# Assessing the role of women in tourism related sectors in the Caribbean

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Abstract.

This study contributes to the rapidly growing literature on women in tourism. It focuses on a group of 13 Caribbean countries. The study analyses the impact of women in apical positions within firms (top manager or owner) on firm performance – productivity, profitability and female employment. For this both a decomposition model and the Inverse Probability Weighted Regression Adjustment (IPWRA) estimator are used. The analysis finds that opportunities for women in these positions in the Caribbean are constrained to less productive and profitable firms, as elsewhere. However, those firms with females at the top employ more women, particularly in management roles.

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# 1. Introduction

This paper aims to contribute to the growing literature on the role of women in tourism related sectors by focusing on a group of 13 Caribbean countries, a region which has been under-researched in both the gender and tourism literature. For most of these countries tourism represents an important, often vital contribution to employment and national income. Our analysis relies on a unique source of statistical information, namely the PROTEqIN enterprise survey conducted by Compete Caribbean in 2014. We consider firms in tourism related sectors - hotels, restaurants, transport and supporting activities.

We provide detailed information regarding the role of women in employment in tourism related activities and, what is less common, in senior positions in the tourism industry, namely in management and ownership of tourist activities. We study both the determinants of the presence of women in senior positions and the impact on the performance of firms. We look at differences between firms owned and/or managed partly or wholly by women (our "treated" group) which we compare with closely comparable firms owned and/or managed predominantly by men, our control group.

In this way, the study overlaps with different recent strands of the literature. Firstly, we contribute to the study of the determinants of the segregation of women in some low value added industries and occupations within the service sector, where women tend to be concentrated. Within the Caribbean women are more frequently employed in tourism related activities than in, say, manufacturing industries. Within tourism women tend to be concentrated in those occupations which are generally at low productivity, such as cooking, cleaning and hospitality. This is not unusual. Similar findings are still quite common in the literature concerning gender and tourism in other regions. This is not to downplay the importance of tourism when, as in the Caribbean, there are few alternative sources of employment for women. This study also supports earlier research which finds that tourism has potential to empower women in many countries by providing a source of employment, as discussed by, for example, Hall et al. (2018).

The study uses, firstly, ordinary least squares (OLS) regression to analyse the performance of female owned and female run firms by several performance criteria – productivity, profitability and employment of females. A particular contribution is to also analyse employment of women in managerial positions as well as in all positions. The OLS regression analysis is supported by a matching estimator – inverse probability weighted regression estimator (IPWRA). This provides not only a robustness check on the findings of the OLS analysis but also enriches the analysis by, for example, comparing firms which are both female owned and run with male dominated firms. As such it makes a methodological contribution to the literature.

The study finds that, with some exceptions, firms that are predominantly female owned or have predominantly female top managers (or both) tend to have lower productivity and profitability than others. This is not unique to tourism related firms but applies (again with some exceptions) to firms in other services and in manufacturing. In contrast having, in particular, female participation in top management does typically make a significant difference to the share of females in firm

employment.  An even stronger effect can be observed on the share of females employed in managerial positions.

The paper is structured as follows. Section two provides a survey of the several strands of literature that overlap with our study. Section three discusses the main characteristics of the data. We also provide an analysis of the main characteristics of our data of relevance to the study. Section four describes key aspects of the methodology adopted – OLS regression and IPWRA. Section five presents the main findings of the OLS regression analysis. In section six the absolute and relative impact of the female participation in ownership and in top management is analysed using the IPWRA estimator.  Section seven presents the conclusions of the study.

# 2. Survey of the literature

This study focuses on the overlap between two different strands in the literature. Firstly, the role of women in senior positions within tourism and tourism related firms and their impact on the firm's performance is considered. Secondly, the employment of women in tourism related sectors in the Caribbean is examined.

## 2.1. Gender and managerial positions

The first theme in the literature that our paper develops is that on the role of women in "senior" positions, including ownership and management of firms. Two types of questions have been asked. Firstly the literature considers whether and to what extent women are discriminated against in accessing these apical (senior) positions and, hence, also apical earnings. Secondly, the literature examines whether having a woman as owner or manager makes any difference in terms of firms' performance. For the first issue the literature is quite clear about the constraints that impede women from accessing apical positions in both ownership and management. For the second, the literature on the impact of women in senior positions on firms' performance is more divided. While some authors find a positive impact, others do not.

Regarding the first research question, several authors have shown that women tend to concentrate mainly among low skill, low productivity industries and occupations. This can be explained first of all in terms of the greater commitment of women in unpaid family work. In his seminal paper, Polachek (1981) constructs a theoretical model in which female potential earnings depreciate during temporary exits from the labour force. At the same time that males remaining in the labour force see their earnings potential appreciate from continued skill development. This affects investment in skills and, hence, occupational choice. Maternity pushes women to self-segregate themselves into jobs which are less innovative and less skill driven, but are consequently paid less.

Polachek (1985) further extends this link between gender wages and a life-cycle view of occupational choice. Polachek (2014) finds the gender pay gap to be smaller between single men and women and larger between married men and women. This is attributable to his life-cycle model of human capital and the resulting different occupational structure between the genders. In other words, due to their activity in unpaid work, women would experience a relative disadvantage in accumulating work experience and job tenure, which are important factors to reach senior positions.

Although declining from the 1970s, gender segregation in low productivity industries and occupations and in less senior positions is still important and explained about 40% of the gender gap

in a number of developed countries in the 2000s (Blau and Kahn, 2017; Meara et al., 2019). More specifically, the negative impact of the occupational segregation of women and their tendency not to reach senior (apical) positions has an impact on the wage distributions of men and women. Arulampalam et al. (2007) found that the gap was particularly sizeable at the lower (so-called "sticky floor effect") and upper (so-called "glass ceiling effect") ends of the wage distribution.

In addition to the traditional competitive advantage of men in paid work and division of roles, a further argument has been brought to the fore in the literature to explain the hardship of women in accessing managerial positions, especially the top ones(such as being a CEO) and in accessing many well paid professions. By their very nature, these jobs require a particularly large number of working hours and a high degree of temporal flexibility to be done properly (Goldin, 2014). As she notes, in these types of jobs it is not only a matter of education and human capital but of "trust" in the relationship with customers which makes the role of some individuals hard to substitute. This requires an extremely large number of hours and flexibility to work, conditions that are often not easy to meet for women. All these types of job require meeting deadlines (time pressure), adhering to pre-set schedules, impossibility, especially in some periods, to work shorter hours or undergoing interruptions. All are conditions that conflict with the role of women in reproductive activities.A number of personality traits or non-cognitive skills have been considered in a growing body of literature as factors able to explain the position of women in the labor market relative to men (Blau and Kahn, 2017, section 4). More generally, a large literature argues that men possess characteristics that are associated with occupying senior positions. In this view men place a higher value on money, have higher self-esteem, are less risk averse, more competitive, self-confident and believe that they control better their fate than women (Blay and Kahn, 2017, p. 837). Other even more contentious advantages of men over women would consist of being more disposed to negotiate for better economic conditions. Moreover, women are seen as less likely to being competitive within the organization, which prevents them from advancement. These reasons are taken to explain why, as Blau and Kahn (2017, p. 828) report, based on Fortune 500 companies, although women are nearly half of managers, only 14.3% are executive officers, 3.8% are CEOs, and only 16.6% hold board seats.

Some experimental studies show that women are more risk averse than men on average, which would make them less fit for managerial positions (Croson and Gneezy, 2009). Other studies based on comparison of male and female managers find that there is no difference in the preference for risk, suggesting that the female attitude to risk may change over time because they may learn from their professional environment. In other words, preference for risk (in this view) is shaped by environment rather than being innate.

A more recent strand of literature (see again Blau and Kahn, 2017) attempts to explain why women are slowly occupying an increasingly larger number of senior positions. Several observers ask whether there is some competitive advantage that women have that might make them better managers and, therefore, have a positive impact on firms' performance. Some authors are considering social preferences by gender (see, among others, de Oliveira et al. 2014; and the surveys of the literature: Eagly and Johnson, 1990; Badura et al. 2018; and Offermann and Foley, 2020; and references therein). Borghans, ter Weel, and Weinberg (2014) postulate and test whether women have better interpersonal or "people" skills than men. If this is true, then, it might give to women some advantage in some type of managerial positions. suited to perform monitoring, controlling and other tasks typical of independent directors. Team collaboration is greatly improved when the group

includes female members; the presence of women directors increases the attendance rate of the board members, including among male directors. Extending the analysis to 73 developing countries observed over the years 2007-2010, Islam and Amin (2016) find that the share of female managers is higher in the firms of countries where women outperform men in terms of enrollment rates in all levels of education (primary, secondary and tertiary).

Some authors, such as Schwartz-Ziv (2015) proposed the minimum of three women directors as a critical threshold. Some papers find a positive association between the presence of women directors, on the one hand, and board and company performance on the other hand (e.g. Carter et al. 2003, Campbell and Minguez-Vera 2008, Francoeur et al. 2008, Garanina and Muravyev, 2017). Others report no statistically significant relationship (Carter et al. 2010, Miller and Triana 2009, Rose 2007, Marinova et al. 2015). Some even find a negative relationship between these factors (Adams and Ferreira 2009, Boehren and Stroem 2010, Haslam et al. 2010, Ahern and Dittmar 2012).

## 2.2. Gender and tourism

The focus of this paper is on the role of gender participation in tourist activities, either as workforce or as managers and owners of tourism related activities. This survey is therefore focused on this more recent, but fast-growing body of literature[1]. Much early research on gender and tourism in the Caribbean focused on sex tourism (see, for instance, Phillips, 2008 and the references therein). Our focus is, instead, on the role of gender participation in tourist activities, either as workforce or as managers and owners of tourism related activities. This survey is therefore focused on this more recent, but fast-growing body of literature.


Probably the first important contribution to this new strand of literature is constituted by a 1995 special issue of the Annals of Tourism Research edited by Margaret Byrne Swain. As she notes, tourism was originally a high class, male activity in the mid-1700s. Only more recently, it has become an activity for the entire population, including the middle class and women. Before the special issue by Swain, there were three main types of studies on gender and tourism: a) gender issues in tourism; b) feminist theories in leisure studies; c) interpretations of the meaning of the expression "gendered tourism".

