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Abstract

In Bangladesh, despite of increased participation in the labour market in recent decades, women are still lagging behind men by a significant margin with the formers being concentrated mostly in low paid agriculture as well as in lower stages of occupational ladder. With the help of latest labour market data of 2016-17, this paper attempts to examine gender based occupational segregation through sectoral classification as well as skill based occupational classes. Our econometric estimation of different sectors (agriculture, manufacturing, construction and service) reflects importance of gender centric factors such as care burden and marital status in determining females' employment status. Besides, decomposition analysis highlights that, if women would be given similar return to their endowments as that of men, their sector wise participation is expected to change in favour of relatively high paid service and industry and will fall in low paid agriculture sector. Both sector wise as well as occupation based segregation indices reflect high degree of segregation between men and women. Against the backdrop of concentration of women in low skilled jobs and low productive sector, this paper expects to provide important policy insights for boosting female employment in relatively high productive sectors and highly paid occupations while utilizing the structural shift in the labour market of Bangladesh.

1. Introduction and Background[2]

Despite of attaining consistently high rates of growth of more than 7% over the last five years and making remarkable progress in a number of human development indicators, e.g. head count poverty, life expectancy, gender parity at primary education etc., there remains argument that Bangladesh has not been able to translate the growth experience into its labour market. For example, employment elasticity of growth is showing a falling trend in recent years, indicating declining capacity of growth to generate employment.[3] However, the most significant change that has occurred in the labour market in the last two or three decades is perhaps the rising participation of women, with the female labour force participation expanding from around 8% in the mid 1980s to more than 36% in 2016-17. Given the patriarchal and conservative social structure of the country, such a trend in female labour force participation is certainly impressive. However, labour market participation of women in Bangladesh should be analysed more critically for a number of reasons. From a mere numerical point of view, despite the increase, women's participation rate is still much lower than that of men's and the rate of growth of participation rate has also slowed down in recent years, and as a result labour market participation rate of women has been within the range of 33 to 36% for the last ten years or so. On the other hand, on the ground of quality of work, women are found to be concentrated in low paid and low productive activities with a significant percentage working as unpaid family worker, reflecting inferior position of women in comparison to men (Raihan & Bidisha, 2018).

Women are also found to be in overwhelmingly large proportion in agriculture sector, which is low paid, low productive and often suffers from high degree of income volatility and as high as 59.7% of women are found to be engaged in such activities (BBS, 2018). With the structural transformation in the economy, over time the share of women's employment in agriculture has come down from as high as 68% in 2005-06 to 59.7% in 2016-17 and in industry and service sector the percentages have gone up from 12.5% to 16.8% and from 19.3% to 23.5% respectively. However, one important feature of this transformation is its gendered nature-the shift in sectoral transformation has been much stronger for men, leaving women lagging behind men in the labour market. Besides, it is not only from a broad based sectoral perspective, but also from more detailed occupational choices, women's inferior position can be observed. For example, the latest data from the Quarterly Labour Force Survey (QLFS) of 2016-17 shows that, only 10.73% of managerial positions are held by women where the corresponding figure for professional jobs is also around 35.33% -which strengthens the argument in favour of not only sectoral but also occupational segregation of women (BBS, 2018).

Despite of the importance of such gender based occupational segregation, both from a broad sectoral point of view as well as from occupational context, to our knowledge no study has attempted to examine it for Bangladesh. This paper, with the help of latest labour market data of Bangladesh has attempted to examine sectoral and skill based occupational segregation between men and women. Against the backdrop of stagnant participation of women on one hand, and

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[2] Abbreviations used in this article: Bangladesh Bureau of Statistics (BBS); Quarterly Labour Force Survey (QLFS); Labour Force Survey (LFS); Ready-Made Garments (RMG); Multinomial Logit (MNL); Index of Dissimilarity (D); Index of Net Differences (ND); Female Labour Force Participation (FLFP); Labour Force Participation Rate (LFPR); and Average Marginal Effects (AMEs).

[3] During 2005-06 to 2009-10 employment elasticity was 0.55 which has fallen to 0.25 during 2009-10 to 2017-18 with employment elasticity in manufacturing sector fallen from 0.87 to 0.65 (Authors' own calculation).

their concentration in low skilled jobs on the other hand, it expects to provide important policy insights for boosting female employment while utilizing the structural shift in the economy.

The remainder of the paper is structured as follows: section 2 examines relevant prior literature; section 3 describes the data and outlines the empirical strategy of the study; section 4 offers key summary statistics regarding the labour market of Bangladesh; section 5 presents and discusses the empirical results; and section 6 concludes by providing policy recommendations.

2. Literature Review

While looking at the literature on female labour force participation in Bangladesh, one interesting aspect can be observed-despite the constraints of social norms and customs, poverty has been a push factor for labour force participation of women. For example, Cain and Nahar (1979) explored the relationship among social class, male dominance and women's work and demonstrated that despite the presence of powerful norms of female seclusion, due to poverty and family responsibilities, potential resistance of patriarchy was reduced to some extent and more women started to get involved in paid work. Kabeer and Mahmud (2004), with the help of information of 1,322 working women, made a comparison of socio-economic characteristics, wages and working conditions and found the importance of poverty in case of employment of women in the export-oriented industries of Bangladesh. Verick (2018) attempted to explore the complex relationship between female labour force participation and development and found that labour force participation of women in developing countries was not only driven by poverty but also by the type of shock coping mechanism that they might have applied.

