Regional Integration in South Asia

Implications for Green Growth, Female Labor Force Participation, and the Gender Wage Gap

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Abstract

The study aims to provide insights to policy makers in measuring the impact of trade liberalization and regional integration measures on gender employment and wages. The study incorporates gender-differentiated employment and wages for selected South Asian economies across sectors to identify targeted value chains and economic activities, particularly among green trade sectors. This is the first major attempt to develop a gender-differentiated data set for South Asian countries, within the widely used Global Trade Analysis Project framework, to examine the nexus between trade, green economy, and gender. Two illustrative scenarios are examined. The first scenario examines a complete tariff elimination among the Bhutan-Bangladesh-India-Nepal grouping of countries in all sectors. The second scenario involves complete tariff elimination among countries in South Asia. The results indicate that a free trade agreement signed by all countries is likely to be more beneficial compared with only some countries signing the free trade agreement. Women's employment grows faster than men's employment, as most of the sectors that benefit due to these free trade agreements are women intensive. Growth in women's employment and wages in South Asia is consistent with growth in green sectors.

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1. Introduction

Trade liberalization is seen as a panacea for economic growth and development especially for developing countries. Trade is expected to generate higher levels of growth and productivity by expanding employment opportunities and sustain livelihoods for all and thereby enabling these countries to find their way out of poverty. Over the past two decades, numerous bilateral, regional trade agreements and multilateral trade agreements have been floated across the world. The impacts of opening of trade opportunities by these agreements vary for different groups - across the developed and developing world, the skilled and unskilled, the urban and the rural and so on.

Most importantly, the implications of these trade agreements on the economic and social prospects of women and men differ especially for those in developing and least developed countries, as the factors of production are reallocated among sectors that employ men and women in different intensities. Global trade liberalization and regional integration have gender-specific outcomes in developing countries where women do not have the same access to the benefits of trade as men.

Though there has been a growing literature on the impact of trade liberalization and regional integration on women in developing countries, these studies have come out with conflicting conclusions. Some studies highlight that greater trade openness and integration has often been accompanied by growing economic opportunities for women mainly in manufacturing and services sectors especially in export-oriented sectors in many developing countries. Sectors such as garments and light manufacturing, have employed large numbers of women in recent decades. These developments have translated into stronger market incentives for women's labor force participation in the form of rising demand for female labor and, in some cases, higher absolute and relative wages.[2]

On the other hand, there have been studies that have shown that women tend to be negatively impacted by trade openness and integration compared to men. Trade leads to changes in the structure of production as some sectors may expand because of new export opportunities, while others may contract because of import substitution. These studies argue that since in developing countries, women are usually clustered in some specific productive sectors and have limited skills and mobility, they are often found to be engaged in the contracting sectors, leading to further jobs losses for them. Moreover, it has been found that even if women work in sectors that expand, the quality of the jobs created and the perspectives for skill development often remain limited for them because of horizontal and vertical gender segregation.[3]

Another related issue is that while increase in employment opportunities for women is important, however, this does not necessarily translate to reduced gender inequalities such as gender segregation in types of occupations and activities, gender gaps in terms of wages and working conditions, and gender-specific constraints in access to productive resources,

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[2] World Development Report (2012).
[3] Zarrilli, Simonetta (2017).

infrastructure and services.[4] For instance, women's participation as employees in international value chains is often limited to the most price competitive, lowest value-added segments (such as textiles and agriculture), where employment is highly vulnerable to fluctuations in demand and segregated by sex. Moreover, women in most countries are more likely than men to hold informal jobs, thus removing them from the benefits of national labor legislation, social protection, and entitlement to many employment benefits.[5] A more holistic approach is hence required to identify key issues, opportunities and challenges for gender equality and socio-economic development.

There has been a growing interest recently in "green growth" or "green trade" for economic development. The United Nations Conference on Sustainable Development (Rio+20) in 2012 provided a new dimension to the ongoing debates on the linkages between gender equality, economic development and environmental sustainability. It focused on green economy as one of the important tools available for achieving sustainable development in the developing countries with trade as one of key instruments for transitioning to greener economies. Since agriculture, agro-processed products and other low value-added products comprise the bulk of the export basket of the majority of the developing economies given their large primary sector and coincidentally since a large number of women in the labor force in developing countries are employed in these sectors, it is imperative to integrate and understand the gender differentiated effects in trade from the green industries.

It is important and interesting, therefore, to analyze gendered economic impacts across South Asian countries focusing on regional trade. South Asia is the one of the rapidly growing regions in the world, however, the region is unable to realize its full potential for trade. The intra-regional trade constitutes less than 5 percent of the total trade among South Asian countries. Despite significant liberalization in tariffs by South Asian countries since the1980s, average tariffs in the region still remain high. In 2016, average tariffs for South Asian countries were 13.6 percent, more than double the world average (6.3 percent) and the highest among major regions of the world as each country maintains a long sensitive list of products which are exempted from the tariff liberalization measures. Nearly 35 percent of the value of intraregional trade in South Asia is subject to sensitive list tariffs.[6]

Moreover, given the inter-dependence of South Asian countries on external countries for their exports and being part of some of the global value chains, any global shocks are likely to affect their labor market structures. Moreover, agriculture or low value-added manufacturing jobs remain the predominant source of women's employment and livelihoods in these countries. It is being increasingly recognized that regional cooperation can play an important role in achieving the long-term development objectives of South Asian countries. By deepening regional cooperation, the region can exploit the economies of scale and cost advantages resulting from the large regional market, sustained economic growth rates and continued reduction in poverty. At present, the total exports in green sectors is relatively low in the region, however, this sector has a vast potential for growing intra-regional trade as well as generating more livelihood opportunities for women.

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[4] Bamber and Staritz (2016).

[5] ILO (2013).

[6] Kathuria, S. (2018).

In this context, this study aims to incorporate the gender-differentiated employment and wages for select South Asian economies across sectors to identify targeted value chains and economic activities, particularly among green trade sectors, that would benefit women in the region. The study has the potential to provide insights to policy makers in measuring the impact of trade liberalization and regional integration measures on gender employment and wages focusing on green trade sectors. The data set developed would help analyze economic activities related to green trade that could benefit female labor force participation and wages. The understanding about gender outcomes when supported by data and analysis could enable governments to design better trade liberalization and regional integration policies and programs and improve the targeting of sectors that would benefit women and reduce existing gender disparities over time in South Asian countries. The study would not only help in analyzing the gender dimensions of trade agreements but also in subsequent research on the gendered impacts of other global shocks.

While global trade liberalization is an important issue, in our study we focus mainly on regional integration for a couple of reasons; first, regional integration is a pressing issue in this region, given the mutual protectionism even in terms of tariffs: therefore it is interesting enough to focus on regional integration; second, we have focused on gender data development only in this region and not in other countries, which is beyond the scope of this study; a global trade policy shock would have required inclusion of gender information in other countries as well. We therefore focus on a couple of illustrative simulations of tariff elimination, a practical one that involves BBIN (Bangladesh, Bhutan, India and Nepal), and an ambitious one that involves all the South Asian countries.

1.1 Female Labor Force Participation and Gender Wage Gap: What is the evidence?

The importance of achieving gender equality has been increasingly recognized in the policy debate across the globe. However, the recent literature highlights that the gender gap has widened globally for women both in terms of employment and wages at work compared to men. A recent Global Gender Gap Report 2020 published by World Economic Forum (2019) highlights that overall global gender parity will not be attained for the next 99.5 years mainly because of lack of progress in closing the Economic Participation and Opportunity gap. The report also projects that it would take 257 years in 2019 to close the global gender pay gap compared to 202 years last year. A report published by ILO (2016) had also projected that at the current pace of progress, it would take more than 70 years to close the gender wage gaps completely, i.e., the gender pay gap would remain until 2086. It highlighted that the gender wage gap is unrelated to a country's level of economic development, as some of the countries with high per-capita levels are also among those with the highest gender wage gaps.

A study by McKinsey Global Institute (2015) showed that narrowing the gender gap in the global labor market would double women's contribution to global GDP growth between 2014 and 2025. The study estimated that in a full potential scenario in which women play an identical role in labor markets as men, as much as US$ 28 trillion, or 26 percent, could be added to global annual GDP by 2025 compared with a business-as-usual scenario. While

in an alternative best-in-region scenario, in which all countries match the improvement rate of the fastest-improving country in their region, it could add up to USD 12 trillion, or 11 percent to global annual GDP by 2025. The study also established a clear link between gender equality in society and gender equality in the workplace and mentioned that no country has achieved gender equality in the workforce without first narrowing gender gaps in society.

Thus, one of the main inequalities between men and women at work is the inequality of wages received. Globally, the gender wage gap is estimated to be 23 percent, i.e., women earn 77 percent of what men earn. Though some progress has been made in reducing these gender wage gaps, these improvements are small. ILO's Global Wage Report (2015) highlighted that worldwide women's average wages are between 4 and 36 percent less than those of men, and identified the underlying factors which cause such inequality, viz., an undervaluation of women's work, workplace characteristics, occupational segregation channeling women into low value-added jobs, the overall wage setting mechanism in each country, the view of women as economic dependents, the likelihood that women are in unorganized sectors or not represented in unions and the multiple roles women are required to play, especially within the family.

Moreover, the ILO (2016) report also highlighted that between 1995 and 2015, the global female labor force participation rate decreased from 52.4 to 49.6 percent, while the corresponding figures for men are 79.9 and 76.1 percent, respectively. Thus, the chances for women to participate in the labor market remain almost 27 percentage points less than those for men. Also, in South Asia and East Asia, the gap has grown even wider. The report also emphasizes that sectoral and occupational segregation contributes significantly to gender gaps both in terms of the number and the quality of jobs, since women in employment have been overrepresented in a narrow range of sectors and occupations. In upper-middle-income countries, around 33.9 percent of women are employed in wholesale and retail trade services and 12.4 percent in the manufacturing sector. In high-income countries, the major source of employment for women is the health and education sector, which employs almost one-third of the women in the labor market (30.6 percent). Agriculture remains the most important source of employment for women in low-income and lower-middle-income countries. In Southern Asia and Sub-Saharan Africa, over 60 percent of all working women remain in agriculture, in which jobs are labor-intensive and unpaid or poorly remunerated.

