Analysing the changing determinants of labour force participation in Belize

Marco A. Chan

CBB Working Paper

Research Department

Analysing the changing determinants of labour force participation in Belize

Prepared by: Marco A. Chan

Authorized for distribution by: Emory Ford

November 2019

Abstract

Labour force participation in Belize has risen by 8.2 percentage points over the past 25 years, owing to a gradual increase in female labour force participation, while male participation has virtually stagnated. This study investigates the principal attributes of individuals participating in the labour force, focusing on gender-specific characteristics, and analysing how these have shifted between 2013 and 2018. National Labour Force Survey data, sourced from the Statistical Institute of Belize, were used in a binary logistic regression model to identify the prominent characteristics of persons participating in the labour force. Results indicated that educational attainment for women led to higher likelihoods of participation in the labour force. The opposite was discovered for males, as individuals with no education were found to participate at a higher rate in the labour force, which may be attributed to labour intensive infrastructural projects. Meanwhile, changing social and cultural norms have incited higher participation from females within households and falling likelihoods of 'youth' labour force participation. Lastly, capacity building measures and structural enhancements to both the educational system and labour market dynamics were found to be critical in curbing the drop off in male labour force participation and providing an environment for sustainable growth of female participation rates.

Table of Contents

List of Illustrations

List of Figures

List of Tables

1.0 Introduction

Historically, males tend to participate in labour force activities at a much higher rate than females. This is likely due to widely held social and cultural norms in many societies, where men are the primary income earners of households, while females partake in household activities (Becker, 1981). Recently, the gap between both rates of participation has been narrowing as females have been participating more in the workforce in many developing nations (Tzvetkova & Ortiz-Ospina, 2017). Meanwhile, male participation has been contracting in observed developed nations (Dotsey, 2018).

Lindauer (2014) identified several perceived weaknesses in Belize's labour market; those being structural inadequacies, poorly educated workers and stagnating wages. Nevertheless, labour force participation in Belize has increased steadily over the past 25 years. This increase has been driven by a rise in female labour force participation rates, as women conscientiously migrate from household activity into the labour market (Greenwood, Seshadri, & Yorukoglu, 2002). In contrast, male labour force participation rates have virtually stagnated during the same time period, trending slightly below its 25-year average. The steady rise in proportion of women entering the labour market demand has led to increased feminisation of the labour force. Though intriguing, these trends are not unique to Belize, as observed male and female participation rates in Belize follow those seen in various other nations (Çağatay & Özler, 1995).

A key factor in influencing these trends have been an individual's decision to participate in labour force activities. The choice of whether or not to participate is based on determinants influenced by a combination of societal norms, broad macroeconomic influences, and potential economic opportunities available. The determinants underlining the participation rates of both males and females in the labour force have been studied in a multitude of research conducted on countries of varying income groups. Save for a handful of research conducted labour market

activities in Belize, no country study has been conducted on identifying the determinants of labour force participation. This study aims to fill the gap by identifying key determinants influencing male and female labour force participation in Belize.

The principal attributes of individuals participating in the labour force were examined in this study. National Labour Force Survey data, sourced from the nation's statistical office, (SIB), were used in a binary logistic regression model to identify the prominent determinants of the working age population participating in the labour force. The determinants were then analysed to examine how they have shifted between 2013 and 2018. Gender-specific determinants of the working age population were identified and the salient changes between the five-year periods were examined. The findings of this paper suggest males with no education and vocational education were most likely to participate in the labour force than men with higher levels of education. The opposite was noted for females, as higher levels of education correlated with higher labour force participation. Furthermore, evidence supporting regional linkages to participation rates were noted, while shifts in cultural and social norms were elaborated upon given the results.

The rest of this study is structured as follows. Section 2 provides an overview of labour force participation rate trends. Section 3 contains the literature review which identifies key variables of labour force participation and empirical methodologies used in similar studies. Section 4 outlines the methodology employed in this paper, while the empirical results and discussions are presented in Section 5. Section 6 concludes with relevant policy prescriptions.

2.0 Background

2.1 Labour Force Participation Trends

(i) World Labour Force Trends

The International Labour Organisation (ILO) reported that over a 25-year period labour

force participation rates of the global working-age population have been declining (see Table 1).

The 3.7 percentage points decline in total world participation rates is attributable mostly to

falling male participation rates across all income categories. Female participation rates on the

other hand, have been rising in high and low income nations. However, dragged down by falling

participation rates in middle income nations, total world female participation rates contracted

over the time period as well. Changing social norms, incentivisation of non-participation, and the

lack, or emergence of, economic opportunities are generally accepted as the driving forces

behind the change in the global trends of participation rates.

Table 1

Percent Growth in Participation Rates 1993 – 2018

	Total	Males	Females
World	-3.7	-4.6	-2.5
High Income	-0.2	-4.0	6.6
Middle Income	-5.4	-5.5	-5.0
Low Income	-0.6	-2.1	0.8

Note: Adapted from data obtained from the International Labour Organisation (ILO) website.

As summarised in Table 2, participation rates of women remained distinctly lower than

that of men. Though narrower in high income nations, the gap between male and female

participation rates were sizeable in middle income nations. According to Sinha (1965) this may

be attributable to the lack of opportunities available to women in a transitioning economy.

Also noted in Table 2 were the lower rates of participation across income categories for

males. Participation rates in high income nations were lower than that of both middle and low

income nations. The reasoning behind this phenomenon may be found in the works of Parsons

(1980) and Aguila (2014) which stated that the incentivisation of non-participation may play a role in declining participation rates, particularly in high income nations.

Table 2

Average Participation rates at 2018 (%).

	Total	Males	Females	Difference
World	61.8	75.0	53.7	-21.3
High Income	60.1	68.1	65.3	-2.8
Middle Income	61.1	76.2	49.8	-26.4
Low Income	72.5	80.2	66.6	-13.6

Note: Adapted from data obtained from the International Labour Organisation (ILO) website.

(ii) Caribbean Labour Force Trends

In the Caribbean, total labour force participation rates of the working-age population have been stagnating throughout the 25-year period between 1993 and 2018 (see Figure 1). Contributing to the rut in participation rate growth were male participation rates, which contracted by 1.3 percentage points during the period under review. According to Kandil, et al. (2014), this may be as a result of a weakened labour market brought on by poor economic performances within the period under observation.

Female participation rates in the Caribbean increased by 4.2 percentage points, as nations increasingly moved towards service-based economies, particularly tourism-based activities. Within these burgeoning sectors, the demand for female labourers within labour markets, along with supply of female labourers trained both formally, and informally contributed positively to female labour force participation rates (Coppin, 1995).
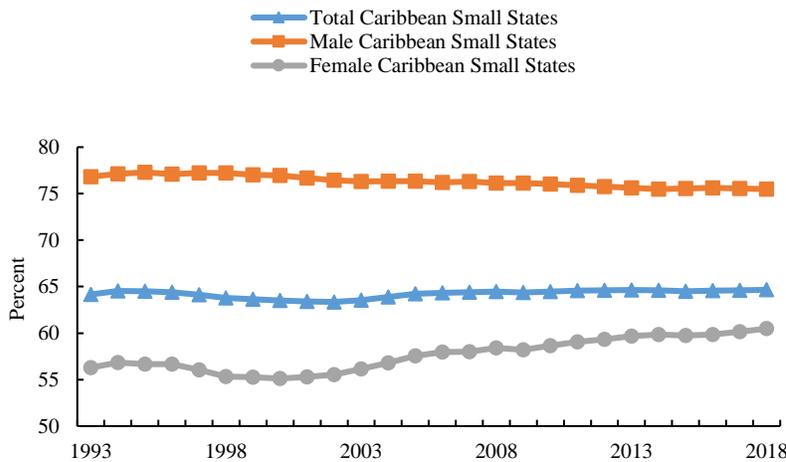
Figure 1. A comparative look at labour force participation rates in Caribbean small states by gender. Adapted from data obtained from the International Labour Organisation (ILO) website.

(iii) Belize Labour Force Trends

Breaking from the global and regional pattern, Belize's participation rates have been trending upwards in the 25-year period between 1993 and 2018, increasing by 8.2 percentage points. Driving growth was a 16.4 percentage point increase in female participation rates, as male participation rates contracted by 1.0 percentage point.

Despite the remarkable drive upwards in Belize's female participation rates, when compared to the World and select Caribbean nations, it remained below almost all comparable rates (see Table 3). In fact, Belize stood 7.6 percentage points below the average Caribbean female labour force participation rate. By contrast, male participation rates in Belize stood above all other comparable rates.

Belize's labour market demands at 2018 are still met in large part by male participants, with growing, but limited options for female participation. Lindauer (2014), attempted to explain labour market conditions within Belize, outlining poor labour market supply growth due to

structural inadequacies, and poorly educated workers. Nevertheless, national demographics, economic structures, and social constructs have shifted, and changed labour market dynamics.

Table 3

Participations R ates by Gender at 2018 (%)

	Total	Male	Female
Barbados	65.5	69.5	75.1
Belize	65.5	78.3	52.9
Jamaica	67.4	77.6	64.0
Trinidad and Tobago	61.8	73.2	58.7
Guyana	57.8	74.5	44.0
Haiti	68.4	72.8	65.7
Caribbean	64.7	75.5	60.5
World	61.8	75.0	53.7

Note: Adapted from data obtained from the International Labour Organisation (ILO) and Statistical Institute of Belize (SIB)

2.2 Male Labour Force Participation Trends in Belize

In Belize, despite a boom in female labour force participation, male participation rates have declined over the past quarter century. Fluctuating between 1993 and 2018, participation rates of males contracted by 1.0 percentage point to 78.3% of the total working-age population. From data analysed, it was gathered that the decline resulted from a higher rate of males disengaging from employment-seeking activities.

In economies transitioning from agriculturally intensive to service-based activities, transitional pressure is exerted on the labour force resulting in unskilled and unqualified workers being less likely to find employment. These individuals are faced with rapidly changing labour market requirements accompanying services-based employment. The transitional phase eventually discourages workers at the lower and upper age ranges from participating in labour market activities due to the lack of skills, experience or educational requirements necessary to partake in the labour force.

Over the course of 25 years, the composition of the male labour force, with regards to age categories, skid into a slightly different pattern. The labour force matured, as the participation rate of "*prime working-age*" males[1] increased by 5.2 percentage points to 50.7% of the total male working-age population (see Figure 2). Of the males seeking employment in each age category, "*prime working-age*" males had the largest margin of participation at 96.2% in 2018. The share of the "*past prime working-age*" male[2] category remained unchanged.