In addition to poverty, several other literatures explored the importance of other socio-cultural factors in determining female labour force participation. In this context, research of Salway, Rahman and Jesmin (2003) on urban poor of Dhaka revealed that socio-cultural factors like marriage and motherhood were the key factors associated with lower rates of employment of women. Hossain, Bose and Ahmad (2004) while using household-level data explored the nature and impact of women's participation in economic activities in rural Bangladesh. In their analysis, they constructed an empowerment index from the data on household decision making and analysed its impact on women's employment. In the context of developing countries, using data from a survey of both public and private sectors, Andaleeb and Wolford (2004) attempted to analyze the way women were integrated into the workforce and found that there was statistically significant differences in the perception of workplace environment and organizational inhibitors across genders. Using data of slum dwellers of Bangladesh, Salway, Jesmin and Rahman (2005) attempted to explore the impact of female employment on a number of empowerment related indicators e.g. mobility, control of material resources, etc., and found that employment status posed challenges to these indicators. In addition, the author also examined the existing pay gap and lack of formalisation of jobs among the slum-dwellers of Dhaka city. Chowdhury (2010) explored the impact of infrastructural development in promoting opportunities of paid work and in reducing women's time burden. Using household income and expenditure survey data, this research showed that infrastructure indeed had an important role in shaping women's work but that was with a lag. In addition, the author also found that, in contrast to general perception, an

increase in paid work outside the house was not inversely related to the amount of unpaid work at home. A study conducted on the trends, drivers and barriers of female labour force participation by Rahman and Islam (2013) revealed that women's participation in casual jobs was positively correlated with poverty and negatively correlated with motherhood, marital status and educational attainment. Heath (2014) found that for women with low education and for those who were married at young age, there was a positive association between paid employment and domestic violence. According to the author, the risk of domestic violence was likely to be greater for this group of women and that was likely to be related to the fact that their husbands sought to counteract with their increased bargaining power gained through employment. Ahmed and Maitra (2015), using unconditional quantile regression models, showed that women were paid less than men throughout the entire distribution and the gap was found to be higher at the lower end of the distribution. Verick (2018) revealed the importance of access to education in case of employment and found a positive relationship between reservation wage and educational attainment. Using Labour Force Survey data of two rounds, Mahmud and Bidisha (2018) tried to identify the factors behind labour supply decisions of women in Bangladesh. They concluded that compared to earlier periods when poverty acted as the driver of women's labour force participation, in later years the impact of gender based norms/characteristics became the dominant factors. In a relatively recent work, Raihan and Bidisha (2018), while exploring stagnation of female labour force participation in Bangladesh, also found the important impact of gender centric factors. In addition, their study also emphasized about the impact of demand side factors e.g. sluggish growth of the Ready-Made Garments (RMG) sector, technological change on female labour force participation in Bangladesh.

From methodological point of view, a number of indices and decomposition techniques have been used to investigate gender based inequality in occupational status and wage distribution. In a seminal work, Oaxaca and Blinder (1973) examined wage differentials between men and women within the same occupation due to differences in characteristics as well as differences in returns to characteristics, where their decomposition technique estimated and assessed the degree of discrimination against female workers in the United States. Blinder-Oaxaca decomposition however has two limitations. Firstly, it has been devised for a situation where the sample could be subdivided into two mutually exclusive groups thus it does not let us perform the decomposition using a common coefficient vector. Secondly, Blinder Oaxaca decomposition cannot be applied in cases of more than two groups of population. In this context, Borooah and Iyer (2005) formulated a decomposition technique addressing these limitations and estimated inter-community differences in the enrolment of boys at schools in India. In another research work, Borooah (2005) explored inequality and poverty in terms of cast-based discrimination among the households of India and applied a decomposition method which decomposed the income differences between Hindu (caste) and Scheduled Cast (SC) and Scheduled Tribe (ST) into a 'discrimination effect' and an 'attributes (residual) effect'. The former effect accounted for the effect which depended on the household being a Schedule Cast or Scheduled Tribe. On the

other hand, the latter accounted for the fact that there are systematic differences in income generating profile among the Hindu and the SC/ ST.

A number of indices have also been applied in the literature to understand the gap in labour market experiences between men and women. In this context, Duncan and Duncan (1955) devised a gender based occupational segregation index which assessed whether there was more than expected number of participants of a particular gender in a particular occupation. In particular, this index shows the proportion of employed men or women who would have to change their occupations to equalize the occupational distribution. Another method to assess the extent of differentiation for a distribution of ranked categories is the Index of Net Differences, introduced by Lieberson (1975). This method is often considered superior to understand occupational segregation due to its flexibility in application- it can be applied when the ordered distribution have different distributional form in each group. Later this index was modified and applied by Epstein and Semyonov (1992), and Semyonov and Jones (1999). The former assessed the degree of occupational differentiation between Arab men and women whereas the latter work attempted to explore differences between gender-based occupational segregation and gender-based occupational inequality.