Furthermore, the 2030 Agenda for Sustainable Development Goals (SDGs) has reaffirmed the universal consent on the key importance of gender equality and its contribution to the achievement of the 17 SDGs. More jobs and quality jobs for women, universal social protection and measures to recognize, reduce and redistribute unpaid care and household work are indispensable to delivering on the new transformative sustainable development agenda. The 2030 agenda, which aims to reduce poverty and inequalities, to achieve gender equality and to promote inclusive and sustainable economic growth, full and productive employment and decent work for all, has also emphasized the use of trade as an important tool to achieve gender equality and women's economic empowerment. Since trade as an

economic tool can create jobs, which will enhance women's chances of having better livelihoods and help bridging the gender inequality.

1.2 Study Objectives

The study was inspired by the increasing evidence of growing gender wage gaps and declining female labor force participation and the little evidence on gender impacts of freer trade in general or green trade in particular. Comparisons of gendered economic impacts of free trade across these countries are impeded by the lack of a gender differentiated data set. Most of these quantitative analyses of trade reforms use global computable general equilibrium (CGE) models which illustrate the linkages between sectors within an economy and the linkages between countries. These global CGE models have become the standard quantitative tool in assessing the impacts of trade reforms on sectoral adjustments, patterns of production and trade, etc. and are mostly based on the Global Trade Analysis Project (GTAP) database, which is a multi-regional, multi-sectoral database designed to capture the economy-wide relationships among sectors in a region and interregional trade. These models have also been used to assess the impacts of other recent global shocks such as the food crisis and financial crisis, bioenergy mandates, demographic changes including migration, and climate change. However, since the present GTAP database does not contain a gendered employment database across countries and sectors and also does not isolate the commodities relevant for green trade. there have been no attempts at assessing the impacts of multilateral reforms using a gendered global model. To address this gap in the literature, this study aims to construct a gender differentiated database across countries and sectors.

The objectives of the study are therefore:
- To develop a gender differentiated employment and wages database in the current GTAP database version 9 for select South Asian economies across sectors and modify the standard GTAP model to recognize gender differentiated employment and wages.
- To identify goods and services related to green trade and split them as separate commodities in the newly constructed GTAP database and model.
- Using the newly constructed model and database, the study identifies targeted value chains and economic activities, particularly among green trade sectors, that will benefit women in South Asia.

The unique contribution of this study is to incorporate the gendered differentiated employment and wages into an empirical global CGE framework and also to differentiate 'green trade' commodities in the GTAP. The data set developed would help analyze economic activities related to trade that could benefit female labor force participation and wages. The understanding about gender outcomes when supported by data and analysis could enable governments to design better trade liberalization policies and programs and improve the targeting of sectors that would benefit women and reduce existing gender disparities over time in South Asian countries. Thus, the study would not only help in analyzing the gender dimensions of trade agreements but also in subsequent research on the gendered impacts of other global shocks.

1.3 Outline of Data and Methodology

A gendered global database was first constructed by incorporating female employment and wages across sectors and countries in select South Asian countries. The study followed an approach similar to the one developed by Narayanan and Walmsley (2011) and Narayanan et al (2016) in the context of child labor, to generate gender differentiated employment and wages data in the current GTAP database version 9.

To generate gender differentiated employment and wages data in the current GTAP database, gendered employment data and industry average wages, across industry and occupations, for each country, were compiled and reconciled using the Yearbook of Labor Statistics from the International Labor Organization (ILO). To fill in the data gaps, data were obtained from various published government sources for the select countries. For instance, in case of India, latest data from summary results from national sample survey (NSS) 68th round on employment and unemployment 2011-2012 were used.

Female labor force participation and the gender wage gap were calculated using data disaggregated by economic activity according to the International Standard Industrial Classification of All Economic Activities (ISIC) at the 2-digit level of the classification and for the latest data available for that country. The gender pay gap is defined as a measure of the difference between men's and women's average earnings. It is measured as "female average wage/salary as a percentage of male average wage/salary" for different industrial sectors where data are available.

In the context of green trade, the approach proposed in Narayanan and Khorana (2011) was used to split the green trade sectors from others. The trade data were obtained from UN COMTRADE and the classification used follows the one used by the United States Bureau of Labor Statistics (BLS) to split green sectors. BLS has identified 333 detailed industries where green goods and services are produced.

2. Review of the Literature

In the existing literature, there are several studies that have quantitatively examined the impact of trade liberalization on labor markets for both developed and developing countries. However, a very few of these studies have focused on measuring the impact of trade liberalization on women's employment and wages. In the empirical literature, the trade-gender nexus has been examined - using cross-country, country or sector multiple regression analysis, or computable general equilibrium (CGE) models. Moreover, in most cases this gender-differentiated impact of trade liberalization has been assessed using single-country CGE models only. Also, given the paucity of gender differentiated data, most of these studies have assessed trade impacts on gender focusing mainly on labor market impacts for the manufacturing sector. Though there are many other descriptive studies that have analyzed gender-specific effects of trade liberalization, the focus of this review is on empirical studies, especially the ones that have used CGE models.

2.1 Trade and Gender - Theoretical Aspects

Theoretical underpinnings on the impact of trade liberalization on gender equitable effects has been predicted by the standard international trade theory (Hecksher-Ohlin-Stolper-Samuelson). According to the theory, countries that specialize in production and trade based on their relatively abundant factor endowment would benefit from trade. Trade liberalization in this case is expected to bring about increase in demand for the relatively abundant type of labor, which is relatively unskilled labor in developing countries and relatively skilled labor in developed countries. It may be noted that women workers generally comprise a disproportionately larger segment of the unskilled labor force in developing countries and to an extent in developed countries as well, this theory predicts employment gains for women in export sectors of developing countries and employment losses for women in developed countries. Moreover, in developing countries, women workers are expected to see a rise in their wages relative to men in skilled jobs and a decline in the gender wage gap. Conversely, for developed countries, disproportionate job losses for unskilled workers (women), and a widening wage gap between skilled (men) and unskilled (women) labor are expected. Thus, for developing countries, the theory predicts that trade expansion would increase the demand for women workers and close gender wage gaps. In this sense, trade liberalization impacts positively in developing countries and negatively in developed countries with respect to gender employment and wages.

2.1.1 Trade and Gender - Evidence using Single Country CGE

A study by Fontana and Wood (2000) quantitatively analyzed the gender dimension of trade liberalization in Bangladesh. Using a CGE model by constructing a gender-specific SAM (for the year 1985) with only three factors of production and five sectors, they simulated the impact of trade liberalization on women's employment and wages. The authors found sharp expansion in the exporting manufacturing sectors with the reallocation of labor from agriculture to manufacturing sectors, resulting into increase in employment of women as well as their absolute and relative wages.[7] Thus, their results support the theory that trade liberalization would benefit unskilled female workers. However, the authors also highlight that though an expansion of manufacturing exports raises the wages of women, it also reduces their leisure.

Fofana et al. (2005) used a gender-aware CGE model to analyze the impact of fiscal policies and other external shocks such as trade liberalization on employment, income and welfare in South Africa. The simulation results showed that trade liberalization in South Africa would have a distinct positive effect on male employment and wages and a negative effect on female employment and wages. Similar results have been found by Fofana et al. (2003) for Nepal. Moreover, female entrance to the labor market is accomplished with a decrease of leisure time as men's leisure time rises.

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[7] Bangladesh is relatively abundant in labor, and the garments industry accounts for 60 percent of export revenue. More than 80 percent of employees in the sector are women.

Weerahewa (2002) assessed both short run and long run impacts of the expansion of garment exports on male-female wage inequality in Sri Lanka in 2000 using a CGE model under three different assumptions on factor mobility. The model consisted of three sectors (agriculture, garments and rest of the economy) and three factors (male labor, female labor and capital). The simulation results show that the wage gap is narrower when trade policies expand the garment sector. The biggest impact is observed when female labor is treated as the specific factor and the smallest impact is observed when capital is treated as the specific factor. The results imply that the expansion of the garment sector can help narrow the wage gap, but the impact is highly sensitive to the assumptions on the factor specificity. A bigger impact on the male-female wage gap could be expected in the short run due to liberalization, however, its impact would be smaller in the long run.

Sinha and Sangeeta (2003) examine the impacts of major policy changes on women in India. Using a gender-oriented CGE model, they assess the impact of trade reforms on income distribution distinguished by informality and gender, within the formal and informal sectors of the economy since a large section of women in India are involved in informal activities. The results highlight increase in welfare gains because of tariff reductions. However, the formal households gain relatively more, as the regular wage rates increase marginally, whereas in comparison casual wage rates suffered. They imply that overall men wage earners benefitted more than women wage earners, as men wage earners form a larger share of workers in formal households.

Siddiqui (2009) investigates gender dimensions of the effects of trade liberalization in Pakistan using a computable general equilibrium (CGE) model. The model employs various indicators to measure the gendered impacts, including income poverty, time poverty (leisure), capability poverty (literacy and infant mortality), and welfare. The simulation results show that a revenue-neutral trade liberalization in Pakistan will increase women's employment in unskilled jobs and increase women's real wage income more than men for all types of labor, but keep the division of labor biased against women. The study found that Pakistan's trade liberalization adversely affected women in relatively poor households by increasing their workload, deteriorating capabilities, and increasing relative income poverty. However, interestingly the effects remain gender neutral or favored women in the richest group of households.

2.1.2 Trade and Gender - Cross-Country Evidence

Oostendorp (2009) examines the impact of globalization on the gender wage gap using data for more than 80 countries for 1983 to 1999. The study finds that the gender wage gap (controlled by occupation) decreased with trade and FDI in developed countries. However, there is no such clear effect for poorer countries. The author concludes that development has to reach a certain threshold before the gender gap closes with further economic growth.

Tejani and Milberg (2010) examine the impact of trade liberalization on the female share of employment in manufacturing for 60 high-income developed countries and middle-income developing countries over the period 1985 to 2007. The authors find that the relative employment of women increased in developing countries but declined in in the

high-income countries. However, while Latin American countries continued to experience rising female intensity of employment, most Southeast Asian and Pacific countries experienced a "defeminization" of employment. Given that both regions were involved in important liberalization policies, the authors conclude that changes on export orientation do not seem to be the only explanation of trends in female intensity. They suggest that initial low levels of female intensity and slower industrial upgrading explain the increase in female employment participation in manufacturing in Latin America, while initial high levels of female intensity and a dramatic industrial upgrading experienced in Southeast Asia explains the defeminization of manufacturing labor in that region.