Figure 2. A comparative look at the composition of male labour force by age category for the years 2018 and 1993. Adapted from data obtained from the Statistical Institute of Belize (SIB).

The share of "*youth*" male[3] participants in the labour force declined by 6.2 percentage points to 18.3% of the total working age population (see Figure 2). This trend indicated that "*youth*" males became less likely to participate in the labour force, this statement is supported by a 54.6% "*youth*" male participation rate in 2018 (See Table 3). Among the three age categories, "*youth*" male participation rates was the lowest.

---

[1] Individuals between the ages of 25 – 54 are considered to be of prime working age.
[2] Individuals above the age 55 are considered to be past prime working age.
[3] Individuals between the ages of 14 – 24 are considered to be youths.
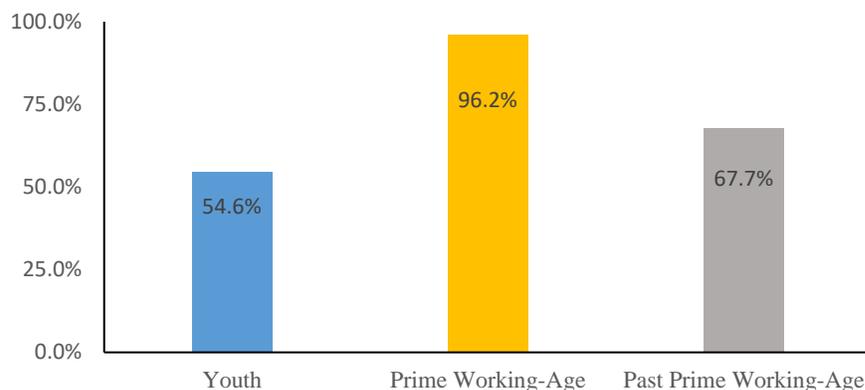
Figure 3. A comparative look at labour force participation by age category for 2018. Adapted from data obtained from the Statistical Institute of Belize (SIB).

The upside to non-participation by "*youth*" males, was the potential for engaging in activities that may maximise potential earnings, specifically vocational and educational activities. It was noted that 70.1% of all non-participant males are "*youths*", and fall within the age an individual is expected to attend school. However, of the total unemployed male population, 57.2% are "*youth*" males, registering a 5.2 percentage-point increase compared to 1993. The figure indicated a clear choice occurring between furthering education and exploring opportunities for potential work.

Statistics from the Ministry of Education of Belize (MOE) pointed towards a reduction in the total share of males enrolled in school between 1995 and 2018. The share of males fell by 1.2 percentage points to 49.4% of the total. A widening in the gap between males and females currently enrolled in junior colleges and universities of 5.7 percentage points fuelled the decline in male shares. In 2018, males held smaller shares of participants over all but one level of education (primary school), with increasingly smaller shares across secondary and tertiary levels of education (see Figure 3).
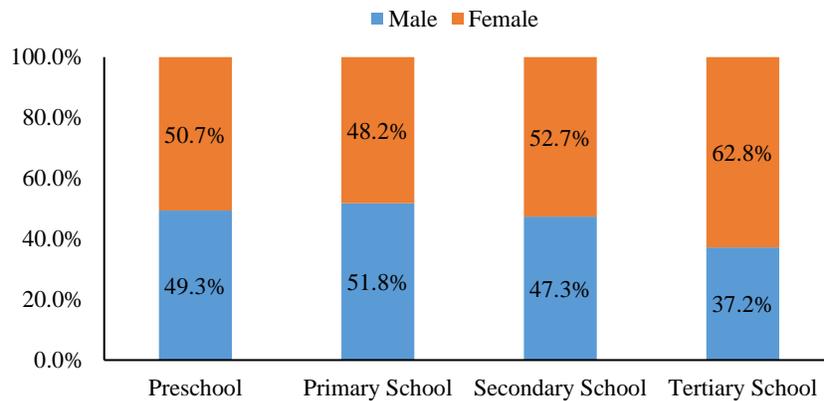
Figure 4. A comparative look at the composition of school enrolment by gender across education levels for 2018. Adapted from data obtained from the Statistical Institute of Belize (SIB).

2.3 Female Labour Force Participation Trends in Belize

In contrast to stagnating male participation rates, outstanding gains were made in female labour force participation rates during the period under review based on expanding availability of opportunities for work. The 16.4 percentage point expansion between 1993 and 2018 was sourced primarily from an influx of "*prime working-age*" individuals actively engaging in labour force activities (see Figure 4). In recent years, a movement towards a service-based labour market resulted in increased availability of work options, encouraging employment of educated, and trained members of the female population.
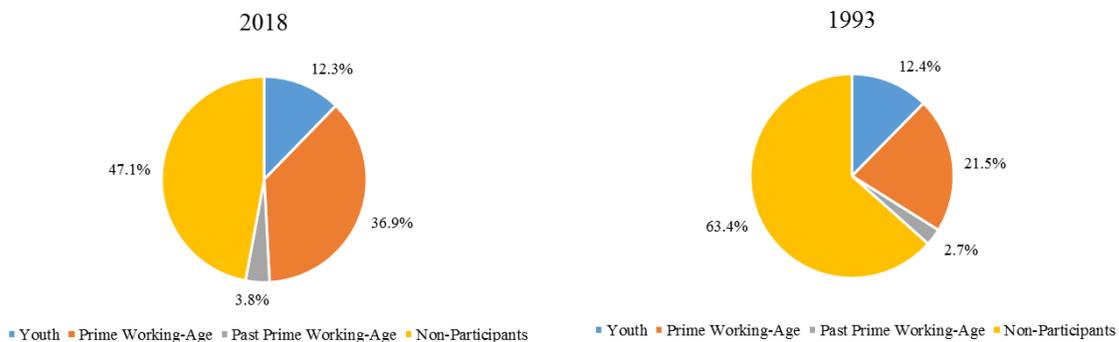
Figure 5. A comparative look at the composition of female labour force by age category for the years 2018 and 2013. Adapted from data obtained from the Statistical Institute of Belize (SIB).

Female non-participants, the largest component of the female working-age population, underwent significant structural changes within the observed time period. In 1993, 50.1% of all non-participant females were classified as a "*spouse*[4]". By 2018, that Figure had reduced by 14.6 percentage points to 35.5%, indicating a movement towards participation in the labour force (see Table 4). The shift resulted in females classified as a "*child*[5]" in a household to hold the largest share of female non-participants. These individuals, comprising of 55.4% of the total working age "*child*" population, would potentially be furthering schooling while remaining at home, rather than partaking in the labour force, and potentially moving out to start their own household.

Table 4

Percentage of Non-Participant Female Population by Status in Household

	Head of Household	Spouse	Child	Other
1993	12.4%	50.1%	25.9%	11.6%
2018	15.4%	35.5%	38.7%	10.5%

Note: Adapted from data obtained from the Statistical Institute of Belize (SIB).

The share of female "*heads of households*[6]" within the employed labour force, increased to 23.1% from 15.5% in 1993 (see Figure 6). The increase may be indicative of a shift away from patriarchal social norms, allowing females to not only partake in the labour force, but to also influence household budgetary decisions. This holds true for households where females may be the sole breadwinners.

---

[4] Refers to wife or husband whether married or in a common-law relationship.
[5] Son or daughter of the head whether biological, step or adopted/foster child.
[6] Refers to individual with primary authority and responsibility for household affairs and may or may not be the main economic support for the household.
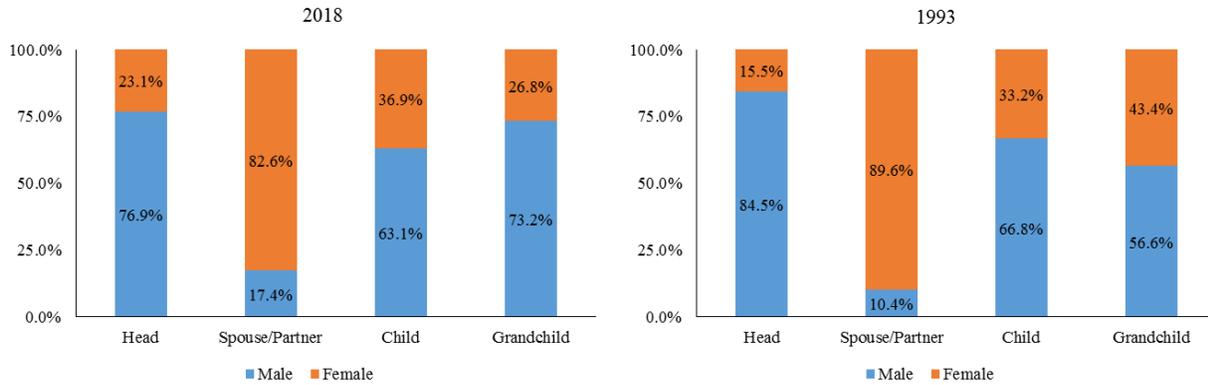
Figure 6. Composition of household by gender of employed population for the years 2018 and 1993. Adapted from data obtained from the Statistical Institute of Belize (SIB).

A closer examination of the employed female population revealed a marked decrease in the share of "*youth*" participants within the time period, from 30.1% to 18.5% (see Table 5). When compared to that of males, the trend reflects a similar downward pattern, albeit steeper than the male counterpart. The trend indicates a move towards non-participation by "*youths*" in order to potentially attend school. The likely outcome of which, would be entering the labour force as a "*prime working-age*" individual, following attainment of a higher level of education. Supporting this statement was data from Figure 3 indicating that females held the majority share in both secondary and tertiary levels of education.

Table 5

Comparison of Employed Female Population by Age Category.

	Youth	Prime Working-Age	Past Prime Working-Age
1993	30.1%	61.9%	8.0%
2018	18.5%	73.4%	8.2%

Note: Adapted from data obtained from the Statistical Institute of Belize (SIB).

3.0 Literature Review

Shifting gender compositions in labour markets have recently began to gather the attention of researchers, prompting studies focused on labour force participation for both males

and females and the underlying determinants of participation. However, as mentioned in

Bellony, Hoyos, & Ñopo (2010) few studies have focused on labour market issues in the

Caribbean. There has been even less studies conducted specifically on Belize's labour market

issues. This section will review the literature pertaining to labour force participation for the two

most studied genders and provide analysis on determinants investigated throughout the available

literature.

3.1 Literature on Female Participation

The choice of whether or not to participate in the labour force is based on determinants

influenced by a combination of social norms, broad macroeconomic influences, and potential

economic opportunities available. For females, history has always made a case for the intentional

restriction from participating in the labour force. In fact, social norms dictating females' roles

within a household were present in most of the older literature examined.