3. Data and Methodology

3.1. Data description

This paper is based on the Quarterly Labour Force Survey (QLFS) 2016-2017 and Labour Force Survey (LFS) 2010 of Bangladesh, conducted by Bangladesh Bureau of Statistics (BBS). These are nationally representative surveys containing information of key labour market variables along with socio-demographic factors.[4][5] From a methodological point of view, in addition to simple descriptive statistics of gender based labour market status, this paper has applied a number of econometric techniques for getting better insights of gender based segregation.[6][7]

3.2. Empirical methodology

Due to heavy concentration of women in relatively low paid and low productive agriculture, it is crucial to understand the factors constraining their participation in non-agriculture activities. From an econometric point of view, to this end we estimated a Probit regression of non-

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[4] The survey of 2016-17 is a rotating panel by construction.
[5] For this analysis, the study considered only primary jobs.
[6] The annual weight provided by BBS was applied to QLFS 2016-17 to ensure comparability between 2016-17 and 2010 databases.
[7] For industrial classification, both datasets have made use of the Bangladesh Standard Industrial Classification (BSIC), which is based on the International Standard Industrial Classification (ISIC) Revision 4. For occupational classification, however, LFS 2010 used International Standard Classification of Occupation (ISCO-88) whereas QLFS 2016-17 used Bangladesh Standard Classification of Occupations 2012 (BSCO-2012), which is based on the International Standard Classification of Occupations (ISCO-08). We used the Stata command *iscogen* (Jann, 2019) for converting ISCO-88 to ISCO-08.

agricultural vs. agricultural employment and applied Blinder-Oaxaca decomposition where the decomposition disaggregated differences in employment probability into explainable part due to differences in characteristics and an unexplainable component.

It is not only non-agricultural activities as a whole, there can be differential effect of different factors for being in a specific sector of employment too and for this analysis, a Multinomial Logit (MNL) model on sectoral employment for both men and women has been estimated for four broad sectors, namely (i) agriculture (ii) manufacturing (iii) construction and (iv) service. The analysis has been proceeded further while decomposing the results following Borooah (2005) where differences in probability of being in different sectors are decomposed while considering the change in those average probabilities if: (i) women were given the coefficients (or endowments) of men and vice versa, and (ii) women were given the endowments of men and vice versa.[8]

Given the concentration of women in agriculture sector and less representation in manufacturing and service sector (see Table 4), it is worth investigating the sectoral employment pattern. In this context, we constructed horizontal segregation indices (Index of Dissimilarity), a variant of which is commonly used in the literature (see, for instance, Bertaux, 1991; Brown, Pagán & Rodriguez-Oreggia, 1999; DeLeire & Levy, 2004; Fuchs, 1989; Preston, 1999; Semyonov & Jones, 1999; and Tzannatos, 1999) to understand the sectoral status of gender based segregation. In addition to sectoral segregation, women are also found to be less represented in high skilled occupations (Table 3) thus in the next step the degree of occupational segregation in the labour market has also been analysed through Index of Dissimilarity (D). This segregation index can be calculated in the following manner (Duncan & Duncan, 1955):

$$D = 0.5 \sum_{i=1}^{n} |F_i/F - M_i/M| \tag{1}$$

where F_i is the number of women in the ith sector/occupation; F is the total number of employed women in the labour force; M_i is the number of men in the ith sector/occupation; and M is the total number of employed men in the labour force.

In addition to occupational choices, it is also argued that women are faring lower than men in terms of earnings and therefore in the final stage of our analysis, we attempted to understand the rank-based occupational distributions between men and women, with the assumption being higher paying jobs are 'better' jobs. For that, we measured vertical segregation using an Index of Net Differences (ND)[9]. ND has been estimated in the following manner (Lieberson, 1976):

$$ND_{mf} = pr(M > F) - pr(F > M) = \sum_{i=2}^{n} M_i \left(\sum_{j=1}^{n=i-1} F_j \right) - \sum_{i=2}^{n} F_i \left(\sum_{j=1}^{n=i-1} M_j \right) \tag{2}$$

where M and F are the relative frequency distributions of men and women, respectively, and i and j denote rank-ordered occupational categories from lowest to highest. ND takes into account the ordinal nature of occupations and helps to measure vertical segregation (Lewin-Epstein & Semyonov, 1992; Semyonov & Jones, 1999).[10]

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[8] For methodological discussion, see Borooah (2005).

[9] See Beggs (1995), Fossett et al. (1986), Cohen and Huffman (2007), Huh (2016), Lewin-Epstein and Semyonov (1992), Meyer (2003), and Semyonov and Jones (1999), for a variety of applications.