Thus, empirical evidence on the impact of trade liberalization on gender inequality seems ambiguous, suggesting both positive and negative effects of trade liberalization on women in both developed and developing countries. While some studies find that women tend to benefit from trade as labor-intensive sectors such as garments, basic manufactures, and tourism sectors expand, there are other studies that find that women in agriculture in food-importing developing countries may be harmed by trade reforms that allow the influx of cheaper food imports. The impact of trade reform on men and women employed in different sectors and regions will depend on many factors including the modalities of the trade reforms, labor markets institutions, resource endowments, and sectoral gender intensities. However, none of the studies has done cross-country comparison of the impacts on trade liberalization on female participation in the labor force and their wages using CGE.

One can conclude that while trade policy may by itself be gender neutral, the impact of trade policy on underlying gender relations is significant. Moreover, while gender equality is an end in itself, it is also a means to achieve poverty reduction, economic growth and export expansion. Therefore, there is need for a much more in-depth examination of the gender impact of trade policy.

2.2   Female Labor Force Participation and the Gender Wage Gap in South Asia

This section examines the differentials in female labor force participation rates as well as the extent of the gender wage gap (women's wages relative to men's wages) across different sectors/economic activities for the economies of South Asia.

The Global Gender Gap Report (2020)[8] has ranked South Asia as the second-lowest scoring region with an average remaining gender gap of 34 percent, ahead only of the Middle East and North Africa (MENA) region with the lowest performance (having an average remaining gender gap of 39 percent). Bangladesh is the best performer in the region and only one of the seven South Asian countries studied to feature in the top 100 of the Global Gender Gap Index, ahead of Nepal (101st) and Sri Lanka (102nd), and some 60 places ahead of India (112th). Furthermore, UN Women[9] reports that South Asia has the world's

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[8] World Economic Forum. Global Gender Gap Report 2020, Geneva, 2019 available at
http://reports.weforum.org/global-gender-gap-report-2020/dataexplorer.
[9] United Nations Entity for Gender Equality and the Empowerment of Women (UN Women). Progress of the World's Women 2015-2016: Transforming economies, realizing rights, 2016.

most skewed gender wage gap and is among the few regions where gender labor force participation is both large and growing.

2.2.1   Bangladesh

Bangladesh is the top-ranked country in the South Asia region, having a better female labor participation rate and improved gender wage gap compared to other South Asian economies. Bangladesh's female labor force participation has increased over the last one and half decades, rising from 16 percent in 1996 to 30 percent by 2010 mainly fueled by employment in rural agricultural areas and certain specific sectors such as garment industries.[10] Amin (2005) shows that female labor force participation has increased mainly in Bangladesh owing to better payment of home-based economic activities. Although the number of women participating in employment has been increasing, they are still outnumbered by their male counterparts in terms of numbers in majority of the employment sectors.

Bangladesh's female labor force participation was 29 percent in 2013 as shown in Table 1. Taking a detailed look at sectoral distribution of the female workers, it can be observed that agriculture, manufacturing and community and personal services are the significant contributors of women's employment in Bangladesh. In terms of the sectoral composition of employment, the significant feature of Bangladesh is that when compared to other South Asian countries in general, a small proportion of women work in agriculture. In 2013, the share of women employees in agriculture, hunting, animal production and related activities was just 35.6 percent of total employees in the sector. However, as compared to men (34.5 percent) a large majority of women (65.7 percent) are employed in agriculture.

During 2010 to 2013, the female labor force participation grew rapidly in manufacturing, wholesale trade, health and other community services. The share of women in manufacturing almost doubled and became much higher than that of men during this period. The same is true for wholesale trade and other community services sectors as well. However, women's labor participation has a much lower share in the services sector. This is mainly due to women's low participation in transport and retail trade in Bangladesh.[11] Overall, Bangladesh has a much higher proportion of women workers in the manufacturing sector and agriculture sector.

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[10] The daily Star, Women workforce growing fast October 11, 2015 accessed online at http://www.thedailystar.net/frontpage/women-workforce-growing-fast-155149.
[11] Asian Development Bank & International Labor Organization (2016).

Table 1: Women Labor Force Participation by Economic Activity in Bangladesh

S.No	Sectors / Economic Activity	2010				2013			
		No. of Men	No. of Women	Share of women in sectoral employment (%)	Share of the sector in total women employment (%)	No. of Men	No. of Women	Share of women in sectoral employment (%)	Share of the sector in total women employment (%)
1	Crop and animal production, hunting and related activities	14430	10461	42.0	76.9	16240	8965	35.6	65.7
2	Manufacture of wearing apparel	2114	1118	34.6	8.2	1292	1703	56.8	12.5
3	Manufacture of textiles	682	282	29.2	2.1	965	884	47.8	6.5
4	Manufacture of food products	387	181	31.8	1.3	579	652	52.9	4.8
5	Retail trade, except of motor vehicles and motorcycles	5987	1012	14.5	7.4	4965	415	7.7	3.0
6	Wholesale trade, except motor vehicles & cycles	297	13	4.2	0.1	1581	354	18.3	2.6
7	Human health activities	237	72	23.2	0.5	391	242	38.2	1.8
8	Food and beverage service activities	742	51	6.4 t	0.4	736	115	13.5	0.8
9	Land transport and transport via pipelines	3516	224	6.0	1.6	3242	84	2.5	0.6
10	Construction of buildings	1630	90	5.2	0.7	1423	74	4.9	0.5
11	Financial service activities, except insurance, pension	256	39	13.2	0.3	244	55	18.4	0.4
12	Fishing and aquaculture	641	41	6.0	0.3	867	38	4.2	0.3
13	Manufacture of furniture	298	9	2.9	0.1	675	34	4.8	0.2
14	Manufacture of basic pharmaceutical products	44	3	6.4	0.0	69	9	11.4	0.1
15	Water collection, treatment and supply	16		0.0	0.0	40	7	14.6	0.1
16	Accommodation	26	3	10.3	0.0	14	4	21.1	0.0
17	Telecommunications	16	1	5.6	0.0	35	3	7.7	0.0
18	Insurance, reinsurance and pension funding	41	11	21.2	0.1	23	3	11.1	0.0
19	Employment activities	7	0	0.0	0.0	19	2	9.5	0.0
20	Manufacture of beverages	7	0	0.0	0.0	37	1	2.6	0.0
Total employees (in thousand)		31374	13611	30.3	100	33437	13644	29.0	100

Source: ILOSTAT database, International Labor Organization

In terms of gender wage equality, though Bangladesh fares much better than other South Asian countries, Rahman and Islam (2013) show that in Bangladesh, in 2006 women's wage was only 66 percent of men's wage, whereas it increased to 84 percent in 2010. As shown in Table 2, in terms of the gender wage gap, i.e., female to male wage ratio, wholesale and retail trade; arts, entertainment and recreation; and administrative and support service activities were the only 3 sectors where wages for women were slightly higher than those for men. The gender wage gap was 83.7 percent in the manufacturing sector and 88.5 percent in agriculture; forestry and fishing. It is the services sectors where women are earning at par with men in Bangladesh.

Table 2: Gender Wage Gap by Economic Activity in Bangladesh in 2016

No.	Economic activity	Men	Women	Wage Gap (%)
		Nominal annual earnings (in US$)		
1	Activities of extraterritorial organizations and bodies	3840	2088	54.4
2	Activities of households as employers	1704	1248	73.2
3	Electricity; gas, steam and air conditioning supply	3000	2304	76.8
4	Water collection, treatment and supply	2124	1680	79.1
5	Financial and insurance activities	4380	3624	82.7
6	Manufacturing	1992	1668	83.7
7	Information and communication	3576	3084	86.2
8	Construction	1776	1560	87.8
9	Agriculture; forestry and fishing	1464	1296	88.5
10	Accommodation and food service activities	1896	1680	88.6
11	Mining and quarrying	1488	1356	91.1
12	Transportation and storage	1908	1800	94.3
13	Human health and social work activities	3180	3012	94.7
14	Education	3024	2892	95.6
15	Other service activities	2088	2016	96.6
16	Public administration and defense	2808	2712	96.6
17	Professional, scientific and technical activities	3240	3132	96.7
18	Wholesale and retail trade; repair of motor vehicles and motorcycles	1980	1992	100.6
19	Arts, entertainment and recreation	2004	2148	107.2
20	Administrative and support service activities	2232	2520	112.9
21	Real estate activities	4044	n/a	n/a

Source: ILOSTAT database, International Labor Organization

Overall, the participation of women in the Bangladesh economy may have increased, but it is mostly in low-paid and low-skilled jobs. The readymade garment industry is the main employment option for women outside agriculture. However, not only women earn much

less than their male colleagues, they have low occupational safety and health standards as well.[12]

2.2.2 India

Despite significant progress in female labor force participation over the past two decades, the formal labor force participation rate of women is still very low, and women in many sectors of the economy receive lower wages than men. According to the Global Wage Report (ILO, 2017), India suffers from a huge gender pay gap. The report finds that India has among the worst levels of gender wage disparity (men earning more than women in similar jobs) with the gap exceeding 30 percent. There remains a pervasive and persistent gender gap in earnings for women across different sectors and jobs, and the extent of the gender wage gap is measured on various parameters such as age, educational qualifications, industry, work experience, type of contract, marital status, level of skill, etc.[13]

As can be seen in Table 3, only 22 percent of women were employed as compared to 78 percent of men employed in the same economic activities in India in 2012. Moreover, women appear to be concentrated mainly in low-productivity jobs and in the informal sector. The distribution of female workers in different sectors reveals that the highest share of total female employment is in agricultural, forestry, fishing and hunting (76.8 percent) and manufacturing of textiles and wearing apparel industry (7.8 percent), followed by retail and health services (7.2 percent). These are the industries with the highest concentration of women, even though, the percentage share of females in these industries is not more than 36.2 percent which is highest share of female workers in human health services followed by manufacture of wearing apparel industry with 35 percent share. Overall, among the female workers, about 77 percent were engaged in the agricultural sector and related activities and nearly 13 percent of the female workers were engaged in secondary sector while only 10 percent were engaged in the tertiary sector in 2012.

Table 3: Women Labor Force Participation by Economic Activity in India (in 2012)

S.No.	Economic activity	No. of Men	No. of Women	Share of women in sectoral employment (%)	Share of the sector in total women employment (%)
1	Crop and animal production, hunting and related service activities	127841	50409	28.3	76.8
2	Retail trade, except of motor vehicles and motorcycles	26969	3565	11.7	5.4
3	Manufacture of wearing apparel	4783	2575	35.0	3.9

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[12] The Guardian, Urbanization in Bangladesh proves a double-edged sword for women, 5 November 2012 assessed online at
https://www.theguardian.com/globaldevelopment/2012/nov/05/urbanisation-bangladesh-women.
[13] Gender Gap in India: An Analysis, Sep 2017 accessed online at
https://www.2thepoint.in/gender-gap-india-analysis/.

