Impact of the Accord and Alliance on Labor Productivity of the Bangladesh RMG Industry

By

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A thesis submitted to the Department of Economics and Social Sciences in partial fulfillment of the requirements for the degree of
Master of Science in Applied Economics

Department of Economics and Social Sciences (ESS)

Brac University

Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing degree at BRAC University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

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of Spring, 2019 has been accepted as satisfactory in partial fulfillment of the requirement for the degree of Master of Science in Applied Economics on 10 July, 2020.

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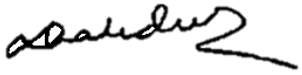

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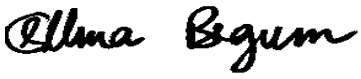

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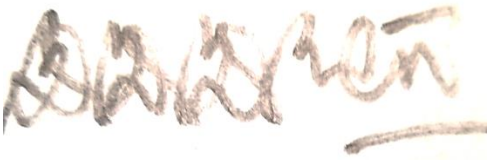

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Abstract

The year 2013 saw one of the most tragic accidents in the readymade garment (RMG) industry, the Rana Plaza accident, which claimed more than 1100 lives of garment workers. This accident drew attention of the world to the failures in ensuring safety in the workplace. In an attempt to make sure such an accident does not occur in future, two transnational governance initiatives were introduced; "Accord on fire and building and safety in Bangladesh" (Accord) and "Alliance for Bangladesh worker safety" (Alliance), and these two initiatives have been guided by the principles of occupational safety and health (OSH). Also, an initiative by Bangladesh government, "National Tripartite Plan of Action" (NTPA) was taken to ensure worker safety in RMG factories. The study aims to find if actions taken by the Accord and Alliance to implement OSH regulations in their affiliated factories could make a strong impact on labor productivity of their member factories, amongst other factors effecting labor productivity at factory level such as; factory size, factory age, wage of skilled labor, management indicators, and export status. Also, the study aimed to compare the findings for the Accord and Alliance affiliated factories with NTPA affiliated factories. The study uses two approaches; quantitative and qualitative. In the quantitative approach, two types of models; ordinary least squares (OLS) estimation and multinomial logistic regression are used to estimate the effect of aforementioned factors on factory level labor productivity. The study argues that, there is no strong positive relationship between factories being affiliated with the Accord and Alliance, and labor productivity, because apart from building safety, other factors also influenced labor productivity. The qualitative study helped to identify possible reasons for changes in labor productivity by analyzing experiences of factory owners/managers (affiliated with the Accord and Alliance) during implementation of remediation works and experiences regarding costs associated with the remediation works. The study identified that the resources required to enhance labor productivity were diverted to expensive remediation work as there was no assistance from the buyer side in terms of funding the remediation work, and the factories were often assigned with expensive remediation works. Policies such as; creation of a common fund by all the stakeholders, providing skill development training and investing in physical capital of factories, ensuring fair pricing and recommending cost effective safety improvements, that are also suitable for local specificities; should be taken to address the identified problems and enhance labor productivity.

Dedicated To

My Family

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Glossary of Terms

BGMEA	Bangladesh Garment Manufacturers and Exporters Association
BKMEA	Bangladesh Knitwear Manufacturing and Exporting Association
CAP	Corrective Action Plan
CCC	Clean Clothes Campaign
CoC	Code of Conduct
CSR	Corporate Social Responsibility
DIFE	Department of Inspection for Factories and Establishments
EPZ	Export Processing Zone
IFC	International Finance Corporation
ILO	International Labor Organization
MFA	Multi-Fiber Agreement
NGO	Non-governmental Organization
GoB	Government of Bangladesh
GSP	Generalized System of Preferences
MoLE	Ministry of Labor and Employment
NTPA	National Tripartite Plan of Action
OLS	Ordinary Least Squares
OSH	Occupational Safety and Health
RMG	Readymade Garment
RSC	RMG Sustainability Council

Chapter 1

Introduction

1.1.Statement of the Problem

Bangladesh's garments industry originated in the late 1970s with Desh Company pioneering the trend of exporting and partnering up with South Korean company Daewoo to utilize the opportunities and explore the possibilities provided by the Multi-Fiber Agreement (MFA) (Rahman, 2014, 18-20). In 1983-84 the proportion of garments in the total exports of Bangladesh was only 3.89 per cent, carrying the total value (exports) of only 31.57 Million dollars (USD) (BGMEA, 2019). The garment industry of Bangladesh has come a long way from that stage. The industry held a share of 84.21 per cent of the total exports of Bangladesh in FY 2018-19 which was worth 34133.27 million dollars (USD) with an annual growth rate of 8.76 per cent (BGMEA, 2019). Despite this impressive achievement of the industry, accidents of different scales keep happening because of the social costs attached to the success of the RMG sector. The world was shook by the fire accident in Tazreen Fashions garment factory and then in the following year, the Rana Plaza tragedy.