[10] It reveals both the magnitude and direction between the two probabilities of inequality. ND=0 when the gender distribution is symmetric; ND=+1 if all males possess higher ranked occupations than all females, and ND=-1 if the

4. Descriptive Analysis

As discussed, the most significant change that has occurred over time in the labour market of Bangladesh is probably the rise of participation of women with the participation of men being more or less constant at around 80%--female labour force participation (FLFP) has increased from around 24% in 1999-2000 to 36% in 2010 (Table 1). However, since 2010 we do not observe much improvement and in 2016-17 the Labour Force Participation Rate (LFPR) of women stood at around 36.3% only. There have been significant differences across the types of employment too. For example, as high as 29.1% of employed women are found to be engaged as unpaid family worker- it is therefore not only in terms of mere participation, but also from the point of view of quality of employment women are in inferior position than men (Table 2). Table 3, in addition shows that in terms of occupational choices, in high paid and high skilled managerial position, women's representation is significantly less than those of men whereas in occupations like skilled agriculture which is considered as less productive, significantly greater proportion of women are found to be engaged. From a sectoral point of view, despite of ongoing structural transformation in the economy, as shown in Table 4, as high as 59.7% women are still found to be in agriculture sector as opposed to 32.2% of men. It is therefore crucial to understand the sectoral employment pattern of both sexes in greater detail and we proceeded to do this while applying suitable econometric tools.

Table 1
Trend of Labour Force Participation Rate (%).

	1999-00	2005-06	2010	2013	2015-16	2016-17
All	54.9	58.5	59.3	57.1	58.5	58.2
Male	84.2	86.8	82.5	81.7	81.9	80.5
Female	23.9	29.2	36	33.5	35.6	36.3

Source: Labour Force Surveys, different years; and Raihan and Bidisha (2018).

Table 2
Trend of Labour Force Participation Rate (%) – Type of Employment wise.

Types	2005-06		2010		2016-17	
	Male	Female	Male	Female	Male	Female
Wage employment	40.0	23.9	46.1	18.5	42.6	31.2
Self-employment	50.4	16.0	47.7	25.3	52.5	39.2
Unpaid family worker	9.7	60.1	7.1	56.3	4.2	29.1

Source: Labour Force Surveys, different years; and Raihan and Bidisha (2018).

Table 3
Occupational Distribution of Employment in 2016-17.

% of Employment	All	Male	Female	Difference Adjusted Wald Test
Armed Forces Occupations	0.25	0.34	0.04	0.30[***]
Managers	1.64	2.11	0.57	1.54[***]
Professionals	4.83	4.50	5.56	-1.06[***]

opposite is true. For the Bangladeshi context, occupations were ranked according to their monthly median income, since status or prestige rankings in previous studies were either subjective or country-specific. For studies where earnings were used as proxy for status, see del Río and Alonso-Villar (2012), Gradín (2020), and Hutchens (2009), amongst others.

Technicians and Associate Professionals	1.86	2.28	0.91	1.36***
Clerical Support Workers	1.47	1.79	0.75	1.04***
Service and Sales Workers	16.48	21.58	4.94	16.63***
Skilled Agricultural, Forestry and Fishery Workers	32.35	23.79	51.70	-27.91***
Craft and Related Trades Workers	17.05	16.88	17.45	-0.58
Plant and Machine Operators, and Assemblers	6.84	8.89	2.20	6.68***
Elementary Occupations	17.24	17.85	15.85	2.00***

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' own calculation from QLFS 2016-17 (up to 2 d.p.).

Table 4

Trend of Sector Wise Labour Force Participation Rate (%).

	1999/00	2005-06	2010	2013	2015-16	2016-17
Agriculture	51.3	48.0	47.5	45.1	42.7	40.6
Male	52.2	41.8	40.1	41.7	34.0	32.2
Female	47.6	68.1	64.8	53.5	63.1	59.7
Industry	13.1	14.5	17.7	20.8	20.5	20.4
Male	11.3	15.1	19.6	19.6	22.3	22.0
Female	20.0	12.5	13.3	23.7	16.1	16.8
Manufacturing	9.5	11.0	12.4	16.4	14.4	14.4
Male	7.4	10.8	12.7	13.9	14.2	14.0
Female	17.9	11.5	11.7	22.5	14.9	15.4
Service	35.6	37.4	35.3	34.1	36.9	39.0
Male	36.4	43	41.1	38.7	43.7	45.8
Female	32.2	19.3	21.8	22.8	20.8	23.5

Source: Labour Force Surveys, different years; and Raihan and Bidisha (2018).

5. Econometric Analysis

The descriptive as outlined in section 4 indicates that women are disproportionately concentrated in agriculture sector and also in unpaid family work. Table 5, in this regard reveals that, after adjusting for covariates, not only that there remains significant gender-based gap in the participation of non-agricultural employment, but also that this gap is observable in agriculture, construction as well as in service sector with the gap being positive (in favour of women) for the former only. Thus, in order to understand the factors behind women' (non) participation in non-agricultural activities, in Table 6 we estimated average marginal effects (AMEs) from a simple Probit model of participation in non-agricultural employment (for the sake of comparison, we estimated probit for both of the sexes). Our estimates revealed a number of important findings and some of these are applicable for both men and women. For example, except basic education (below primary level) and other education category, all other stages of education have found to have strong positive effect for participation in non-agricultural activities. In terms of characteristics of household head--with a self employed head, probability to be in non-agriculture job reduces and this result holds irrespective of gender. In case of the effect of other household factors, on one hand women (as well as men) from households with higher income have higher probability to be in non-agriculture sector, on the other hand, household landholding has a negative effect. The former result is likely to be linked to the fact that, participants from relatively poorer households are more concentrated in low paid agricultural activities and for similar reasoning the latter finding is expected to be related to greater presence of participants with landholding households in agricultural activities. In terms of household characteristics, it is however interesting that, though household remittance earning act as a negative factor for non-