Becker (1981) suggested that women held a comparative advantage in domestic

household production while men did so in labour market activity. In most societies, women

tended to the domestic needs of a household in the form of unpaid care work, while males

provided the primary income within a household through participating in the labour market as

the head of the household (Pampel & Tanaka, 1986). This was heightened during the transition

from homebased production activities to labour intensive agricultural industrialisation, which

further affected female participation rates. The transition helped to marginalise women's

bargaining power within a household, and helped to boost the male position in the household

(Clark, Ramsbey, & Adler, 1991).

As of late however, an increase in females taking on roles as the head of household has

been noted in the literature examined. As an economy transitions from labour intensive,

agricultural-based economic activity to a skill-based, service-driven economy, male participation in the labour force has been noted to deteriorate. In this case, women participate in labour force activities in order to supplement the loss of income (Safa, 2008). This is not dissimilar to situations in nations where households are exposed to economic shocks, forcing women to partake in labour force activities as a means of generating a secondary source of income (Chen, et al., 2005). In all cases, the bargaining power of females within their respective household improved. In some, the social constructs shifted, leading to female-headed households based on economic bargaining power. This brought on a new dimension to household expenditure patterns. According to Morrison et al. (2007), as women gained access to household budgetary decisions, improved investment in healthcare and education for children were noted.

The role education plays in a woman's decision to participate in the labour force cannot be understated. In Fatima & Sultana (2009), results of a panel data regression analysis recommended higher educational attainment by females in order to take advantage of increased opportunities for work. Supporting this was a recent study conducted in Cameroon, which highlighted education as a main determinant of female participation rates (Che & Sundjo, 2018). Oftentimes however, due to underdeveloped labour markets, graduates often are unable to secure employment, especially in rural areas. Such was the case in Che & Sundjo (2018). Along these lines was a study from Roopnarine & Ramrattan (2011) based in Trinidad and Tobago, which found that even though education was defined as a main determinant of participation, women with tertiary level education participated at a lower rate in the labour market. One possible explanation for this phenomenon is the inability of the labour market to create employment opportunities to keep up with the added influx of qualified individuals, effectively causing a lag when analysing employment rates and educational attainment (Tindigarukayo, 1996).

As important as it has been made out to be, education alone may not guarantee increases in labour force participation if the expected rate of return from higher levels of education does not match current labour market returns (Brooks, 1991). Within the Caribbean, in Bellony, Hoyos, & Ñopo (2010), it was noted that female educational achievement surpassed that of males, especially so in Barbados. However, despite educational superiority, females were unable to attain a significant level of socio-economic advantage (Tindigarukayo, 1996). Males earned 25% and 12% more than females in Barbados and Jamaica, respectively, supporting the existence of gender earnings gaps (Bellony, Hoyos, & Ñopo, 2010). Interestingly enough, this is shown to exist mostly in traditionally male oriented occupations with low yielding income, as higher income, high skill occupations have a narrower gap in earnings. Though existing across all sectors, these high skill occupations are often concentrated in the services sector.

In examined Caribbean nations, the development of the services sector contributed to enhanced opportunities for female employment (Bellony, Hoyos, & Ñopo, 2010). Tourism services, as noted by Coppin (1995), favoured female participants in the labour force based on the nature of the hospitality industries present. In Belize, qualified women took advantage of opening positions within the tourism and call centre sectors in order to build work ethic and skills necessary in the shifting labour market (Lindauer, 2014).

When analysing literature pertaining to urban/rural settings, most studies noted that participation in rural areas were lower for both males and females than in urban areas. However, Contreras, De Mello, & Puentes (2011) noted that participation rates were especially lower for females in rural areas than that of males. This reflected the composition of labour markets, which focused predominantly on mechanised and labour-intensive agricultural production. The environment created served to exclude female participation based on physical and social

limitations pertaining to cultural norms (Çağatay & Özler, 1995). With regard to the latter,

McClaurin (1996) specifically made mention of the intricate social norms present in ethnic

groups occupying rural Belize, which formed a patriarchal society restricting female

participation.

Furthermore, the body of literature examined provided evidence to support the hypothesis

on participants' age affecting labour force participation rates. It was found that "*prime working-*

age" women were more likely to participate than "*youth*", and "*past prime working-age*" women

(Roopnarine & Ramrattan, 2011). Similarly, "*prime working-age*" males were found to

participate at higher rates than those of "*youth*", and "*past prime working-age*" males, and

females (Contreras, De Mello, & Puentes, 2011). In examining data within the previous section,

similar findings were drawn.

3.2 Literature on Male Participation

As alluded to in the previous section, the existing patriarchal construct found in many

Latin American and Caribbean societies has been found to support male dominance within

labour market activities (Clark, Ramsbey, & Adler, 1991). Thus, declining participation rates

noted worldwide have resulted in various investigations into the subject, which have all drawn a

wide range of conclusions, pointing towards varying determinants. Some researchers focused on

the sensitivity of the participation rate to lack of access to schooling and training, particularly for

rural participants and ethnic minorities. Most agree however, that the learning curve associated

with the transition from labour-intensive employment to that of services disenfranchised male

participants, at the same time, changing social norms have caused shifts in males' roles in both

society and households (Leigh, 1974), (Cullison, 1979), and (Brooks, 1991).

Similar to the case of females, children present within the household had an impact on male participation rates. The effect contrasted that of females, as the presence of children provided strong incentives for most males to participate in the labour force (Contreras, De Mello, & Puentes, 2011). This was noted as being influenced by the added pressure to provide for children, and a potentially inactive partner, who may be financially dependent on the male.

Unfortunately, the social norm present in most societies of the male sole breadwinner places unnecessary pressure on males to perform well in the labour market despite obvious vulnerabilities. Specifically in developing nations where the transition from labour intensive, agricultural-based economic activity to a skill-based services driven economy. The transition caused the disenfranchisement of males from partaking in the labour force as the structure of the labour force changed. In Cullison (1979), the discouraged worker effect is defined as a state in which an individual has given up participation in labour market activities due to widening durations of unemployment and rising unemployment rates. Indeed, it can be assumed that as an economy transitions, individuals with specific skillsets would be discouraged from participating in the labour market as unemployment for these occupations would rise. Often times, due to the learning curve associated with the transition, males have been unable to find economically viable employment. This has led males to pursue alternative options to maximising income.

Non-labour income sources, which take the form of government welfare programs, subsidies, disability benefits, and financial support from family members, were found to negatively influence labour force participation rates (Dotsey, 2018). In Mexico, Aguila (2014) found that in the lower income populace, benefits offered by the national social security, outweighed returns of low skilled labour activities provided by "*prime working-age*" male individuals. Support for the negative relationship shared between non-labour income sources and

male participation rates were established in the literature reviewed (Parsons, 1980), (Brooks, 1991).

Another, more unorthodox source of non-labour income, is that sourced from criminal activity. In one of the few studies conducted in Belize, Gayle et al. (2010) examined the impact of crime and a wide range of social issues on male social participation, which included labour force activity. According to Gayle et al. (2010), the criminal elements in Belize were found to generate income from extortion, courier activities, robbery, smuggling, and security operations. These activities were found to serve as a form of informal welfare for those associated with the criminal factions, providing income for unemployed and uneducated "*youth*" males.

Ethnicity was found to play a role in male labour force participation, particularly so in geographic locations with relatively large economic inequalities. This subject has been the focus of research for some time, as Leigh (1974) demonstrated in low-income urban areas in the United States that changes in unemployment conditions have a more profound effect on non-white males. Gitter (1982) contributed with empirical findings from cross-sectional regression analysis that pointed towards a significant negative correlation between non-white males and labour force participation. Parsons (1980) went further and suggested that increased welfare benefits without a corresponding increase in wages resulted in higher levels of non-participation among non-white males. All studies found higher rates of discouragement and non-participation by non-white males.

Interestingly, arguments have been made supporting the theory that feminisation of the labour force has directly impacted male labour force participation rates. Morrissey (1998) stated that climbing female labour force participation rates, brought on by economic structural adjustments, reduced male job prospects. The reduction resulted from a higher labour market

demand for female labour force participants, specifically trained to partake in hospitality and trade occupations, effectively replacing males in the labour force; though not directly (Coppin, 1995). Furthermore, findings in Bellony, Hoyos, & Ñopo (2010) indicated that female labour market participants operating in households without any other wage earners were shown to be far more competitive within the workplace. The heightened competitive approach was found to positively correlate with high wages and controversially, non-participation for males in the labour force. On the one hand, the findings suggest that sole female earners are able to support male non-participants, particularly "*youth*" males in the household. However, on the other hand this can be dismissed, as the strength of social norms mandating that males participate in the labour force cannot be overlooked (Clark, et al, 1991).

3.3 Empirical Review

In analysing empirical sources, it was noted that few focused on the combined examination of both male and female determinants for labour force participation. The five studies illustrated in Table 6 provide cross-sectional insight into models utilised, major goals/findings, and potential shortcomings. Of these, only Contreras, Demello, & Puentes (2011) correlate to the study at hand, estimating potential determinants for both males and females and measuring changes in the labour supply between the time periods of 1990 – 2003. The subsequent studies were representative of the body of literature examined, with an abundance of studies conducted on female labour force participation. On the other hand, studies focusing on male participation and the combined male and female participation were scarce.

Table 6

Overview of Empirical Literature by Author.

Author	Contreras, De Mello, & Puentes	Fadayomi & Oluranti	Faridi & Chaudhry	Che & Sundjo	Roopnarine & Ramrattan
Year of Study	2011	2014	2009	2018	2011
Paper Title	The determinants of labour force participation and employment in Chile.	Determinants of labour force participation in Nigeria	An Analysis of the determinants of male labour force participation and employment status in Pakistan	Determinants of female labour force participation in Cameroon.	Female labour force participation: the case of Trinidad and Tobago
Technique Utilised	Probit Model; Decomposition Analysis	Logistic Regression Model	Logistic Regression Model / Multinomial Logistic Regression Model	Logistic Regression Model	Probit Model
Data Source	National Household Survey	National Labour Market Survey	Field Surveys	Demographic and Health Survey	Household Budget Survey 2008/2009
Dependent Variable(s)	Prime Age Females & Youths 1990, 1996, 2003 Prime Age Males & Youths 1990, 1996, 2003	Total Labour Force Participation	Male Labour Force Participation	Female Labour Force Participation	Female Labour Force Participation
Findings/ Weaknesses	• Study argues that educational attainment is critical to participation • Decomposition analysis reveals that structural changes in economy drive changes in participation for prime-aged individuals • Study focuses on household variables and neglects variables relating to individuals	• Study confirms the role of household structure on labour force participation • Characteristics influencing participation were similar for both genders with few differences, mostly based on financial responsibilities • Study fails to provide marginal analysis for coefficient results from logistic regression model	• Study analyses factors of male participation rates into differing employment states • Differing employment states resulted in different reactions from explanatory variables	• Study found positive correlation between participation and education • Higher levels of education lessened opportunities for work due to weak labour market • Study fails to provide marginal analysis of coefficient results from logistic regression model	• The study found positive correlation between participation and education, age, status as head of household and a 'single' marital status. • Women with tertiary level education had a lower likelihood of participating • Policy prescriptions were not provided, as the paper sought only to report on results without proper synthesis

The composition of the models being utilised for the various studies were of explanatory

variables chosen for economic reasons supported by statistical significance within the models

utilised. These variables sought to capture a snapshot of the socioeconomic conditions present in

the average household within a given study. Table 7 provides a clear representation of various

explanatory variables utilised for this type of study sourced from various survey datasets.