After Rana Plaza in which more than 1100 workers lost their lives, Bangladeshi garment owners or suppliers faced great challenges in ensuring occupational safety and health (OSH) for their workers. In the 1990s, in response to the activists' movements and concerns regarding poor working conditions in supplier countries to the consumers of the United States and Germany, brands and retailers developed codes of conducts (CoC) covering labor standards (also incorporated ILO labor standards). They used internal or third party auditing for monitoring (Schüßler et al., 2019). Nonetheless, these initiatives rendered fruitless as there was no conditions on building safety in buyers' CoCs. Moreover, the auditing of "freedom of association" did not give the workers the right to refuse from entering into a building which was evacuated by other occupants. The result was the Rana Plaza tragedy in April, 2013 which claimed 1134 lives (Schüßler et al., 2019). This incident caused huge international outcry. Civil societies, worker unions, and consumers started to demand that large apparel brands take responsibility for workers in supplier factories (Reinecke, & Donaghey, 2015).

To address the compliance problems, two transnational governance initiatives were introduced after the Rana Plaza tragedy; "Accord on fire and building and safety in Bangladesh" (Accord) and "Alliance for Bangladesh worker safety" (Alliance). These two initiatives were, "aimed to transform the safety of the Bangladesh garment industry through a regime of inspection and remediation, coupled with promises that signatory brands and retailers would continue to source from Bangladesh" (Schüßler et al., 2019). Also, Bangladesh government formed "National Tripartite Plan of Action" (NTPA), which was the most comprehensive initiative by the government for ensuring worker safety (Khan, & Wichterich, 2015). Both the Accord and Alliance aimed to ensure worker safety through factory inspections, suggesting and monitoring factory remediation, and safety training (the Accord, 2018; Alliance, 2018). For ensuring worker safety they undertook activities such as; credible inspections on fire, electricity and building safety, providing support for implementation of remediation works through development of corrective action plans (CAPs), and trainings on fire and building safety for workers, managers and security staff were delivered (The Accord, 2013, 2020). By developing and implementing measures such as; inspection, CAPs, and trainings, these OSH driven governance mechanisms developed a powerful set of tools for supplier factory managements to improve and implement OSH conditions, this strategy is on par with ILO which recommends development of a number of tools for sound management of OSH (Alli, 2008). By 31 December, 2015, 3, 780 RMG factories were inspected, of which, 1, 549 were assessed by the government initiate (ILO, 2016). Although, OSH interventions are aimed at reducing worker injuries, and accidents, there is a view that OSH interventions are expensive, and regulations impose investment a non-productive investment (Shearn, 2003; De Greef, & Van den Broek, 2004), so, cost of ensuring safer work place should effect labor productivity. On the other hand, previous studies reveal; workers tend to be more productive in a well-facilitated working environment (Akinyele, 2009). Another important factor in ensuring OSH for workers in Bangladeshi RMG sector is buyer responsibility. After the accident, buyers took many initiatives to ensure ethical sourcing, formation of the Accord and Alliance being the most prominent. Nonetheless, the question remains if these initiatives were enough and what impact they made on worker productivity.

It is necessary to assess the roles of supplier factory managements and the Accord and Alliance in ensuring OSH for the workers and how these factors are impacting labor productivity, which is usually measured by dividing output by labor input (Van Biesebroeck, 2015). If proper

implementation of OSH is ensured in Bangladeshi RMG supplier factories, labor productivity should change. Because, better working conditions prompt workers to perform better which leads to more productivity. In words of O' Donnell (2000) this can be described as:

> …. human performance is higher when people are physically and emotionally able to work and have a desire to work. Higher levels of human performance lead to higher levels of productivity, which in turn can lead to higher profits.

So, the objective of this thesis is to find out how steps taken by the Accord and Alliance to ensure OSH, effected labor productivity, among some other factors effecting labor productivity such as; factory size, age, management related factors, export status (Tekleselassie et al., 2018). The role of OSH will be investigated by examining the impact of the Accord and Alliances' activities for implementing OSH conditions in supplier factories, and factories' affiliations with these two initiatives. This thesis will evaluate whether or not affiliation with these two transnational governances could make an impact on labor productivity, among other factors effecting labor productivity in sample factories. And, since there is a view that OSH interventions are expensive and cause non-productive investments (Shearn, 2003; De Greef, & Van den Broek, 2004), it will also be observed, if cost of implementing OSH regulations through inspection and implementation steps taken by the two transnational initiatives, had an effect on labor productivity.

1.2.Research Questions

The aim of this thesis is to assess how affiliation with the Accord and Alliance and their activities for implementing worker safety in factories, effect labor productivity among other factors effecting labor productivity. This aim can be achieved by answering the following research questions:

1. How do labor productivity related factors effect sample factories?
2. How does affiliation with the Accord and Alliance effect labor productivity, and how does affiliation with NTPA compare with the Accord and Alliance affiliated factories?
3. What types of experiences were faced by the factory managers/owners during remediation works suggested by the Accord and Alliance and why did they think,

remediation work was important? Also, does this explain cost related issues of remediation works?

4. How does the assessment labor productivity in the surveyed factories connect with the experiences shared by managers/owners of those factories? And, can a strong influence of the Accord and Alliances' work be found to have an impact on worker productivity.