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agricultural employment of men, it has no significant effect on women. This result is likely to be linked to the dependence of male household members on remittance income with the female members' decision being taken irrespective of having such income or not. Gender of the participant however plays a crucial role when we look at the effect of gender norm centric variables (see Raihan & Bidisha, 2018) such as marital status (being married) and care burden (having young child in the household), since being married and having young child reduces probability to participate in non-agricultural activities. From a policy point of view, boosting female employment in non-agricultural activities therefore needs targeted strategies towards this end.

Given the gender based difference in non-agricultural employment probability, in the next step, we applied Blinder-Oaxaca Decomposition of participation in non-agriculture sector. The result of decomposition analysis reflects dominance (90.63%) of unexplained part in explaining the gap (Table A1).

Table 5
Gender Participation Gap in 2016-17 (Average Marginal Effects).

Variable	(1) Probit	(2) Multinomial Logit			
	Non-Agriculture	Agriculture	Manufacturing	Construction	Service
Female	-0.2152***	0.2172***	-0.0005	-0.0852***	-0.1315***
	(0.0080)	(0.0080)	(0.0073)	(0.0039)	(0.0076)
Others variables Included?	Yes	Yes	Yes	Yes	Yes
Observations	63408	63408	63408	63408	63408

Notes: Robust standard errors in parentheses; $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$. The following other explanatory variables were included in each model: age and age squared; educational qualification; training; marital status; location and division of residences; presence of children and elders in the household; remittance-receiving household or not; education and occupation of household head; net income and land-ownership of household. Full results suppressed for the sake of brevity.
Source: Authors' own calculation from QLFS 2016-17 (up to 4 d.p.).

Table 6
Participation of Non-agricultural Employment (Average Marginal Effects from Probit).

Variable	(1) Male	(2) Female
Age	-0.0048***	-0.0049***
	(0.0003)	(0.0004)
Educational Qualification (ref: *No Education*):		
Below Primary	0.0504**	0.0234
	(0.0159)	(0.0134)
Primary	0.1109***	0.0487***
	(0.0136)	(0.0113)
Secondary	0.1301***	0.0603***
	(0.0146)	(0.0144)
Higher Secondary	0.1849***	0.1725***
	(0.0153)	(0.0175)
Tertiary	0.2861***	0.4829***
	(0.0163)	(0.0210)
Others	0.2603***	0.1594
	(0.0297)	(0.1292)
Training	0.0181	0.1094
	(0.0317)	(0.0573)

Married	0.0090	-0.1855***
	(0.0096)	(0.0140)
Urban	0.2254***	0.3539***
	(0.0132)	(0.0219)
Household Has Children under 6	0.0075	-0.0609***
	(0.0069)	(0.0082)
Household Has People over 64	-0.0151	0.0062
	(0.0095)	(0.0115)
Remittance-Receiving Household	-0.0627**	-0.0484
	(0.0213)	(0.0267)
Educated Head	-0.0139	0.0023
	(0.0098)	(0.0082)
Occupation of Household Head (ref: *Unpaid Worker or Unemployed*):		
Self-Employed Head	-0.0401**	-0.0397*
	(0.0147)	(0.0175)
Wage-Employed Head	-0.0206	-0.0219
	(0.0150)	(0.0180)
Natural Log of Net Household Income	0.0181***	0.0139*
	(0.0053)	(0.0068)
Household Owns Land	-0.1156***	-0.1362***
	(0.0133)	(0.0186)
Observations	38528	24880

Notes: Robust standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Results for divisional dummies suppressed for the sake of brevity; remittance-receiving household implies that the main source of income for these households is remittance.
Source: Authors' own calculation from QLFS 2016-17 (up to 4 d.p.).

As shown in Table 4 (Section 4), within non-agriculture, there remains differences in employment structure across sub-sectors e.g. industry (comprising manufacturing and construction) and service sector. In order to understand such differences within non-agriculture sector, AMEs from a MNL model of employment of different sectors, namely agriculture, manufacturing, construction and service (with agriculture being the base category), have been estimated (Table 7). In terms of the effect of different factors in determining choices within non-agriculture, although the findings of Table 7 reflect similar findings to those of Table 6, a number of results are worth mentioning- (i) for the participation of construction sector activity, education seems to have no impact, (ii) having training increases the employment probability of women in service sector by a significantly high margin where the results are found to be opposite for manufacturing and construction sector, (iii) for both genders, education of the head has a negative impact on the choice of construction sector employment, (iv) household income has completely opposite effect on employment probability of construction and service sectors with the effect being negative for the former but positive for the latter, (v) household land holding have positive effect on employment probability in agriculture but negative on employment probability of manufacturing sector. Based on such findings, it can be inferred that, for the women in particular, factors affecting employment in service sector differs quite significantly from those affecting employment in construction as well as in manufacturing.

