses recent datasets for two economically important but diverse Caribbean countries and provides an enhanced understanding of gender earnings. The empirical findings will investigate whether improvements in females' human capital endowments has caused a reduction in both the gender pay gap and the unexplained component of the gap.

The structure of the paper follows. Section 2 provides a background of the two countries. Section 3 describes the empirical methodology drawing upon the approach introduced by Ñopo (2008). In Section 4 the main empirical results and estimates of the gender pay gap for Barbados are discussed. In the following section, the results are similarly explained for Jamaica. Section 6 summarizes the study's findings and concludes.

2. Background

Jamaica is located in the western Caribbean, situated to the west of Hispaniola. Jamaica gained independence in 1962 from the United Kingdom, having been previously a Spanish colony from the 1400s until 1655 when the British took control. Once the British settled in Jamaica sugar production became the mainstay of the economy; first African slaves were imported and later Chinese and Indian workers as indentured servants, and today their descendants remain on the

² The CHSS was later changed to the Continuous Labor Force Sample Survey (CLFSS)

³ Terrell 1992 references the findings for Haiti from unpublished research by Brendan (1991).

island, contributing to the ethnic diversity of the Jamaican people. The population of Jamaica is slightly below 3 million, thus making Jamaica the most densely populated country in the Caribbean archipelago of countries. Tourism forms the mainstay of the economy, followed by bauxite and manufacturing.

The confluence of diverse ethnic groups resulted in the creation of a pidgin language known as the Jamaican patois, which is widely spoken. The use of Jamaican patois has contributed in some part to low educational outcomes, especially among males.

Barbados is in the eastern segment of the Caribbean archipelago and it has a past solely dominated by British colonization from 1625-1966. An estimated 90 percent of the 270,000 population are of African descent, and the remainder of white or mixed ethnicity. Barbados, like many of the other Eastern Caribbean countries, has had a history of dependence on one crop as the main export commodity, in this case sugarcane. The economy has over time evolved to focus primarily on services, particularly tourism and the financial sector.

In many respects the historical and economic pasts of Jamaica and Barbados have followed closely the same trajectory. However, in terms of progress on social indicators the two countries display some noteworthy differences, as variations in access to human capital provide the backdrop for understanding the empirical results later in the paper. Barbados has consistently ranked in the top 40 countries of the United Nations Human Development Index, while Jamaica has a 2007 HDI rank of 100 (UNDP, 2009). Both Jamaica and Barbados are home to two of the three campuses of the University of the West Indies (UWI), but the level of educational infiltration is noticeably different. In Barbados the presence of the university has been capitalized upon, and the Government provides free tuition to suitably qualified candidates as an investment in the future economic and social development of the country. In Barbados, the exposure to tertiary education, although low by international standards, is high for the Caribbean.⁴ In the case of Jamaica tertiary educational outcomes are much lower, especially among males, notwithstanding the similar presence of UWI campuses. The incidence of poverty in Barbados is low as compared to Jamaica. See Table 1 for selected social and economic indicators for each country.

⁴ See summary statistics for tertiary education in Table 2 for Barbados and Table 7 for Jamaica.

Table 1. Selected Labor Market, Social and Economic Indicators

	Barbados	Jamaica
Labor market		
Labor Force participation Rate (2007)		
Male	75.0	73.4
Female	62.2	56.0
Total	68.2	64.5
Unemployment Rate (2007)		
Male	6.9	6.7
Female	9.0	14.6
Total	7.9	10.2
Social and Demographic		
Human Development Index (UNDP, 2009 rank) 1/	37	100
Population (in millions)	0.275	2.686
Life Expectancy at birth (in years)	75.4	71.7
Adult literacy rate (% ages 15 years and above)	99.4	86
Economic		
GDP per capita (USD 2008)	13,328	5,335
GDP Growth (annual percent change)		
2007	3.4	2.4
2008	0.2	1.0
CPI Inflation (average percent)		
2007	4.0	7.4
2008	8.1	12.1
Public Sector Debt (in percent of GDP, 2008)	105.9	128.3

Sources: Labor Market Indicators—International Labor Organisation based on national household surveys; IMF World Economic Outlook; United Nations Development Programme

Note to table: 1/ A low rank indicates a strong position.

3. Matching and Gender Wage Gap Decompositions

In this paper we follow the approach introduced by Ñopo (2008), based on a matching-on-characteristics approach, which is a non-parametric alternative to the traditional Blinder-Oaxaca (BO) decomposition (Blinder, 1973; Oaxaca, 1973). The matching procedure consists of the

creation of cells with a certain combination of characteristics and the classification of females and males in each of these cells according to their observable characteristics. The characteristics used in the matching procedure must be defined as categorical variables with a finite number of elements.

The application of this matching algorithm delivers three types of cells: i) those with combinations of observable characteristics that are achieved only by females ii) those with combinations of observable characteristics that are achieved only by males and iii) those with combinations of observable characteristics that are achieved by males and females simultaneously. These cells of the last group represent the common support of characteristics between males and females. However, the distribution of characteristics in the common support differs by gender. Thus, the sample weights of males are adjusted in such a way that the empirical distribution of the observable characteristics mimics that of females. Then, any wage gap that remains is considered as unexplained.

The wage gap Δ , which is defined as the difference in average wage rates of males and females, and reported as a percentage of females' average wage, can be decomposed into four additive elements:

$$\Delta = (\Delta_x + \Delta_f + \Delta_m) + \Delta_0$$

where:

- Δ_x is the explained component of the wage gap and is the result of the differences in the distribution of observable characteristics between males and females in the common support.
- Δ_f and Δ_m are the components of the wage gaps that arise by differences in average earnings between those in and out of the common support.
- Δ_0 is the unexplained component of the wage gap and it can be attributed to the existence of unobservable factors, with discrimination being one of them.

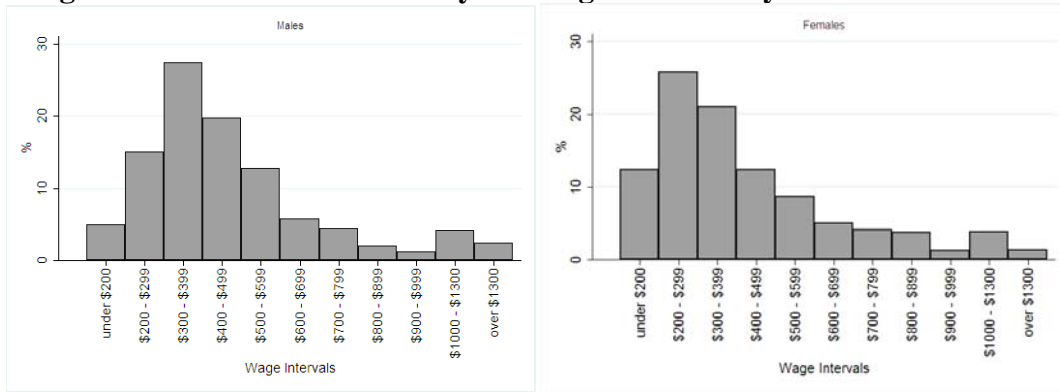
The approach does not require the assumption of any sort of functional form for the relationship between characteristics and wages (Mincerian model), as it constrains the wage gaps comparison to males and females with comparable characteristics.