4	Construction of buildings	29234	2528	8.0	3.9
5	Manufacture of textiles	4806	2188	31.3	3.3
6	Human health activities	2083	1183	36.2	1.8
7	Manufacture of food products	3925	1061	21.3	1.6
8	Food and beverage service activities	5175	741	12.5	1.1
9	Financial service activities, except insurance, pension	1886	352	15.7	0.5
10	Wholesale trade, except of motor vehicles and motorcycles	4416	231	5.0	0.4
11	Accommodation	512	194	27.5	0.3
12	Fishing and aquaculture	1189	158	11.7	0.2
13	Land transport and transport via pipelines	15307	114	0.7	0.2
14	Insurance, reinsurance and pension funding	721	112	13.4	0.2
15	Manufacture of basic pharmaceutical products	617	76	11.0	0.1
16	Telecommunications	853	71	7.7	0.1
17	Manufacture of beverages	313	45	12.6	0.1
18	Employment activities	61	23	27.4	0.0
19	Manufacture of furniture	2076	16	0.8	0.0
20	Water collection, treatment and supply	255	3	1.2	0.0
	Total employees (in thousand)	233022	65645	22.0	100

Source: ILOSTAT database, International Labor Organization

Even the latest National Sample Survey (NSS) report on employment and unemployment in India (2013)[14] highlights that about 75 percent of female workers were engaged in the agricultural sector while only 44 percent of the male workers were engaged in the sector during this period. Similarly, 26 percent and 30 percent male workers were engaged in secondary and tertiary sectors and the corresponding proportions for female workers were 17 percent and 8 percent, respectively. Moreover, the industrial distribution of the workers in the urban areas was distinctly different from that of rural areas. In urban areas, the share of the tertiary sector was dominant followed by that of secondary sector while agricultural sector engaged only a small proportion of total workers for both male and females. In rural areas, nearly 59 percent of the male workers and 75 percent of the female workers were engaged in the agricultural sector while the share of urban workforce in agricultural sector was nearly 6 percent for male workers and 11 percent for female workers. In urban areas, about 59 percent of male workers and 55 percent of the female workers were engaged in the tertiary sector.

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[14] Key Indicators of Employment and Unemployment in India, 2011-12, NSS 68th Round, Ministry of Statistics and Programme Implementation, Government of India, June 2013.

Table 4: Gender Wage Gap for Regular Salaried Employee by Industry: 2007-08

Industry	Rural (%)	Urban (%)
Agriculture (01-05)	69.09	61.89
Mining and Quarrying (10-14)	56.96	56.43
Manufacturing (15-22)	51.69	58.73
Manufacturing (23-37)	41.7	83.32
Electricity, Gas and Water (40-41)	90.04	69.49
Construction (45)	95.71	74.69
Trade (50-55)	77.78	80.71
Transport and Storage etc. (60-64)	106.01	129.9
Services (65-74)	53.57	86.71
Services (75-93)	51.32	68.62
Private hhs with emp. Persons (95)	44.47	39.93
All	61.69	77.11

Source: Adapted from Chakravarty and Gandhi (2016). Note: Codes in brackets represent National Industrial Classification (NIC), 2004 industry codes.

The micro-level data from the employment/unemployment survey of the Indian labor market conducted by NSSO depicts that the largest gaps in wage (wage gap is calculated by female average wage (in Rs.) as a percentage of male average wage/ salary received per day) exists in private households with employed persons in both rural and urban areas where females get nearly 40 percent of the wage given to that of males. The manufacturing sector has higher concentration of women workers and huge gap in wages exits in rural areas was compared in urban areas. The only sector which provides higher wages to female workers as compared to men is transport and storage industry. Other sectors like construction; electricity, gas and water; and trade depict relatively lower wage gap for both rural and urban areas, however, these are the sectors with low concentration of women workers as well. Thus, it could be interpreted that the industries with high concentration of women also depict high gender wage gap and vice versa.[15]

As seen in Table 4, the gender wage gap is often observable in almost all the industries and sectors in India, it is expected to vary also across areas of residence, i.e. urban or rural. The main reason behind this gap is the skewed sex ratio and female labor force participation rate across the organized and unorganized sectors of the economy. The social norms and stereotypical perceptions about women's work lead to scarce employment opportunities and wage discrimination against women in India. Due to marginal increase in the sex ratio in India for rural and urban areas and overall sex ratio in the last two decades, the changes in female workforce participation gap have not been much visible yet. Though several

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[15] Chakravarty, Kavita and Tanya Gandhi 2016. "Extent of Gender Wage Gap in India", paper presented 25th IAFFE Annual Conference, Galway, Ireland, June.

research studies suggest that greater discrimination against women persists in unorganized sector of labor markets in India, the analysis on differences in gender wage gaps in organized and unorganized sectors of labor market becomes difficult due to lack of availability of data.

2.2.3 Pakistan

Pakistan's women's participation in the labor force is among the lowest in the world. The WEF's Global Gender Gap Report (2017) ranks Pakistan at 143 of 144 countries surveyed, just ahead of the Republic of Yemen. Pakistan has more men than women working in any occupation and the level of women's participation in the labor force is low at 25 percent (as opposed to a male participation rate of 75 percent) in 2015. The cultural barriers and are prevalent, emphasizing women's primary role as homemakers and caregivers, coupled with high levels of early marriage, discourage women from entering the workforce, particularly as employed women shoulder the same burden of household-related unpaid work as do their non-employed counterparts.[16]

Though female labor market participation has increased from 13.7 percent in the 1990s to 21.1 percent in 2007 and further to 25 percent in 2015 in Pakistan, it is still very low as compared to other South Asian countries. Nearly 82 percent of the employed women are in agriculture/ forestry/ hunting & fishing industry division followed by manufacturing (13.9 percent). Within manufacturing, the textile and garment sector is the most significant employer for women in Pakistan. About 55 percent of women employment in the manufacturing sector is in the garment industry, while the corresponding figure for men is 19 percent.[17]

The largest proportion of women workers are employed in manufacture of wearing apparel (42 percent) followed by agricultural, forestry and fishery (40 percent) and manufacturing of textiles (30 percent). As per UN estimates,[18] the highest percentage share of women working in agriculture sector was in animal production at 47 percent, followed by mixed farming at 23 percent and growing of non-perennial crops at 18 percent. Thus, there is a disproportionately high concentration of women still employed in agriculture and other informal activities. Some services sectors with women employees are retail trade and health services (in capacities of being doctors and more as midwives and lady health visitors).

Table 5: Women Labor Force Participation by Economic Activity in Pakistan (in 2015)

S.No.	Sectors/Economic activity) (2015)	No. of Men	No. of Women	Share of women in sectoral employment (%)	Share of the sector in total women employment (%)
1	Crop and animal production, hunting and related service activities	13691	9077	39.9	82.4
2	Manufacture of wearing apparel	1327	975	42.4	8.8
3	Manufacture of textiles	1251	525	29.6	4.8

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[16] Khan, Frida (2017).
[17] N. Jamal (2015).
[18] UN Women (2016).

4	Retail trade, except of motor vehicles and motorcycles	6308	163	2.5	1.5
5	Human health activities	515	161	23.8	1.5
6	Manufacture of food products	818	30	3.5	0.3
7	Construction of buildings	3673	24	0.6	0.2
8	Food and beverage service activities	850	22	2.5	0.2
9	Financial service activities, except insurance and pension funding	271	13	4.6	0.1
10	Wholesale trade, except of motor vehicles and motorcycles	947	9	0.9	0.1
11	Land transport and transport via pipelines	2616	6	0.2	0.1
12	Manufacture of furniture	407	4	1.0	0.0
13	Manufacture of basic pharmaceutical products and pharmaceutical preparations	127	4	3.1	0.0
14	Telecommunications	144	3	2.0	0.0
15	Manufacture of beverages	40	2	4.8	0.0
16	Accommodation	19	1	5.0	0.0
17	Fishing and aquaculture	106	0	0.0	0.0
18	Water collection, treatment and supply	137	0	0.0	0.0
19	Insurance, reinsurance and pension funding, except compulsory social security	37	0	0.0	0.0
20	Employment activities	4	0	0.0	0.0
	Total employees (in thousand)	33288	11019	24.9	100

Source: ILOSTAT database, International Labor Organization

A noticeable wage gap exists between average earnings of males and females across major industry groups without taking into account differences in workers' characteristics. Pakistan's Labor Force Surveys for 2014-2015 show a gender pay gap of 26 percent on average at the national level.[19]

Table 6: Gender Wage Gap by Economic Activity in Pakistan in 2016

S.No.	Economic activity (2016)	Men	Women	Wage Gap (%)
		Nominal annual earnings (in US$)		
1	Manufacturing	1644	612	37.2
2	Activities of households as employers	1212	576	47.5
3	Electricity; gas, steam and air conditioning supply	3324	1596	48.0
4	Mining and quarrying	1716	912	53.1
5	Real estate activities	2196	1260	57.4
6	Professional, scientific and technical activities	2700	1596	59.1
7	Activities of extraterritorial organizations and bodies	4452	2724	61.2
8	Education	3240	2016	62.2

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[19] Khan, Frida (2017).