The first strand focuses on tourism as a tool of economic development and how women start to play a role in this new sector (Hall et al. 2013). Our paper contributes to some new developments of this, more economic, stream of the literature. As Figueroa-Domecq et al. (2017) noted, after a decade of marginal interest, these issues are generating a renewed interest which is witnessed by a large number of new papers. This literature emphasises the increasing importance that tourism is quickly gaining over the years worldwide Tourism represents an ever increasing share of GDP not only in some countries which specialize in tourism but also in more mature advanced economies with a complex economic structure. Moreover, due to the seasonal nature of service sector employment – providing hospitality for part of the year – tourism tends to be strongly related to gender and also with low pay, low productivity and seasonal working. These aspects have attracted the attention of researchers for the adverse consequences, risks and opportunities that they generate for women.

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[1] For a recent more in-depth overview of the literature and the main issues under discussion, see Morgan and Pritchard (2019).

In a United Nations World Tourism Organization (UNWTO) Global Report on women in tourism, published in 2010 it was found that 'women in tourism are still underpaid, under-utilized, under-educated and under-represented' (UNWTO, 2010: p. ii). Yet, in the same report, the UNWTO argued that tourism still represented one of the best means through which women could be empowered from an economic point of view, particularly in developing countries, where other sectors are lagging behind.

Boluk et al. (2019) highlight the importance of gender equality for the development of sustainable tourism, as also noted by the UNWTO in a declaration of 2017. This declaration positions tourism as a tool to advance the universal 2030 Agenda for Sustainable Development, including the 17 Sustainable Development Goals (2015–2030) (SDGs) and 169 targets. The latter has substituted the MDGs which, despite the emphasis, were not reached by 2015.

Recent studies have demonstrated the existence of gender inequality in leadership positions (see Munar et al, 2015; Pritchard and Morgan, 2017). Serious questions still remain about the complex and interlocking factors that result in the continued disempowerment of women in tourism and which have defied any sustainable transformation. Maliva et al. (2018) and Foley et al. (2018) in a special issue on gender and tourism have provided counter-narratives to hegemonic representations of the Third World woman in tourism as 'victim': in Zanzibar, Papua New Guinea and other similarly low income countries, tourism is contributing to empower women. Other similar previous studies (Movono and Dahles, 2017; and Tucker, 2007) had reinforced this concept in different country contexts, such as the Fiji highlands and Turkey respectively. They show that the possibility to work in tourism and earn a pay pushed many women in these countries to put under discussion traditional gender roles which had tended to exclude or marginalize women from some jobs.

An important point to consider when looking at gender and tourism in developing countries is that a lack of female empowerment - the gap in opportunities between men and women - is complicated by other factors which increase the disadvantage of women. These include ethnicity, living in rural areas and belonging to a poor household. Nonetheless, as Ferguson (2010) notes, tourism may represent an important source to empower women and reach the 3rd Millennium Development Goal. However, economic policy interventions aimed at fostering female employment, ownership and management are still underdeveloped, despite their high expected potential.

According to Rinaldi and Salerno (2019), women represent about 46% of employment in the sector worldwide, although still women experience sectoral and occupational segregation also within this industry.  For instance, women tend to occupy positions in cooking, cleaning and hospitality, rather than in more qualified occupations and branches (on this, see also: Purcell, 1997; Campos-Soria et al., 2011). Santero-Sanchez et al. (2015) provide evidence of the lower quality level of jobs occupied by women using their job quality index.

The share of female employment in tourism is higher than in other sectors, but still below the average and wages are worldwide about 35-40% lower than for men employed in the sector according to World Bank data. Existing studies already document the existence of a gender pay gap in the tourism industry in several countries which is not explained only by different productivity characteristics, but is due to some form of discrimination, namely a different way the same characteristics are paid for men and women (for the case of Spain, see Campos-Soria et al., 2011b;

for Brazil, Ferreira Freire Guimaraes and Silva, 2016).Moreover, the existence of a glass ceiling effect – a larger gap at the highest end of the wage distribution – has been long identified in tourism economics and tourism management (Cotter et al., 2001).Firms owned by women face constraints in their access to credit (International Finance Corporation 2011), while female social networks are less developed (Baines and Wheelock, 2000) which correlates with their businesses having less success. Carvalho et al (2019) showed that women continue to be considered less fit for management in the tourist sector, although discrimination is not overt anymore, but invisible and still pervasive. In turn, the prejudice that women are less competent and less fit for management reinforces in a more subtle way the well-known glass ceiling effect (see, also, Acker, 1998; Bruni, Gherardi, & Poggio, 2004; Patterson, Mavin, & Turner, 2012).

By bringing to the fore arguments similar to Goldin (2014), interestingly, Costa et al. (2017) define a sort of ideal type of tourism worker (and manager) showing that women may find themselves excluded from some apical (senior) positions because of their difficulty in being as flexible as required in some types of jobs in terms of working hours. "Tourism is notorious for having very long work hours, at unsocial times and days (e.g. the weekend). Besides, shift work is very common, mainly because tourist services are available 24h a day, seven days a week" (p. 64). As a consequence, "flexibility", or, more specifically, employer-friendly flexibility (availability to work at any hour that the employer requests) is considered an important asset in the sector. In other words, the ideal type of tourism worker and manager would follow more closely male, rather than female norms of behavior, therefore favoring men to women in managerial roles.

Nonetheless, Rinaldi and Salerno (2019) report evidence that female participation in ownership and management of tourist activities is dramatically increasing in many countries, particularly advanced countries such as the EU. Despite this differences are still remarkable and empirical evidence by country is useful to better assess the evolution of this phenomenon.

As noted above, policy interventions aimed at fostering female participation in employment, management and ownership of tourist activities are expected to a better chance of success (see Ferguson, 2011) given that women do have a comparative advantage in sectors related to services, hospitality, organization of events and other similar activities. In fact, in more advanced economies, female entrepreneurship and management in these sectors is now becoming even more frequent and successful than that of men.

As to the impact of women occupying senior positions on the performance of firms a large literature shows gender productivity (and profitability) gaps in certain sectors, and then tries to explain why these gaps exist. In many cases, women managers or owners may face discrimination in accessing financial assets and other resources which might indirectly affect also firms' performance. Typically, a decomposition analysis (usually of the Blinder and Oaxaca type) is used to explore these issues - see, amongst others, Bardasi et al., 2011; Klapper and Parker, 2010; Kilic et al., 2014; Martin-Ugedo et al., 2014; Islam et al., 2018.

Klapper et al. (2010) summarises the then existing literature and find that female owned firms tend to concentrate in the more labor-intensive sectors such as trade and services, rather than manufacturing. The differences in business survival rates and growth patterns derive from those different characteristics. Amin and Islam (2014) confirm with an empirical analysis relative to about 90 developing countries that women tend to manage firms in the service sector, particularly in the

retail rather than the wholesale sector. Moreover, female-managed firms tend to be of small size and to locate in relatively small cities.

Bardasi et al. (2011) is one of the first studies to address the issue of gender gaps in productivity among firms owned by individuals of different genders in a sample of developing countries of different continents. They find that female owned companies tend to be much smaller than their male counterparts, but not less efficient. The smaller size is explained by segregation and the concentration of female owned firms in those sectors where firms are generally smaller in size. The authors find no evidence of gender discrimination in access to formal finance, although female entrepreneurs tend to receive smaller loans than men, despite the fact that the returns from each dollar they receive is no lower in terms of sales revenue.

In a study relative to agriculture in Malawi, Kilic et al. (2014) find that the productivity gap between female managed plots and those male managed is essentially due to the different observable characteristics of the two types of plots, and especially the high-value crop cultivation and household adult male labor inputs of male managed crops. From the point of view of this paper, this implies caution is needed to avoid comparing firms whose ownership (or management) is of different genders and then using decomposition analysis to explain gaps. The question remains whether the gap is itself due to gender or to the fact that we are comparing different types of firms.

More recently, Islam et al. (2018) find an unconditional productivity gap of female managed firms as compared to male owned firms of about 11% in a large sample of 128 mostly developing economies. When using decomposition analysis, the Authors find that fewer female- than male-managed firms protect themselves from crime and power outages, have their own websites, and are (co-) owned by foreigners. In addition, in the manufacturing sector, female-managed firms are less capitalized and have lower labor cost than male-managed firms. Interestingly, restricting the analysis to the retail sector, where female managed firms are more frequent, does not allow reveal any gender gap. This suggests that the performance gap is usually found in the manufacturing sector between female and male managed firms.

A related field of study has addressed the question of what determines the tendency of women to be more frequently owners and managers of firms with low productivity characteristics. For instance, the question is why women tend to own or manage small sized firms or low productivity /profitability firms? Aisedu et al. (2013) provide empirical evidence to support the view that female owned firms are financially constrained in Sub-Saharan Africa. Hansen and Rand (2014a) provide a more complex picture regarding the different access to financial assets of male and female owned firms in Sub-Saharian Africa as based on different data sources. When real data are used, then female owned firms often appear to be no more constrained than male owned firms, especially for firms of smaller size. Perception, though, is more in favour of the idea that female owned firms are financially constrained. Again with reference to Sub-Saharan Africa, Hansen and Rand (2014b) find that small sized female firms have easier access to credit as compared to their male counterparts. Medium sized firms instead show no gender differences in access to credit. The authors note that firms' performance by gender is not different and this lack of difference would not justify a different treatment of female owned firms by banks and other financial intermediaries.
In another interesting study, based on a sample of over 50,000 firms belonging to about 100 economies, Islam et al. (2019) have found that the type of legislation and its ability to guarantee

gender equality matters. Moreover, access to finance, property ownership, business registration, and labour market constraints are pathways by which legal gender disparities disempower women in the private sector in the sample of countries considered.