4. Barbados: Where Both High and Low Earnings Females Coexist

The data used in the analysis for Barbados is derived from the Continuous Labor Force Sample Survey (CLFSS) for 2004. The Barbados Statistical service conducts the CLFSS on a quarterly basis. The CLFSS includes the employed, unemployed and inactive segments of the labor market. The survey extracts information on demographics (age, gender, education), labor market activity (hours of work, economic sector, occupation, earnings, experience, employment type and employment activity) and region of residence. The full sample contains 16,463 observations. The data are purged to include only individuals aged 15-64 years and to eliminate observations with missing values for the key variables, resulting in the final sample of 8,854 observations, from which the results of the paper are derived. The description of the variables is given in Table 2.

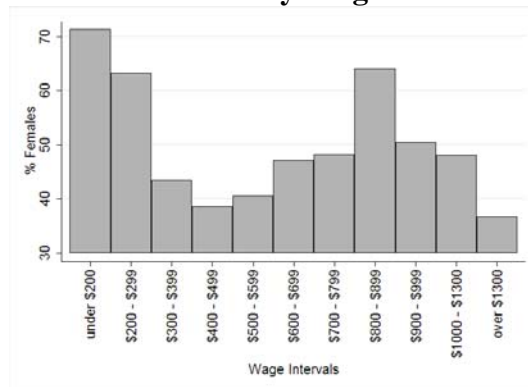
Data on labor earnings are coded in intervals. This imposes some challenges on the computation of gender wage gaps, as the computation of average earnings require assuming particular values for earnings within the given intervals. For simplicity, we will just assume the lowest extreme of each earnings interval as the representative value. Figure 1 shows the distribution of males and females along the earnings intervals. It can be seen that the distribution for females is skewed towards the left of that for males. However, at the highest extremes of the earnings distributions there are almost no gender differences in the percentages of males and females at those income brackets. This is preliminary evidence of a characteristic that will arise as prevalent in Barbados in this paper: a certain prevalence of females at both extremes of the earnings distribution.

Figure 1. Distribution of Weekly Earnings Intervals by Gender: Barbados



This occurrence is seen when exploring the percentage of females that are working within each income bracket. In the lower-middle of the earnings distribution female prevalence is relatively small (close to 40 percent), but it is high at the two lowest extreme income brackets and also at the upper-middle of the distribution (see Figure 2).

Figure 2. Female Prevalence by Wage Intervals – Barbados



An additional challenge that the dataset imposes is that not only earnings but also hours worked per week are coded in intervals. Fortunately close to three out of four male workers and four out of five female workers in Barbados work between 40 and 44 hours per week. There are some gender differences in the percentages of overtime workers, as 20 percent of males and 10 percent of females fall within this category. This imposes extra challenges for the computation of hourly wages. Our approach is to present results for weekly wages by first adjusting the distributions of males and females such that the distributions of hours worked per week are the same across genders. This is done by reweighting the expansion factors using matching on hours between males and females. The rest of the paper presents results using the reweighting of

observations for males and females such that the distribution of the number of hours worked per week is the same across genders.

Table 2 shows more descriptive statistics of the data utilized for the analysis. The first two data columns contain information on the percentage composition of the population by gender and relevant characteristics. The last two columns, in turn, contain information on relative wages by gender and the same characteristics. Average females' wages are normalized to 100 such that the gender wage gap can be directly computed as average males' wages. It is seen, then, that the average gender wage gap reaches 18.9 percent of average females' wages in Barbados.

Regarding age, the data suggest a slight male prevalence at both extremes of the age distributions, with a female prevalence for middle-age workers (25 to 54 years old). The data also show how earnings evolve with age in a monotone way for males along the life cycle, while females earnings' increase monotonically up to age 54, after which there is a slight decrease.

Females' educational achievement surpasses that of males, as 27.8 percent of females have reached the tertiary level while only 22.6 percent of males have done so. However, when looking at average earnings per educational level, males earn more than females at all levels. It is also interesting to see that average earnings for females with none, primary and secondary educational achievements are statistically similar. Among females, there are only notorious increases in earnings when they reach the tertiary level. For males the situation is different as earnings among secondary graduates are higher than earnings among those with none or primary education; moreover, earnings among tertiary graduates are even higher than among those with secondary achievement.

The presence of children and also other wage earners in the household is higher among females than among males. The differences in earnings, however, show different patterns. The earnings premium linked to children living in the household is higher for males than for females. The earnings premium linked to the presence of other wage earner at home is nonexistent for males and negative for females. That is, females who have the sole responsibility of income generation at home tend to have higher earnings than those who have the support of a partner or a different person generating income with them.

In the sample design, the 11 parishes in Barbados are grouped into four strata according to socio-economic development and geographical proximity.⁵ For this paper the four strata are re-classified as urban, mixed and rural. Stratum 1 contains the capital city, and as this is the business and political center, it is classified as urban. Strata 2 and 3 are classified as mixed, as they contain parishes that are both suburban and rural, thus negating the identification of these districts as fully rural.⁶ Stratum 4 is termed rural as the concentration of businesses and population densities are lower; also, the parishes within Stratum 4 are farthest away from the capital city. Earnings are higher in the two mixed strata than in the other two (one rural and the other urban) for both males and females, and this finding is reflective of the socio-economic make-up of these regions.

The majority of workers in Barbados are private and public sector employees (82 percent of males and 92 percent of females). Being an employer is a male-dominated category, as in most labor markets. Self-employment, however, is also a male-dominated category in Barbados, in sharp contrast with the rest of the developing world where this is a female-dominated category. While the highest earning males are the employers, public sector employment is the segment in the labor markets that pays the most for females.

The highest-paid occupational group consists of professionals, which has important gender gaps comprising 8 percent of males and 14 percent of females. The economic sectors of finance, insurance, real estate, business services and community, social and personal services have higher shares of female workers with respect to males (55 percent of females versus 43 percent of males), with important gender gaps in the business sectors and almost no gaps among social workers. An economic sector with notorious gender differences in participation is construction, as it employs 18 percent of male workers and only 1 percent of females. It is interesting to note, however, that the few females working in this show earnings that are on average higher than those of males (although the table does not show statistical significance of the differences in earnings).

Regarding experience, males have higher representation in the segments with more experience. About 38 percent of males show 11 years of experience or more, while 30 percent of

⁵ Stratum 1 (St. Michael, which includes the capital city of Bridgetown); Stratum 2 (Christ Church, St. Phillip); Stratum 3 (St. George, St. James, St. Thomas); Stratum 4 (St. John, St. Joseph, St. Andrews, St. Peter, St. Lucy).

⁶ The definition of rural in Barbados connotes areas with less concentrated population densities.

females report having similar experience. It is clear that earnings increase monotonically with experience for both females and males.