9	Agriculture; forestry and fishing	1032	720	69.8
10	Accommodation and food service activities	1320	924	70.0
11	Administrative and support service activities	1692	1212	71.6
12	Water collection, treatment and supply	2460	1908	77.6
13	Human health and social work activities	2808	2184	77.8
14	Other service activities	1104	876	79.3
15	Construction	1368	1224	89.5
16	Public administration and defense	2964	2736	92.3
17	Information and communication	2988	2760	92.4
18	Financial and insurance activities	4440	4140	93.2
19	Wholesale and retail trade; repair of motor vehicles and motorcycles	1212	1224	101.0
20	Arts, entertainment and recreation	1500	1824	121.6
21	Transportation and storage	1668	2904	174.1

Source: ILOSTAT database, International Labor Organization

Table 6 shows the gender wage gap in Pakistan across different industry sectors in 2016. A very skewed gender pay gap exists in the manufacturing sector with women earning only 37.2 percent of wages as compared to men for the same work. Other major sectors where majority of women are employed show similar trends, for instance, in agriculture, forestry and fishery group females gender wage gap is 69.8 percent, i.e., women earn 30.2 percent less as compared to men. The only sector which provides higher wages to female workers compared to male counterpart is transport and storage industry (with gender wage gap of 17.4 percent), however, this sector has very low concentration of women workers. Thus, many different factors determine the wage gap in Pakistan, women are generally concentrated in a smaller number of specific industry groups than men, and these occupations usually pay lower wages. In occupations where there are fewer women, they tend to earn relatively higher wages.[20]

2.3.4 Sri Lanka

Sri Lanka is the second best among South Asian countries in terms of gender equity with regard to attainment of education, health and other social indicators for women, however, female labor force participation has remained pegged at a low level of 30-35 percent of the workforce for the past two decades. An ILO (2016) study on women's labor force participation in Sri Lanka highlighted that combination of demand-side constraints such as discrimination in employment, differences in the quality of jobs available to women versus the quantity of such jobs, wage discrimination faced for doing exactly the same job, etc. result in lower participation of women into the workforce than men.[21]

In another way, Sri Lanka is distinct compared to other countries in the region is that it has less dependence of women in agriculture and other informal activities. The 2014 labor force survey in Sri Lanka shows that the highest percentage of women workers are in the

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[20] Saeed, Muhammad B. (2017).

[21] International Labor Organization 2016. Factors affecting women's Labor force participation in Sri Lanka, ILO Country Office for Sri Lanka and the Maldives. Colombo.

services sector accounting for 39.5 percent of the labor force, while women employees in agriculture and industry account for 35.3 percent and 25.1 percent of the workforce, respectively.[22]

As shown in Table 7, nearly 35 percent of women were employed in Sri Lanka in 2015, which means that only 35 out of every 100 women in the working age category participated in the labor market. Moreover, crop and animal production, hunting and related activities sector accounted only 45 percent share of total women's employment. The service sector is currently the dominant source of demand for labor in Sri Lanka, and has been expanding in terms of its share of GDP. Among men, employment in the service sector has grown steadily and has become the predominant employment sector with 45 percent of all employed men. Agriculture and industry still account for roughly 25 and 30 percent of male employment, respectively. In 2010, nearly 50 percent of women workers were engaged in agriculture and related activities, however this share declined to 45 percent by 2014. In manufacturing, the textiles and garment sector has the highest share of women workers in Sri Lanka as compared to men.

Table 7: Women Labor Force Participation by Economic Activity in Sri Lanka

S.No	Economic activity	2010				2014			
		No. of Men	No. of Women	Share of women in sectoral employment (%)	Share of the sector in total women employment (%)	No. of Men	No. of Women	Share of women in sectoral employment (%)	Share of the sector in total women employment (%)
1	Crop and animal production, hunting and related activities	1444	968	40.1	50.2	1374	910	39.8	45.0
2	Manufacture of wearing apparel	133	312	70.1	16.2	165	375	69.6	18.6
3	Retail trade, except of motor vehicles and motorcycles	566	240	29.8	12.4	523	280	34.9	13.9
4	Manufacture of food products	126	110	46.6	5.7	155	122	43.9	6.0
5	Human health activities	42	67	61.5	3.5	53	73	57.9	3.6
6	Manufacture of textiles	29	39	57.4	2.0	31	59	64.8	2.9
7	Financial service activities, except insurance and pension funding	53	43	44.8	2.2	60	59	49.6	2.9
8	Food and beverage service activities	49	31	38.8	1.6	83	53	39.0	2.6
9	Wholesale trade, except of motor vehicles and motorcycles	83	26	23.9	1.3	138	31	18.5	1.5
10	Construction of buildings	363	9	2.4	0.5	449	11	2.4	0.5
11	Land transport and transport via pipelines	394	7	1.7	0.4	468	11	2.3	0.5
12	Accommodation	54	12	18.2	0.6	54	10	15.6	0.5

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[22] Sri Lanka female labor force participation could boost productivity, December 11, 2015 accessed online at http://www.lankabusinessonline.com/sri-lanka-female-labor-force-participation-could-boost-productivity-kvintradze/.

13	Manufacture of furniture	94	19	16.8	1.0	67	7	9.5	0.3
14	Insurance, reinsurance and pension funding	21	6	22.2	0.3	23	7	23.3	0.3
15	Fishing and aquaculture	91	3	3.2	0.2	101	6	5.6	0.3
16	Telecommunications	26	10	27.8	0.5	12	6	33.3	0.3
17	Manufacture of beverages	7	0	0.0	0.0	10	1	9.1	0.0
18	Manufacture of basic pharmaceutical products & preps	27	15	36.6	0.8				
19	Water collection, treatment and supply	9	2	18.2	0.1				
20	Employment activities	52	9	14.8	0.5				
	Total employees (in thousand)	3663	1928	34.5	100	3766	2021	34.9	100

Source: ILOSTAT database, International Labor Organization

Services sectors consists of around 40 percent of women in the work force, however, within the services sector male workers dominate all the sectors except education, health and manufacturing. Women predominate in the expected sectors of health and education, as most teachers, nursing and medical staff are female, and are well represented in industry groups that rely on professional services such as insurance and banking. Even service sectors such as accommodation (hospitality), wholesale and retail, and agriculture where women could reasonably be expected to be employed in larger number, employ more male workers. [23]

Just like other countries in the region, the gender wage gap is high in Sri Lanka as well. The Global Gender Gap report (2017) highlights that Sri Lanka has widened its gender gap in wage equality for similar work despite a modest increase in parity in estimated earned income.

Table 8: Gender Wage Gap by Economic Activity in Sri Lanka in 2010

S.No.	Economic activity	Men	Women	Wage Gap (%)
		Nominal annual earnings (in US$)		
1	Hotels and restaurants	1596	816	51.1
2	Electricity, gas and water supply	2292	1440	62.8
3	Manufacturing	1536	984	64.1
4	Activities of private households as employers	1128	732	64.9
5	Extraterritorial organizations and bodies	2592	1728	66.7
6	Not elsewhere classified	888	600	67.6
7	Agriculture, hunting and forestry	924	672	72.7
8	Financial intermediation	2940	2220	75.5

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[23] International Labor Organization 2016. Factors affecting women's Labor force participation in Sri Lanka, ILO Country Office for Sri Lanka and the Maldives. Colombo.

9	Wholesale and retail trade; repair of motor vehicles, motorcycles	1428	1128	79.0
10	Mining and quarrying	708	564	79.7
11	Other community, social and personal service activities	1476	1188	80.5
12	Fishing	1644	1392	84.7
13	Education	2256	1932	85.6
14	Construction	1344	1212	90.2
15	Public administration and defense	2256	2052	91.0
16	Real estate, renting and business activities	2052	1896	92.4
17	Health and social work	2388	2232	93.5
18	Transport, storage and communications	1680	1968	117.1

Source: ILOSTAT database, International Labor Organization

Table 8 shows that in majority of the sectors with higher share of female workers in Sri Lanka, women earn anywhere between 28-36 percent less than their male counterparts for doing the same job. In agriculture, hunting and forestry sector gender wage gap is around 28 percent, while employed women earn just 64 percent of their men counterparts in the manufacturing sector. However, the picture is not entirely bleak as greater gender parity in wages exists for women professionals in some service sectors such as education, health, and social work.

2.2.5 Nepal

Among all the South Asian countries, Nepal surprisingly has the highest female labor force participation. ILO reports that overall female labor force participation in Nepal stood at 80.1 percent in 2008. Though these numbers are encouraging, a detailed analysis at a sectoral level reveals a gloomy picture. As shown in Table 9, of the total women workforce employed in the registered sector in Nepal in 2008, almost 83 percent of women were engaged in agriculture, hunting and forestry activities, followed by other sectors such as electricity, gas and water supply (4.9 percent), hotels and restaurants (3.9 percent), and transport, storage and communications (1.6 percent). As highlighted by Tanaka and Muzones (2016), this is primarily because majority of the women entering the labor force in Nepal have a minimum level of education, thus ending up in low skilled and low paid jobs in the informal sector. Around 61 percent of employed females aged 15 and above had never attended school, 20.3 percent had attained less than primary to primary level education, and only 15 percent had attained lower secondary to secondary level education (Nepal labor force survey 2008).

Like other low-income countries, women in Nepal must work out of necessity and poverty In Nepal, majority of the women are burdened with household work and have less qualification in education and skills and mostly they are employed in informal sectors and do not have well-paying jobs in the formal sector. Thus, women's share is large in all lower skill occupations working mainly in 'service workers' category and negligible in higher skill jobs. Under registered sectors, non-financial sector is the largest employer, followed

by the government sector. However, all these sectors have a significantly higher number of male employees compared to the number of female employees (CBS, 2009).[24]

Table 9: Women Labor Force Participation by Economic Activity in Nepal (2008)

S.No.	Economic activity	No. of Men	No. of Women	Share of women in sectoral employment (%)	Share of the sector in total women employment (%)
1	Agriculture, hunting and forestry	3407	5256	60.7	83.2
2	Fishing	2			
3	Manufacturing	18	8	30.8	0.1
4	Electricity, gas and water supply	460	302	39.6	4.8
5	Construction	39	69	63.9	1.1
6	Wholesale and retail trade; repair of motor vehicles, etc.	323	40	11.0	0.6
7	Hotels and restaurants	444	244	35.5	3.9
8	Transport, storage and communications	91	102	52.6	1.6
9	Financial intermediation	186	6	3.1	0.1
10	Real estate, renting and business activities	22	9	29.0	0.1
11	Public administration and defense; social security	57	13	18.6	0.2
12	Education	281	106	27.4	1.7
13	Health and social work	45	30	39.5	0.5
14	Other community, social and personal service activities	76	22	22.4	0.3
15	Activities of private households	13	19	59.4	0.3
16	Extraterritorial organizations and bodies	3	0	0.0	0.0
17	Not elsewhere classified	371	83	18.3	1.3
18	Total employees (in thousand)	5845	6316	51.9	100.0

Source: ILOSTAT database, International Labor Organization

In addition, when it comes to paid employment a very significant gender pay gap exists in Nepal as women are paid less than their male counterparts for the same job in mostly all the sectors, owing to such circumstances women are poorer than men in the country.[25] A very skewed gender pay gap exists in the agriculture, hunting and forestry with women earning 40 percent less as compared to men for the same work. Other major sectors where majority of women are employed show similar trends (Table 10).

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[24] CBS. 2009. Report on the Nepal Labor force survey 2008. Kathmandu, National Planning Commission.

[25] Published 18 December 2015. The Kathmandu Post at https://ceslam.org/index.php?pageName=newsDetail&nid=7054.