Table 7

Explanatory Variables by Author.

Contreras, De Mello, & Puentes (2011)	Fadayomi & Oluranti (2014)	Faridi & Chaudhry (2009)	Che & Sundjo (2018)	Roopnarine & Ramrattan (2011)
Level of Education	*Level of Education*	*Level of Education*	*Level of Education*	*Level of Education*
-	Education (Year)	-	Education (Categorical)	-
8 to 11 Years	Primary Education	8 Years	Primary Education	Primary Education
12 Years	Secondary Education	10 Years	Secondary Education	Secondary Education
12+ Years	Tertiary Education	12 Years	University Education	Tertiary Education
-	No Education	14 Years	-	-
-	-	16 Years	-	-
-	-	Education Level (Parents, Spouse)	-	-
Household Characteristics	*Household Characteristics*	*Household Characteristics*	*Household Characteristics*	*Household Characteristics*
Status as Head of Household	Status as Head of Household	-	-	Status as Head of household
Number of Elderly in HouseHold	Household Size (1-3, 4-6, 7+)	Household Size	Number of Females Present in Household	-
Presence of Children (3-5, 6-10, 11-17 Years old)	-	Number of Dependents	Presence of Children under 5	Presence of Children
Location (Rural)	Region (Urban, South Nigeria)	Region (Urban)	-	Location (Urban)
Household Per Capita Non-Labour Income	-	-	-	Income Source (Non-Labour Income)
-	-	Spouse Participation in Labour Force	Spouse Participation in Labour Force	-
-	-	-	Births in Past Year	-
Personal Characteristics	*Personal Characteristics*	*Personal Characteristics*	*Personal Characteristics*	*Personal Characteristics*
-	Marital Status (Never Married, Married, Divorced)	Marital Status	Marital Status	Marital Status (single)
-	-	-	Religion (Muslim)	Religion (R. Catholic, Hindu)
-	-	-	Ethnicity (Pygmy)	Ethnicity (African, East Indian)
-	-	-	-	Health (Chronic illness)
Age (Age Squared)	Age (Actual)	Age Groupings (5 Categories)	-	Age Groupings (8 categories)
-	Age (Age Squared)	-	-	-
-	Age (Age Groupings)	-	-	-
-	Gender (Male)	-	-	-
-	-	Presence of Assets	-	-

Of the studies analysed, a clear inclination towards binary logistic regression models over probit models was noted due to the dichotomous nature of the dependent variable. Furthermore, both techniques tend to yield similar results. The logistic regression and probit model analyses conducted in the examined papers all yielded results that aligned with a priori expectations. Minor differences in the roles of select explanatory variables were reflective of each country's unique labour market structure and the diverging roles socioeconomic and household factors played in determining participation rates.

Furthermore, decomposition analysis and marginal analysis clarified the impacts of key determinants on labour force participation rates. Contreras, De Mello, & Puentes (2011) utilised decomposition analysis in order to determine the change between the three time periods. The results showed that the changing economic structure was the main determinant of rising participation (Contreras, De Mello, & Puentes, 2011). Within studies on female labour force participation, the marginal effects of the logit and probit model results were calculated to show the magnitude of impact that the determinants had on labour force participation. With varying results trending within the same directions, the studies provide clear evidence supporting prior assumptions, despite minute deviations attributable to case specific variables.

4.0 Methodology

This paper aims to investigate the principal attributes of working age individuals participating in the labour force across two time periods. Consequently, a binary logistic regression model was chosen as it is best suited for this paper, being able to determine relationships between predictors and a predicted variable where the dependent variable is binary. The output arising from this model is known as an odds ratio, which interprets the strength of association of two events if the odds ratio is above or below a value of one. This output will be

used in determining the characteristics of an individual participating in the labour force. The

following section provides insight into the nature of the data chosen, along with descriptive

statistics, assumptions for the binary logistic regression model, relevant goodness of fit tests, and

model fitting information.

4.1 Data

The study utilised labour force survey microdata from two time periods collected by the

SIB. In order to compare determinants between two specific points in time, datasets from the

2013 April labour force survey and the 2018 April labour force survey were selected. The two

datasets were chosen specifically due to data limitations, as complete sample datasets are

unavailable for time periods predating 2013. The surveys were conducted by the SIB nationwide

and sampled a total of 2,500 households in 2013, and 2,266 households in 2018, yielding

responses from 9,309, and 8,309 individuals, respectively. A subsample was then constructed, in

order to remove all persons not within the working age population (anyone below 14 years of

age). The working age population subsample was then segregated into both male and female

categories for further analysis (see Table A.1). The similarity in size of the working age

population subsample relative to the total working age population was seen as a positive

component when analysing the results of the study, lending credence to the findings being

representative of the actual working age population.

4.2 Binary Regression Model

This paper sought to investigate the main determinants of working age individuals

participating in the labour force across 2013 and 2018. In order to analyse the data the

coefficients of selected parameters were estimated using binary logistic regression models. The

dependent variable is dichotomous, with individuals participating in the labour force assigned a

value of 1, while individuals who do not, were assigned a value of 0. These procedures were

carried out utilising the statistical program; Statistical Package for Social Sciences (SPSS).

The model assumes the logistic distribution function through the following transformation;

$$P_1 = \frac{1}{1+e^{-(\beta_o+\beta_1 x_1+\cdots\beta_n x_n)}} \tag{1}$$

$$P_1 = \frac{1}{1+e^{-z_i}} = \frac{e^z}{1+e^z} \tag{2}$$

$$\text{Where } Z_i = \beta_0 + \beta_1 x_1 + \cdots \beta_n x_n \tag{3}$$

Where P_1 represents the probability of an individual participating in the labour force, e

represents the exponential value, both β_x and x_n represent the coefficients of the parameters.

Equation (1) illustrates the cumulative probability density function, which is nonlinear, as z_i lies

between $-\infty$ and $+\infty$ while P_1 lies between 1 and 0.

Derived from equation (1), the logistic distribution function (equation (2)), simply

represents the probability of participating in the labour force. In order to illustrate the probability

of not participating in the labour force, the following is written;

$$1 - P_1 = \frac{1}{1+e^{z_i}} \tag{4}$$

Therefore, likelihood of participation in the labour force is illustrated as;

$$\frac{P_1}{1-P_1} = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{z_i} \tag{5}$$

$$\text{Where } Z_i = \beta_0 + \beta_1 x_1 + \cdots \beta_n x_n \tag{6}$$

In equation (5), the odds ratio is denoted by $\frac{P_1}{1-P_1}$, which is the ratio of the probability of

an individual participating in the labour force. This ratio will be used to interpret the strength of

association of between the dependent and explanatory variable if the odds ratio is above or below

a value of one.

These procedures were conducted for all four binary logistic regression models, resulting in a comparative look at the relationships between male and female labour force participation across two time periods. These were carried out within the results section in the following manner:

- o Comparisons between "male 2013 results" and "female 2013 results".

- o Comparisons between "male 2018 results" and "female 2018 results".

- o Comparisons between "male 2013 results" and "male 2018 results".

- o Comparisons between "female 2013 results" and "female 2018 results".

Male probabilities of participating in the labour force were compared to both female probabilities of the same time period and that of males from the other representative time period. The analysis of female probabilities of labour force participation was conducted in a similar fashion.

4.3 Variables

The dependent variables chosen for this study were the labour force participation rate for both males and females at 2013 and 2018. The variables were assigned the value of 1 if the individual participates in the labour force, while persons who do not, were assigned a value of 0. The chosen method was deemed suitable due to the dichotomous nature of the dependent variables. Seven explanatory variables were chosen with the preceding empirical review establishing motives for the selection of the variables within the logistic regression model. These were chosen in order to provide a glimpse into the socioeconomic conditions an individual may be subject to within the current study. Summary list of the explanatory variables and a brief description are provided in Table A.2.

Of the seven explanatory variables, **relation to head**, **age category**, and **education level** are categorical variables, which take on a fixed number of possible values assigned to a unit of observation. Two infrequently used explanatory variables were chosen from the subsample dataset provided by the SIB due to their perceived relevance to participation in the Belizean labour market. **Ethnicity** was chosen specifically due to the diverse multicultural makeup of the population of Belize. With regards to geographical area, Belize has a relatively small territorial area. Nevertheless, geographic regions are highly specialised in various forms of economic output specific to the regions, each with a specific demand from the labour market. Thus, these assumptions validated the inclusion of the variable, **region** in the model.

4.4 Descriptive Statistics

In Table A.3, the summarised descriptive statistics by year and gender are reported, outlining the mean and standard deviation of each explanatory variable chosen to describe the dependent variable. The mean statistic illustrates the share of a variable with respect to other similar variables while the standard deviation illustrates the spread from the mean. Both male and female subsamples are inclusive only of the working age population (individuals above the age of 14), and comprise of 5,912 and 5,766 individuals for both 2013 and 2018, respectively.

In the reported descriptive statistics, in 2013, 53.4% of males identified themselves as the **head of the household**, with 43.7% identifying as a child within the household. These statistics shifted marginally in 2018, with the average amount of males identifying as a child within the household falling slightly to 42.3%. For females, 22.5% in 2018 identified themselves as the **head of the household**, up from 2013's 16.3%. Interestingly, the number of females identifying themselves as spouses fell marginally, while those of males increased, hinting at a shift in social constructs dictating the roles of individuals in the household.

In regards to **age**, there were reductions in the number of male and female youth in 2018 from 2013, leading to growth in the prime working-age population for both genders. Notably, the ratios of female prime working-age individuals were reported to be higher within the subsamples, indicating higher ratios of prime working-age women surveyed.