Table 2. Descriptive Statistics – Barbados

	Composition		Wage Index	
	(%)		(Base: Average female wage = 100)	
	Male	Female	Male	Female
All	100	100	118.9	100.0
Age				
15 to 24	13.9	10.8	75.4	66.7
25 to 34	23.7	24.8	107.2	98.0
35 to 44	27.7	31.0	127.5	107.4
45 to 54	23.6	24.0	134.9	108.1
55 to 64	11.1	9.3	142.0	99.4
Education				
None	1.3	0.9	97.6	80.0
Primary	16.1	12.4	89.0	57.7
Secondary	60.0	58.9	107.3	79.0
Tertiary	22.6	27.8	171.2	165.7
Presence of Children in the Household				
No	75.5	70.0	115.2	98.4
Yes	24.5	30.0	130.6	103.9
Presence of Other Wage Earners in the Household				
No	28.7	23.0	118.3	107.7
Yes	71.3	77.0	119.2	97.5
Stratum (Based on Socio-Economic Development)				
1 (Urban)	32.8	32.4	111.9	93.5
2 (Mixed)	28.3	29.5	124.8	101.2
3 (Mixed)	22.2	23.7	125.5	111.3
4 (Rural)	16.7	14.5	113.9	93.6
Type of Employment				
Employer	1.0	0.4	151.9	117.8
Public Employee	21.9	25.6	138.5	134.4
Private Employee	60.0	66.1	107.7	85.9
Self-Employed	17.1	7.9	135.5	104.9
Occupation				
Legislators and Senior Officials	6.5	6.8	189.7	169.9
Professionals	8.2	14.3	203.6	185.2
Technicians and Associate Professionals	10.1	6.4	157.7	122.7
Clerks	4.9	19.8	121.0	111.6
Service, Shop and Market Sales Workers	12.2	26.8	103.0	66.0
Skilled Agricultural and Fishery Workers	4.4	1.0	83.5	52.8
Craft and Related Trades Workers	23.8	3.0	108.2	67.1
Plant and Machine Operators and Assemblers	8.9	2.8	103.2	58.6
Elementary Occupations	21.0	19.1	77.1	52.5
Economic Sector				
Agriculture and Mining	4.9	3.5	98.7	61.2
Manufacturing	6.2	6.4	105.7	69.1
Electricity, Gas and Water	2.1	1.9	127.1	88.5
Construction	17.6	1.0	104.3	110.9
Wholesale and Retail Trade, Hotels and Restaurants	12.1	17.8	107.1	73.1
Transport, Storage and Communication	14.2	14.8	116.3	91.2
Finance, Insurance, Real Estate and Business Services	22.8	30.2	126.1	101.4
Community, Social and Personal Services	20.0	24.5	139.8	135.4
Experience				
Less than 1 year	8.6	11.1	87.2	69.6
1 to 5 years	33.7	38.6	104.0	91.8
6 to 10 years	20.1	20.6	114.8	98.6
11 to 15 years	11.7	9.8	128.6	106.5
16 to 20 years	7.8	5.9	132.7	117.2
20 or more years	18.1	14.0	154.8	139.3

Having explored the distribution of males and females across segments of the labor markets and the average earnings for each segment, it is time to turn to the decompositions of the earnings gaps. The relevant question to answer within this framework is: to what extent the observed differences in earnings correspond to differences in observable characteristics that the labor markets reward? For that purpose, we create counterfactual situations such as the following: i) what the distribution of males' earnings would look like if their distribution of observable characteristics were exactly the same as the distribution of females' earnings; and in particular, (ii) what the gender wage gap would be in that case.

The counterfactual situations are created with the available data using the matching technique described in the previous section. According to this technique, males and females are matched on the basis of a set of observable characteristics; thus some males and females end up matched while other males and some females remain unmatched. This is due to the fact that they have combinations of observable characteristics that cannot be found among their peers of the opposite sex. This induces a decomposition of the observed wage gap that deconstructs it into the four additive elements previously described.

The matching approach, being of a non-parametric configuration faces a challenge known as the "curse of dimensionality." In this framework it can be stated as follows: a researcher would like to use the maximum number of observable characteristics in order to control the scope for the role of unobservable factor explaining the wage gap, but on the other hand, as the number of observable characteristics increases, the likelihood of finding matches for males and females is reduced. It is for this reason that the decomposition exercises are performed with different sets of observable characteristics, reporting in each case the measure of the common supports (that is, the percentages of males and females that are matched for each combination of observable characteristics). Table 3 below show the decomposition exercises for different combinations of observable socio-demographic characteristics. The different combinations of characteristics are constructed such that each combination builds on the previous one by adding one characteristic. Hence, the first column of decompositions considers only matching on age; the second column then adds education as a matching characteristic such that the matching is performed on age and education; the third column show the decomposition results after matching on age, education and presence of children (6 years old or less) in the household; and so on.

Table 3. Wage Gap Decomposition: Barbados

	Age	+ Education	+ Presence of Children in the HH	+ Presence of other wage earner in the HH	+ Stratum
Δ	18.9%	18.9%	18.9%	18.9%	18.9%
$\Delta 0$	20.4%	25.7%	25.9%	25.0%	20.4%
ΔM	-2.6%	-3.6%	-10.8%	-11.4%	-10.4%
ΔF	2.7%	2.2%	9.8%	10.8%	11.0%
ΔX	-1.7%	-5.4%	-5.9%	-5.5%	-2.1%
% CS Females	96.3%	92.6%	90.4%	86.9%	73.7%
% CS Males	97.6%	93.0%	88.8%	83.5%	67.7%

The comparison of the different decomposition exercises is analyzed next. First, as discussed above, the Barbados labor market tends to have a higher proportion of prime-age female workers than males. This is translated into the first decomposition result that in a hypothetical world where males and females were to have the same age distribution, the observed gender wage gap would reach 20.4 percent of average females' wages (instead of the 18.9 percent observed in the real world). Although females are more concentrated around prime-agers they do not earn correspondingly more than their male counterparts.

A result in the same direction, but more pronounced, is found when considering education as a second matching characteristic within this exercise. The counterfactual gender wage gap that would be observed in a world where males and females were to have the same distribution of age and education in the labor markets surpasses that observed in reality by almost 7 percentage points, reaching 25.7 percent of average females' wages. Although females are more concentrated around prime-agers and are in possession of more education than their male counterparts they do not earn correspondingly more than them.

The inclusion of presence of children and presence of other wage earners in the household does not change much the measure of unexplained gender differences in earnings, but the components attributable to the existence of uncommon supports become pronounced, reaching levels around 10 percent (positive for females and negative for males). Socio-economic stratum reduces the measure of unexplained wage gap, maintaining at the same 10 percent level the components attributed to the existence of uncommon supports.

As previously explained, the likelihood of finding matches gets reduced as the number of matching characteristics increases. This can be observed with the percentages of males and females in the common support in the last two rows of the table. Linked to this result is the fact that the measures of the gender wage gap can be attributed to the existence of males and females

with unmatchable characteristics, which grows in absolute value as the number of matching characteristics tends to increase.