The following figure helps in providing a summarized view of the aim of this study.

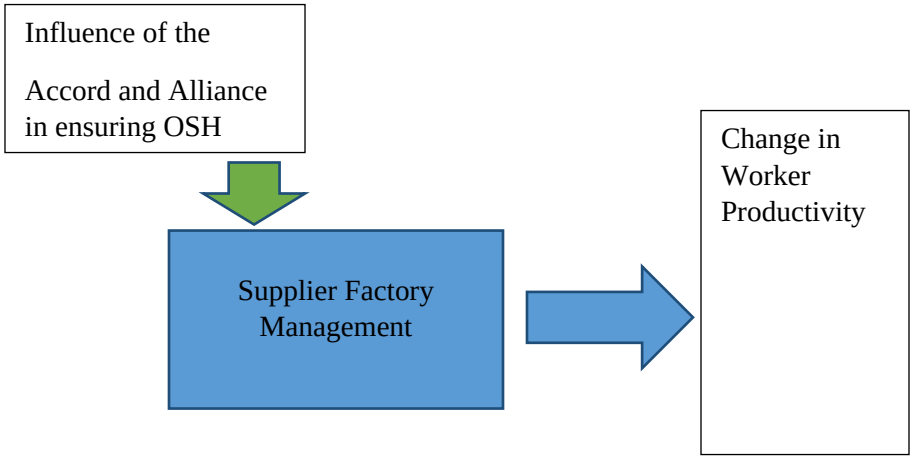

Figure 1 : Relationship between Influence of the Accord, Alliance, factory management and worker productivity.

Note: the green arrows represent relationship between the Accord, Alliance, and the supplier factory management

The blue arrow represents how influence of the Accord, Alliance on supplier factory management in ensuring OSH effects worker productivity

The Accord and Alliance influenced supplier factory management for ensuring worker safety through factory inspections on fire, electricity, and building safety, suggesting and monitoring factory remediation, and safety training (The Accord, 2018, 2013; Alliance, 2018) (see Figure 1). Through these activities, the two initiatives provided a powerful set of tools for ensuring implementation of OSH on par with ILO's strategy of developing set of tools for factory managers for sound management of OSH (Alli, 2008). These activities undertaken by the Accord and Alliance should impact labor productivity in supplier factories (see Figure 1) as better working conditions enables workers to perform better physically and emotionally which leads to

more productivity (O'Donnell, 2000). Also, costs related to remediation works are of interest of study as OSH interventions are often viewed as expensive and cause of non-productive investments (Shearn, 2003; De Greef, & Van den Broek, 2004)

1.3.Objectives

The aim of this study is to assess if labor productivity of RMG workers were effected as a result of affiliation with the Accord and Alliance, and the actions taken by these two initiatives for ensuring worker safety. The following objectives can help in answering the research questions from the previous section:

1. To form a model consisting of indicators effecting labor productivity at factory level, and estimate the effect on labor productivity of those factors; using two statistical methods; OLS regression and Multinomial Logistic regression;
2. To compare worker productivity among factories that are members of either one or both of the Accord and Alliance, and factories that are members of NTPA;
3. To use qualitative analysis to assess the experience of managers on why they thought compliance was important, challenges faced by them while implementing remediation work, and who paid for the remediation work; and
4. To connect the findings from the qualitative study and the quantitative analysis, and conclude if Accord, and Alliances' activities made a strong impact on labor productivity.

1.4. Conceptual Framework

1.4.1. Occupational Safety and Health (OSH)

According to "Labor Behind the Label" garment works are pushed to work for 10 to 12 hours and even stretching to 16 to 18 hours or even more when deadlines are close. These figures imply that they have to spend a significant amount of time in a day in the factories they are working for. Such long work shifts may prove to be very harmful to health and may reduce productivity overall if OSH is not maintained in the factory premises. Before looking at OSH situation in this country's factories, it is important to learn International Labor Organization's (ILO) convention about it and what it is. According to Alli (2008),

> The Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187), and its accompanying Recommendation (No. 197) integrate the two fundamental pillars of the ILO's global strategy to improve safety and health in the world of work, namely the building and maintenance of a national preventive safety and health culture, and the application of a systems approach to the management of occupational safety and health at both national and enterprise levels (pp. 26).

Muchemedzi, & Charamba (2006) have defined occupational health as a science which is concerned with health and its relation to work and the working environment, itself.

So, OSH framework includes both national and individual leveled OSH framework. This study aims to focus on individual level OSH framework. High temperatures, loud noises, long hours, low wages, lower quality of air, unhygienic work environment; and verbal and non-verbal abuse are usually cited as "sweatshop" characters of many manufacturing establishments in relatively poor developing countries (Robertson, Brown & Dehejia, 2016).