Education levels for males improved between subsamples across all levels of education. For females, the average amount of females with secondary and tertiary level education increased in 2018 compared to 2013, increasing to levels above that of males. The issue of a lack of prior job training was noted in the descriptive statistics, with 79.2% of males and 88.9% of females in 2013 not having any prior job training. In 2018, these statistics improved marginally for females and substantially for males, indicating increased availability, and capitalisation on job training activities and maturity of the labour market.

The **source of financing** explanatory variable was included to identify whether an individual was dependent on financing that is self-generated or sourced through another means. In line with a priori expectations, the descriptive statistics reported that 73.0% of females in 2013 were financed by sources other than themselves. This figure contracted to 66.1% in 2018, signalling movements towards greater autonomy. The descriptive statistics reported that between 2013 and 2018, only 29.9% and 27.1% of males, respectively, were dependent on other sources of income, supporting the assumption of their position as breadwinners within households.

The **ethnic** composition shifted marginally between the 2013 and 2018 subsamples, with Mestizos comprising more than half of the subsamples for both genders in both years. Meanwhile, the number of Creole responses increased tepidly between both time periods for both males and females. Other ethnicities made up the remainder of the subsample population, with Mayas comprising of the largest share.

In terms of **regional distribution**, the mean statistic points towards a larger share of individuals from the northern and southern region than the central region. These regions comprise of two districts each, with the northern region representing Corozal and Orange Walk districts, central region representing Cayo and Belize districts, and southern region representing Stann Creek and Toledo districts.

4.5 Spearman's Rank-Order Correlation Test

In order to investigate the intensity of association between the explanatory and dependent variables, the Spearman's rank-order correlation test was chosen. Alternatively, the Pearson's correlation test was an option, however, given the ordinal nature of the explanatory variables, Spearman's rank-order correlation test was chosen as it caters to such datasets more precisely (SPSS, 2015). The results are outlined in Table A.4 with the outcomes revealing that three of the eight variables report inconsistencies in correlation results across both years and genders under review.

For males, **regional characteristics** showed non-significant association with male labour force participation for both 2013 and 2018. For females, the pattern was only noted for 2018, as the association between **regional characteristics** and female labour force participation in 2013 recorded weak negative correlation. These results signify the weakness in association between participation rates and the explanatory variable, potentially due to the lack of influence a person's regional location plays in explaining their labour force participation.

The second explanatory variable reporting inconsistencies was **ethnicity**, as the strength of association was weak for males in 2013 and non-significant in 2018. A mirrored pattern was noted for females, with weak association noted in 2018 and non-significant association recorded

in 2013. This provides a basis for the assumption that ethnicity may not play as significant a role in participation rates in Belize as had been initially suspected.

Lastly, the **educational attainment** explanatory variable recorded weak positive association with male labour force participation in 2013, which deteriorated to weak positive non-significant correlation in 2018. This result came as a surprise, given the strong association between education and labour force participation outlined in the literature reviewed. However, this suggests that the labour market caters to a high level of unskilled labour force participants, providing evidence for the assumption that educational attainment for males holds little significance for labour force participation in 2018. This stands in direct contrast to the strong positive correlation between female participation and education.

Overall, the remaining explanatory variables reported significant correlation with the dependent variable across both years for both male and female. Despite the results reported from regional, educational, and ethnic explanatory variables, all three were included in the logistic regression model. The justification for this was twofold, as some sub-variables were found to contribute to the model's explanation of the dependent variable. Also, the inclusion highlighted the change in significance of explanatory variables across both years, supporting the assumption of changing determinants of labour force participation across both years.

4.6 Model summary, Classification table, and Hosmer-Lemeshow tests

To ensure the reliability of the binary logistic regression analysis, the model summary and the Hosmer-Lemeshow (HL) test for the goodness-of-fit were analysed. Given that the model utilises a binary dependent variable, a pseudo R squared was generated by SPSS in a model summary table (Table A.5). From the results generated, the pseudo R squared utilised was the Nagelkerke R squared which ranges between zero and one, and is derived from the Cox-Snell

R Squared, which has an ambiguous upper bound range that may lie below one (Allison, 2013). As illustrated in Table A.5, all models fell within the acceptable bounds of zero to one, above 0.05. On their own, these results are suggestive of a good fit given their range since there are no models being compared.

The Hosmer-Lemeshow (HL) test is used to test for the goodness-of-fit for a given model[7]. The HL test measures the difference in the observed probabilities against expected probabilities for each grouping of similar cases within the observations (SPSS, 2015). The p-value is indicative of a poor fit if it is below 0.05. As illustrated in Table A.6, for the four models tested, all except for the model '*Female 2018*' indicated adequate goodness-of-fit of the model to the data. Despite the lack of goodness-of-fit, the model was included in the regression analysis to provide a means of comparison for 2013. The justification for this stated course of action was that the non-significance of variables did not rule out importance to explaining the overall model.

Lastly, the classification table utilises the observed and predicted data in order to provide a percentage rate of whether the model correctly predicts outcome categories[8]. The results determined that the models predicted the responses of non-participation and participation at a high percentage of accuracy (Table A.7). Interestingly, the models predicted overall non-participation responses in females at a more accurate rate than that of males, while the responses for males demonstrated overall higher accuracy for participation responses.

---

[7] Limitations of the HL test have been noted in the literature examined with the primary complaints rooted in issues of overfitting not being accounted for, low explanation power, and large movements in p-values influenced by small changes in independent variables (Bartley, 2014), (Hosmer, Lemeshow, & Sturdivant, 2003).

[8] An individual's decision to participate or not participate in the labour force.

5.0 Presentation of Empirical Findings and Discussions

5.1 Empirical Results of Logistic Regression Models by Year and Gender

The summarised results from the binary logistic regression analyses for both 2013 and 2018 are

reported in Table 8.

Table 8

Summarised Logistic Regression Estimates by Year and Gender.

	2013				2018			
	Male		Female		Male		Female	
	Co-Efficient	Odds Ratio	Co-Efficient	Odds Ratio	Co-Efficient	Odds Ratio	Co-Efficient	Odds Ratio
Relationship to Head								
Head of Household	1.336	3.805	0.827	2.286	0.846	2.330	0.303	1.354
Spouse	0.785	2.192	0.598	1.819	0.914	2.495	0.346	1.413
Child	0.281	1.324	0.637	1.891	0.073	1.075	0.303	1.354
Other Member[R]	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Age Category								
14 – 24	1.992	7.329	1.437	4.209	1.769	5.865	0.905	2.473
25 – 34	3.520	33.769	1.936	6.931	3.394	29.773	1.801	6.057
34 – 44	3.013	20.357	2.013	7.487	3.666	39.098	1.638	5.144
45 – 54	2.542	12.708	1.351	3.860	2.283	9.805	1.852	6.374
55+[R]	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Education Level								
Primary Level	-0.119	0.887	0.194	1.214	-0.524	0.592	-0.081	0.922
Secondary Level	-0.177	0.838	0.909	2.482	-0.343	0.709	0.267	1.306
Tertiary Level	-0.403	0.668	0.895	2.446	-1.133	0.322	0.454	1.574
Other Education	1.625	5.078	-0.602	0.548	-0.099	0.906	-0.303	0.739
No Education[R]	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Ethnicity								
Creole	-0.213	0.808	-0.151	0.860	-0.302	0.740	0.273	1.314
Mestizo	0.236	1.266	-0.125	0.883	-0.016	0.984	0.405	1.499
Maya	0.731	2.078	-0.730	0.482	0.583	1.792	0.323	1.381
Other Ethnicity[R]	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Region								
Northern	0.120	1.127	0.105	1.110	0.181	1.198	-0.278	0.758
Central	-0.177	0.838	0.230	1.259	-0.154	0.857	-0.066	0.936
Southern[R]	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Other								
Prior Training	-0.449	0.638	-0.555	0.574	-0.837	0.433	-0.712	0.491
Source of Financing	-3.193	0.041	-3.062	0.047	-2.900	0.055	-2.731	0.065
Constant	4.335	76.292	3.978	53.837	5.183	178.194	4.129	62.13

Note: R = Reference categories.

The summarised results contain the log odds coefficients for both males and females by year, and the odds ratio. The log odds coefficient determined the direction of the association; whether the explanatory variable positively or negatively affected the dependent variable. Meanwhile, the odds ratio was used to interpret the strength of association between the dependent and independent variables if the odds ratio was above or below a value of one.

From the results it was noted that heads of households were more likely to be employed in 2013, which shifted in 2018 to include spouses. Furthermore, prime-aged individuals were most likely to participate in the labour force across both sexes and time periods analysed when compared to "*past prime working-age*" individuals. Notably, "*youths*" became less likely to participate in the labour force in 2018. With regards to education, males with other forms of education and no education were far more likely to participate in the labour force in 2013 and 2018, respectively. For females, individuals with secondary and tertiary level education were most likely to participate in the labour force.

Across both time periods, individuals with no prior work training were far less likely to participate in the labour force than those with experience. Furthermore, individuals with a source of income other than themselves were universally unlikely to participate in the labour force. Results for ethnicity for males identified Mayan men as most likely to participate in the labour force across both time periods, followed closely by Mestizo men. For females, higher participation for Creole and Mestizo women in 2013 gave way to a more balanced likelihood of participation in 2018 with Mestizo women still most likely to participate. For regional determinants, males from the Northern region were more likely to participate in the labour force than any other region across both years while females from the central region were more likely to participate in 2013, which shifted to the southern region women in 2018.

5.2 Discussion

In analysing the results, key points were extracted for discussion. The first, was that a noted shift in strength of determinants on labour force participation signalled changing social and cultural norms by way of increased female participation rates and decreased youth rates. Second, diversity in the labour market was limited, particularly so for males. Third, educational attainment for women led to higher likelihoods of participation, and lastly, evidence was uncovered in support of linkages between regional variables and labour force participation.

Long held social and cultural norms dictating the role of males and females within the household and labour force found supporting evidence when analysing the results. Likewise, evidence in support of changing norms were noted when analysing variations between time periods. The general assumption of males as contributors to a household's financial wellbeing held weight when noting that across both years tested, there was a higher likelihood of male *'youth'* participation than that of female *'youth'*. This could only be succinctly ascribed to social pressures placed on males to contribute to household wellbeing.