It is interesting to note, however, that, as opposed to what is typically observed in this decomposition exercise for other Latin American or Caribbean countries, the Δ_M component is negative and the Δ_F component is positive. That is, those males whose characteristics cannot be comparable to those of any female in the labor markets tend to have lower earnings than those whose characteristics are “matchable.” In other words, they tend to be at the lower percentiles of the wage distribution.

This is shown more clearly in Figure 3 that reports the percentages of unmatched females at each earnings bracket. The two extremes of the earnings distribution are home to the highest percentages of unmatched females. This result may suggest some segmentation in the labor markets such that there is a profile of lower earnings males at the bottom extreme of the earnings distribution and another profile of overachiever females at the other extreme.

Figure 3. Unmatched Females by Wage Intervals after Matching on the Demographic Set of Characteristics: Barbados

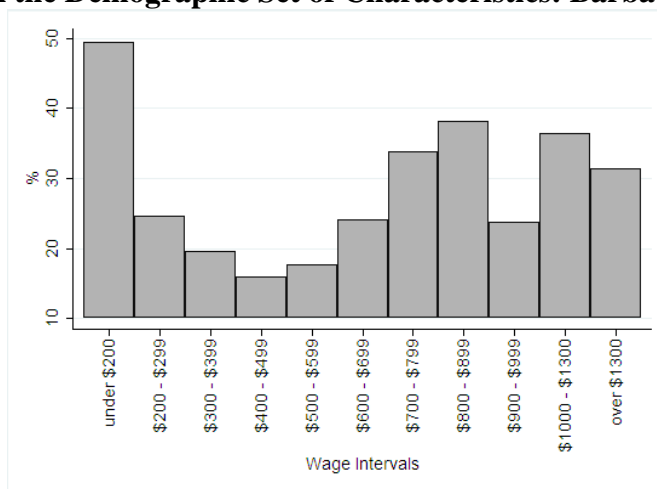


Table 4 below complement the previous matching exercises by adding job-related characteristics to the socio-demographic characteristics used in the previous table. To deal with the “curse of dimensionality” problem, which in this setup is seen as the shrinking of the common support, the variables are not added sequentially and cumulatively as in the previous table. Instead, they are added sequentially, but with replacement to the set of socio-demographic characteristics. To facilitate the reading of the table, the last column of Table 3 containing the

decomposition exercise for the full set of socio-demographic characteristics is copied in Table 4 as the first column. Then, the second column of Table 4 adds “Type of employment” as a matching variable to the set of socio-demographic characteristics. The third column uses “Occupation” as a matching characteristic on top of the socio-demographics but replacing “Type of employment.” The fourth column shows the decomposition exercise replacing “Occupation” with “Sector.” The fifth uses “Experience” instead of “Sector” and the sixth and last decomposition exercise combines all the socio-demographic characteristics with the four job-related characteristics available in the Barbados survey.

Table 4. Wage Gap Decomposition by Job-Related Characteristics: Barbados

	Demographic Set	& Type of Employment	& Occupation	& Sector	& Experience	Full Set
Δ	18.9%	18.9%	18.9%	18.9%	18.9%	18.9%
ΔO	20.4%	20.4%	26.7%	14.1%	17.8%	15.3%
ΔM	-10.4%	-2.5%	-38.4%	-41.1%	-27.4%	-68.0%
ΔF	11.0%	1.8%	31.7%	45.4%	29.1%	72.1%
ΔX	-2.1%	-0.8%	-1.1%	0.5%	-0.6%	-0.5%
% CS Females	73.7%	56.8%	30.6%	35.2%	44.6%	3.3%
% CS Males	67.7%	50.9%	24.3%	30.5%	41.4%	2.7%

The results show that “Sector” is the job-related characteristic that explains the gender wage gap the most. The inclusion of this variable as a matching characteristic to the socio-demographic set reduces the unexplained component of the gap from 20.4 percent to 14.1 percent of average females’ wages. That is, a hypothetical complete reduction of gender segregation in the economic sectors of their jobs would lead to a reduction of more than 6 percentage points of the gender wage gap. Another variable that helps explain gender wage gaps in Barbados is experience. As seen before, males tend to accumulate more experience than their female peers, and this is translated into higher wage gaps. A complete elimination of gender differences in experience would yield a reduction of observed gender wage gaps of about 2.5 percentage points.

On the other hand, contrary to common perceptions, and along the lines of what has been found in other Latin American and Caribbean countries, a reduction of occupational segregation by gender would not lead to reduction in the gender wage gap (Atal, Ñopo, and Winder, 2009).

On the contrary, a hypothetical complete reduction of gender occupational segregation is linked to an increase of more than 6 percentage points in the gender wage gap.

Type of employment is a variable that does not alter the decomposition of the wage gap when compared to the decomposition obtained from the inclusion of socio-demographic variables. However, as will be shown in the next table, there are interesting differences in unexplained wage gaps across the different types of employment.

The last column of the table shows the decomposition exercise after including the full set of matching variables (the five socio-demographic characteristics and the four job-related characteristics). As shown in the last two rows of that column, the measures of the common support are small. Roughly, only 3 percent of females and males can be compared when using this set of nine matching characteristics.

One of the main advantages of decomposing wage gaps using the matching approach instead of the traditional regression-based one is the possibility of more deeply exploring the distribution of the unexplained wage gap. Table 5 shows the magnitude of the unexplained wage gaps for different segments of the labor markets (and using different sets of matching characteristics). The columns of the table follow the same structure as in Table 4 above. That is, the matching variables are added sequentially but with replacement as one moves to the right of the table.

Regarding age, the evidence seems to be mixed. When using only socio-demographic characteristics the unexplained gender wage gap increases with age. When using the full set of matching characteristics, however, the situation is almost reversed.

The results show more consistency regarding education. For all sets of matching characteristics shown in the table the unexplained gaps are smallest (and in some cases even negative) among the tertiary educated.

Presence of children in the household also shows a switching of their relationship with unexplained gender wage gaps depending on the set of matching variables used. For almost all sets of matching characteristics, the unexplained wage gaps seem to be higher among those with no children at home. When considering experience as a matching variable, however, the evidence is reversed. After accounting for it (in the last two columns of the table) workers living with children at home show higher unexplained wage gaps than those with no children less than 6 years old.

The data also suggest that when no other wage earner lives at home females participate in the labor markets in a more competitive way and their wage differences with respect to males are smaller. This is true for all sets of matching characteristics except the one that uses the full set of nine variables together. The third stratum shows the smallest unexplained gender wage gaps.

Although type of employment does not help to explain much of the gender wage gaps in Barbados in the aggregate (Table 4), there are differences in wage gaps within types that deserve to be highlighted. The unexplained wage gaps are higher among the self-employed and private sector employees.

The unexplained gender wage gaps are more pronounced among clerks, craft and related trades workers, plant and machine operators and assemblers and workers in elementary occupations. Among high-skilled occupations (professionals and senior officials) the unexplained wage gaps are notoriously smaller and even in some cases close to zero. This is consistent with the previously outlined finding that the unexplained gaps are smallest among workers with tertiary education.