As mentioned earlier, before the Rana Plaza tragedy large retailers formed CoCs covering labor standards and used internal auditing (Schüßler et al., 2019). However, Tazreen fire and Rana Plaza tragedy bared testaments that those initiatives were inadequate and the large retailers needed to form better OSH framework. After much negotiations, the Accord and Alliance were formed to ensure that workers would no longer fear fire, building collapse and other forms of accidents through implementation of occupational safety and health (the Accord, 2018). Since then, fewer accidents have been reported in this sector. However, this may not be able to draw the whole picture. A study a by the labor department of the New Zealand (2007) suggests that, fewer incidences of injury does not mean that appropriate safety and health measures are in place throughout an industry. The study also observed that, production costs including the costs of incidents and loss of quality and productivity are directly or indirectly linked to health and safety measures (Massey, Lamm, & Perry, 2007).

1.4.2. Labor Productivity

Productivity is the efficiency in the process of production and it is usually measured by how much output can be obtained from a given input. So, it is expressed as a ratio of output and input.

Single-factor productivity can reflect units of output produced for a particular input and labor productivity is used as the most common measure of single-factor productivity (Syverson, 2011).

Although conceptually measurement of productivity seems simple but in reality measurement of productivity faces issues regarding measuring outputs, inputs, and aggregating multiple inputs (Syverson, 2011). Various methods are used in measuring productivities at different levels, namely; individual, firm, industry, and country level productivities. However, construction of productivity measures from real production data often raises measurement and data quality issues (Syverson, 2011).

The context of this study requires to focus on labor productivity. According the U.S. Bureau of Labor Statistics (BLS) (2014):

> Labor productivity is defined as real output per labor hour, and growth in labor productivity is measured as the change in this ratio over time. Labor productivity growth is what enables workers to produce more goods and services than they otherwise could for a given number of work hours (pp. 2).

Labor productivity can be measured in two ways; one being by measuring the quantity of work which involves, consideration of the total number of hours worked by all employees to produce output. Another method is known as “quality weighting”. This method considers the quality aspect of labor services focused into production of outputs. Here, the notion of using more productive workers than using more workers for increasing outputs, is considered (Van Biesebroeck, 2015). Studying labor productivity is important for several reasons. ILO has shed light on why, it is important; firstly, it drives economic growth as more labor productivity means an economy can produce more, using fewer resources, and secondly, higher labor productivity can bring more profits and investment opportunities for firms (ILO, 2015).

Several factors influence labor productivity and OSH is one of those factors. Existing literature (Samaddar, 2016; Katsuro et al., 2010) suggest that, weak OSH measures contribute towards reduction in worker productivity. Because, better working conditions are required for workers to be able to perform well both physically and mentally, which leads to higher productivity (O’Donnell, 2000). The Accord and Alliance have mainly focused on the implementation of

OSH through inspections of fire, electrical, and building safety, monitoring and guiding implementation of remediation works, and providing training on fire, and building safety (Accord, 2013) in supplier factories. O'Donnell's (2000) finding on how better working conditions lead to more productivity should also be applicable for Accord and Alliances' efforts of implementing OSH in supplier factories and its effect on labor productivity.

Productivity is a widely studied concept where productivity of firms, labor and capital are measured frequently on both macro and micro levels. The Accord, Alliance, NTPA, and similar types of other initiatives such as' NTPA, influence RMG supplier factories in Bangladesh to implement safety measures assigned by these initiatives, to make working conditions safer for workers. These activities should have an impact on labor productivity as Samddar (2016); and Better Work (2016) suggest that, better working conditions enhance worker productivity. On the other hand, a study by Gray (1987) shows, implementation of OSH reduced productivity growth in the average manufacturing industry.

So, the purpose of this study is to see if labor productivity is effected for the Accord and Alliance affiliated factories as well as for factories affiliated with other initiatives such as NTPA, and do the findings follow the results of Better Work (2016); & Samaddar (2016) or the finding of Gray (1987).

Many factors influence labor productivity in a factory/firm. Common factors like; export behavior, factory size, and age, wage for skilled labor, management quality related indicators (education level of owners, location of factories, type of ownership) (Tekleselassie et al., 2018; Moazzem, & Khandker, 2018; Samaddar, 2016). Also, factors related to implementing OSH requirements in factories are also important for the context of this study. Indicators exclusive to the activities of the Accord, Alliance, and NTPA such as; CAP progress, importance attached to change in building safety, investment on training for building safety, are also considered as they can influence labor productivity of the sample of RMG supplier factories used in the quantitative analysis section of this study.

Also, improvement in labor productivity needs investments in skill development, and physical capital of the factory (Hohenegger, Miller, & Curley, 2018).

In addition to quantitative analysis, I have used qualitative analysis to find out the experience of managers regarding compliance, payment for remediation work, and challenges faced by them while implementing the remediation work. As safety regulations require large expenses and under most funding arrangements, factory managements/owners have to bear the costs of implementing safety regulations (Hopkins, 2014), it is important to understand if this was also the case for factories in the sample of this study. So, an understanding of costs related to remediation works incurred by factory owners/managers, and if factories had sufficient fund to invest for skill development and physical capital of factories after remediation works, can be developed from the qualitative analysis.

In the literature review section, I have discussed in detail how the OSH and productivity are related, and how remediation work suggested by the Accord and Alliance can relate to the theme of the study.

In the next section, I have stated the significance of the study.