In order to get better insight of the factors behind such differences in sector based employment, the results of MNL estimates have been decomposed where the results reveal the importance of coefficient effect (returns to endowments) or the dominance of unexplained factors. For example, if women were *treated* as men, their presence in agricultural sector would have fallen to 28.87%, whereas presence in manufacturing, construction and service sectors

would have risen to 21.94%, 10.71% and 38.48%, respectively. Hence, of the total gender difference in probabilities of participation in various sectors, 92.46% in agriculture is attributable to coefficient effect in favour of women, whereas 320% in manufacturing, 114.73% in construction and 69.91% in service are attributable to coefficient effect against women. On the other hand, if men were *treated* as women, their presence in agricultural and manufacturing sector would have risen to 45.08% and 22.02%, respectively, whereas presence in construction and service sectors would have fallen to 1.57% and 31.33%, respectively. Hence, in this case, of the total gender difference in probabilities of participation in various sectors, 68.69% in agriculture and 435% in manufacturing are attributable to the returns to factors against men, whereas 98.14% in construction and 67.65% in service are attributable to the returns in favour of men. Dominance of coefficients effect is therefore apparent from either point of view (Table A2).

Table 7

Determinants of the Choice of Sector of Employment (Average Marginal Effects from Multinomial Logit).

Variable	(1) Male				(2) Female			
	Agriculture	Manufacturing	Construction	Service	Agriculture	Manufacturing	Construction	Service
Age	0.0050***	-0.0061***	-0.0010**	0.0020***	0.0052***	-0.0073***	-0.0001	0.0022***
	(0.0003)	(0.0005)	(0.0003)	(0.0005)	(0.0004)	(0.0006)	(0.0001)	(0.0005)
Educational Qualification (ref: *No Education*):								
Below Primary	-0.0450**	0.0311**	0.0171	-0.0032	-0.0235	0.0252*	0.0011	-0.0028
	(0.0162)	(0.0119)	(0.0095)	(0.0149)	(0.0133)	(0.0125)	(0.0042)	(0.0120)
Primary	-0.1065***	0.0658***	0.0153	0.0254*	-0.0468***	0.0505***	-0.0037	-0.0000
	(0.0138)	(0.0108)	(0.0086)	(0.0128)	(0.0114)	(0.0107)	(0.0030)	(0.0118)
Secondary	-0.1264***	0.0772***	-0.0137	0.0629***	-0.0615***	0.0196	-0.0049	0.0468**
	(0.0149)	(0.0133)	(0.0096)	(0.0146)	(0.0144)	(0.0139)	(0.0036)	(0.0152)
Higher Secondary	-0.1817***	0.0730***	-0.0610***	0.1697***	-0.1804***	-0.0594***	-0.0023	0.2421***
	(0.0157)	(0.0142)	(0.0086)	(0.0161)	(0.0184)	(0.0138)	(0.0044)	(0.0201)
Tertiary	-0.2882***	0.0303	-0.0785***	0.3364***	-0.4901***	-0.0883***	-0.0127***	0.5911***
	(0.0162)	(0.0169)	(0.0093)	(0.0201)	(0.0214)	(0.0211)	(0.0038)	(0.0282)
Others	-0.2610***	-0.0610*	-0.0325	0.3545***	-0.1700	-0.0624	-0.0169***	0.2493
	(0.0308)	(0.0304)	(0.0259)	(0.0514)	(0.1294)	(0.0999)	(0.0022)	(0.1677)
Training	-0.0290	0.0104	-0.0504***	0.0689	-0.1156	-0.0833***	-0.0117***	0.2106***
	(0.0341)	(0.0288)	(0.0150)	(0.0379)	(0.0644)	(0.0217)	(0.0023)	(0.0638)
Married	-0.0082	0.0400***	-0.0130*	-0.0188	0.1928***	-0.0313*	-0.0161**	-0.1453***
	(0.0097)	(0.0106)	(0.0066)	(0.0122)	(0.0144)	(0.0122)	(0.0056)	(0.0131)
Urban	-0.2299***	0.0216	0.0254**	0.1829***	-0.3503***	0.1454***	0.0013	0.2036***
	(0.0132)	(0.0153)	(0.0077)	(0.0150)	(0.0212)	(0.0228)	(0.0029)	(0.0201)
Household Has Children under 6	-0.0082	-0.0118	0.0033	0.0168*	0.0627***	-0.0588***	-0.0042*	0.0004
	(0.0070)	(0.0077)	(0.0050)	(0.0082)	(0.0083)	(0.0088)	(0.0020)	(0.0074)
Household Has People over 64	0.0144	0.0072	-0.0062	-0.0154	-0.0055	-0.0143	0.0055	0.0143
	(0.0096)	(0.0100)	(0.0072)	(0.0116)	(0.0118)	(0.0117)	(0.0035)	(0.0106)
Remittance-Receiving Household	0.0610**	-0.0018	0.0338	-0.0931***	0.0489	-0.0384	0.0173	-0.0277
	(0.0214)	(0.0224)	(0.0191)	(0.0225)	(0.0274)	(0.0240)	(0.0111)	(0.0259)
Educated Head	0.0122	-0.0169	-0.0238***	0.0286*	-0.0015	-0.0045	-0.0052*	0.0112
	(0.0101)	(0.0093)	(0.0066)	(0.0112)	(0.0081)	(0.0081)	(0.0021)	(0.0086)
Occupation of Household Head (ref: *Unpaid Worker or Unemployed*):								