The economic sectors with the highest unexplained gender wage gaps are manufacturing, agriculture and mining. The gender wage gaps among community, social and personal service workers is almost zero. The construction sector, a typically male-dominated economic sector in most economies deserves special mention. Barbados is no exception to this male concentration, as 18 percent of males work in construction, compared to 1 percent of females. The few females who participate in construction, however, have higher earnings than their male peers. This may have at least a couple of related explanations. First, the few females who dare to work in male-dominated segments of the labor markets may represent a selected sub-sample of the female population, with unobservable traits (such as work ethic, commitment and motivation) that make them better paid than males. Second, as these females may have better unobservable traits, it is likely that they work as bosses or supervisors of their male peers. Females working in the construction sector are probably not blue-collar workers but instead hold white-collar professional and managerial positions.

The differences in unexplained wage gaps across the experience ladder are mixed. While controlling for the set of socio-demographic characteristics plus experience delivers higher unexplained wage gaps among the most experienced, when using the full set of control variables the unexplained gaps among the most experienced are the lowest. The interplay of experience

with the other socio-demographic and job-related characteristics should be taken into account when trying to use this variable as an explanatory source for gender wage gaps.

Table 5. Unexplained Wage Gap by Categories: Barbados

	Unexplained Wage Gap (%)					
	Demographic Set	& Type of Employment	& Occupation	& Sector	& Experience	Full Set
All	20.4	20.4	26.7	14.1	17.8	15.3
Age						
15 to 24	13.1	14.2	42.1	22.2	12.8	20.4
25 to 34	8.0	9.7	20.8	6.1	11.8	11.9
35 to 44	16.3	13.0	19.9	11.0	12.3	25.8
45 to 54	22.3	23.2	29.1	17.0	32.0	12.1
55 to 64	38.9	28.1	23.9	32.5	22.9	10.2
Education						
None	40.5	-41.2	55.4	134.1	-41.2	55.4
Primary	47.0	32.8	32.6	39.3	44.5	16.3
Secondary	35.7	31.9	37.7	21.8	34.5	19.4
Tertiary	-0.3	-0.9	9.5	1.0	-1.7	7.5
Presence of Children in the Household						
No	21.8	21.6	27.3	14.4	16.5	15.3
Yes	14.6	13.6	20.6	11.2	19.8	23.9
Presence of Other Wage Earners in the Household						
No	12.0	11.1	19.5	5.9	15.9	26.3
Yes	22.8	22.2	27.6	15.8	17.7	15.2
Stratum (Based on Socio-Economic Development)						
1 (Urban)	24.1	17.2	24.3	18.2	21.7	16.2
2 (Mixed)	17.1	21.8	21.7	10.8	11.8	13.5
3 (Mixed)	9.5	9.2	23.1	7.3	14.3	-3.2
4 (Rural)	26.0	28.2	38.9	11.1	25.9	21.2
Type of Employment						
Employer		0.0				0.0
Public Employee		5.9				1.6
Private Employee		16.1				24.4
Self-Employed		23.0				17.3
Occupation						
Legislators and Senior Officials			2.9			0.1
Professionals			5.9			2.7
Technicians and Associate Professionals			16.6			4.8
Clerks			13.1			15.5
Service, Shop and Market Sales Workers			43.0			27.5
Skilled Agricultural and Fishery Workers			8.4			8.4
Craft and Related Trades Workers			52.1			23.1
Plant and Machine Operators and Assemblers			76.9			197.7
Elementary Occupations			39.0			24.8
Economic Sector						
Agriculture and Mining				26.4		56.8
Manufacturing				37.7		41.3
Electricity, Gas and Water				26.5		26.5
Construction				-14.6		-54.9
Wholesale and Retail Trade, Hotels and Restaurants				19.0		22.9
Transport, Storage and Communication				20.5		20.9
Finance, Insurance, Real Estate and Business Services				11.8		21.3
Community, Social and Personal Services				5.2		1.5
Experience						
Less than 1 year					12.2	24.0
1 to 5 years					15.1	16.5
6 to 10 years					15.7	11.2
11 to 15 years					16.5	28.5
16 to 20 years					11.9	36.5
20 or more years					19.5	2.3

5. Jamaica: Mixed Earning Outcomes—Females in the Middle and Males on Both Ends

The data employed in the estimation for Jamaica are from the 2003 Labor Force Survey undertaken by the Statistical Institute (STATIN). The surveys are undertaken quarterly and samples about one percent of the population. The sample enumerates households spread across the fourteen parishes, thereby drawing a representative mix of urban and rural dwellers.⁷ The original sample for 2003 continues 22,692 observations, but following data cleaning and deletion of observations with missing values, 4,974 observations remained in the final sample.

Table 6 shows descriptive statistics for the data. Having normalized average females' earnings to 100, average males' wages can be directly read as the measure of gender earnings gaps. Male earnings below 100 indicate a negative earnings gap, and females earn on average more than males in Jamaica. Although the earnings difference is very small, 0.8 percent of average females' wages, and a significance test would fail to reject the null hypothesis of gender equality in earnings.

Regarding age, the recurrent pattern for most countries of the region of higher prevalence of males at both extremes of the age distribution is present here as well. The pattern of earnings progression along the life cycle is also similar to what has been seen for other countries. Another unsurprising pattern of the data regards the gender disparities in education. While only 12.3 percent of working females have reached tertiary levels of schooling, only 4.5 percent of males have similar tertiary educational attainment. The corresponding earnings for each level of schooling do not show much variation within the three lowest levels of schooling. It is only for the tertiary level that earnings are significantly higher, especially among males.

Presence of children is notoriously more prevalent among working women than among working males. Also, while for working males there are no earnings differences between those who live with children at home and those who do not, for working females presence of children is linked to lower earnings. It is also interesting to note that working females reside more in urban regions than their male counterparts.

Type of employment is another variable that shows certain differences between Jamaica and most Latin American and Caribbean countries. Self-employment in Jamaica is a segment of

⁷ A rural/urban classification in addition to the districts delineations is included in the Jamaica survey unlike the earlier case for Barbados which necessitated the reclassification of districts (that is the strata) into rural, urban and the hybrid category-mixed.

the labor markets with higher male participation. Dependent relationships, both in the private and public sector, are more prevalent among women. It is also interesting to note that the data show no gender differences in earnings in public sector employment (as is the case in most countries), but surprisingly also in self-employment. The segments of the labor markets showing earnings disparities in favor of males are private employment and, not surprisingly, to a greater extent among employers.

Occupational segregation is also prevalent in Jamaica. On the one hand, women tend to be represented in higher proportions than men among professionals, elementary occupations and service, shop and market sales workers. On the other hand, males tend to be overrepresented among skilled agricultural and fishery workers, craft and related trades and plant and machine operators and assemblers. Not only is there an important segregation in occupations, but also in industries. Women tend to work in wholesale and retail trade, hotels and restaurants, as well as in community, social and personal services. In turn, men are engaged in agriculture, mining and construction. The highest-paying occupations for both males and females are in the professional sector. The highest paying activity for males is electricity, gas and water, while for females it is finance, insurance, real estate and business services.