## 2.3. The Caribbean experience

Like a number of earlier studies, Johnson and Devonish (2008) examined the determinants of the demand for tourist services in Barbados. They found the destination of Barbados was associated with such push factors as "relaxation and pleasure-seeking" which was independent of the nationality, gender or age of tourists. Nonetheless, some specific differences existesd in terms of nationality, age and gender. The authors found, for example, that young Canadian tourists were particularly attracted by sporting activities. British tourists were more attracted by opportunities to have fun with fellow tourists and Germans to by the opportunity to live in a natural environment.

In a different form of motivation other research on gender and tourism in the Caribbean focused on sex tourism. In this stream of literature, Phillips (2008) discusses several types of male sex services providers, highlighting the economic role that these types have for the local community and also the health problems (such as HIV) that they generate. Some local men are exploited (the young and poorest) whilst others build their fortune out of sexual relations with "white women". Previous research has already explored the case of romance tourism by female tourists showing that in these type of relationship power is in the hands of women, rather than men (for the example of Jamaica, see Pruitt and La Font, 1995).

The focus of this study is different - on the role of women in the economics and management of tourism related activities in the Caribbean. In their early study on gender and tourism in the Barbados, Levy and Lerch (1991) report their findings from qualitative interviews to a small sample of 53 men and 80 women. They found that women occupied low productivity and low earning job positions, due to their involvement in unpaid family work and their low qualification for jobs in the tourist sector. The authors concluded that for tourism to be a more important source of development and gender equality much should be done to better train women, introduce more flexible hours arrangements and promote female entrepreneurship.

Gentry (2007), Vandergrift (2008), Duffy et al. (2015) reach similar conclusions regarding the employment of women in tourism in Belize, Costa Rica and the Dominican Republic. They also find a high degree of segregation in specific types of low productivity occupations within the sector. Interestingly, Gentry (2007) highlights how in Belize female ownership is also associated with small and very small businesses - often B&B's, small restaurants and so on. The opportunity to start these types of businesses with minimal capital is attractive to women and represents a real means to empower themselves and increase their status. Starting their own business helps

women acquire some decision making power within the family and in the public sphere. Regarding management positions, Gentry (2007) reports that, in foreign owned companies operating in Belize, most top managers were from abroad because the owners felt that local workers were generally not qualified for those positions, but several intermediate positions were occupied by Belizeans, who were trained within the hotels. In the Belizean-owned companies, local workers were better represented.

This study makes a significant contribution to the existing literature on the Caribbean experience by providing an updated and systematic analysis of a multi-country sample.


# 3. Data

## 3.1 The Dataset

The data for this study were taken from the PROTEqIN enterprise survey conducted by Compete Caribbean in 2014. The survey covered firms from a total of 13 Caribbean territories (listed in Table 2), across all broad sectors. It was conducted by means of a standardised questionnaire, intended to be completed in three short interviews with the firm. This questionnaire covered many aspects of firm behaviour including employment, skills, ownership, the business environment, finance, competition, government regulation and costs. The sample of firms was structured to, as far as possible, cover all sectors active in the region and all of the countries covered. A small proportion of firms in the survey were not formally registered (22 of the 1,968 usable returns). It is likely that informal firms and much more prevalent in tourism related activities in the Caribbean so the sample may not be representative in that respect. Nonetheless inclusion of some informal firms was deemed better than none. No wholly state owned firms from the tourism related sector were included but 3 (out of a total of 409) had some partial state ownership. Further details of the survey, including questionnaire and data, can be found here: http://competecaribbean.org/proteqin/.

The survey yielded usable data for a total of 1890 firms, of which 407 were classified in "tourism related" activities. For the purposes of this study "tourism related" was defined as all firms within ISIC (rev.3.1) categories 5510 (hotels etc.) and 5520 (restaurants, bars etc.) plus firms within the categories 6010 to 6309 (transport and supporting activities) excluding all those firms engaged in the transportation, storage and handling of goods rather than people. The sample includes both informal and government owned firms. Further details of the sampling procedures and conduct of the survey are available from: https://publications.iadb.org/en/productivity-technology-innovation-caribbean

The study uses data for both "tourism related" and other firms. Data on firms from other sectors – manufacture and other services – were included to provide a degree of benchmarking. That is, to provide a sense of whether female participation in tourism related firms is greater than in other economic sectors. The data covers a total of 13 different Caribbean countries (listed in Table 2). Table 1 provides details of female labour force participation. It reports the mean share of females in total full-time employment by broad sector and type of job.

**Table 1: Mean female share in firm level employment, 2013**

|  | All | Management |
| --- | --- | --- |
| Manufacturing | 30.0% | 23.6% |
| Other services | 34.1% | 19.6% |
| Tourism related | 36.5% | 21.9% |
| of which: |  |  |
| Travel | 31.9% | 27.6% |
| Hospitality | 37.5% | 20.5% |

Source: PROTEqIN survey, IDB

The data shows that in the Caribbean, as in other parts of the world, tourism related activities do employ a higher proportion of females than other sectors. This is more attributable to high female participation rates in the hospitality sector than in travel and supporting activities. That female participation in tourism related activities is more concentrated in lower skill, lower paid occupations is partly supported by female participation rates in management positions. Firms in the tourism related sector have lower female participation in management jobs than in manufacture but not in other services. Across all sectors females are least well represented in management of all the job categories.

Table 2 presents similar data but for each country in the sample. The data reveal considerable variation in mean female participation rates at firm level between one country and another. For tourism related activities these range from as low as 21% in Dominica to as high as 60% in Guyana. A similar degree of variation is also present in other economic sectors where mean female participation rates vary from 19% in the Bahamas to 45% in Jamaica. For most but not all countries in the sample female participation rates are higher in tourism related activities than in other sectors.

The degree of variation between countries is more extreme with respect to managerial positions. Mean firm level female participation rates in tourism related activities vary from 2.4% in Trinidad and Tobago to 61% in Guyana. Again, a similar variation across countries can be observed for other economic sectors. The importance of variations between countries is such that later econometric analysis includes a number of country level variables to capture these differences.

**Table 2: Mean Share of Female Employees in Firm Level Full-time Employment, by Country, 2013**

| Country | Sector | Mean share of females | |
|---|---|---|---|
| | | **All** | **Managememt** |
| | | | |
| Antigua - Barbuda | tourism related | 30.1% | 26.7% |
| | all other | 21.8% | 25.8% |
| The Bahamas | tourism related | 24.3% | 23.1% |
| | all other | 18.9% | 21.8% |
| Barbados | tourism related | 53.8% | 35.8% |
| | all other | 39.8% | 25.1% |
| Belize | tourism related | 53.7% | 52.6% |
| | all other | 35.9% | 28.2% |
| Dominica | tourism related | 20.6% | 26.8% |
| | all other | 22.8% | 30.2% |
| Grenada | tourism related | 28.4% | 32.8% |
| | all other | 26.1% | 31.9% |
| Guyana | tourism related | 62.0% | 61.0% |
| | all other | 35.5% | 39.0% |
| Jamaica | tourism related | 53.6% | 29.3% |
| | all other | 45.4% | 28.2% |
| Saint Lucia | tourism related | 30.8% | 45.1% |
| | all other | 21.3% | 31.2% |
| St-Kitts and Nevis | tourism related | 37.3% | 34.6% |
| | all other | 23.1% | 28.5% |
| St-Vincent and the Grenadines | tourism related | 24.9% | 22.8% |
| | all other | 24.0% | 32.6% |
| Suriname | tourism related | 47.6% | 44.7% |
| | all other | 32.6% | 36.0% |
| Trinidad & Tobago | tourism related | 35.5% | 2.4% |
| | all other | 28.2% | 3.7% |
| * Temporary workers counted as permanent equivalents (fractional) | | | |
| Source: PROTEqIN survey, IDB | | | |

The PROTEqIN survey asks firms to report the extent to which they are (a) owned and (b) managed by males or females. Response scores can vary from 1 (all men) to 5 (all women), with a score of 3 representing an approximate balance between males and females. Table 3 summarises the survey data. It reports the percentage of firms recording a score of 3 (approximate gender balance) or higher for both ownership and management. The data show that the proportion of firms in tourism related activities in the Caribbean that are not predominantly male owned is comparable to other service sector firms but higher than in manufacture. In terms of management of firms the proportions that are not predominantly male managed is substantially higher in tourism related activities than other sectors.

**Table 3: Female Ownership and Top Management of Firms, 2013.**

| Sector | % of firms not predominantly male | |
|---|---|---|
| | owned | managed |
| tourism related | 30.2% | 39.8% |
| of which: | | |
| travel | 16.9% | 31.2% |
| hospitality | 33.3% | 41.8% |
| | | |
| manufacturing | 28.9% | 33.1% |
| other services | 30.7% | 36.4% |

Source: PROTEqIN survey, IDB

Table 4 provides a similar summary on a country by country basis. Again there is considerable variation between one country and another. In terms of ownership as few as 9% of tourism related firms in Antigua and Barbuda and the Bahamas have other than predominantly male or wholly male owners. The comparable figure for Guyana is 60%. This variation between countries is greater for tourism related activities than for other sectors. In most but not all countries the proportion of firms not predominantly male owned is higher for tourism related firms than in other sectors.

In almost all countries the proportion of firms in which the top management is not wholly or predominantly male is substantially higher than in the case of ownership. With respect to top management firms not male dominated vary from 23.5% in Suriname to 90% in Guyana.