1.5.Significance of the Study

As ILO (2015) suggested, higher labor productivity drives economic growth. Bangladesh has been maintaining a 6+ per cent GDP growth rate since 2011 and in 2018, it achieved a growth of 7.9 per cent (The World Bank, 2019). So, the necessity of a higher labor productivity for Bangladesh can be easily understood. However, Bangladesh's labor productivity growth rate was below 4 per cent as recently as 2013 and varied from 5-6 per cent during 2016-2018 (Hussain, 2019). The country's closest competitor, Vietnam (Hossain, 2019) on the other hand, saw a 4.5 per cent growth in labor productivity per year on average, for the past two decades (ILO, 2015). So, lower labor productivity, can make Bangladesh less competitive. Furthermore, RMG sector is the leading export sector, contributing 84. 21 per cent of total exports in FY 2018-2019 (BGMEA, 2019). So, it is important to study labor productivity of this sector. After Rana Plaza accident in 2013, two transnational initiatives; the Accord and Alliance were introduced to ensure worker safety in Bangladeshi garment factories (The Accord, 2018 and Alliance, 2018). Evidence from previous studies show that, better working conditions enhance worker productivity (Better Work, 2016; Samaddar, 2016). However, Gray's (1987) study shows implementation of OSH reduced productivity growth in the average manufacturing industry.

RMG industry, is important for the economic growth of this country and a study on labor productivity of this sector after the changes brought in terms of worker safety by the Accord and Alliance, is important. In addition to that, this study will help the policymakers for assessing the impact of initiatives; the Accord and Alliance on worker productivity and determine, how 'RMG Sustainability Council' (RSC) which became operational very recently, can be further improved to enhance worker productivity.

Chapter 2

Literature Review

This chapter contains a review of existing literature on a brief overview of Bangladeshi RMG industry, and some major causes behind the Rana Plaza tragedy, status of OSH situation in Bangladesh before and after the Rana Plaza accident, formation of the Accord and Alliance, how they operated and their current status, relationship between OSH and worker productivity, and how the Accord and Alliance connect with labor productivity. The aim of this study is to assess the change in worker productivity owing to the impact made by the Accord and Alliance on Bangladeshi RMG supplier. The literature review section is going to help identify the gap in the existing literature regarding the impact of the Accord and Alliance on worker productivity and justify how this thesis contributes to efforts in filling in the gap.

2.1. Bangladesh RMG: Origin and Impact on the Country

The readymade garments industry acts as a catalyst for the Development of Bangladesh. The 'made in Bangladesh' tag has brought glory for the country and has helped to turn Bangladesh into a 'basket full of wonders' from "bottomless" basket, a title given by cynics (BGMEA, 2019). The country has been maintaining a 6+ per cent of GDP growth rate since 2011 and in 2018, the country was able to clock a GDP growth rate of 7.9 per cent (The World Bank, 2019).

After achieving independence in 1971, Bangladesh did not have economic strength and the country seriously lacked in the development of any major industry as industries were not allowed to be developed in East Pakistan (currently Bangladesh) by the West Pakistan due to discriminatory attitude toward the former by the latter. So, after liberation, building a newly born country was the biggest challenge. Before the RMG industry, jute was our main industry. However, it started to lose its golden days and the RMG industry gradually replaced it from the role of the major industry (BGMEA, 2019).

The RMG industry started its journey in the late 1970s and early 1980s. The late Nurool Quader Khan was the pioneer of the industry in Bangladesh. In 1978, he sent 130 trainees to South Korea for training on the production of readymade garments. With those trainees, he established Desh Company, pioneering the trend of exporting and partnering up with South Korean company

Daewoo to utilize the opportunities and explore the possibilities provided by the Multi-Fiber Agreement (MFA) (Rahman, 2014, 18-20).

Following the footsteps of Desh Company, many other garments factories were established and the industry started to grow. Now this industry employs approximately 4.4 million workers, making it the largest industry in Bangladesh (Schüßler et al., 2019). In FY 1983-1984, the industry could export only products worth 31.57 million USD which accounted for only 3.89 per cent of total exports of the country. From that phase, the industry has come a long way and as of FY 2018-2019, accounted for 84.21 per cent of the total exports of the country (BGMEA, 2019).