There are some gender differences in job tenure, such that males tend to accumulate more time at their job than females. An estimated 67 percent of males have been at their job for five years or more while the corresponding percentage for females is 10 percentage points below. The gender differences in regular time worked per week are substantial. Females are more prevalent in part-time work than males, and the opposite happens in overtime work.

Table 6. Descriptive Statistics: Jamaica

	Composition		Wage Index	
	(%)		(Base: Average female wage = 100)	
	Male	Female	Male	Female
All	100	100	99.2	100.0
Age				
15 to 24	16.9	13.2	84.8	99.3
25 to 34	28.9	30.4	98.5	107.1
35 to 44	26.8	30.7	109.7	94.6
45 to 54	17.7	17.3	102.2	104.6
55 to 64	9.7	8.4	91.9	85.6
Education				
None	0.2	0.2	64.9	62.0
Primary	26.3	19.7	79.8	73.0
Secondary	69.0	67.8	97.5	87.1
Tertiary	4.5	12.3	240.0	214.8
Presence of Children in the Household				
No	70.2	61.6	98.6	106.2
Yes	29.8	38.4	100.6	90.0
Presence of Other Wage Earners in the Household				
No	49.8	42.0	98.8	107.5
Yes	50.2	58.0	99.6	94.6
Urban				
No	64.1	53.6	84.6	81.1
Yes	35.9	46.4	125.2	121.8
Type of Employment				
Employer	2.4	1.6	171.8	140.7
Public Employee	9.2	17.1	160.7	156.6
Private Employee	45.9	52.5	108.8	96.6
Self-Employed	42.5	28.7	71.3	70.1
Occupation				
Armed Forces	0.3	0.0	161.3	-
Legislators and Senior Officials	2.6	7.6	166.5	121.1
Professionals	3.9	10.3	212.6	208.5
Technicians and Associate Professionals	3.6	5.8	175.8	124.3
Clerks	2.5	12.1	133.5	122.2
Service, Shop and Market Sales Workers	11.1	24.4	108.9	86.3
Skilled Agricultural and Fishery Workers	30.8	8.1	58.1	47.2
Craft and Related Trades Workers	22.2	4.0	116.8	70.5
Plant and Machine Operators and Assemblers	8.5	1.7	113.7	78.6
Elementary Occupations	14.4	26.0	74.5	70.2
Economic Sector				
Agriculture and Mining	34.2	9.7	63.4	50.9
Manufacturing	7.0	4.9	109.2	90.7
Electricity, Gas and Water	0.4	0.3	165.6	113.9
Construction	15.8	0.7	116.9	92.7
Wholesale and Retail Trade, Hotels and Restaurants	13.8	32.3	94.3	81.9
Transport, Storage and Communication	8.0	2.7	119.9	157.1
Finance, Insurance, Real Estate and Business Services	4.4	5.7	133.1	177.2
Community, Social and Personal Services	16.3	43.8	136.1	111.8
Tenure				
Less than 3 months	1.9	2.3	84.3	80.2
3 to 6 months	2.0	4.4	114.3	76.1
6 to 9 months	2.3	3.0	82.2	83.0
9 to 12 months	2.5	3.2	83.0	68.1
1 to 2 years	6.0	7.7	99.7	91.6
2 to 5 years	18.5	22.4	97.7	98.1
5 years or more	66.9	57.0	100.7	107.2
Small Firm				
No	41.8	43.4	129.4	134.7
Yes	58.2	56.6	77.5	73.3
Time Worked				
Part-Time	6.0	12.6	99.0	85.7
Full-Time	72.7	74.6	102.5	105.1
Over-Time	21.3	12.8	87.9	84.1

Next, Tables 7 and 8 show the earnings gap decompositions exercise. The format of the tables is the same as in the previous section for Barbados. Each column shows one decomposition, based on a set of matching variables. The first table uses only socio-demographic characteristics, adding them sequentially without replacement as one move to the right. The second table adds job related characteristics to the set of socio-demographic ones, but, in order to deal with the curse of dimensionality, it does so with replacement. It is only the last column of Table 8 that uses the full set of socio-demographic and job-related characteristics simultaneously.

The first thing to note is that the -0.8 percent earnings gap seen in Jamaica for the overall economy masks the fact that women have accumulated more schooling than men (and they are not compensated for it appropriately). When comparing men and women with the same age and education, the unexplained differences in earnings reach 12.2 percent of average females' earnings, in favor of men. To a lesser extent, the inclusion of presence of other wage earner in the household as a matching variable helps to reduce the measure of explained gender differences in earnings. The addition of other socio-demographic controls does not alter much of the unexplained gaps. The measure of the common supports is nearly 90 percent of males and females.

The addition of job-related characteristics changes the panorama a bit. First, the data show that there are two job-related characteristics that do not greatly change the measure of unexplained earnings gap: tenure and time worked. One variable, firm size, noticeably reduces this measure. A hypothetical world in which all gender differences in firm size of workers would reduce the unexplained differences in earnings by 4 percentage points. The other three variables (type of employment, occupation and economic sector) work in such a way that a reduction of gender differences in any of them would increase unexplained gender earnings gaps. Most notably, a complete elimination of gender occupational segregation in Jamaica would lead to an increase of gender earnings gap by 4.5 percentage points. Jamaica is another country of the region for which a reduction of gender occupational segregation seems to be a wrong target within an agenda of reduction of gender earnings gaps. It is interesting to note, however, that the matching exercise including occupation as a matching variable leads to the lowest measures of the common supports among all job-related characteristics. That is, gender occupational

segregation is a prevalent feature in Jamaican labor markets. However, to undertake the reduction of it as a policy objective may have detrimental effects on gender earnings disparities.

Almost all the decomposition exercises exhibit components due to the lack of common support that are positive for males and negative for females, a situation that is exactly the same as the one seen in Barbados. Unmatched males and females show earnings above the national average.

The matching decomposition exercise after the inclusion of all socio-demographic and job-related characteristics is shown in the last column of Table 9. The results are qualitatively similar to all those shown after the inclusion of job-related variables, but quantitatively magnified. The measures of the common supports get smaller. That is to say, it is only close to 5 percent of males and females that are fully comparable under these sets of socio-demographic and job-related characteristics.