**Table 4: Female Ownership and Top Management by Country, 2013**

| Country | Sector | % of firms not premoninantly male | |
|---|---|---|---|
| | | owned | managed |
| Antigua – Barbuda | tourism related | 9.1% | 25.0% |
| | all other | 16.1% | 13.8% |
| The Bahamas | tourism related | 9.4% | 78.1% |
| | all other | 22.1% | 64.2% |
| Barbados | tourism related | 47.1% | 47.1% |
| | all other | 40.8% | 30.3% |
| Belize | tourism related | 46.9% | 46.9% |
| | all other | 46.1% | 50.0% |
| Dominica | tourism related | 14.8% | 31.5% |
| | all other | 13.9% | 25.0% |
| Grenada | tourism related | 42.1% | 39.5% |
| | all other | 35.2% | 39.6% |
| Guyana | tourism related | 60.0% | 90.0% |
| | all other | 33.0% | 42.0% |
| Jamaica | tourism related | 55.6% | 27.8% |
| | all other | 43.1% | 32.4% |
| Saint Lucia | tourism related | 16.7% | 33.3% |
| | all other | 17.4% | 25.0% |
| St-Kitts and Nevis | tourism related | 36.4% | 27.3% |
| | all other | 37.4% | 33.0% |
| St-Vincent and the Grenadines | tourism related | 32.0% | 48.0% |
| | all other | 39.3% | 44.9% |
| Suriname | tourism related | 35.3% | 23.5% |
| | all other | 28.2% | 35.3% |
| Trinidad & Tobago | tourism related | 38.2% | 35.3% |
| | all other | 20.9% | 30.1% |
| Source: PROTEqIN survey, IDB | | | |

## 3.2   Variables

### 3.2.1   Country Level Control Variables

As has already been seen it is not possible to treat the Caribbean as a single homogeneous entity. This means that subsequent analysis needs to be capable of capturing differences between one country and another.  To do this a number of country level variables were used in both strands of analysis. Data were taken from the World Bank's *World Development Indicators* database. The variables were:

- *fertil* – fertility rate (children per woman)
- *fempop* – females as a percentage of the of total population
- *regeff* -  distance to frontier score (a measure of regulatory efficacy)
- *internet* - secure Internet servers (per 1 million people)
- *gdpcap* - GDP per capita (current US$)
- *rural* - rural population (% of total population)


Further country level variables intended to capture the general favourability of the country's legal, social and business environment towards women were also included, taken from the *Women, Business and Law* database (all scored from 0 to 100). These were:

- wbljob – starting a job
- wblpay – getting paid
- wblbus – running a business
- wblfin – managing assets

All country variables were used as control variables.

### 3.2.2   Outcome (Dependent) Variables

For the analysis of the effects of female ownership and female top management on firm performance the following two outcome (dependent) variables were used:

- *lopw* -  log of output per worker (productivity)
- *lppw* – log of profit per worker (profitability)

Profits were defined as gross (pre-tax) profits – total revenues less total costs.

Please note that productivity and profitability are different concepts and should not be expected to produce identical results. In addition the sample for both differs from the other. Output per worker is strictly positive but profit may be zero or negative. In such cases the log does not exist and the relevant observations are automatically deleted by *Stata*.

For the analysis of the effects of female ownership and top management on female employment the following outcome variables were used:

- *fsall* – the share of females in the firm's total employment
- *fsmg* – the share of females in the firm's managerial employees

Please note that the variable *fsmg* covers all persons employed in a management position, not just the firm's top manager. It is the share of females in the overall management team.

### 3.2.3 Treatment (Focus) Variables

For both strands of analysis the same treatment variables were used. These were:

- *femown* - 0 if the firm was predominantly or wholly owned by males, 1 if otherwise
- *femboss* – 0 if the firm's top management was predominantly or wholly male, 1 if otherwise.

Please note that the variable *femboss* relates to the gender of the top manager and not to other members of the management team.

### 3.2.4 Firm Level Control Variables

The following control variables were used in both the analysis of firm performance and of female employment:

- *empall* - total full-time employees (used as a measure of firm size)
- *foreign* – percentage foreign ownership
- *age* – age of the firm
- *manexp* – number of years of experience of the firm's top manager
- *loan* – (0,1) whether or not the firm was in receipt of a loan or line of credit

For the analysis of firm performance two further control variables were included, covering the firm's experience with infrastructure and bureaucracy. The inclusion of infrastructure follows the finding in existing literature by, for example, Islam and Hyland (2019), Davis et al (2001) and Moyo (2011) that water outages in particular adversely affected firm performance. The variables were:

- *infrastructure* – total percentage of sales lost to outages of power, mobile phones, internet and water.
- *bureaucracy* – the typical percentage of management time spent on dealing with government and regulatory requirements each week.

For the analysis of female employment the following control variables were also used:

- *training* – (0,1) whether or not the firm had provided training to its full-time employees
- *seas* – the share of temporary or seasonal workers in full-time employment
- *workeduc* – firm level average of difference between actual education of workers and minimum education needed.

# 4. Methodology

## 4.1 Overview

This study uses, firstly, Ordinary Least Squares (OLS) regression to analyse differences in performance between male dominated firms and those with female participation at the top.. A second approach is also employed, partly to serve as a robustness check on the findings of the regression analysis. This is a matching technique – the Inverse Probability Weighted Regression Adjustment (IPWRA) estimator. As this is a more recent, less well known technique this section focuses more on an explanation of it. The approach of the study is that all estimators have strengths

and weaknesses and both techniques are not exceptions. However, using both together provides insights which are more than the sum of their parts. That is, the combination of OLS and IPWRA adds a depth to the analysis which offers more than a robustness check alone.

## 4.2    OLS Regression

This study uses a general to specific approach to OLS regression. For further details of this approach see Campos et al (2011) . In every case we started with a general specification – one that included all of the independent variables listed in the data section. This was intended to reduce the risk of endogeneity through omitted variable bias. In consequence all "general" specifications had an identical set of independent variables.   All regressions were tested for heteroscedasticity. In almost all cases the results of these tests (not reported but available from the authors) were to conclusively reject the hypothesis of constant variance so robust standard errors were used throughout.

The inclusion of redundant variables, by unnecessarily increasing the variance of estimates, also affects statistical inference so each general specification was tested using a standard F test for redundant variables.  The key focus variables – female ownership and female top management – were retained whether statistically significant or not but all other (control) variables were excluded where they could be found to be jointly insignificant.  The resulting "specific" model and not the earlier "general" specifications are reported.  In almost all cases variables that were jointly significant were also individually insignificant (according to a t test using robust standard errors) but there were a small number of exceptions.  *Stata 15* was used to conduct the analysis.

The generic OLS regression equation is given by:

$$Y = X\beta + u \hspace{5cm} (1)$$

Where Y is a (n x1) vector of observations of the dependent variable, X a (n x k) matrix of observations of the k independent variables, $\beta$ the (k x1) vector of coefficients to be estimated and u a (n x 1) vector of disturbance terms.  The X matrix is presumed to be fixed by observation. The disturbance term, although unknown, has a probability distribution. For testing purposes this is often assumed to be normally distributed.  Since the X matrix is fixed by observation this means that Y must share the same distribution as the unobservable u.  Prior to estimation we examined the kernel density for each dependent variable (not reported but available from the authors) to visually assess whether it was reasonable to assume that it was normally distributed.  For both productivity and profitability it was not but taking the logs of each did produce an approximately normal distribution.  To improve the accuracy of testing the logs of both variables were used for estimation.

## 4.3    Matching Estimators

Almost all matching approaches seek to estimate whether a (0,1) "treatment " variable has a statistically significant effect on an outcome variable.  For example, it may seek to test whether the (0,1) variable of a female top manager has a statistically significant effect on the share of females in the firm's employment.  A simplistic approach would be to divide the sample into *treated* (firms with a female top manager) and *untreated* (firms with a male top manager) and test for a difference in means between the two groups.  The matching approach is not dissimilar but seeks to compare the treated group with a carefully selected control group drawn from within the untreated group.

At the heart of all matching approaches is an attempt to address a problem known as "missing data". We can observe that a particular firm had a female top manager at the time of the survey and the share of females in the firm's employment. But we cannot observe what the share of females in the same firm's employment would have been had the top manager been male. This is the "missing data" problem. Matching seeks to create these missing data from observations of untreated (male managed) firms which are identical in all relevant characteristics other than the gender of their top manager. In effect, it selects a control group to create a counter-factual for the missing data.

Matching estimators use a series of *control* variables to select a comparison group to the treated (female owned or run) firms. This is a probability model (logit in this study) which estimates the probability of observing treatment (a firm with a female top manager) given the control variables. These control variables should be relevant to explaining the outcome (the share of females in employment) and not necessarily the treatment (female top manager). For practical purposes these were exactly the same as the control variables used in the OLS regression analysis.

Although there are different possible treatment effects most applications focus on the average treatment effect for treated firms (ATT) . This is defined as:

- ATT – the average treatment effect for treated firms
  $$ATT = E(Y_{1i} - Y_{0i} | D_i = 1) \equiv E(\beta_i | D_i = 1) \tag{2}$$

where Y is the outcome (share of females in employment), with subscript 1 for those firms that are *treated* (female top manager) and subscript 0 for those that are not (male top manager). D is an indicator of the treatment received (by definition 1 for treated and 0 for untreated). Of the different treatment effects ATT is the most widely used and is the one estimated in this study. In some matching approaches, including that used in this study, ATT is estimated by a form of regression. This means that it could be characterised as a robustness check on OLS regression; one which seeks to reduce the risk of sample selection bias. However, its properties mean that it adds significantly more than just a robustness check.

A potential problem with matching is known as bias on unobservables. This is similar to omitted variable bias in regression models. This bias can arise if an important confounding variable has been excluded from the propensity score and, hence, from the selection of the control group. As with confounding variables more generally there is no certain method to avoid such bias. The strategy of this study has been to minimise the risk of an excluded variable by including as many firm level and country level control variables as possible.

## 4.4 Matching with Inverse Probability Weighted Regression Adjustment (IPWRA)

The IPWRA model has some common ground with, for example, propensity score (PS) matching. That is, like PS matching it estimates a (probability of) treatment model. In this study logit rather than probit is used for that purpose. For example, this gives the probability of observing a female top manager given that the firm is, say, foreign owned or is small in size. This treatment model is used to assign a sampling probability for each observation. This provides a solution to the missing data problem. The inverse probabilities – the probability of the counter-factual that the firm had a male top manager – can be used to model the missing data.

The IPWRA model differs from PS matching in that it also includes an outcome model – for example, a model of the determination of the share of females in firm employment. These outcome models are estimated by weighted regressions, with inverse probabilities used to weight each observation. In effect, this weights all observations by their (counter-factual) inverse probability. The technique estimates multiple outcome models - one for each treatment level – each with a predicted outcome. Estimates of treatment effects (ATT) are based on the means of these predicted outcomes.