Self-Employed Head	0.0429**	-0.0810***	-0.0172	0.0553**	0.0362*	-0.0024	-0.0059	-0.0279
	(0.0150)	(0.0141)	(0.0092)	(0.0181)	(0.0178)	(0.0140)	(0.0051)	(0.0168)
Wage-Employed Head	0.0245	0.0358**	0.0556***	-0.1159***	0.0178	0.0321*	-0.0036	-0.0463**
	(0.0154)	(0.0136)	(0.0097)	(0.0182)	(0.0186)	(0.0144)	(0.0052)	(0.0175)
Natural Log of Net Household Income	-0.0151**	0.0039	-0.0171***	0.0284***	-0.0118	-0.0230**	-0.0036*	0.0384***
	(0.0054)	(0.0065)	(0.0046)	(0.0073)	(0.0070)	(0.0073)	(0.0016)	(0.0074)
Household Owns Land	0.1155***	-0.0376*	0.0124	-0.0904***	0.1288***	-0.0934***	-0.0018	-0.0336*
	(0.0139)	(0.0147)	(0.0071)	(0.0152)	(0.0177)	(0.0190)	(0.0031)	(0.0158)
Observations	38528	38528	38528	38528	24880	24880	24880	24880

Notes: Robust standard errors in parentheses; $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$. Results for divisional dummies suppressed for the sake of brevity; remittance-receiving household implies that the main source of income for these households is remittance.

Source: Authors' own calculation from QLFS 2016-17 (up to 4 d.p.).

Table 8
Sectoral Segregation (D).

Sector	Index of Dissimilarity (D)	
	2010 (%)	2016-17 (%)
Agriculture	12.49	13.72
Manufacturing	0.66	0.49
Construction	2.43	3.10
Service	9.40	11.11
Overall	24.99	28.42

Note: Here, manufacturing constitutes manufacturing, mining and quarrying and other industrial activities.
Source: Authors' own calculation from QLFS 2016-17 (up to 2 d.p.).

Given the high degree of sector based segregation in labour market, in the next step of analysis, a sectoral segregation index named Index of Dissimilarity (D) has been constructed to understand the degree of segregation between men and women over time as well as within each of the broad sectors.[11] According to it, between 2010 and 2016-17, sectoral segregation has increased from 25% to 28% and in both of the years, D has been much higher in agricultural and service sector. From this result, it cannot be inferred if this segregation is in favour of or against women—a key problem associated with horizontal segregation measures such as D. However, combined with the findings from Table 4, it can be concluded that the segregation in agriculture is pro-women, whereas service sector segregation favours men. In the latter sector which is relatively high-paid, labour market is more segregated in terms of higher representation of men, while the former, which is low-paid, has higher representation of women. Besides, over time in these already segregated sectors, D has also increased (Table 8).

As shown in Table 3, simple descriptive reflects concentration of women in skilled agriculture and less representation in managerial occupations. In order to get better insights, we constructed D index from an occupational point of view too. It is not only in terms of different sectors, segregation can also be observed in terms of different types of occupational categories (Table 9). Though overall occupational segregation index has reduced over time, segregation has drastically reduced mainly in lower skilled jobs such as elementary occupations whereas in some high skilled jobs e.g. managers or associated professionals D has increased marginally.

As pointed out above, a limitation of horizontal segregation measures is that they do not reveal the direction of segregation, rather only the magnitude, neither do we get the segregation measured on an ordinal scale, i.e. if the concentration occurs in a 'better' or in a 'worse' job/sector. Thus it may be worth investigating gender segregation from a different point of view and we therefore applied vertical segregation measure based on wage-based ranking. In this regard, with a view to understand and compare labour market status of women with men, in Table A3, we showed the results of wage based occupational rank for both of the sexes. According to the vertical segregation measure Index of Net Differences (ND), on average, men's occupational rank will exceed women's 28.37% more often than women's occupational rank will exceed that of men's. In addition, probability of men to be ranked higher is greater than that of women, so women also fall behind in the occupational hierarchy based on earnings. It is also evident in the data that women have disproportionate representation in the lowest-paying

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[11] Value of the index indicates the percentage by which of men or women would have to change major sectoral/ occupational categories to equalize employment distribution by gender. Here, only the primary job of the individuals has been considered. Furthermore, the Armed Forces Occupations have been excluded and only the civilian labour force is considered here.

category, and lacklustre representation in higher-paying jobs (except for 'Professionals' category).

Table 9
Occupational Segregation (D).

Occupation	Index of Dissimilarity (D)	
	2010 (%)	2016-17 (%)
Managers	0.43	0.77
Professionals	0.52	0.52
Technicians and Associate Professionals	0.33	0.69
Clerical Support Workers	0.82	0.52
Service and Sales Workers	5.57	8.35
Skilled Agricultural, Forestry and Fishery Workers	7.60	13.93
Craft and Related Trades Workers	1.19	0.26
Plant and Machine Operators, and Assemblers	0.42	3.36
Elementary Occupations	16.89	1.03
Overall	33.77	29.43

Source: Authors' own calculation from QLFS 2016-17 (up to 2 d.p.).