Table 7. Wage Gap Decomposition: Jamaica

	Age	+ Education	+ Presence of Children in the HH	+ Presence of other wage earner in the HH	+ Urban
Δ	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%
ΔO	0.2%	12.2%	11.0%	9.7%	12.0%
ΔM	0.0%	-0.1%	0.1%	0.1%	2.2%
ΔF	0.0%	-1.8%	-2.8%	-4.4%	-7.8%
ΔX	-1.0%	-11.1%	-9.1%	-6.2%	-7.2%
% CS Females	100.0%	99.5%	98.0%	94.8%	88.7%
% CS Males	99.9%	98.3%	96.9%	94.3%	88.7%

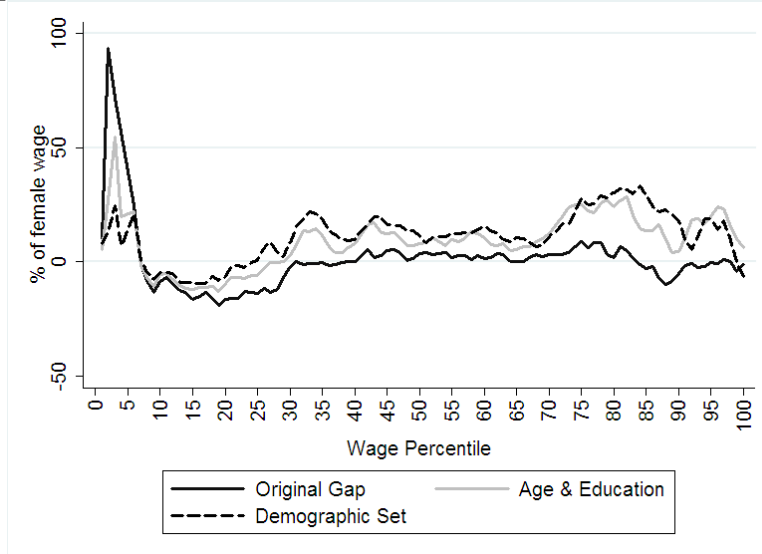
Table 8. Wage Gap Decomposition by Job Related Characteristics: Jamaica

	Demographic Set	& Type of Employment	& Occupation	& Sector	& Tenure	& Firm Size	& Time Worked	Full Set
Δ	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%
ΔO	12.0%	15.3%	16.5%	14.6%	11.2%	7.9%	12.4%	16.8%
ΔM	2.2%	5.7%	6.6%	5.9%	1.1%	3.9%	0.9%	18.8%
ΔF	-7.8%	-15.3%	-15.5%	-14.0%	-6.1%	-8.6%	-6.4%	-24.8%
ΔX	-7.2%	-6.5%	-8.4%	-7.3%	-7.1%	-4.0%	-7.7%	-11.6%
% CS Females	88.7%	69.4%	37.4%	41.3%	70.7%	79.7%	72.4%	5.8%
% CS Males	88.7%	72.6%	46.3%	52.0%	64.9%	82.5%	74.0%	5.5%

The exploration of unexplained differences in earnings along the distribution of earnings reveals a similar pattern to that found in other Latin American and Caribbean countries. The unexplained gap is higher among lower-income workers, suggesting that the problem of earnings gaps is linked to the problem of low income generation and hence poverty. For some

intermediary percentiles (in this case between the 10th and 20th percentiles) the earnings gap attains a minimum and increases thereafter. The original gap is higher than those obtained after controlling for observable characteristics from the first to the seventh percentiles, and after these percentiles the situation is as it has been shown for other Latin Americas and Caribbean countries: the controlled earnings gaps is higher than the original, one as females have completed more schooling (see Figure 4)

Figure 4. Unexplained Wage Gap by Percentiles of the Earnings Distribution: Jamaica⁸



To conclude the analysis for Jamaica, Figure 5 shows confidence intervals for unexplained gender differences in earnings for different segments of the labor markets. The extremes of the boxes represent 90 percent and the extremes of the bar represent 99 percent confidence intervals. Some patterns shown in the different panels of the figure are similar to those found in other countries. Unexplained gender differences in earnings increase with age (although the differences are mostly non-statistically significant) and show an inverted U-shape with respect to education (where the highest unexplained gaps are found among middle education individuals, in this case, high school graduates). Workers with children (6 years old and under) at home, experience higher unexplained gender differences in earnings. The presence

⁸ The original earnings gaps around the 5th percentile are actually higher than the reported 100 percent, but in order to keep the scale of the figure they are top-coded at that value

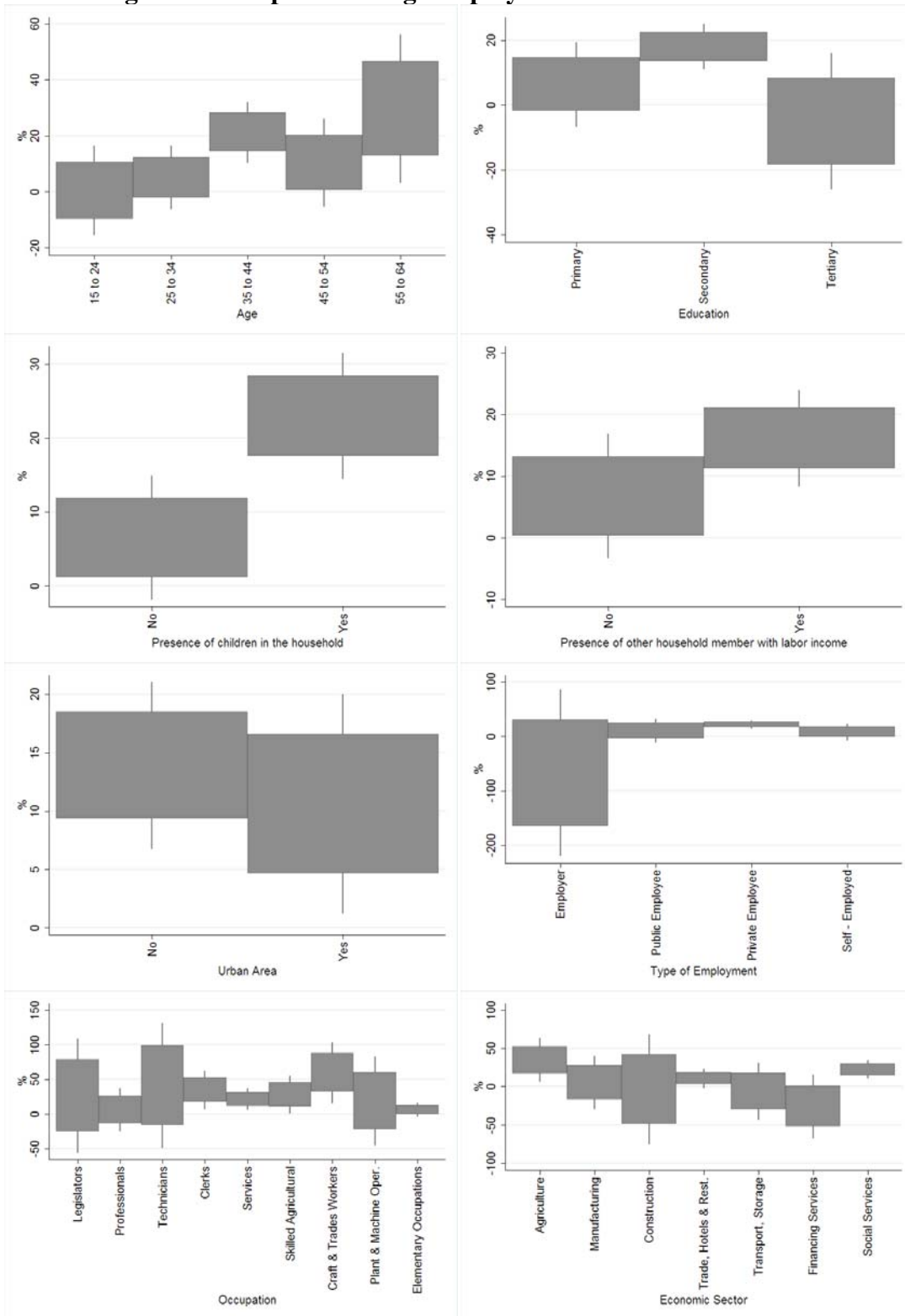
of other income generator at home is also linked with higher gender disparities, but the result does not show statistical significance.