The explicit estimation of inverse probabilities and, hence, a clear counter-factual for the missing data problem is an attractive feature of the IPWRA. As Cattaneo (2010) and Cattaneo et al (2013) show the IPWRA technique also has the very useful property of "double robustness". The technique comprises both a treatment and outcome model. If either one of these is mis-specified but the other is correctly specified then the IPWRA estimator is still consistent. A further problem with matching models is selecting a control group on irrelevant variables. King and Nielsen (2016) found IPWRA estimators to be less prone to bias from mis-matching on irrelevant observables. Doubly robust estimators such as IPWRA were found by Hirano et al (2003) to exhibit lower bias than other estimators.

For the purposes of this study a particularly useful feature of the IPWRA model is that, unlike PS matching, it allows for more than one treatment variable. In this study the main focus is on two treatment variables – female top management and female ownership. The IPWRA technique allows treatment effects to be estimated not only for each individual "treatment" but also for the interaction between the two. The ability to differentiate firms with female participation in both ownership and top management from firms with female participation in just one clearly offers additional breadth to the analysis.

# 5. OLS regression analysis

In this section we discuss the results of the OLS regression analysis for each of the four key performance variables: productivity, profitability, female employment and female employment in managerial positions. The main focus is on the tourism related sector but results for both "other services" and for "manufacture" are included for comparison. This is intended to detect whether or not there are any important behavioural differences which are unique to tourism related activities. The full list of control variables included in our initial (unreported) "general" specification are included in each table but, where these variables were jointly statistically insignificant are left blank. This means that it is the resulting "specific" model that is reported but that the reader can infer which variables were excluded on grounds of (joint) statistical insignificance. Please note that *Stata 15* was used for estimation and it automatically removes observations for which there are missing values of one or more variables. For this reason sample sizes vary from one table to another.

Table 5 presents the OLS regression results for the analysis of productivity – the log of output per worker. The results suggest a negative relationship between productivity on the one hand and (a) female top management and (b) female ownership on the other. However, in most cases this is not a statistically significant relationship. The exceptions are that this is statistically significant (at 99% confidence) for female top management in tourism related activities and significant (at 95% confidence) for female ownership in other services. For simplicity coefficients for individual country dummy variables are not reported.

Although not the focus of this analysis the relationship between productivity and the control variables is worth some brief comment. Substantial and statistically significant positive effects on productivity are revealed for both the existence of a loan and for the regulatory efficiency of the country. This suggests that further research on improving the regulatory climate for business could show scope for productivity gains. It also shows that access to loan financing is important for productivity in the Caribbean. To the extent women are owners and top managers of lower productivity firms further research could address the possibility of prioritising female owned or run firms for loan financing.

**Table 5: OLS Regression Analysis of Productivity (log of output per worker)**

| Variable | Description | Coefficient Estimates | | |
|---|---|---|---|---|
| | | Tourism Related | Other Serviices | Manufacturing |
| **Focus variables** | | | | |
| femboss | female top management (0,1) | -0.2871*** | -0.1277 | -0.0155 |
| | | (0.0992) | (0.0859) | (0.0759) |
| femown | female ownership (0,1) | -0.1237 | -0.2140** | -0.0692 |
| | | (0.1008) | (0.0944) | (0.0799) |
| **Country level countrol variables** | | | | |
| fertil | fertility rate | | | |
| fempop | female % of population | | -0.1734** | -0.2883*** |
| | | | (0.0825) | (0.0802) |
| regeff | regulatory efficiency | 0.1644*** | 0.1220*** | 0.1680*** |
| | | (0.0172) | (0.0168) | (0.0157) |
| Internet | internet servers | 0.0008*** | | |
| | | (0.0002) | | |
| gdpcap | GDP per capita | 0.0001*** | 0.0001*** | 0.0002*** |
| | | (0.0000) | (0.0000) | (0.0000) |
| rural | rural % of population | -0.0075* | -0.0052 | 0.0205*** |
| | | (0.0044) | (0.0039) | (0.0040) |
| wbljob | women – getting job | | 0.0175*** | -0.0045 |
| | | | (0.0027) | (0.0032) |
| wblpay | women – being paid | 0.0305*** | | 0.0381*** |
| | | (0.0057) | | (0.0045) |
| wblbus | women – running business | -0.0916*** | -0.0705*** | -0.1385*** |
| | | (0.0123) | (0.0099) | (0.0057) |
| wblfin | women – managing assets | 0.0161** | -0.0365*** | |
| | | (0.0073) | (0.0062) | |
| **Firm level control variables** | | | | |
| empall | Firm size (employment) | | | 0.0014*** |
| | | | | (0.0004) |
| foreign | % foreign owned | | | 0.0044*** |
| | | | | (0.0014) |
| age | age of firm | | | |
| manexp | top manager experience | | -0.0108*** | |
| | | | (0.0036) | |
| loan | firm received loan (0,1) | 0.1786* | 0.2242*** | 0.1443** |
| | | (0.1027) | (0.0873) | (0.0722) |
| infrastructure | sales lost to infrastructure problems | | | |
| bureaucracy | % of management time lost | | -0.1675*** | |
| | | | (0.0635) | |
| training | training provided (0,1) | | 0.1926** | 0.1867** |
| | | | (0.0830) | (0.0757) |
| seas | share of seasonal employment | | -3.1963*** | |
| | | | (0.7158) | |
| workeduc | gap in worker education | | 0.0473 | |
| | | | (0.0335) | |
| cons | constant (intercept) | 1.0267 | 16.897*** | 16.678*** |
| | | (1.1788) | (3.7958) | (3.6114) |
| Country dummy variables | | yes | yes | yes |
| Number of observations | | 407 | 686 | 626 |
| F statistic | | 25.8 | 31.67 | 165.26 |
| | | (13, 393) | (18, 667) | (16, 609) |
| R squared | | 0.5704 | 0.5204 | 0.8063 |
| Root MSE | | 0.96822 | 1.0681 | 0.87794 |
| NOTE: robust standard errors are in parentheses | | | | |
| *** indicates significant at 99% confidence, ** 95% and * 90% | | | | |

Table 6 presents the OLS regression analysis for profitability. Blank entries indicate that the variables concerned were excluded, having been jointly statistically insignificant in an earlier "general" specification.

**Table 6: OLS Regression Analysis of Profitability (log of profit per worker)**

| Variable | Description | Coefficient Estimates | | |
| --- | --- | --- | --- | --- |
| | | Tourism Related | Other Serviices | Manufacturing |
| **Focus variables** | | | | |
| femown | female ownership (0,1) | -0.1916 | -0.2351* | 0.128 |
| | | (0.1542) | (0.1405) | (0.1491) |
| femboss | female top management (0,1) | -0.1075 | -0.0991 | 0.1301 |
| | | (0.1552) | (0.1369) | (0.1524) |
| **Country level countrol variables** | | | | |
| fertil | fertility rate | 1.2733** | | |
| | | (0.6131) | | |
| fempop | female % of population | | | -0.4166*** |
| | | | | (0.1259) |
| regeff | regulatory efficiency | 0.3587*** | 0.1158*** | 0.2032*** |
| | | (0.0324) | (0.0233) | (0.0255) |
| Internet | internet servers | 0.0016*** | | |
| | | (0.0002) | | |
| gdpcap | GDP per capita | 0.0002*** | 0.0001*** | 0.0002*** |
| | | (0.0000) | (0.0000) | (0.0000) |
| rural | rural % of population | | | 0.0343*** |
| | | | | (0.0061) |
| wbljob | women - getting job | -0.0534*** | | 0.0317*** |
| | | (0.0068) | | (0.0042) |
| wblpay | women - being paid | 0.0940*** | 0.0107*** | |
| | | (0.0102) | (0.0033) | |
| wblbus | women - running business | -0.1346*** | -0.0698*** | -0.1633*** |
| | | (0.0106) | (0.0083) | (0.0126) |
| wblfin | women - managing assets | 0.1007*** | -0.0390*** | |
| | | (0.0164) | (0.0075) | |
| **Firm level control variables** | | | | |
| empall | Firm size (employment) | | 0.0012 | 0.0019*** |
| | | | (0.0007) | (0.0005) |
| foreign | % foreign owned | | 0.0062** | |
| | | | (0.0027) | |
| age | age of firm | | | |
| manexp | top manager experience | | | 0.0113* |
| | | | | (0.0065) |
| loan | firm received loan (0,1) | | 0.2279* | |
| | | | (0.1327) | |
| infrastructure | sales lost to infrastructure problems | 0.1454** | | |
| | | (0.0724) | | |
| bureaucracy | % of management time lost | | | |
| training | training provided (0,1) | | | 0.4126*** |
| | | | | (0.1545) |
| seas | share of seasonal employment | | -4.3319*** | 2.3360** |
| | | | (0.9210) | (0.9267) |
| workeduc | gap in worker education | | | |
| cons | constant (intercept) | -23.6129*** | 6.9947*** | 19.977*** |
| | | (3.3342) | (1.3752) | (5.8007) |
| Country dummy variables | | yes | yes | yes |
| Number of observations | | 353 | 585 | 378 |
| F statistic | | 24.96 | 23.46 | 28.51 |
| | | (14, 338) | (13, 571) | (15, 362) |
| R squared | | 0.5278 | 0.3761 | 0.5323 |
| Root MSE | | 1.3075 | 1.4859 | 1.339 |
| **NOTE: robust standard errors are in parentheses** | | | | |
| **\*\*\* indicates significant at 99% confidence, \*\* 95% and \* 90%** | | | | |

For both tourism related firms and those in other services the results suggest a negative relationship between profitability and (a) female top management and (b) female ownership. In the main this is not a statistically significant finding except for female ownership in other services significant at only 90% confidence).  For Manufacturing both coefficients are positive but not statistically significant. As with productivity the efficiency of national regulatory environments has a substantial, positive and statistically significant association with profitability for all three sectors. This suggests that improvements to the regulatory environment have potential to improve profitability in the Caribbean.  Unlike productivity the existence of a loan only had a positive and statistically significant effect on profitability for the other services sector.