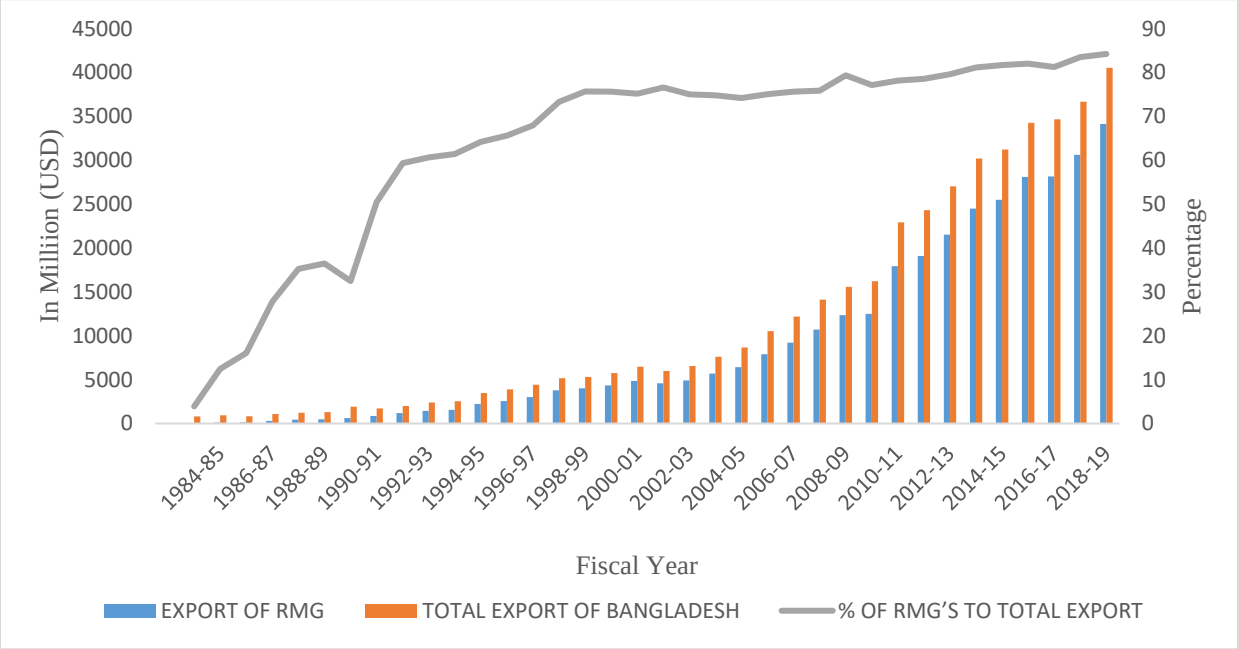

Figure 2: Percentage of RMG Exports in the Total Exports of Bangladesh

Data Source: BGMEA, 2019[1]

The Impressive growth of the industry came at a steep price. Several accidents took place over the years due to inadequate attention to OSH in factories, resulting in loss of lives of the workers and severe injuries. Rana Plaza was the worst accident in the history of Bangladeshi RMG industry. Bangladeshi manufacturers adopted strategies to reduce production costs resulting in lower-wage and reduction in expenditure for new factory building and safety means. This race to 'bottom' enabled the industry to expand more (Hepple, 2005). Furthermore, apart from the

[1] I gathered export data from BGMEA website and formed the figure in Microsoft Excel.

factories inside the EPZs and some other factories with direct connections to international buyers, the majority of the factory owners operate with an informal sector mindset, by adjusting the production of their factories according to demand through outsourcing and subcontracting to larger factories or in a sweat-shop like an arrangement. Such high competitive strategies of accumulation enable them to maximize profit and reinvest at a minimal cost (Kabeer, & Mahmud, 2004a). Buyers are also to be responsible for major accidents. A report by the *Wall Street Journal*, sheds light on the inept measures taken by the buyers, "retailers rely largely on trade association initiatives, independent third-party assessors and their own in-house auditors to monitor suppliers in Bangladesh, the second-largest clothing exporter after China" (Al-Mahmood, & Wright, 2013). In a country like Bangladesh where many factories operate with an "informal mindset" and in dangerous working environment, such measures adopted by buyers are very inadequate and can lead to deadly accidents which in fact happened in the case of Rana Plaza collapse in 2013, claiming more than 1100 lives.

2.2. OSH in Bangladesh: Before and After Rana Plaza

Even before the Rana Plaza accident, the safety record for the apparel industry in Bangladesh was grim. Clean Clothes Campaign (CCC) dubbed (2012) the safety record of the Bangladeshi garment industry as one of the worst. CCC reports between the years 2006 and 2009, fire broke out in at least 213 garment factories, claiming 414 lives. Another 79 lives were lost in 2010 in 21 separate incidents. The month of April in 2005 saw 64 lives of garment workers being lost to the Spectrum factory collapse, which was producing clothing for Inditex, and Karstadt Quelle among others (Clean Clothes Campaign, 2012).

The reason behind such poor safety records and frequent accidents that are in most cases fatal lies in the heart of the growth process of the industry. Before the Rana Plaza tragedy, around four to five thousand garment factories existed ranging from large first-tier factories to small factories, operating as subcontractors to larger clients. These factories employed around three million workers, most of whom were women. The lack of alternative employment options and poverty forced those women to take low paid jobs as a garment worker and to work in factories that lacked even basic standards of health and safety. The rapid expansion of the apparel industry-led factory owners to convert many buildings into garment factories, although those buildings were built for other purposes and these conversions were done without any safety

permits. Many other buildings had extra floor added or had added extra workforce and machinery, often crossing the safety limit of a building (Clean Clothes Campaign, 2012). Unplanned expansion and reluctance to follow proper safety standards resulted in many fatal accidents even before the Rana Plaza tragedy.