While social norms for males were shown to remain arguably unchanged, those for females were observed to have shifted. Movement towards greater labour force participation by females were noted for 2018 when compared to 2013, as female spouses were most likely to be participating in the labour force when compared to all other members of the household. This finding does not imply that female heads of households are participating less, rather, that female spouses are participating in greater proportions and attempting to contribute positively to the wellbeing of the household. Interestingly, despite the fact that men participate in the labour force at a higher rate than women, it was noted that likelihood of participation dropped sharply as

males entered '*past prime working-age*'. Females however, demonstrated higher durability in the labour market with slower drop offs in the likelihood of participation at older ages.

This shift in social and cultural norms is most notable for women in rural areas, where ethnic backgrounds usually correlate with the influence of social and cultural norms in relation to labour force participation (Che & Sundjo, 2018) . This was invariably noted in 2013, as "*Mayan"* females were found to be the least likely to participate in the labour force when compared to other ethnicities. Social conditions present within rural '*Mayan'* communities restrict female independence and their ability to work, associate, and even form social relationships outside their immediate familial group (McClaurin, 1996). However, this has been shifting for a generation now, and was substantial in 2018 as the likelihood of '*Mayan*' women participating in the labour force stood higher than that of '*other ethnicities*', signalling greater independence and opportunities available.

A trend was noted for females in rural regions that extended beyond the easily identified ethnicity. For females in the traditionally rural "*southern region*", it was noted that women from this region were far less likely to participate in labour force activities, the same held true for females in the "*northern region*" in 2018. Notably, both regions are home to the nation's main agricultural industries, which are labour-intensive. Both of these scenarios can be attributed to limited opportunities for women seeking employment in areas not directly related to agricultural activity.

Indeed, these trends were evident across regions and ethnicity for both sexes and time periods analysed, lending credence to widely-held but un-verified assumptions between these determinants and labour force participation. For men, regional influences played a key role in participation, as males from the '*northern region*' and '*southern region'* were most likely to

participate in the labour force. As alluded to earlier, these regions are home to the nation's main

agricultural industries, where unskilled, manual labour is required. Across both time periods,

men from the urbanised '*central region*'[9] were least likely to participate in labour force

activities, indicating a multitude of dynamics which may be at play. There may be more

opportunities available in the '*southern region*' and *'northern region'*, albeit low skilled labour

activities, or possibly, males from the '*central region*' may not be partaking in the labour force

due to socioeconomic factors beyond the scope of this study. Both are likely, and could be a

result of changing social norms on the pressures of '*youth*' participation in the labour force, or

lack of opportunities/competition for highly skilled labourers.

The inverse was noted for females, as the likelihood of participation was highest in the

'*central region*,' where services and clerical occupations are concentrated. As touched upon

earlier, the *'southern region'* and '*northern region*' may provide limited job opportunities for

women outside of agricultural activity in 2013. This shifted in 2018, with women from the

'southern region' having a higher likelihood in participation, indicating greater opportunities

available within this region, particularly for services activities. Nevertheless, the central theme of

women from the '*central region*' participating at a higher rate remains unaffected as they were

still more likely to participate in the labour force than women from the '*northern region*'. The

urbanised '*central region*' holds the highest concentration of services and clerical-based

occupations, with a strong presence of call centres being present[10] (Sam, 2018). Similar to

---

[9] The 'c*entral region*' holds the majority of the urbanised population by way of two cities including the capital, and three municipalities.

[10] According to Sam (2018), 14 of the 16 BPO's in operation currently operate within the '*central region*'.

findings by Lindauer (2014) and Coppin (1995), it is noted that females take greater advantage of job offerings within these fields due to their qualifications, gender[11], and education levels.

When analysing ethnicity, two critical observations stood out. The first was the higher likelihood of participation of '*Mayan*' men compared to all other ethnicities across both time periods. The second was that '*Creole*' men and women were among the least likely to participate in labour force activities across both time periods. Both these results reflect social and cultural constructs that individuals may be subject to. Despite being often classified as among the poorest populations in the nation, '*Mayan'* men were found to have participated at a higher rate than all other ethnicities. However, they are often limited to unskilled labour market activities, particularly agricultural opportunities present within their immediate area[12]. Furthermore, higher rates of participation could be attributed to the necessity for providing for the entire family as the sole bread-winner, similar to findings by Contreras, De Mello, & Puentes (2011).

Meanwhile, socioeconomic factors may be at play for '*Creole'* individuals, especially in urban settings as detailed by Gayle et al. (2010). These assumptions are of course, purely speculative, as the results require further investigation, as the explanatory variable *'Ethnicity',* was non-significant in the Spearman's rank-order correlation test. Nevertheless, the declining nature of relationship between ethnicity and labour force participation that led to non-significance may reflect the sociocultural and socioeconomic constructs at play, which may be reducing the explanatory power of the variable within the model.

Across all literature examined, education played a key role in ensuring individuals are best equipped to meet the needs of the labour market and participate in labour force activities.

---

[11] As mentioned in Coppin (1995), the services sector favours female participants based on the demands of the hospitality industries.
[12] These may range from subsistence farming to southern agricultural industries such as banana, citrus, grains, and cacao production.

However, according to the Spearman's rank-order correlation test, the explanatory variable for males recorded weak positive association in 2013, which deteriorated to weak positive non-significant correlation in 2018. A surprising result, given the strong positive association between education and labour for women. These results provides a basis for the assumption that educational attainment holds little significance for male participation. In analysing the results, it is clear that the structure of the labour market does not cater to the overall needs of the working age population based on their qualifications and gender.

Males with no education or vocational education were more likely to participate in the labour force than men with high levels of education (secondary and tertiary). In fact, for 2018, the higher the level of education, the less likely the chances of participation. This can be attributed to a higher demand for low skilled manual labourers, where vocational training and prior job experience are preferred and formal education may be irrelevant. This is a worrying scenario, as it implies that there may not be enough opportunities for males with higher levels of education, leading to non-participation and to a greater extent – migration, crime, and other socioeconomic inspired ills (Gayle, et al., 2010). However, it could also be explained by an increase in construction activities by both the public and private sector, specifically large capital projects which have required large injections of labourers. This may paint a skewed picture of the unemployment rate and labour markets and their demands for males between these time periods, diminishing the importance of formal education in the labour force. Thus, critical research must be conducted in order to assess the labour market and the quality of employment available within the nation.

The opposite was noted for females, as higher levels of education were linked to a greater likelihood of participation. As was noted earlier by Brooks (1991) the expected rate of return of

attaining higher education must match current labour market returns. The services industry has

been critical in providing labour opportunities for qualified females, particularly the tourism

industry and the business process outsourcing (BPO) industry. The tourism industry in particular,

based on the nature of the hospitality industries, prefers women over men to partake in the

industry (Coppin, 1995). BPOs have contributed to the ongoing growth in female labour force

participation since 2015. Lindauer (2014) reported that 70% of employees from the largest

BPO's were female who exhibited more stability in maintaining their jobs relative to their male

counterparts.

Across services industries examined by Lindauer (2014), issues were noted for

individuals with no prior job training, as the business community viewed the education system in

Belize as inadequate and unable to prepare graduates with the proper skills to participate in the

labour force, resulting in higher likelihoods of non-participation. This finding corresponded with

the likelihood of participation in the labour force with no prior training diminishing for both

males and females, worsening from 2013 to 2018. This signalled a greater need for prior job

training in order to participate in the labour force, which can be viewed as problematic for new

entrants without proper workforce training coming by way of formal education.

6.0 Conclusions

In utilising binary logistic regression models, this paper offered insight into the

relationship between labour force participation and main determinants/explanatory variables for

males and females across two periods in time. Furthermore, this paper highlighted critical roles

each gender plays in Belize's labour market. Altogether, it was determined that social norms,

educational attainment, available economic opportunities, and macro-economic factors all play

varying roles in an individual's decision to partake in the labour force. The results mostly fell in

line with previous research completed on the subject matter and provided a Belizean context to various assumptions investigated.

Several key issues were brought to light after analysing the results which may be addressed in further studies. The first being a potential for studying the brain drain phenomenon. Throughout the course of this paper, it was noted that highly educated males were participating at a lower rate than individuals with lower education levels. Either these individuals are settling for employment that may be incompatible and less demanding of their skill set, or they could be migrating, furthering their education, or even dropping out of the labour force completely. All of which are compelling scenarios which may be investigated further.

In addition, assessing the quality of the labour market and its current opportunities presented may be of significant consequence given the demand for low skilled manual labourers noted for male participants and the high rates of female participation in the tourism and BPO sectors. This could be further expanded when analysing the evidence presented for regional linkages. The inverse relationship between gender and participation in the three regions could be further explored to form a basis for creating frameworks for enhancing the quality of employment within these areas.

In tangent with growing quality of employment, quality of education must be assessed, as literature suggested that the current standard may not meet the demands of the labour market. This was backed by results pointing towards reduced likelihood of participation in the labour force for individuals with no previous job training. Lastly, as feminisation of the labour force progresses, greater shifts will be noted in female participation within households, especially amongst '*youths*'. The effects of which will be more noticeable as educational and employment opportunities are made available in areas where restrictive cultural norms have played a part in

suppressing participation. It is imperative that these opportunities are introduced in order to provide dual incomes into households and aid development.

Ultimately, capacity building measures and structural enhancements to both the educational system and labour market dynamic are the endgame for policymakers in order to curb the drop off in male labour force participation and provide an environment for sustainable growth of female participation rates. Despite insignificance of a few selected variables, this paper provides a stepping stone from which further work can be produced in order to build a body of work on Belize's labour force.

7.0 References

Aguila, E. (2014). Male labour force participation and social security in Mexico. *Journal of Pension Economics and Finance, 13*(2), 145-171. doi:10.1017/s1474747213000292

Allison, P. (2013, February). *What's the Best R-Squared for Logistic Regression?* Retrieved from Statistical Horizons: https://statisticalhorizons.com/r2logistic

Bartley, A. (2014). *Evaluating goodness-of-fit for a logistic regression model using the Hosmer-Lemeshow test on samples from a large data set.* The Ohio State University.

Becker, G. S. (1981). *A treatise on the family.* Cambridge, Massachusetts: Harvard University Press.

Bellony, A., Hoyos, A., & Ñopo, H. (2010). *Gender earnings gaps in the Caribbean: evidence from Barbados and Jamaica.* (Working Paper IDB-WP-210), Inter-American Development Bank, Department of research.

Brooks, R. (1991). Male and female labour force participation in New Zealand 1965–1990: A cointegration analysis. *New Zealand Economic Papers, 25*(2), 219-251. doi:10.1080/00779959109544177

Çağatay, N., & Özler, Ş. (1995). Feminization of the labor force: The effects of long-term development and structural adjustment. *World Development, 23*(11), 1883-1894. doi:10.1016/0305-750x(95)00086-r

Cavalcanti, T. V., & Tavares, J. (2007). Women prefer larger governments: Growth, structural transformation, and government size. *Economic Inquiry, 49*(1), 155-171.