Table 7 presents the results of the OLS regression analysis with the share of females in overall firm employment. For the tourism related sector a female top manager has a substantial, positive and statistically significant (at 90% confidence) on female employment but female ownership a positive but not statistically significant effect.  For Manufacturing a similar pattern can be observed - a substantial, positive and statistically significant (at 99%) effect of female top management but a positive but not statistically significant effect of female ownership.  For the other services sector the effects of both female top management and female ownership were found to be substantial, positive and statistically significant (at 95% at least).

With respect to the control variables there were none that revealed a consistent pattern of behaviour across the three different sectors.  The share of females in the population had a substantial, negative and statistically significant effect on female employment in tourism related firms but a substantial and significantly positive effect for other services.  Regulatory efficiency had a negative and statistically significant effect on female employment for both the tourism related and the other services sectors.  It is likely that this finding reflects (a) the positive effect of regulatory efficiency on productivity and (b) the tendency of women to be concentrated in lower productivity firms. The general conduciveness of national environments to women in business had a positive and statistically significant effect on female employment in both Manufacturing and other services but not on tourism related firms.

**Table 7: OLS Regression Analysis of Female Employment (share in total employment)**

| Variable | Description | Coefficient Estimates | | |
|---|---|---|---|---|
| | | Tourism Related | Other Serviices | Manufacturing |
| **Focus Variables** | | | | |
| femown | female ownership (0,1) | 0.0799 | 0.0994** | 0.1103 |
| | | (0.0632) | (0.0465) | (0.0744) |
| femboss | female top management (0,1) | 0.1317* | 0.1878*** | 0.2194*** |
| | | (0.0693) | (0.0451) | (0.0737) |
| **Country level countrol variables** | | | | |
| fertil | fertility rate | | -1.5720*** | |
| | | | (0.2490) | |
| fempop | female % of population | -0.1162** | 0.1775*** | |
| | | (0.0549) | (0.0557) | |
| regeff | regulatory efficiency | -0.0650*** | -0.0602*** | |
| | | (0.0133) | (0.0138) | |
| Internet | internet servers | -0.0004*** | | |
| | | (0.0000) | | |
| gdpcap | GDP per capita | | -0.0001*** | -0.0001*** |
| | | | (0.0000) | (0.0000) |
| rural | rural % of population | 0.0105*** | -0.0155*** | -0.0088*** |
| | | (0.0019) | (0.0038) | (0.0027) |
| wbljob | women - getting job | 0.0144*** | -0.0031 | -0.0089*** |
| | | (0.0027) | (0.0022) | (0.0013) |
| wblpay | women - being paid | -0.0274*** | -0.0047** | |
| | | (0.0033) | (0.0023) | |
| wblbus | women - running business | | 0.0360*** | 0.0245*** |
| | | | (0.0073) | (0.0048) |
| wblfin | women - managing assets | -0.0257*** | -0.0113** | |
| | | (0.0070) | (0.0054) | |
| **Firm level control variables** | | | | |
| empall | Firm size (employment) | | | -0.0004* |
| | | | | (0.0002) |
| foreign | % foreign owned | 0.0018** | | |
| | | (0.0007) | | |
| age | age of firm | | | |
| manexp | top manager experience | | -0.0040** | |
| | | | (0.0018) | |
| loan | firm received loan (0,1) | | | |
| infrastructure | sales lost to infrastructure problems | 0.0882** | | 0.0598 |
| | | (0.0375) | | (0.0404) |
| bureaucracy | % of management time lost | | | |
| training | training provided (0,1) | | | |
| seas | share of seasonal employment | | | -0.9144* |
| | | | | (0.5491) |
| workeduc | gap in worker education | | | |
| cons | constant (intercept) | 11.654*** | -2.7737 | -2.0961*** |
| | | (3.0290) | (2.5390) | (0.2085) |
| Country dummy variables | | yes | yes | yes |
| Number of observations | | 370 | 756 | 421 |
| F statistic | | 17.42 | 41.28 | 6.89 |
| | | (14, 355) | (16, 739) | (12, 408) |
| R squared | | 0.2618 | 0.2447 | 0.1685 |
| Root MSE | | 0.62073 | 0.58077 | 0.68447 |
| **NOTE: robust standard errors are in parentheses** | | | | |
| **\*\*\* indicates significant at 99% confidence, \*\* 95% and \* 90%** | | | | |

Table 8 provides details of the OLS regression analysis of the share of females in employment in managerial positions.

**Table 8: OLS Regression Analysis of Female Employment in Managerial Positions (share in total employment)**

| Variable | Description | Coefficient Estimates | | |
|---|---|---|---|---|
| | | Tourism Related | Other Serviices | Manufacturing |
| **Focus Variables** | | | | |
| femown | female ownership (0,1) | 0.1347 | 0.2722*** | 0.1704* |
| | | (0.1086) | (0.1047) | (0.0974) |
| femboss | female top management (0,1) | 0.2831*** | 0.3576*** | 0.5432*** |
| | | (0.1097) | (0.0979) | (0.0987) |
| **Country level countrol variables** | | | | |
| fertil | fertility rate | | | |
| fempop | female % of population | | 0.4134*** | |
| | | | (0.0937) | |
| regeff | regulatory efficiency | | 0.0215 | |
| | | | (0.0174) | |
| Internet | internet servers | | 0.0007*** | 0.0005*** |
| | | | (0.0001) | (0.0001) |
| gdpcap | GDP per capita | -0.0001*** | -0.0001*** | -0.0001*** |
| | | (0.0000) | (0.0000) | (0.0000) |
| rural | rural % of population | -0.011** | -0.0315*** | -0.0109*** |
| | | (0.0044) | (0.0055) | (0.0035) |
| wbljob | women – getting job | | -0.0111*** | -0.0067*** |
| | | | (0.0038) | (0.0020) |
| wblpay | women – being paid | 0.0104*** | 0.0169*** | 0.0144*** |
| | | (0.0032) | (0.0053) | (0.0022) |
| wblbus | women – running business | -0.020*** | 0.0165* | |
| | | (0.0070) | (0.0093) | |
| wblfin | women – managing assets | -0.037*** | 0.0088 | |
| | | (0.0076) | (0.0099) | |
| **Firm level control variables** | | | | |
| empall | Firm size (employment) | -0.002*** | -0.0019*** | |
| | | (0.0007) | (0.0007) | |
| foreign | % foreign owned | | | -0.0058*** |
| | | | | (0.0017) |
| age | age of firm | | | |
| manexp | top manager experience | | -0.0101** | |
| | | | (0.0041) | |
| loan | firm received loan (0,1) | | | |
| infrastructure | sales lost to infrastructure problems | 0.1086* | | 0.0867* |
| | | (0.0611) | | (0.0492) |
| bureaucracy | % of management time lost | | | |
| training | training provided (0,1) | | | -0.1509 |
| | | | | (0.0941) |
| seas | share of seasonal employment | | 1.2247** | |
| | | | (0.5105) | |
| workeduc | gap in worker education | | | |
| cons | constant (intercept) | 4.2139*** | -23.049*** | -10.731*** |
| | | (0.6973) | (4.9479) | (3.6700) |
| Country dummy variables | | yes | yes | yes |
| Number of observations | | 243 | 371 | 335 |
| F statistic | | 23.71 | 47.5 | 11.91 |
| | | (11, 231) | (15, 355) | (11, 323) |
| R squared | | 0.4105 | 0.4652 | 0.2853 |
| Root MSE | | 0.84703 | 0.86796 | 0.84613 |
| **NOTE: robust standard errors are in parentheses** | | | | |
| *** indicates significant at 99% confidence, ** 95% and * 90% | | | | |

For all three sectors the existence of a female top manager has a substantial, positive and statistically significant (at 99% confidence) effect on the employment of women in managerial positions. This suggests that, for all sectors, female top managers are much more willing than males to recruit females into the managerial team. The effect of female ownership had a positive and statistically significant (at 99%) effect on female management employment in other services, perhaps as a result of the prevalence of owner run businesses in that sector. For tourism related firms the effect was positive but not statistically significant and for Manufacturing positive and significant at 90% confidence. There were very few consistent findings across sectors with respect to the control variables. Where effects were statistically significant there were of relatively small magnitude.

The main conclusions of the OLS regression analysis are that a female top manager was negatively associated with productivity across all three sectors but this effect was only statistically significant for tourism related firms. Likewise female ownership was negatively associated with productivity for all three sectors but the effect was only statistically significant for other services. For profitability the findings were that both a female top manager and female ownership were negatively associated with profitability (but only statistically significantly for female ownership in other services). For Manufacturing the effects of both were positive but not statistically significant.

For the analysis of the share of females in employment the analysis resulted in a positive and statistically significant effect (at 90% confidence or higher) for all three sectors. In short, female top managers tend to be more willing to hire females in any sector in the Caribbean. The effects of female ownership were also positive for each sector but only statistically significant for other services. When the effects on female employment in managerial positions is considered the effects are similar but stronger. A female top manager has a positive and substantial effect on female managerial employment which is significant at 99% confidence in all three sectors. The effect of female ownership is also positive for all three sectors but not statistically significant for tourism related firms

# 6.    Inverse Probability Weighted Regression Adjustment (IPWRA)

In Table 3 this study showed that, for the sample of tourism related firms, the share of firms with equal or greater than equal female ownership or top management was higher than for other economic sectors. There are many possible explanations as to why tourism related activities might exhibit comparatively more female owned and run firms. The purpose of this analysis is, firstly, to test whether firm performance has a role at all in any of these explanations. That is, it seeks to test whether there is any evidence from tourism related firms and firms in other broad sectors (by way of comparison) that those with a female top manager or some female ownership perform better or worse than male dominated firms. Performance, as before, is measured by productivity, profitability and the share of women in employment (in total and in managerial positions).

IPWRA analysis varies both the treated and control group. To avoid possible confusion the treated and control groups in each case are summarised as follows. For "absolute" treatment effects the control group are those firms that are male dominated (that have neither a female top manager nor any female owners). The comparison is with three different "treated" groups:

- firms with a female top manager but no female owners
- firms with some female ownership but no female top manager, and
- firms which have both a female top manager and some female ownership.

Note that the first two of these are comparable to the corresponding variables in the OLS regression analysis but the IPWRA analysis adds a third – firms which are both female owned and managed. This adds a further and important dimension to the analysis. For example, it allows the possibility that female owned and managed firms may differ from those that are female owned but male managed.