Table 10: Gender Wage Gap by Economic Activity in Nepal (2008)

S.No.	Economic activity	Men	Women	Wage Gap (%)
		Nominal annual earnings (in US$)		
1	Agriculture, hunting and forestry	816	492	60.3
2	Fishing	600		
3	Manufacturing	1056		
4	Electricity, gas and water supply	1164	768	66.0
5	Construction	1848	876	47.4
6	Wholesale and retail trade; repair of motor vehicles, etc.	1020	708	69.4
7	Hotels and restaurants	768	672	87.5
8	Transport, storage and communications	1632	756	46.3
9	Financial intermediation	1116	936	83.9
10	Real estate, renting and business activities	2316	1260	54.4
11	Public administration and defense; social security	1176	888	75.5
12	Education	1500	972	64.8
13	Health and social work	1308	1044	79.8
14	Other community, social and personal service activities	1644	744	45.3
15	Activities of private households as employers	672	372	55.4
16	Extraterritorial organizations and bodies	1956	1920	98.2

Source: ILOSTAT database, International Labor Organization

The existing literature and the results above suggest that gender differences in the labor market in South Asia are highly prevalent. Gender differences loom large in female labor force participation and earnings across different sectors and jobs in South Asia. Though the combined effect of economic development, rising education among women, and declining fertility to an extent explains increase in female participation rates in some South Asian countries, there still remains several prominent constraints to increasing female labor force participation such as women's domestic responsibilities, limited mobility, which restrict the subset of jobs considered appropriate for women, and also impede their access to information.

3. Development of the GTAP-Gender Data Set for South Asia

Data on the wages and number of employees for different sectors were first obtained, separately for men and women. These sectors were then mapped for which data were available to the 57 sectors in the standard GTAP database. In the GTAP-Power data set, electricity is further broken down into several types of renewable and non-renewable sectors, so the male and female wage bill shares were used corresponding to ISIC sector 35 to all the electricity sectors in GTAP-Power.

It is assumed that the wage bill shares from a given aggregated sector from the data sets explained before, hold good across the GTAP sectors mapped to this aggregated sector. For example, if male wage bill share were 50 percent of the total wage bill in ISIC sector 1, which is crop and animal production, the male wage bill share in GTAP sectors 1 to 13 is assumed as 50 percent of their sectoral wage bills, based on the concordances shown in the boxes 1 and 2 above. Further, Bhutan dataset does not exist in GTAP, therefore it was split away from GTAP's composite region named Rest of South Asia, using macro-economic and trade data from the World Bank in SplitReg tool, to compute shares to separate Bhutan from this composite region. It is also assumed that the gender data in Bhutan may be similar to that in Nepal.

4. Description of the Modeling Framework

The model developed in this paper is an extension of the standard GTAP model (Hertel, 1997). The sets SECT of sectors is defined (indexed by k) and REG of regions (indexed by r in most cases and if the region is the source of exports/imports but by s if the region is destination of exports/imports).

International Trade

The change in imports of each region from each of the others is determined by three factors: (i) substitution among different sources, based on the differential between import prices from specific sources and the sum of import-augmented technical change and aggregate import prices $pimk_{k,s}$, multiplied by the elasticity of substitution of imports between the sources $\sigma_{M,k}$, using the Armington elasticity for the sector as in the GTAP Data Base, (ii) import-augmenting technical change, $amsk_{k,r,s}$ that lowers the effective price of a good in the destination market, and (iii) the import penetration as captured by the change in composite imports of subsector commodity k, $qimk_{k,s}$. Note that the substitution effect for a particular flow (k,r,s) increases in divergence of import tariff for good k from regions r to s, from the weighted-average tariff of s. Since a higher weight means lower divergence, this effect decreases in import-shares of region r in the total imports by region s of the good k.

For all sectors k in SECT, regions r and s in REG:

$$qxsk_{k,r,s} = -amsk_{k,r,s} + qimk_{k,s} - \sigma_{M,k} * [pmsk_{k,r,s} - amsk_{k,r,s} - pimk_{k,s}] \quad \text{............... (1)}$$

Global transport margins are treated in the same manner as in the standard GTAP model, with the quantity of international trade, transport and insurance services required being a fixed proportion of the volume of goods shipped. Technical change in this sector is represented with the variable atmfsdkk$_{,r,s}$ and is obtained by adding up the changes at different levels, which are directly translated from the aggregate changes in the corresponding variables. Trade and transport services are provided at a common price, pt, which represents a Cobb-Douglas aggregation of trade and transport services exports from all regions in the model. Deducting the rate of technical progress from this price change gives the percentage change in the commodity and route-specific transport margin, $ptransk_{k,r,s}$. The price linkages in the model also include export taxes, $txsk_{k,r,s,}$ export *fob*

prices *pfobk*$_{k,r,s}$, and import *cif* prices *pcifk*$_{k,r,s}$ as shown in figure 2. Changes in import tariff and export taxes are the policy variables here.

a. Domestic Consumption

There are three broad categories of consumption of products and services manufactured in a country: private households, government and firms. In addition, each of these categories of agents also consume imports that are aggregated across exporters, based on the descriptions in section a above. For private households, GTAP assumes a Constant Difference Elasticity (CDE) functional form, which is flexible enough to handle Linearized Expenditure Systems (LES) and Constant Elasticity of Substitution (CES) as special cases. For government to consume different products and for firms to consume different intermediate inputs, the CES functional form is used. There is also a nested CES function between domestic and imported products for each of these agents.

b. Domestic Production

Production functions in GTAP involve 3 levels of nests: (1) There is a Leontief function on the topmost part of production system, wherein intermediate inputs are a composite single input and primary factors as another composite single input are complements. (2) Within the intermediate inputs, there is a CES function. (3) Within the primary factor inputs, there is a CES function. Except for land and natural resources, which can move only within agricultural and extraction sectors respectively. Other factors are mobile across sectors. In the standard GTAP model, the only factors are land, unskilled labor, skilled labor, capital and natural resources. This is where our model deviates from the standard model; we have land, capital, natural resources, skilled female labor, unskilled female labor, skilled male labor and unskilled male labor, all substituting against each other.

We modified this standard production function as follows, because this standard formulation implicitly assumes gender equality and does not directly pose male and female labor as being substitutes on a one-on-one .

We let unskilled and skilled labor substitute each other in every sector as it would do in the standard model, but in separate nests for male and female labor. The elasticities here are taken from the standard model as well. In other words, male unskilled labor substitutes imperfectly with male skilled labor, with elasticities in the GTAP model that exist for all the factor endowments (ESUBVA).

- We let male and female composite labor act as perfect substitutes at a higher level of nesting than the above.

Another major change that we have introduced to the standard model is the estimation and inclusion of a labor supply equation. From the literature, we found that this elasticity of labor supply with respect to real wages ranges between 0.6 and 1 for the developed countries, such as Germany and the United States.[26] For South Asian countries, the literature on this area has been quite dated; therefore, we employed the long time-series

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[26] See for example (last accessed on Jan 15, 2020): https://voxeu.org/article/aggregating-labour-supply-elasticities
http://conference.iza.org/conference_files/ESSLE2013/merz_m878.pdf.

data (1981-82 to 2017-18) on employment (total persons engaged) and real wages (based on total emoluments paid) from Annual Survey of Industries, Ministry of Statistics and Program Implementation, Government of India,[27] to compute the average labor supply elasticity, which turned out to be around 0.4. We introduced this labor supply equation in the model.

c. Links between Production, Consumption and International Trade:

The sub-modules explained above are linked with each other. The percentage change in sector-level domestic consumption, $qdmk_{k,s}$, with a corresponding price change $pmk_{k,s}$, substitutes for imported subsector goods, $qimk_{k,s}$, with a corresponding price change $pimk_{k,s}$. The CES elasticity between these two variables is $\sigma_{D,k}$, and this substitution takes place based on their respective price differentials from the sector-level domestic prices $pdk_{k,s}$, as illustrated by equations (2) and (3):

For all k in SECT and s in REG:

$qimk(k,s) = qdk(k,s) – \sigma_D(k) * [pimk(k,s) - pdk(k,s)]$ .....………………… (2)

$qdmk(k,s) = qdk(k,s) - \sigma_D(k) * [pmk(k,s) - pdk(k,s)]$ ………………………… (3)

Domestic market and import price changes are aggregated to domestic price changes by weighting according to their respective shares. $VDK_{k,r}$ is the total value of domestic consumption of goods corresponding to the sub-sector k in the region r, $VDMK_{k,r}$ is the value of domestic consumption of goods produced by the domestic sector k in the region r and $VIMK_{k,s}$ is the value of imports of goods produced by the sub-sector k to the region s.

For all k in SECT and s in REG:

$pdk_{k,s} = \alpha D_{k,s} * pmk_{k,s} + \alpha M_{k,s} * pimk_{k,s}$ ……………………… (4)

where: $\alpha D_{k,s} = VDMK_{k,s} / VDK_{k,s}$ and $\alpha M_{k,s} = VIMK_{k,s} / VDK_{k,s}$

Finally, the total changes in supply and demand are equalized to ensure equilibrium, by equating the percentage change in total output $qok_{k,r}$ with the share-weighted sum of exports and domestic consumption for all sectors k in SECT and regions r in REG. When the slack variable $tradslackk_{k,r}$, is exogenized, this equilibrium condition determines the change in market prices, $pmk_{k,r}$ (output, $qok_{k,r}$) is determined by Equation (5).

For all k in SECT and r in REG:

$qok_{k,r} = \beta D_{k,r} * qdmk_{k,r} + \Sigma_s \beta M_{k,r,s} * qxsk_{k,r,s} + tradslackk_{k,r}$ ……………………… (5)

Figures

Notations in Figures 1 and 2 follow standard GTAP notations (Hertel, 1997) [22]. In general, the variables starting with: 'q' represent changes in quantities, 't' represent tax/tariff changes and 'p' represent changes in prices. Those ending with 'k' are at disaggregate level. In the variable-names,

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'*d*' stands for domestic, '*i*' for imports, '*x*' for exports, and '*o'* for output. Indices '*r*' and '*s*' denote source and destination regions, respectively; '*k*' denotes sectors.

5. Green Sectors

Despite great interest of policy makers across countries in creating "green jobs", there is no commonly accepted definition of "green jobs" that exists globally. Various organizations have suggested different definitions and approaches of "green jobs", some of which focus on the purpose of output or work, i.e., whether the produced goods and services can be used to "green" the economy. While others focus on environmental impacts of output and work, i.e., whether the production or consumption damages the environment or is unsustainable.