Following the Spectrum tragedy, several demands were made to the buyers, the Bangladesh industry, and the Bangladesh government to take necessary steps to improve the safety situation in the Bangladeshi garment industry. Just after the Spectrum accident, measures like buyer-requested audits focusing on building safety, the setting up of a government task force to assess building safety, and the involvement of BGMEA in unannounced inspections to check access to fire exits. However, concerns were raised by labor groups that such measures were not taken in a systematic manner and inspections were done at a limited capacity and on an ad hoc basis, without any effective follow ups (Clean Clothes Campaign, 2012). The initiatives were failing and the failure was apparent in the accidents taking place after the Spectrum disaster. Finally, the Rana Plaza tragedy took place in April 2013 which worked as a wakeup call for taking the OSH situation with due importance. After the incident, many initiatives were taken with keeping worker safety and health issues as one of the main aims.

The formation of the Accord and Alliance was the most prominent response to the Rana Plaza tragedy by multi-stakeholders involved in Bangladesh's RMG industry. As of January 2020, the Accord has inspected more than 2100 garment factories, around 1173 factories have completed primary remediation work under the Accord. Furthermore, 1.8 million workers have been informed about workplace safety through the formation of safety committees, and training (the Accord, 2020). Before leaving operations in 2018, the Alliance's annual progress report revealed that it had trained around 1.6 million workers in fire safety in Alliance member factories. The widespread impacts of the Accord and Alliance are very impressive and provide hope that the Bangladeshi apparel industry is going in the right direction in overcoming shortages in ensuring OSH for workers in the industry and research findings reinforce this statement. This claim is further backed by changes in workers' perspectives regarding building safety and health in the Accord and Alliance affiliated factories. Kabeer, Haq, & Sulaiman (2019) observe, "Workers in factories with AA (the Accord and Alliance) affiliation were significantly more likely than those in nonaffiliated factories to report improvements in building safety, the healthiness of

environment, safety training". Schüßler et al., (2019) state that, "our key finding is that working conditions in the Bangladesh garment industry have improved since Rana Plaza. Firms affiliated to Accord and Alliance perform better across all factory sizes".

Although the Accord and Alliance have made considerable contributions towards improving the OSH situation in the country's RMG sector, there is much scope of improvement. Also, these initiatives are just the beginning steps to something much larger. Salvai in ILO's working paper (2015) acknowledged that the challenge in the coming years is to figure out how to improve working conditions by increasing both productivity of workers and the quality of the goods produced.

2.3.Accord and Alliance: What are These, Why They Emerged in Bangladesh, How They Operated, and Current Status

Formation of the Accord and Alliance

A major accident such as the Rana Plaza tragedy caused a huge international outcry. Particularly, domestic and international media, international trade unions and labor rights campaigns denigrated sourcing processes of large apparel brands and their lack of responsibility in ensuring safe working conditions and living wages for workers working at supplier factories. Protests that took place in Bangladesh and in many western countries threatened the corporate reputation and brand image of large apparel buying and selling corporations (Khan, & Wichterich, 2015). Buyers were urged by civil societies to take the responsibility of ensuring decent working conditions in supplier factories and in the value production chain as a whole including factories working on a subcontract basis. Global labor unions, in particular, IndustriAll and UNI Global Union, utilizing their previous international framework agreements, and labor and consumer campaigns, created a way for negotiations with corporations as strategic partners rather than playing the role of opposition through damaging the image of large apparel brands (Donaghey, & Reinecke, 2015).

The outcome of all the civil society efforts took shape when the "Bangladesh Accord on Fire and Building Safety" (Accord) was signed on May 13, 2013, from the European side. After much hesitation, resistance and negotiations, the Accord was signed by over 220 apparel corporations throughout the globe, and two global union federations; IndustriAll and UNI Global Unions, and eight of their affiliated Bangladeshi unions to ensure workplace safety in the Bangladeshi RMG

industry. The International Labor Organization (ILO) and the government of Bangladesh are cooperating with the Accord as well. It is a legally binding agreement that works for ensuring the safe and healthy garment and textile industry in Bangladesh (Accord, 2018). Accord is first of its kind and in the history of industrial relations, it is the first initiative that was formed including all stakeholders to take the responsibility of workers' safety and rights by forming a legally binding agreement (Khan, & Wichterich, 2015). Researchers and labor rights activists have described this initiative as a "game-changer" (Ryan, 2013) and another group has described it as a 'breakthrough'. In the words of Hensler, & Blasi (2013), this initiative has been described as:

> One of the most distinctive attributes of the recently signed Accord on Building and Fire Safety in Bangladesh ("Accord") is that, unlike nearly all initiatives since the advent of global manufacturing to address the safety and wellbeing of supply chain workers, the agreement entails commitments by multinational enterprises that are legally enforceable (pp.1).

To maintain the achievements and growth by Accord, 2013, the 190 brands and retailers and signed Transition Accord, 2018 with global unions, which came into effect on June 1st, 2018 (Accord, 2018). The platform has been granted with 281 days of extended tenure from May 8th, 2019 (The Daily Star, 2019). According to 'Quarterly Aggregate Report' published on January 2020 by the Accord, among the 2159 factories inspected or scheduled for an initial inspection under the Accord program, 1665 factories were covered by Accord and 529 factories were no longer covered by the initiative for various reasons such as; factories becoming ineligible for business with the Accord brands, closures, relocation and being out of scope. Moreover, 311 safety committees have so far completed safety training and 1.8 million workers have been informed about workplace safety (The Accord, 2020).