The "relative" treatment effects are defined as:

- firms with some female ownership (but no female top manager) compared to the control group of firms with a female top manager (but no female ownership)
- firms with both female owners and a female top manager compared to those with a female top manager but no female ownership
- firms with both female owners and a female top manager compared to those with a female ownership but no female top manager.

Table 9 sets out the results of the IPWRA analysis of the effects of female ownership and top management on productivity for tourism related firms. Other services and Manufacturing are included to provide a sense of whether tourism related firms are somehow distinct from other sectors. Note that "Both" refers to firms which have at least equal female ownership and at least equal female top management. In terms of absolute effects there were no statistically significant results for tourism related firms. For tourism related firms there was no statistically significant absolute effect of female ownership on productivity but a negative and statistically significant effect of a female top manager (at 95% confidence) and for firms with both a female top manager and female ownership (at 90% confidence). Firms with both a female top manager and female ownership also exhibited statistically significant lower productivity but only at 90% confidence. These results, although in accord with a number of findings in the literature, are at variance with our decomposition findings. This is attributable to the difference in techniques. IPWRA does not utilise the full sample but compares a "treated" sub-sample with a matched "control" group – in this case a sample of male owned and male managed firms selected to share common characteristics of relevance.

By way of comparison the absolute effects for other services suggest that there is no statistically significant difference in productivity (at 90% confidence) between firms that are male dominated in both management and ownership and firms with either female top management or female ownership. As with tourism related firms, those with both a female top manager and female ownership had a statistically significantly lower productivity but, again, only at 90% confidence. For Manufacturing the findings are different. Firms with a female top manager (but not female owners) and those with female owners (but not a female top manager) have a statistically significantly, at 95% confidence, higher productivity than firms that are male dominated by both ownership and top management. Firms which have both female top management and female ownership revealed no statistically significant difference from male dominated firms.

**Table 9: IPWRA Analysis of Productivity**

| Sample | | Absolute Effects | | |
|---|---|---|---|---|
| | | Female Management | Female Ownership | Both |
| TOURISM RELATED | ATT | -0.3488729** | -0.2776307 | -0.514286* |
| | Std Error | (0.1712492) | (0.1924114) | (0.3077358) |
| | | Relative Effects | | |
| | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | -0.13222 | -0.3917115 | -0.4522852 |
| | Std Error | (0.1906952) | (0.2533314) | (0.3394977) |
| Sample | | Absolute Effects | | |
| | | Female Management | Female Ownership | Both |
| OTHER SERVICES | ATT | 0.0461782 | -0.0722388 | -0.3058096* |
| | Std Error | (0.1293075) | (0.1492284) | (0.1650006) |
| | | Relative Effects | | |
| | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | -0.0485483 | -0.4425244** | -0.4840134** |
| | Std Error | (0.1671408) | (0.1832599) | (0.2275934) |
| Sample | | Absolute Effects | | |
| | | Female Management | Female Ownership | Both |
| MANUFACTURING | ATT | 0.3880039** | 0.3181685** | 0.0487317 |
| | Std Error | (0.1525581) | (0.1603947) | (0.2039546) |
| | | Relative Effects | | |
| | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | 0.054326 | -0.3209625 | -0.5294192* |
| | Std Error | (0.2545655) | (0.3003421) | (0.3159794) |
| Absolute treatment effects are in relation to the control group of predominantly male owned and male managed firms *** statistically significant at 99%, ** at 95% and * at 90%. | | | | |

For all tourism related and for hospitality firms there were no statistically significant relative effects. That is, for example, comparing firms with female participation in management with those with female participation in ownership (and those with both) suggests no statistically significant effects on productivity. In this respect the tourism related sector is systematically different from other services but not from manufacturing. The OLS regression results found a statistically significant negative association between a female top manager and productivity only for tourism related firms. The IPWRA analysis also finds a statistically significant effect and shows that this effect is even stronger when narrowed to firms which are both female managed and owned. The results are most at odds between the two estimators for Manufacturing – a positive and statistically significant effect for IPWRA and a negative but insignificant effect under OLS.

Table 10 provides a similar IPWRA analysis but for the effects of female participation in ownership and top management on profitability. In this case firms in tourism related activities with female participation in top management show no statistically significant difference in profitability from firms dominated by males in both ownership and top management. However, both firms with female participation in ownership only or in both ownership and top management are shown to have a statistically significantly (at 95% and at 90% respectively) lower profitability. For hospitality

firms, it is only those firms with female participation in both ownership and top management that were found to have a statistically significantly (95% confidence) inferior profitability. For all tourism firms and for hospitality firms there were no statistically significant relative effects. That is, there are no differences in profitability performance between firms with female participation in top management only from firms with female ownership only and no significant difference in productivity between either and firms with female participation in both.

Comparison with the results for the "other services" sector again reveals some differences from tourism related firms. For other services none of either the absolute or relative effects were statistically significant. That is, the evidence does not support any difference in profitability between firm with female participation and firms without female participation. For Manufacturing the findings are different. In particular female participation in top management was found to result in a statistically significantly (at 99% confidence) higher level of profitability compared to firms which are male dominated in both ownership and top management.

**Table 10: IPWRA Analysis of Profitability**

| Sample | | Absolute Effects | | |
|---|---|---|---|---|
| | | Female Management | Female Ownership | Both |
| TOURISM RELATED | ATT | -0.5450245** | -0.553776** | -0.7440955* |
| | Std Error | (0.2693557) | (0.2820048) | (0.4213824) |
| | | Relative Effects | | |
| | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | -0.3363805 | -0.5120229 | -0.3732769 |
| | Std Error | (0.3391278) | (0.4040905) | (0.4502057) |
| Sample | | Absolute Effects | | |
| | | Female Management | Female Ownership | Both |
| OTHER SERVICES | ATT | 0.2590029 | 0.0798591 | -0.2084105 |
| | Std Error | (0.2000493) | (0.1853634) | (0.2181458) |
| | | Relative Effects | | |
| | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | 0.1523797 | -0.1968478 | -0.5933237** |
| | Std Error | (0.2098344) | (0.254474) | (0.2861311) |
| Sample | | Absolute Effects | | |
| | | Female Management | Female Ownership | Both |
| MANUFACTURING | ATT | 0.5398939** | 0.5137041** | 0.2988918 |
| | Std Error | (0.2880799) | (0.2200727) | (0.2527255) |
| | | Relative Effects | | |
| | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | 0.3993697 | 0.0560428 | -0.4024534 |
| | Std Error | (0.5113816) | (0.5746286) | (0.3440597) |
| Absolute treatment effects are in relation to the control group of predominantly male owned and male managed firms *** statistically significant at 99%, ** at 95% and * at 90%. | | | | |

For tourism related firms there are, as with the analysis of productivity, no statistically significant relative effects. That is there exists no evidence of statistically significant differences in profitability between firms which are female owned (but not female managed) and firms which are female managed but not female owned, nor is there any significant difference between either type of firm

and those that are both female owned and managed.  These relative effects are in almost all cases also not statistically significant for either other services or manufacturing.  In that respect, tourism related firms are behaviourally similar to those in other sectors in the Caribbean.

The OLS regression analysis found a negative effect of (a) a female top manager and (b) female ownership on profitability for tourism related firms and those in other services but a positive relationship between profitability and both for Manufacturing.  In this respect there is no difference in the findings between OLS and IPWRA.  For OLS none of the relevant coefficients were statistically significant at 95% confidence. Under IPWRA the results were statistically significant at 95% (for both a female top manager and female ownership) for tourism related and Manufacturing but not for other services. This may attributable to the procedure of weighting the regression according to inverse probability providing a more precise basis for comparison between "male" and "female" firms.

Table 11 summarises the IPWRA analysis of the effects of female participation at the top of firms on the employment of women. For tourism related firms the absolute effects on female employment are positive and statistically significant at 95% confidence or more. That is, firms with female management (but not ownership), firms with female ownership (but not management) and firms with both all exhibit statistically significantly higher shares of females in employment than do male dominated firms.  For both Manufacturing and other services a similar set of results can be observed – statistically significant absolute effects on the share of females in employment. Whilst these positive effects are comparable in magnitude between tourism related firms and other services they are somewhat smaller for manufacturing.

**Table 11: IPWRA Analysis of the Share of Females in Total Employment**

| Sample | | Absolute Effects | | |
|---|---|---|---|---|
| | | Female Management | Female Ownership | Both |
| TOURISM RELATED | ATT | 0.0623408** | 0.0636255** | 0.1544623*** |
| | Std Error | (0.0310411) | (0.0326404) | (0.0372403) |
| | | Relative Effects | | |
| | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | -0.0326546 | 0.0891131** | 0.0938938** |
| | Std Error | (0.0351248) | (0.0363182) | (0.0439572) |
| Sample | | Absolute Effects | | |
| | | Female Management | Female Ownership | Both |
| OTHER SERVICES | ATT | 0.0634613*** | 0.0370121** | 0.1526433*** |
| | Std Error | (0.0176201) | (0.0178443) | (0.023725) |
| | | Relative Effects | | |
| | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | -0.0520057** | 0.0613349** | 0.1141053*** |
| | Std Error | (0.0214927) | (0.0241531) | (0.0268731) |
| Sample | | Absolute Effects | | |
| | | Female Management | Female Ownership | Both |
| MANUFACTURING | ATT | 0.0409581** | 0.0386536** | 0.1230089*** |
| | Std Error | (0.0190531) | (0.0200556) | (0.030574) |
| | | Relative Effects | | |
| | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | -0.032367 | 0.0544152 | 0.0610077* |
| | Std Error | (0.0379137) | (0.042393) | (0.0348926) |
| **Absolute treatment effects are in relation to the control group of predominantly male owned and male managed firms *** statistically significant at 99%, ** at 95% and * at 90%.** | | | | |

For tourism related firms the relative effect between those firms which are female managed (but not owned) is not statistically significant but those firms which are both female owned and managed do exhibit a statistically significantly greater share of females in employment than either of them. For other services it is also the case that firms that are both owned and managed by females employ a greater share of women than firms that are either just female owned or just female managed. This is not the case for manufacturing where there were no statistically significant relative effects.