ILO/UNEP (2008)[28] study broadly defines a green job as any decent job that contributes to preserving or restoring the quality of the environment whether it is in agriculture, industry, services or administration. This includes jobs that help to protect ecosystems and biodiversity, reduce energy, materials, and water consumption through high efficiency strategies, de-carbonize the economy, and minimize or altogether avoid generation of all forms of waste and pollution.

While the definition adopted by Eurostat (2009)[29] focuses on the environmental goods and services industry emphasizing on green jobs firmly within green industries explicitly concerned with environmental improvement. A green job comprises "activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems." This includes technologies, products and services that reduce environmental risk and minimize pollution and resources.

The US Department of Commerce (2010)[30] defines the green economy for only the private sector in a broad sense, as "clean and energy efficient." The jobs that are created and supported in businesses that produce green products and services are green jobs, without consideration of the environmental impact of their production or social context.

The US Workforce Information Council (2009)[31] describes green jobs to be comprising the jobs whose work is essential to green economic activity. These jobs refer to work that supports environmental sustainability with specific focus on "economic activity" and not by their particular skills or skill-level, wages or other compensation, or even the tasks being

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[28] ILO/UNEP (2008). Green Jobs: Towards Decent Work in a Sustainable Low Carbon World, United Nations Environment Program.

[29] Eurostat (2009). The Environmental Goods and Services Sector: A Data Collection Handbook, European Commission.

[30] U.S. Department of Commerce (2010). Measuring the Green Economy, U.S. Department of Commerce, Economics and Statistics Administration.

[31] Workforce Information Council (2009). Measurement and Analysis of Employment in the Green Economy, http://www.workforceinfocouncil.org.

performed. The measurable definition by WIC is "a green job is one in which the work is essential to products and services that improve energy efficiency, expand the use of renewable energy, or support environmental sustainability." The job involves work in any of these green economic activity categories: renewable energy and alternative fuels; energy efficiency and conservation; pollution, waste, and greenhouse gas management, prevention, and reduction; environmental cleanup and remediation and waste clean-up and mitigation; sustainable agriculture and natural resource conservation; education, regulation, compliance, public awareness, and training and energy trading.

The US Bureau of Labor Statistics (2010) defines green jobs based on the WIC framework. The BLS definition includes two components and consistent with the output and process approaches. Green jobs are either a) Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources b) Jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources.

BLS has identified 325 detailed industries (6-digit NAICS) as potential producers of green goods and services, which fall into one or more of the following five categories:
1. Energy from renewable sources. Electricity, heat, or fuel generated from renewable sources. These energy sources include wind, biomass, geothermal, solar, ocean, hydropower, and landfill gas and municipal solid waste.
2. Energy efficiency. Products and services that improve energy efficiency. Included in this group are energy-efficient equipment, appliances, buildings, and vehicles, as well as products and services that improve the energy efficiency of buildings and the efficiency of energy storage and distribution, such as Smart Grid technologies.
3. Pollution reduction and removal, greenhouse gas reduction, and recycling and reuse. These are products and services that:
- Reduce or eliminate the creation or release of pollutants or toxic compounds, or remove pollutants or hazardous waste from the environment.
- Reduce greenhouse gas emissions through methods other than renewable energy generation and energy efficiency, such as electricity generated from nuclear sources.
- Reduce or eliminate the creation of waste materials; collect, reuse, remanufacture, recycle, or compost waste materials or wastewater.
4. Natural resources conservation. Products and services that conserve natural resources. Included in this group are products and services related to organic agriculture and sustainable forestry; land management; soil, water, or wildlife conservation; and storm water management.
5. Environmental compliance, education and training, and public awareness. These are products and services that:
- Enforce environmental regulations.
- Provide education and training related to green technologies and practices.
- Increase public awareness of environmental issues.

Among the sectors listed above, detailed information is available on energy from renewable sources. All other sectors are contained within several GTAP sectors and do not contain any detailed information for South Asia. Therefore, the green sector definition used is the

one in which CO2 emissions are on low, at a sustainable level and the main focus is on employment effects arising from a transition towards a green economy. Here, we consider not only the direct CO2 emissions by them, but also the indirect or triggered emissions that are generated as production externalities through intermediate inputs. In other words, jobs are "green" if labor is employed by industries that produce only low CO2 emissions or if the jobs are involved in industries that produce goods and services whose direct purpose is to reduce CO2 emissions. Based on this definition, following is a listing of GTAP sectors from the perspective of sustainability, in the decreasing order, apart from renewable sources of electricity.

Therefore, to the extent that jobs are generated in the first few sectors above, as well as the renewable sectors, one may say that there has been a move towards green jobs.

6. Illustrative Scenarios and Results

We employ two different model closures, to examine the impact on both employment and real wages. First, we use the standard GTAP model closure that keeps aggregate employment fixed and real wages endogenous. This can provide results on real wages. Second, we use the 'unemployment' closure which assumes that the real wages are fixed and aggregate employment is endogenous – to understand the effects on employment. Results on other variables are based on the second, unemployment closure, but they do not differ a lot in the two closures. Other features of the model closure include perfect competition, constant returns to scale, fixed land, capital and natural resources, endogenous prices and quantities, with exogenous and zero technological changes.

The primary objective of this study is to develop a dataset and a GTAP-based modeling framework to pursue policy research on the impact of free trade agreements within South Asia, on green growth and the wages and employment of women. In this context, two illustrative scenarios are examined, which do not necessarily capture all details of real-work negotiations on free trade agreements. Nevertheless, the first scenario does capture some ongoing developments in the Bhutan-Bangladesh-India-Nepal grouping (BBIN[32]): a complete tariff elimination among these countries in all the sectors.

The second scenario involves a rather ambitious and optimistic assumption of complete tariff elimination among countries in South Asia. While SAFTA (South Asian Free Trade Agreement) already exists, it only has a nominal influence on trade policies across countries.

The macro-economic results discussed in tables 11-15 show that all South Asian countries may gain much more if they all sign an FTA together, rather than some of them doing so; in other words, SAFTA scenario is much more positive than BBIN for all countries. Particularly Pakistan and Sri Lanka may lose in BBIN scenario, as they are left out of this

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[32] See Pal (2016) for details on BBIN trade policy issues; this paper is available online: https://www.orfonline.org/wp-content/uploads/2016/03/ORF-Issue-Brief_135.pdf.

FTA; this arises mainly from the trade diversion effects that result in export opportunities moving away from these two countries and the rest of the world, in favor of the BBIN countries. India would gain the most in absolute terms and least in relative terms. Nepal may witness the biggest relative positive impact on GDP, exports, imports and investment; it strangely sees a reduction in private and government consumption, because most of its domestic production declines due to competition from imports, thereby resulting in lower consumption. For Bangladesh and Sri Lanka, the reduction in consumption stems from two effects; first, greater imports substitute domestic consumption; second, greater exports eat in the demand for domestic consumption further.

Table 11: GDP implications of SAFTA and BBIN in South Asian Countries

Country	BBIN		SAFTA	
	% change	Millions of US$	% change	Millions of US$
Bangladesh	0.03	34.9	0.07	81.3
India	0.03	477.6	0.04	758.5
Nepal	0.08	15.7	0.07	13.8
Pakistan	<-0.01	-8.9	0.04	76.2
Sri Lanka	-0.01	-3.9	0.05	29.3
Bhutan	0.02	3.9	-0.07	-16.2
RestofWorld	<-0.01	-208.0	<-0.01	-352.0

Table 12: Trade implications of SAFTA and BBIN in South Asian Countries

	Exports				Imports			
	BBIN		SAFTA		BBIN		SAFTA	
Country	% change	Millions of US$	% change	Millions of US$	% change	Millions of US$	% change	Millions of US$
Bangladesh	5.96	1574.2	8.34	2362.3	3.76	1307.3	5.65	1962.2
India	0.18	565.3	0.34	1258.1	0.32	1694.3	0.54	2828.6
Nepal	36.45	521.5	36.90	531.1	1.74	99.0	1.59	90.3
Pakistan	-0.09	-25.7	1.96	606.2	-0.12	-66.0	1.88	1067.5
Sri Lanka	0	2.9	6.37	791.5	-0.06	-13.3	2.60	590.9
Bhutan	1.61	54.1	10.02	375.8	1.03	128.8	1.21	151.3
RestofWorld	<-0.01	-374.0	<-0.01	-748.0	<-0.01	-852.0	-0.01	-1542.0

Table 13: Other Macroeconomic Implications of SAFTA and BBIN (% change)

	Consumption		Investment		Government	
Country	BBIN	SAFTA	BBIN	SAFTA	BBIN	SAFTA
Bangladesh	-0.64	-0.83	1.4	2.38	-1.06	-1.38

India	0.06	0.09	0.11	0.2	0.06	0.1
Nepal	-2.72	-2.8	2.74	3.75	-4.03	-4.11
Pakistan	-0.02	0.14	-0.06	0.94	-0.01	0.15
Sri Lanka	-0.02	-0.81	-0.06	2.29	-0.01	-1.12
Bhutan	0.07	-1.06	1.13	0.76	0.15	-1.16
RestofWorld	<-0.01	<-0.01	<-0.01	<-0.01	<-0.01	<-0.01

In Bangladesh and Bhutan, as seen in Table 14, the positive impact on female employment is much greater than that on male employment. This is because most of the sectors that grow due to these FTAs are the ones that are female intensive. Nepalese unskilled labor is an exception to this general effect, as the males gain much more than women. This is because to begin with, female unskilled labor in Nepal is predominantly confined to agricultural sectors, which are less positively impacted than other sectors. Skilled women employees in Nepal mostly work in services sectors which witness a major boost in general due to these FTAs. Surprisingly, in India, both men and women face almost the same extent of gain in employment in both types of labor in both scenarios.