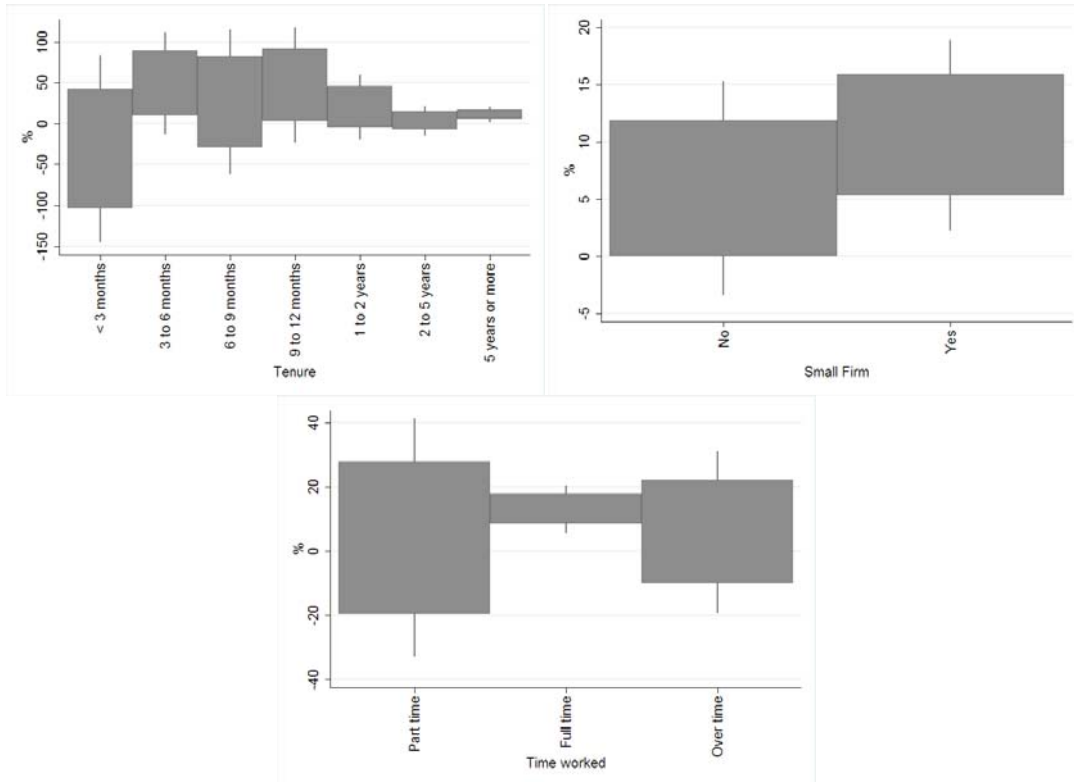
In some other aspects, Jamaica show peculiarities with respect to the distribution of unexplained gender differences in earnings along segments of their labor markets. One of them is that the earnings gaps are similar in urban and rural areas, across type of employment, occupations, economic sectors, firm size and time worked. Regarding type of employment, it is interesting to note, however, that there is huge heterogeneity within the “employer” category and that the only segment of the market for which there seems to be statistically significant differences in earnings is private sector employment. Four occupational categories show statistically positive unexplained gender differences in earnings, and five others are not distinguishable from zero. Among legislators, technicians and machine operators the gender disparities in earnings are very heterogeneous. Something similar happens across economic sectors where the only categories with statistically significant earnings gaps are in agriculture and social services, and, to a lesser extent, in trade, hotels and restaurants.

The dispersion of unexplained gender differences in earnings is also notoriously higher among part-time and overtime workers than for those who work full-time. On average they are both smaller than in full time, but with the dispersion they show the differences are not statistically significant. The unexplained gender gaps are higher in small firms than in larger firms, as in most countries of the region (Atal, Ñopo and Winder, 2009), but in this case, these differences are not statistically significant.

The last point to highlight in this analysis is about job tenure for which apparently there seems to be no substantial gender differences in earnings linked to that. The data shows however some positive gaps among those between 3 and 6 months and between 9 to 12 months of job tenure. Also note that for those at the top of distribution of job tenure (five years and more) the unexplained gender earnings gap is positive and statistically significant. Not only are females less able to accumulate enough occupational experience, but also, when they do accumulate that experience, they earn substantially less than their male counterparts.

Figure 5. Unexplained Wage Gap by Characteristics: Jamaica





6. Concluding Remarks

This paper has explored in parallel gender earnings gaps in two Caribbean economies, Barbados and Jamaica, emphasizing the similarities and highlighting the differences between them and with respect to the rest of Latin American and Caribbean economies.

In both countries, as in most of the region, females' educational achievement is higher than that of males. Jamaica shows lower educational achievement and higher gender disparities in such achievement than Barbados. Nonetheless, males' earnings surpass those of their female peers. A comparison of earnings for males and females with the same age and education reveals that males earn 25 percent of average females' earnings more than females in Barbados. The corresponding figure in Jamaica is 12 percent of average female earnings. The unexplained gender earnings gaps after adding extra control variables are higher in Barbados than in Jamaica

Both countries confirm one finding that has been recurrent in the analysis of gender earnings gaps with this matching approach and that challenges part of the gender literature and some popular beliefs about gender occupational segregation. Namely, the complete elimination

of gender occupational segregation in the labor markets would increase rather than reduce gender earnings gaps. Occupational segregation seems to be one of the wrong culprits of existent gender earnings gaps that the literature has emphasized. Both countries also coincide in showing the lowest unexplained earnings gaps among the high skilled and the highest among the low skilled.

Regarding segregation by economic sectors, the evidence for these two countries is also in line with what has been found in other countries of the region, and it is mixed. The results indicate that a complete elimination of gender sector segregation would reduce the observed gender earnings gap in Barbados but would increase it in Jamaica.

Occupational experience, in the case of Barbados, and job tenure, in the case of Jamaica, are variables that help to explain existing gender earnings gaps. The elimination of gender disparities along these lines is linked to a reduction of between one and two percentage points in unexplained earnings gaps.

The data coding of earnings in intervals poses some challenges to the analysis on Barbados, but thanks to the non-parametric nature of the matching approach utilized here most of the analysis can be performed as in the case of earnings coded as a continuous variable. One of the few results that cannot be replicated is the exploration of unexplained earnings gaps along percentiles of the earnings distribution. This result is available only for Jamaica and reveals higher gender earnings gaps among low-income workers, as is case in most of Latin America and the Caribbean as well. This suggests some linkages between the problem of gender earnings disparities and the problem of low income generation (or poverty). This is an area of action for which working on the reduction of inequities would also work towards the reduction of poverty.

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