6. Conclusion

Against the backdrop of concentration of women in low productive jobs as well as in lower stages of occupational ladder, this paper attempted to understand the factors behind their inferior position in the labour market. Our Probit of non-agricultural employment as well as MNL estimation of different sectors (agriculture, manufacturing, construction and service) reflect importance of gender centric factors (presence of young child, marital status) and household factors (income, land holding) in determining women's employment status. Decomposition analysis highlights that it is mainly 'unexplained' factors rather than inferior endowments that constrain women to enter non-agriculture based 'superior' employment. Besides, MNL decomposition highlights that, if women would be given similar return to their endowments as that of men, their sector wise participation would change in favour of relatively high paid service and industry and would fall in low paid agriculture sector. Both sectoral as well as occupational segregation indices reflect high degree of horizontal segregation between men and women where the sector based segregation index has risen over time. In terms of vertical occupational segregation and ranking based on earnings, probability of men to be ranked higher is greater than that of women, so women also fall behind in the earnings based occupational hierarchy.

Based on our analysis, since 'gender based factors' are the dominant constraints for women in attaining superior position in the labour market, more gender norm centric policies should be given emphasis: e.g. day care facilities, extending the provision of maternity and post-maternity leave and introducing flexible and part time working hour. Bringing the private sector in such processes through appropriate incentive packages can turn out to be effective in ensuring gender sensitive work environment. Following Tzannatos (1999), supporting care work through social safety net programs like in many of the developed countries can be a strategy to consider as well. From a holistic point of view, it is important to consider stricter and careful implementation of anti-child marriage laws. Assuring gender friendly environment in educational institutes as well as at work places can proved to be instrumental for greater involvement of young women and girls at secondary and tertiary level of education and thereby at higher stages of occupational

ladder. As noted by Cohen and Huffman (2007), women in high-status occupations tend to create 'ripple effects' which are advantageous, for their female subordinates too. Thus efforts should be directed towards removing the impediments which prevent women from getting into those positions. For spreading the benefits of structural transformation, newer sectors for female employment should be sought and policy incentive should be directed towards that end (Raihan & Bidisha, 2018). In this regard, care service can be considered as a potential sector, through related education and training.

Acknowledgements

Appendix A.

Table A1
Probit Regression Decomposition Result.

Difference	Summary
Explained	0.0248[***]
	(0.0020)
Unexplained	0.2397[***]
	(0.0042)
Total	0.2644[***]
	(0.0035)

Note: Robust standard errors in parentheses; [*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.001$.
Source: Authors' own calculation from QLFS 2016-17 (up to 4 d.p.).

Table A2
Multinomial Logistic Regression Decomposition Result.

Sector	Sample average	Females treated as males		Males treated as Females	
		Coefficients effect	Characteristics Effect	Coefficients effect	Characteristics Effect
Agriculture	0.2687-0.5338= -0.2651	0.2887-0.5338= -0.2451	0.2687-0.2887= -0.0200	0.2687-0.4508= -0.1821	0.4508-0.5338= -0.0831
Manufacturing	0.1941-0.2001= -0.0060	0.2194-0.2001= 0.0192	0.1941-0.2194= -0.0252	0.1941-0.2202= -0.0261	0.2202-0.2001= 0.0201
Construction	0.0951-0.0143= 0.0808	0.1071-0.0143= 0.0927	0.0951-0.1071= -0.0120	0.0951-0.0157= 0.0793	0.0157-0.0143= 0.0014
Service	0.4421-0.2517= 0.1904	0.3848-0.2517= 0.1331	0.4421-0.3848= 0.0572	0.4421-0.3133= 0.1288	0.3133-0.2517= 0.0616

Source: Authors' own calculation from QLFS 2016-17 (up to 4 d.p.).

Table A3
Occupational Wage Inequality (ND).

Rank-Ordered Occupation (2016-17)	Median Monthly Income (BDT)	Frequency Distribution	
		Males (M)	Females (F)
Skilled Agricultural, Forestry and Fishery Workers	0	0.2387	0.5173
Elementary Occupations	7900	0.1791	0.1586
Service and Sales Workers	9000	0.2165	0.0495
Craft and Related Trades Workers	10000	0.1693	0.1746
Plant and Machine Operators, and Assemblers	11000	0.0892	0.0220
Clerical Support Workers	15000	0.0180	0.0075
Technicians and Associate Professionals	17500	0.0228	0.0091
Professionals	25000	0.0452	0.0556
Managers	28000	0.0212	0.0057
Total		1.0000	1.0000
Observations		128447	52961
Overall Net Difference (ND)		0.2837[1]	

[1] ND_{mf}=pr(M>F)-pr(F>M)= 0.5432976-0.2595982=0.2836994
Source: Authors' own calculation from QLFS 2016-17 (up to 4 d.p.).
Note: For skilled agriculture, forestry and fishery group, due to the presence of a large number of unpaid family workers, the median monthly income has found to be zero.

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