The OLS regression analysis found a positive and statistically significant and positive effect of a female top manager on female employment for all three sectors. For female ownership the effect was positive for all three sectors but only statistically significant for other services. The IPWRA analysis found statistically significant and positive effects of both for all three sectors. As with the profitability analysis the effect of adjusting for comparability has done little to influence the conclusions that could be drawn from the coefficients alone but, by increasing statistical significance, strengthened confidence in those conclusions.

The IPRWA analysis was extended to treatment effects of female ownership and female management on the share of females in managerial positions. Table 12 presents the results. For tourism related firms the share of females in managerial positions is both statistically significantly and substantially higher (than for male dominated firms) for firms with female top management and

for firms with both female management and ownership. There was no statistically significant effect of female ownership alone. A similar picture emerged for manufacturing firms – a statistically significant and substantial absolute effect for female managed only and both female managed and owned firms but not for female owned only.  For other services the absolute effects (that is, in comparison to male dominated firms) were positive and statistically significant for all three types of female participation.

**Table 12: IPWRA Analysis of the Share of Females in Managerial Employment**

| Sample | | | Absolute Effects | | |
|---|---|---|---|---|---|
| | | | Female Management | Female Ownership | Both |
| TOURISM RELATED | ATT | | 0.1442937*** | 0.0473989 | 0.2208901*** |
| | Std Error | | (0.0476971) | (0.0523298) | (0.055632) |
| | | | Relative Effects | | |
| | | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | | -0.1676907** | 0.0601296 | 0.1035186 |
| | Std Error | | (0.0663999) | (0.0705596) | (0.0763075) |
| Sample | | | Absolute Effects | | |
| | | | Female Management | Female Ownership | Both |
| OTHER SERVICES | ATT | | 0.1707145*** | 0.064224** | 0.3504646*** |
| | Std Error | | (0.0278382) | (0.0276053) | (0.0417824) |
| | | | Relative Effects | | |
| | | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | | -0.173093*** | 0.0872405** | 0.2895909*** |
| | Std Error | | (0.0379091) | (0.0455838) | (0.0497975) |
| Sample | | | Absolute Effects | | |
| | | | Female Management | Female Ownership | Both |
| MANUFACTURING | ATT | | 0.1679382*** | 0.0380182 | 0.3064425*** |
| | Std Error | | (0.0365656) | (0.026799) | (0.0533758) |
| | | | Relative Effects | | |
| | | | Female Ownership vs. Female Management | Both vs. Female Management | Both vs. Female Ownership |
| | ATT | | -0.145503** | 0.0734225 | 0.2717444*** |
| | Std Error | | (0.0589865) | (0.0641257) | (0.059908) |
| Absolute treatment effects are in relation to the control group of predominantly male owned and male managed firms | | | | | |
| *** statistically significant at 99%, ** at 95% and * at 90%. | | | | | |

For tourism related firms only one of the relative effects was statistically significant. Female top management was found to have a statistically significantly stronger effect of female managerial employment than female ownership but neither was found to be statistically significantly different from firms with both female management and ownership.  For both other services and manufacturing firms female top management alone also resulted in more female managerial employment than did female ownership alone.  For firms in both sectors firms with both female managers and owners employed a significantly share of females in managerial employment than those with female ownership alone.

The comparable OLS analysis found a positive and statistically significant effect of a female top manager on female managerial employment for all three sectors. The IPWRA analysis finds the same.  For the effects of female ownership OLS analysis found a positive effect for all three sectors but this was only significant at 95% confidence for other services. Again the findings of IPWRA were the same.

Table 13 provides a summary comparison of the main findings of the OLS and IPWRA analysis.

**Table13: Summary Comparison of OLS and IPWRA Results**

| | Female top manager | | | |
| | OLS | | IPWRA | |
| | sign | significance | sign | significance |
|---|---|---|---|---|
| **Tourism Related** | | | | |
| Productivity | negative | *** | negative | ** |
| Profitability | negative | none | negative | ** |
| Share of females in all employment | positive | * | positive | ** |
| Share of females in managerial employment | positive | *** | positive | *** |
| **Other Services** | | | | |
| Productivity | negative | none | positive | none |
| Profitability | negative | none | positive | none |
| Share of females in all employment | positive | *** | positive | ** |
| Share of females in managerial employment | positive | *** | positive | *** |
| **Manufacturing** | | | | |
| Productivity | negative | none | positive | ** |
| Profitability | positive | none | positive | ** |
| Share of females in all employment | positive | *** | positive | ** |
| Share of females in managerial employment | positive | *** | positive | *** |
| | Female ownership | | | |
| | OLS | | IPWRA | |
| | sign | significance | sign | significance |
| **Tourism Related** | | | | |
| Productivity | negative | none | negative | none |
| Profitability | negative | none | negative | ** |
| Share of females in all employment | positive | none | positive | ** |
| Share of females in managerial employment | positive | none | positive | none |
| **Other Services** | | | | |
| Productivity | negative | ** | negative | none |
| Profitability | negative | * | positive | none |
| Share of females in all employment | positive | ** | positive | ** |
| Share of females in managerial employment | positive | *** | positive | ** |
| **Manufacturing** | | | | |
| Productivity | negative | none | positive | ** |
| Profitability | positive | none | positive | ** |
| Share of females in all employment | positive | none | positive | ** |
| Share of females in managerial employment | positive | * | positive | none |
| | | | | |
| **Note: *** statistically significant at 99%, ** at 95% and * at 90%.** | | | | |

The results for both OLS and for IPWRA are consistent for all three sectors for the effects of a female top manager on the share of females in all employment and in managerial employment. The effect is positive and statistically significant according to both estimators for all three sectors. The estimated effects of female ownership on all employment and on managerial employment are again estimated to be positive for all three sectors but the results are not always statistically significant. The IPWRA analysis finds no statistically significant effect on female managerial employment for two

sectors – tourism related and manufacturing.  For all three sectors it produces statistically significant results for overall employment.  It is reasonable to suppose that, all other things being equal, the reduction in heterogeneity of the IPWRA estimator would be more likely to produce statistically significant results. In a general sense the two estimators produce a consistent picture for female employment. A female top manager unambiguously has a positive and statistically significant effect on overall and managerial employment in all three sectors.  Female ownership also has a positive effect on both types of female employment with both estimators but it is less certain that this effect is statistically significant.

The effects of female top management on both productivity and profitability are less consistent across sectors and between estimators. For the tourism related sector both estimators, with one exception produce, estimates  which are negative but not statistically significant.  For other services the effects are negative and statistically significant with OLS but not significant with IPWRA.  For manufacturing the results are not significant with OLS but positive and significant with IPWRA. In general terms this study produces no conclusive or consistent evidence that a female top manager or female ownership affects firm productivity or profitability in the tourism related sector or in the wider economy in the Caribbean.  That is, this study does not find conclusive evidence that female participation systematically affects firm productivity or profitability but it does find strong evidence to believe that a female top manager (in particular) and female ownership do affect female employment in all sectors, particularly in managerial positions.

# 7.    Conclusions

Much of the existing literature on the relationship between firm performance and female participation at the top of the firm (either as owners or as managers or both) suggests a negative relationship between the two – that female managed or owned firms perform less well in terms of productivity or profitability. This and a related literature set out the many reasons why constraints on female opportunities create this situation.  For consistency with the literature this study, firstly, ran an OLS regression analysis of a sample of Caribbean firms.  For manufacturing and other services the results were, as might be expected from the literature, that female management and female ownership were associated with lower productivity and lower profitability than male dominated firms.  For tourism related firms this was also true for profitability but not for productivity.

The second strand of analysis used an IPWRA matching estimator.  This also found statistically significant negative effects of both female top management and female ownership on productivity and profitability for tourism related firms in the Caribbean sample.  The same was true for firms engaged in other services only when firms were both female owned and managed. In contrast, for manufacturing firms female ownership and female management had statistically significant and positive effects on both productivity and profitability.  Thus, for tourism related firms (and for other service firms to a lesser extent) the IPWRA findings are again consistent with the view that female opportunities are constrained. The contrary results for manufacturing can be attributed either to

specific features of the Caribbean or to the way in which the IPWRA estimator addresses heterogeneity in data. No conclusion supported by evidence can be offered but both explanations are plausible and are not mutually exclusive.

An important feature of our analyses was the effect of female top management and female ownership on female employment and, in particular, in tourism related firms. Given the importance of tourism to the Caribbean, outward migration from the region, unemployment within it and continued gender disparities this is of no small relevance. Our OLS regression analysis found both female managed and female owned firms to employ a statistically significantly larger share of women in tourism related firms. In this they were similar to other firms in the Caribbean. Similar results were obtained for firms in manufacturing and other services. These findings were confirmed by the IPWRA analysis which found female participation at the top of firms (ownership and management) to have statistically significant positive effects on the share of women in overall employment for all three sectors.

Both strands of analysis were repeated for female employment in managerial positions. For tourism related firms the decomposition analysis found a statistically significant effect of female management (but not of female ownership) female employment in managerial positions. This was again supported by similar conclusions from the IPWRA analysis. Again, this was not unique to tourism related firms. Those in both manufacturing and other services exhibited comparable behaviour.

From a perspective of policy the common ground with the existing literature (which suggests that women in the Caribbean, as elsewhere, face constraints in becoming owners or managers of firms) is that there is not consistent evidence that firms that are female owned or managed are less competitive. Neither the Caribbean nor tourism related activities are unique in this respect but tourism, employment and gender disparities are of particular concern to the region. The finding that putting women in positions of power within firms, as either top managers or as owners (or both) results in a greater share of female employment is of considerable relevance. Of even more consequence is that these effects are even stronger for employment in a managerial capacity. Policies to support and encourage female ownership or management can be expected to affect not just the women directly concerned but to also extend opportunities to others too. The findings of the OLS analysis suggest that access to loan finance and national regulatory efficiency are important for productivity and profitability. This suggests that loan financing targeted at female run firms may be effective way to promote greater female participation in both the managerial and overall workforce.

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