Che, G. N., & Sundjo, F. (2018). Determinants of female labour force participation in Cameroon. *International Journal of Applied Economics, Finance and Accounting, 3*(2), 88-103. doi:10.33094/8.2017.2018.32.88.103

Chen, M., Vanek, J., Lund, F., Heintz, J., Jhabvala, R., & Bonner, C. (2005). *Progress of World's Women 2005.* United Nations Development Fund for Women.

Clark, R., Ramsbey, T. W., & Adler, E. S. (1991). Culture, gender, and labour force participation: a cross-national study. *Gender and Society, 5*(1), 47-66. Retrieved from http://www.jstor.org/stable/18992

Contreras, D., De Mello, L., & Puentes, E. (2011). The determinants of labour force participation and employment in Chile. *Applied Economics, 43*(21), 2765-2776. doi:10.1080/00036840903373303

Coppin, A. (1995). Women, men and work in a Caribbean economy: Barbados. *Social and Economic Studies, 44*(2/3), 103-124. Retrieved from http://www.jstor.org/stable/27866028

Cullison, W. E. (1979). The Determinants of Labour Force Participation: An Empirical Analysis. *SSRN Electronic Journal*. doi:10.2139/ssrn.2116566

Dotsey, M. (2018). *Long term decline in prime-age male (25 - 54) labour force participation.* Philadelphia : Federal Reserve Bank of Philadelphia.

Fadayomi, T. O., & Olurinola, I. O. (2014). Determinants of Labour Force Participation in Nigeria: The Influence of Household Structure. *Journal of Economics and Development Studies, 2*(2), 169-190.

Faridi, M., Chaudhry, I., & Basit, A. (2009). An analysis of the determinants of male labour force participation and employment status in Pakistan: the case of Bahawalpur District. *Pakistan Journal of Social Sciences, 29*(2), 189-208.

Fatima, A., & Sultana, H. (2009). Tracing out the U-shape relationship between female labour force participation rate and economic development for Pakistan. *International Journal of Social Economics , 36*, 182-198. doi:10.1108/03068290910921253

Gayle, H., Mortis, N., Vasquez, J., Mossiah, R., Hewlett, M., & Amaya, A. (2010). *Male social participation and violence in urban Belize: an examination of their experience with goals, guns, gangs, gender, god and governance.*

Gitter, R. (1982). The determinants of the labour force participation rate of prime-age males: a study across communities. *The American Economist, 26*(2), 11-16. Retrieved from https://www.jstor.org/stable/25603533

Greenwood, J., Seshadri, A., & Yorukoglu, M. (2002). Engines of Liberation. *SSRN Electronic Journal*. doi:10.2139/ssrn.298479

Hosmer, D. W., Hosmer, T., Cessie, S. L., & Lemeshow, S. (1997). A comparison of goodness-of-fit tests for the logistic regression model. *Statistics in Medicine, 16*, 965-980.

Hosmer, D., Lemeshow, S., & Sturdivant, R. (2003). *Applied Logistic Regression. 3rd ed.* Hoboken, New Jersey: Wiley Publishing Company.

Kandil, M., Chen, Q., Lin, X., Lindow, G., Mansilla, M., Okwoukei, J., . . . Stavis, S. (2014). *Labour Market Issues in the Caribbean: Scope to Mobilise Employment Growth.* (Working PAper 14/115), The International Monetary Fund.

Leigh, D. E. (1974). Labor Force Participation of Male Youths Living in Low-Income Urban
        Areas. *ILR Review, 27*(2), 242-248. doi:10.1177/001979397402700206

Lindauer, D. (2014). *Labour Market Performance in Belize.* (IDB-TN-608), Inter-American
        Development Bank, Labour Markets Unit.

McClaurin, I. (1996). *Women of Belize: gender and change in Central America.* New Brunswick,
        United States of America: Rutgers University Press.

Morrison, A., Raju, D., & Sinha, N. (2007). *Gender Equality, Poverty and Economic Growth.*
        (Working Paper 4349), The World Bank, Poverty Reduction and Gender Management
        Network. doi:10.1037/e602412012-001

Morrissey, M. (1998). Explaining the Caribbean Family: Gender Ideologies and Gender
        Relations. In C. Barrow, *Caribbean Portraits: Essays on Gender Ideologies and
        Identities* (pp. 78-92). Kingston, Jamaica: Ian Randle.

Pampel, F. C., & Tanaka, K. (1986). Economic development and female labour force
        participation: a reconsideration. *Social Forces, 64*(3), 599-619. doi:10.2307/2578815

Parsons, D. O. (1980). The decline in male labour force participation. *Journal of Political
        Economy, 88*(1), 117-134. doi:10.1086/260850

Roopnarine, K. A., & Ramrattan, D. (2011). *Female labour force participation: the case of
        Trinidad and Tobago.* (Working Paper 01/2011), Central Bank of Trinidad and Tobago.

Ruhm, C. J. (1998). The economic consequences of parental leave mandates; lessons from
        Europe. *The Quarterly Journal of Economics, 113*(1), 285-317.

Safa, H. (2008). Globalisation, Inequality and the Growth of Female Headed Households in the
        Caribbean. Retrieved from
        https://www.researchgate.net/publication/266015825_Globalisation_Inequality_and_the_
        Growth_of_Female_Headed_Households_in_the_Caribbean

Sam, R. (2018). *Belize BPO Sector Reassessment and Development of Outsourcing Industry for
        Economic Development in Corozal.* Inter-American Development Bank (IDB).

Sankwa, C. (2016). *Determinants of female labour force participation in Zambia: a microdata
        analysis.* University of Zambia.

Santiago, C. (1981). Male-Female Labour Force Participation and Rapid Industrialisation.
        Journal of Economic Development, 6(2), 7-40. Retrieved from
        http://www.jed.or.kr/archives.html

Seguino, S. (2003). Why are women in the Caribbean so much more likely than men to be unemployed? *Social and Economic Studies, 52*(4), 83-120. Retrieved from http://www.jstor.org/stable/27865354

Sinha, J. N. (1965). Dynamics of female participation in economic activity in a developing economy. *World Population Conference*, *4*. Belgrade.

SPSS, I. (2015). *Tests of Model Fit*. Retrieved from IBM Knowledge Center : https://www.ibm.com/support/knowledgecenter/en/SSLVMB_23.0.0/spss/tutorials/log_lo an_fit.html

Tindigarukayo, J. K. (1996). Gender differentials in education and labour force in Jamaica. *Canadian Journal of Development Studies / Revue canadienne d'études du développement, 17*(1), 449-467. doi:10.1080/02255189.1996.9669667

Tzvetkova, S., & Ortiz-Ospina, E. (2017). Working women: What determines female labour force participation? United States of America. Retrieved February 2019, from https://ourworldindata.org/women-in-the-labor-force-determinants

8.0 Appendix

Table A.1 Subsample Description

	April 2013	April 2018
Total Dataset		
Number of Households	2,500	2,266
Number of Responses	9,309	8,309
Subsample		
Number of Responses	5,912	5,766
of Which Male	2,887	2,788
of Which Female	3,025	2,978
Sample Size Relative to WAP		
Number of Responses	2.6%	2.2%
of Which Male	2.5%	2.1%
of Which Female	2.6%	2.3%

Table A.2 Explanatory Variables

List of Variables	Description
Dependent Variable	
Labour Force Participation	1 if an individual is employed, 0 if otherwise
Explanatory Variables	
Education Level	Categorical
Primary Education	1 if an individual has between 1 and 8 years education, 0 if otherwise
Secondary Education	1 if an individual has between 9 and 12 years education, 0 if otherwise
Tertiary Education	1 if an individual has more than 12 years education, 0 if otherwise
Other	1 if an individual has obtained any other form of education, 0 if otherwise
Source of Financing	1 if an individual is self-financed, 2 if otherwise
Prior Training	1 if an individual has prior training, 2 if otherwise
Age Category	Categorical
Youth	1 if an individual is aged 14 - 24 years of age, 0 if otherwise
Prime-Aged	1 if an individual is aged 25 - 54 years of age, 0 if otherwise
Past Prime Aged	1 if an individual is aged 55+ years of age, 0 if otherwise
Relation to Head	Categorical
Head of Household	1 if an individual identifies as a head of the household, 0 if otherwise
Spouse	1 if an individual identifies as a spouse, 0 if otherwise
Other	1 if an individual identifies as other member of household, 0 if otherwise
Region	
Northern	1 if an individual resides in the region, 0 if the individual does not
Central	1 if an individual resides in the region, 0 if the individual does not
Southern	1 if an individual resides in the region, 0 if the individual does not
Ethnicity	
Creole	1 if an individual belongs to the category, 0 if the individual does not
Mestizo	1 if an individual belongs to the category, 0 if the individual does not
Mayan	1 if an individual belongs to the category, 0 if the individual does not
Other	1 if an individual belongs to the category, 0 if the individual does not

Table A.3 Descriptive Statistics By Year and Gender

	2013				2018			
	Male		Female		Male		Female	
	Mean Statistic	Std. Dev. Statistic	Mean Statistic	Std. Dev. Statistic	Mean Statistic	Std. Dev. Statistic	Mean Statistic	Std. Dev. Statistic
Labour Force Participation	0.791	0.407	0.436	0.496	0.770	0.421	0.485	0.500
Head of Household	0.534	0.499	0.163	0.370	0.535	0.499	0.225	0.417
Spouse of HH	0.029	0.168	0.436	0.496	0.042	0.201	0.401	0.490
Child of HH	0.437	0.496	0.401	0.490	0.423	0.494	0.374	0.484
Youth	0.360	0.480	0.340	0.474	0.328	0.470	0.289	0.453
Prime Working-Age	0.478	0.500	0.526	0.499	0.480	0.500	0.533	0.499
Past Prime Working-Age	0.162	0.368	0.135	0.342	0.192	0.394	0.178	0.383
No Education	0.257	0.437	0.266	0.442	0.190	0.392	0.200	0.400
Primary Level Edu.	0.468	0.499	0.463	0.499	0.476	0.499	0.435	0.496
Secondary Level Edu.	0.142	0.349	0.133	0.340	0.193	0.395	0.194	0.396
Tertiary Level Edu.	0.087	0.282	0.099	0.299	0.140	0.347	0.167	0.373
Prior Training	1.792	0.406	1.889	0.314	1.684	0.465	1.842	0.365
Source of Financing	1.299	0.458	1.730	0.444	1.271	0.445	1.661	0.473
Creole (Ethnicity)	0.147	0.354	0.145	0.352	0.179	0.383	0.179	0.383
Mestizo (Ethnicity)	0.528	0.499	0.518	0.500	0.522	0.500	0.507	0.500
Mayan (Ethnicity)	0.187	0.390	0.203	0.403	0.146	0.353	0.161	0.367
Other (Ethnicity)	0.139	0.346	0.134	0.341	0.154	0.361	0.154	0.361
Northern Region	0.390	0.488	0.370	0.483	0.373	0.484	0.362	0.481
Central Region	0.288	0.453	0.304	0.460	0.297	0.457	0.307	0.461
Southern Region	0.323	0.468	0.326	0.469	0.331	0.471	0.331	0.471