Table 14: Employment Implications of SAFTA and BBIN (% change)

Country	BBIN				SAFTA			
	Unskilled Labor		Skilled Labor		Unskilled Labor		Skilled Labor	
	Male	Female	Male	Female	Male	Female	Male	Female
Bangladesh	0.15	0.31	0.09	0.24	0.2	0.41	0.11	0.32
India	0.02	0.02	0.01	0.01	0.03	0.03	0.01	0.01
Nepal	0.31	0.14	0.36	0.44	0.29	0.11	0.35	0.42
Pakistan	-0.01	-0.01	<-0.01	-0.01	0.13	0.21	0.01	0.06
Sri Lanka	-0.01	-0.01	-0.01	-0.01	0.41	0.29	0.25	0.02
Bhutan	0.16	0.25	0.05	0.08	0.17	0.24	-0.01	0.01

In terms of real wage impact, shown in table 15, again the women benefit more from freer trade than men, in general, owing to the greater overall demand for them as shown in table 14. Again, apart from India where the % changes are the same for both gender categories, the exception seen in Nepalese unskilled labor market is consistent with table 14: lower demand expansion for women unskilled labor, who are mostly confined to agricultural sectors, implies lower real wage growth for them.

Table 15: Real Wage Implications of SAFTA and BBIN (% change)

Country	BBIN				SAFTA			
	Unskilled Labor		Skilled Labor		Unskilled Labor		Skilled Labor	
	Male	Female	Male	Female	Male	Female	Male	Female

Bangladesh	0.38	0.77	0.21	0.61	0.5	1.03	0.27	0.8
India	0.06	0.06	0.02	0.02	0.08	0.08	0.03	0.02
Nepal	0.78	0.35	0.91	1.11	0.72	0.26	0.87	1.06
Pakistan	-0.02	-0.02	-0.01	-0.01	0.32	0.52	0.02	0.15
Sri Lanka	-0.03	-0.02	-0.03	-0.03	1.04	0.73	0.64	0.05
Bhutan	0.41	0.62	0.12	0.19	0.42	0.6	-0.02	0.02

In terms of green sectors, it is perhaps not a coincidence that a major part of women employed in South Asia are part of the relatively less polluting sectors. Thus, growth in women employment and wages is consistent with growth in green sectors as well. This is evident in figures 1 and 2. The green sectors in general witness a positive impact of both scenarios of tariff liberalization. There are some exceptions, but there are relatively few and small in terms of negative effect. Only percent changes are shown here and many of the negative percent changes correspond to a lower base in the beginning, implying that they have relatively small negative effect on overall green sector growth. For example, the sugar cane and beet sector (c_b), sugar (sgr) and oilseeds (osd) sectors have output shares of 0.4%, 0.7% and 0.2%, respectively in Bangladesh, therefore their decline that appears big in percent terms is not a major setback to the overall economy.

Figure 1: Output Impact in Different 'Green' Sectors: SAFTA Scenario (% change)
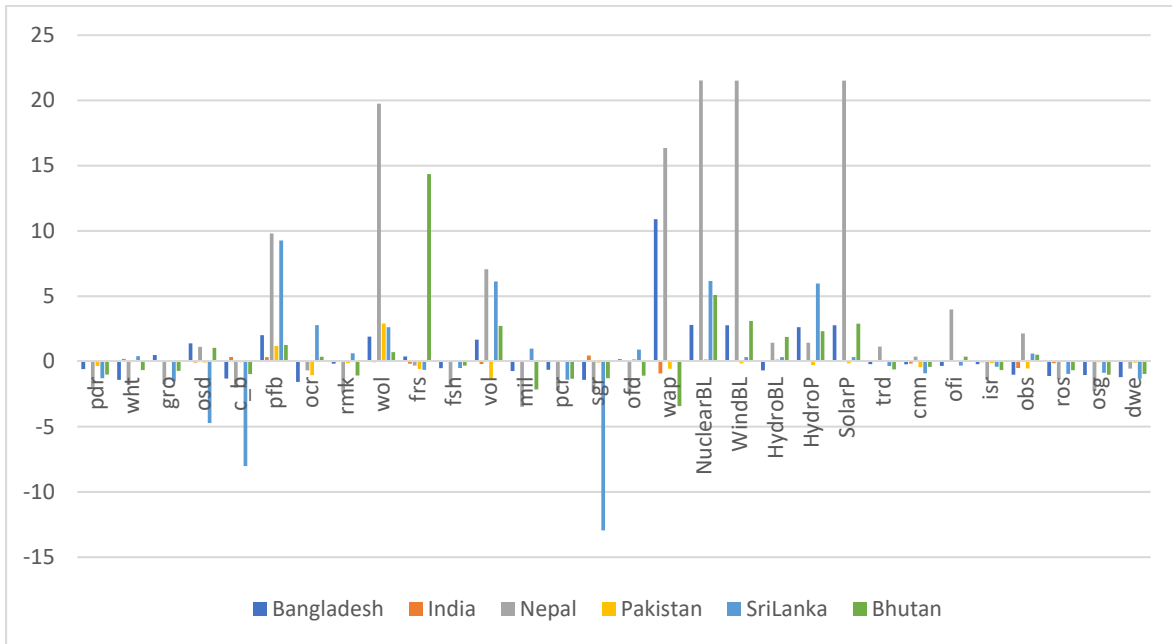
Figure 2: Output Impact in Different 'Green' Sectors: BBIN Scenario (% change)
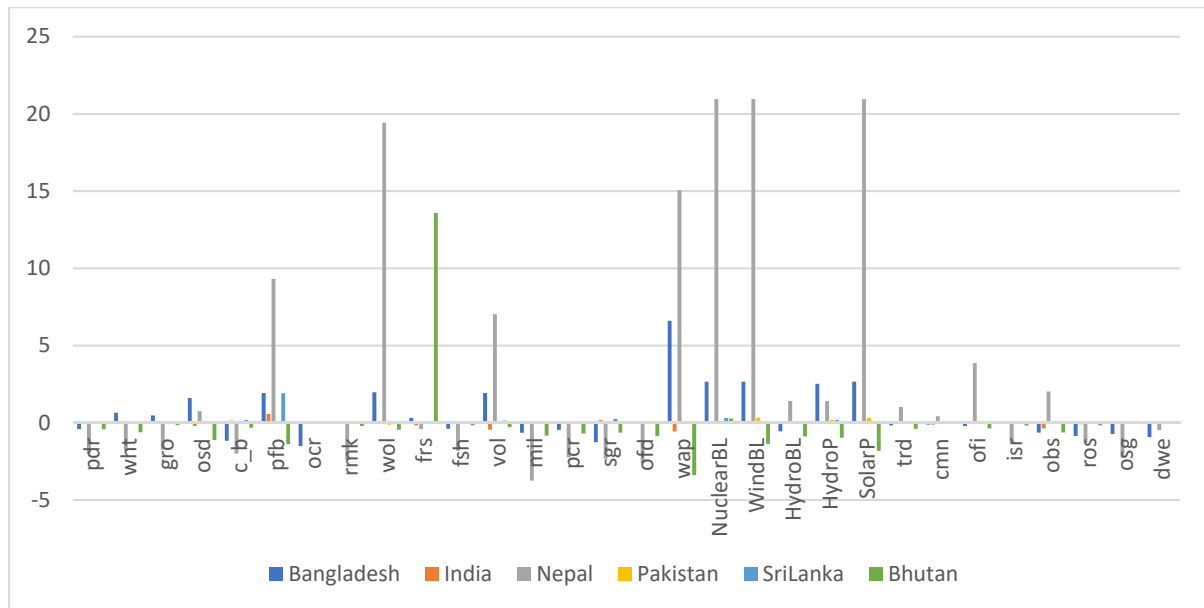
7. Conclusions

This is the first major attempt to develop a gender-differentiated data set for South Asian countries, within the widely used GTAP framework, coupled with the GTAP-POWER model that includes renewable sectors, to examine the nexus between trade, green economy, and gender. In order to generate gender differentiated employment and wages data in the current GTAP database, this study compiles gendered employment data and industry average wages across industries and occupations for each country and reconciles the data using the Yearbook of Labor Statistics from the International Labor Organization (ILO). The model and data set have been derived from a large number of survey data sets in South Asian countries. The data gaps for the select countries were filled using the data obtained from several published government sources. Female labor force participation and the gender wage gap were calculated using data disaggregated by economic activity according to the International Standard Industrial Classification of All Economic Activities (ISIC) at the 2-digit level of the classification and for the latest data available for that country. The study identifies the targeted value chains and economic activities, particularly among green trade sectors, that will benefit women in South Asia using the newly constructed model and database.

A few more innovations were introduced in the model; first, we introduce a multi-level nest in the labor demand, wherein perfect substitution happens between male and female composite labor while the different types of skilled labor substitute each other based on the standard GTAP elasticities; second, we introduce a labor supply curve based on calibrated elasticities from Indian data from 1981-82 to 2017-18, as well as other literature.

In the model, two illustrative simulations are – one in which all South Asian countries reduce all their mutual tariffs to zero (SAFTA) and another in which all of them except Pakistan and Sri Lanka cut their mutual tariffs to zero (BBIN). In terms of macroeconomic growth, the results indicate that an FTA signed by all South Asian countries is likely to be more beneficial to all countries as compared to some countries signing the FTA. The results indicate that SAFTA scenario is more beneficial than BBIN for all countries. Failure to join the FTA may result in Pakistan and Sri Lanka losing out. India stands to gain the most in absolute terms but the least in relative terms while Nepal stands to benefit the most in terms of relative positive impact on GDP, exports, imports, and investments.

We observe the following, in terms of gender and green economy: women employment grows faster than male employment as most of the sectors that benefit due to these FTAs are women intensive. Moreover, unskilled female labor employment grows faster than skilled female labor employment. Pakistan and Sri Lanka experience a negative percentage change in employment in BBIN while they stand to benefit through SAFTA. The exception is, however, Nepalese unskilled labor as the female unskilled labor in Nepal is dominated by the agriculture sector which is not much impacted as compared to other sectors and the service sector which employs the majority of the skilled women labor in Nepal generally tends to benefit from these FTAs. Another exception is India, wherein the growth rates of male and female employment and wages are almost on par with each other.

In terms of real wages, as a result of liberalization, due to the increased demand for labor in different sectors, women benefit more than men with the exception of Nepal's unskilled women labor as they are confined to agriculture sector which implies lower real wage growth.

In terms of green sectors, our results indicate that the growth in women employment and wages in South Asia is consistent with growth in green sectors. Thus, both the scenarios of liberalization have a net positive effect on the green sectors.

In a nutshell, the data set developed in this study helps to analyze the economic activities related to trade that benefits female labor force participation and real wages. The analysis of the data set developed could enable the governments and the policy makers to design better trade liberalization policies and programs which could help improve the targeting of the sectors benefitting women. Moreover, the analysis could help reduce existing gender disparities and wage discrimination over time in South Asian countries. Thus, the study would not only help in analyzing the gender dimensions of trade agreements but also in subsequent research on the gendered impacts of other global shocks.

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