2013 = 2,887 male observations, 3,025 female observations
2018 = 2,788 male observations, 2,978 female observations

Table A.4 Summarised Spearman's Rank-Order Correlation Test by Year and Gender

		2013 Participation		2018 Participation	
		Male	**Female**	**Male**	**Female**
Participation	*Correlation Coefficient*	1	1	1	1
	Sig. (2-tailed)	.	.	.	.
	N	2887	3025	2788	2978
Relation To Head	*Correlation Coefficient*	-.328**	-.143**	-.303**	-.156**
	Sig. (2-tailed)	0	0	0	0
	N	2887	3025	2788	2978
Age Category	*Correlation Coefficient*	.222**	.039*	.199**	.063**
	Sig. (2-tailed)	0	0.03	0	0.001
	N	2887	3025	2788	2978
Education Level	*Correlation Coefficient*	.045*	.218**	0.028	.218**
	Sig. (2-tailed)	0.015	0	0.143	0
	N	2887	3025	2788	2978
Prior Training	*Correlation Coefficient*	-.141**	-.162**	-.221**	-.189**
	Sig. (2-tailed)	0	0	0	0
	N	2887	3025	2788	2978
Source of Financing	*Correlation Coefficient*	-.611**	-.545**	-.597**	-.546**
	Sig. (2-tailed)	0	0	0	0
	N	2887	3025	2788	2978
Ethnicity	*Correlation Coefficient*	.060**	0.035	0.01	-.037*
	Sig. (2-tailed)	0.001	0.055	0.591	0.043
	N	2887	3025	2788	2978
Region	*Correlation Coefficient*	-0.02	-.067**	-0.028	0.024
	Sig. (2-tailed)	0.284	0	0.137	0.191
	N	2887	3025	2788	2978

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table A.5 Summarised Likelihood Ratio Test

	2013		2018	
	Male	**Female**	**Male**	**Female**
Observations	2887	3025	2788	2978
-2 Log likelihood	1658.47	2856.094	1736.156	2871.772
Nagelkerke R Square	0.566	0.465	0.555	0.458

Table A.6 Summarised Hosmer and Lemeshow Test

	2013		2018	
	Male	**Female**	**Male**	**Female**
Chi-square	6.777	13.263	6.868	32.852
degrees of freedom	8	8	8	8
Significance	0.561	0.103	0.551	0

Table A.7 Summarised Classification Table

	2013		2018	
	Male	**Female**	**Male**	**Female**
Non-Participation	76	91	69.6	87.5
Participation	90.1	61	91.2	66
Overall Percentage	87.1	77.9	86.2	77.1

Table A.8 Regression results for Male 2013 Logistic Regression

Variables in the Equation				
	B	S.E.	Wald	Exp(B)
Relationship to Head			18.628	
Head of Household	1.336	0.313	18.193	3.805
Spouse	0.785	0.519	2.287	2.192
Child	0.281	0.222	1.595	1.324
Age Category			151.021	
14 - 24	1.992	0.323	38.138	7.329
25 - 34	3.52	0.37	90.372	33.769
34 - 44	3.013	0.38	62.987	20.357
45 - 54	2.542	0.353	51.949	12.708
Education Level			20.961	
Primary Level	-0.119	0.161	0.55	0.887
Secondary Level	-0.177	0.224	0.624	0.838
Tertiary Level	-0.403	0.29	1.924	0.668
Other Education	1.625	0.436	13.876	5.078
Prior Training	-0.449	0.199	5.114	0.638
Source of Financing	-3.193	0.17	351.364	0.041
Creole (Ethnicity)	-0.213	0.252	0.714	0.808
Mestizo (Ethnicity)	0.236	0.23	1.046	1.266
Maya (Ethnicity)	0.731	0.253	8.368	2.078
Northern Region	0.12	0.206	0.339	1.127
Central Region	-0.177	0.2	0.777	0.838
Constant	4.335	0.592	53.581	76.292

Table A.9 Hosmer and Lemeshow Test for Males 2013 Model

Hosmer and Lemeshow Test			
Step	Chi-square	df	Sig.
1	6.777	8	0.561

Table A.10 Model Summary for Males 2013 Model

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1658.470a	0.363	0.566

Model Summary

Table A.11 Classification Table for Males 2013 Model

Classification Table(a)

Observed		Participation Predicted 0	1	Percentage Correct
Participation	0	458	145	76
	1	227	2057	90.1
Overall Percentage				87.1

Table A.12 Regression Results for Female 2013 Logistic Regression

	B	S.E.	Wald	Exp(B)
Relationship to Head			15.775	
Head of Household	0.827	0.23	12.878	2.286
Spouse	0.598	0.197	9.215	1.819
Child	0.637	0.187	11.571	1.891
Age Category			121.26	
14 - 24	1.437	0.225	40.865	4.209
25 - 34	1.936	0.201	92.764	6.931
34 - 44	2.013	0.199	102.499	7.487
45 - 54	1.351	0.21	41.312	3.86
Education Level			56.935	
Primary Level	0.194	0.119	2.64	1.214
Secondary Level	0.909	0.165	30.474	2.482
Tertiary Level	0.895	0.205	19.112	2.446
Other Education	-0.602	0.314	3.666	0.548
Prior Training	-0.555	0.16	12.084	0.574
Source of Financing	-3.062	0.145	444.291	0.047
Creole (Ethnicity)	-0.151	0.203	0.553	0.86
Mestizo (Ethnicity)	-0.125	0.18	0.483	0.883
Maya (Ethnicity)	-0.73	0.198	13.596	0.482
Northern Region	0.105	0.155	0.458	1.11
Central Region	0.23	0.152	2.288	1.259
Constant	3.978	0.467	72.502	53.387

Variables in the Equation

Table A.13 Hosmer and Lemeshow Test for female 2013 model

Step	Hosmer and Lemeshow Test Chi-square	df	Sig.
1	13.263	8	0.103

Table A.14 Model Summary Table for Female 2013 model

Step	Model Summary -2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1658.470a	0.363	0.566

Table A.15 Classification Table for Female 2013 Model

Classification Table(a)	Participation		Predicted	Percentage Correct
Observed		0	1	
Participation	0	1551	154	91
	1	515	805	61
Overall Percentage				77.9

Table A.16 Regression Results for Male 2018 Logistic Regression

	Variables in the Equation			
	B	S.E.	Wald	Exp(B)
Relationship to Head			10.796	
Head of Household	0.846	0.285	8.829	2.33
Spouse	0.914	0.407	5.041	2.495
Child	0.073	0.231	0.099	1.075
Age Category			195.259	
14 - 24	1.769	0.282	39.266	5.865
25 - 34	3.394	0.327	107.492	29.773
34 - 44	3.666	0.396	85.817	39.098
45 - 54	2.283	0.289	62.396	9.805
Education Level			24.75	
Primary Level	-0.524	0.178	8.69	0.592
Secondary Level	-0.343	0.224	2.353	0.709
Tertiary Level	-1.133	0.236	23.056	0.322
Other Education	-0.099	0.907	0.012	0.906
Prior Training	-0.837	0.161	26.952	0.433
Source of Financing	-2.9	0.164	312.026	0.055
Creole (Ethnicity)	-0.302	0.219	1.887	0.74
Mestizo (Ethnicity)	-0.016	0.181	0.008	0.984
Maya (Ethnicity)	0.583	0.234	6.235	1.792
Northern Region	0.181	0.174	1.078	1.198
Central Region	-0.154	0.178	0.751	0.857
Constant	5.183	0.517	100.518	178.194

Table A.17 Hosmer and Lemeshow Test for Male 2018 Model

Step	Hosmer and Lemeshow Test Chi-square	df	Sig.
1	6.868	8	0.551

Table A.18 Model Summary Table for Male 2018 Model

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1736.156a	0.366	0.555

Table A.19 Classification Table for Male 2018 Model

Classification Table(a)

	Participation	Predicted		Percentage Correct
Observed		0	1	
Participation	0	446	195	69.6
	1	190	1957	91.2
Overall Percentage				86.2

Table A.20 Regression Results for Female 2018 Logistic Regression

	Variables in the Equation			
	B	S.E.	Wald	Exp(B)
Relationship to Head			3.50	
Head of Household	0.303	0.208	2.13	1.354
Spouse	0.346	0.189	3.34	1.413
Other	0.303	0.192	2.50	1.354
Age Category			175.55	
14 - 24	0.905	0.191	22.42	2.473
25 - 34	1.801	0.169	113.97	6.057
34 - 44	1.638	0.169	93.75	5.144
45 - 54	1.852	0.174	112.89	6.374
Education Level			16.80	
Primary Level	-0.081	0.129	0.40	0.922
Secondary Level	0.267	0.158	2.86	1.306
Tertiary Level	0.454	0.174	6.80	1.574
Other Education	-0.303	0.701	0.19	0.739
Prior Training	-0.712	0.139	26.44	0.491
Source of Financing	-2.731	0.127	465.53	0.065
Creole (Ethnicity)	0.273	0.178	2.37	1.314
Mestizo (Ethnicity)	0.405	0.15	7.30	1.499
Maya (Ethnicity)	0.323	0.178	3.29	1.381
Northern Region	-0.278	0.137	4.09	0.758
Central Region	-0.066	0.138	0.23	0.936
Constant	4.129	0.419	97.02	62.13

Table A.21 Hosmer and Lemeshow Test for Female 2018 Model

Hosmer and Lemeshow Test			
Step	Chi-square	df	Sig.
1	32.852	8	0

Table A.22 Model Summary Table for Female 2018 Model

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	2871.772a	0.344	0.458

Table A.23 Classification Table for Female 2018 Model

Classification Table(a)

			Participation	Predicted	Percentage Correct
	Observed		0	1	
Step 1	Participation	0	1342	191	87.5
		1	491	954	66
	Overall Percentage				77.1