A similar approach was taken from the North American side. 2013, the same as Accord was formed, "The Alliance for Bangladesh Worker Safety" (Alliance) was organized through the Bipartisan Policy Center with discussions convened and chaired by former U.S. Senate Majority Leader George Mitchell (D-ME) and former U.S. Senator Olympia Snowe (R-ME), and both of them had a strong record of forging consensus-oriented solutions. The initiative involved 29

apparel industry companies (including some giants in the apparel industry like Walmart, JCPenny Gap Inc., and many others), and other stakeholders including the U.S. and Bangladeshi governments, policymakers, NGOs, members of civil society, and organized labor (Alliance, 2018). The platform inspected more than 700 factories in Bangladesh from where Alliance member factories procured products. As per the data provided by Alliance, 93 percent of the faults identified in the factories were corrected, while 428 factories completed 100 percent remediation work. Alliance ceased its operations in Bangladesh on December 31, 2018 (New Age, 2019).

Difference between the Accord and Alliance

Although, both the Accord and Alliance were formed to ensure worker safety through various remediation measures, they have some structural differences. Donaghey & Reinehe (2018) have explained the differences between the two initiatives. According to them, the Accord was formed with a labor driven governance structure. In contrast to the Accord, Alliance was formed with a corporate-driven structure. Alliance qualifies as a traditional CSR approach as it is a voluntary transnational, industry self-regulating mechanism. On the other hand, the Accord is based on the notion of industrial democracy and involves workers in the design and implementation strategies of the initiative itself. This difference is apparent in its governance system. The Accord's governance steering committee consists of three brands and three unions, meaning that workers are represented. Moreover, four international labor rights NGOs are signatories of the Accord as witnesses. However, in case of Alliance, the board of directors consists of four brands, three outside experts and an independent chair, and workers do not get to participate directly in its governance.

If factory closures took place due to lack of safety, the workers were required to be given compensations. The Accord and Alliance took different approaches regarding compensations. According to Donaghey & Reinecke (2018), the Alliance required both the employers and brands to pay two months' compensation each. The brands paid their portion directly through, Alliance member-funded "Worker Safety Fund". After this payment, the rest of the two months' payment was to be made by employers. However, the extent of this payment is questionable as workers quickly shift to another job and legal enforcement in Bangladesh is quite limited. In the case of the Accord, it took a negotiation approach between employers and workers where, workers

should be able to pursue their interests, and employers instead of the brands would have to bear the responsibility.

From, this discussion it is apparent that, due to their structural differences, the Accord and Alliances' remediation measures could impose different costs on the factory owners/manager. It remains to be seen if a difference is reflected in the empirical analysis through changes (if any) in the level of productivity.

How Inspection and Remediation Worked

According to the Accord (2020), company signatories voluntarily disclose all their RMG supplier factories; their home textiles and fabric, and knit accessory suppliers in Bangladesh. Then all factories covered by the Accord receive initial inspections and follow-up inspections to monitor and verify remedial measures. After each factory is inspected for fire, electrical and structural safety, an inspection report is made which is shared with the factory owners, the responsible Accord signatory companies, and worker representatives. The factory owners and the company signatories are then tasked to form the "Corrective Action Plan" (CAP) which details what type of remedial actions will be taken with a clear timeline and a financial plan. The Accord's team of case handlers and engineers work closely together to provide the necessary support for the implementation and development of CAPs. After the finalization of a CAP by factory owners and signatory companies, it is submitted to the Accord for a review and approval by the chief safety inspector.

During the remediation period, factories are given a CAP status at different levels of remediation. The status is given based on a few indicators (see Table 1).

Table 1: CAP Status [2]

Name of Indicators	Description of the Indicators
CAP behind schedule	The CAP is in implementation but one or more timelines have not been met.
CAP on track	The CAP is in implementation and all timelines have so far been met.
Initial CAP completed	All issues identified in the Accord initial inspections have been verified as corrected by Accord.
CAP not implemented	The factory does not agree to implement the CAP and as a result the supplier is ineligible for business with Accord signatory companies
CAP not finalized/no CAP	The CAP is either incomplete, absent or not yet approved by the Accord.

Source: The Accord, 2020

The status is given by comparing progress to the condition at the time of the year of the initial inspection.

[2] Some of the CAP status from the table are used as indicators in empirical study of the thesis as the "current status of CAP".

Also, trainings on fire and building safety for workers, managers and security staff were delivered. As of 2020, 311 safety committees have so far completed safety training and 1.8 million workers have been informed about workplace safety (the Accord 2020, 2013).

Current Status of the Accord and Alliance

Alliance ceased its operations in December, 2018 with the release of its fifth and final annual report. The initiative transitioned its widely renowned training program and helpline to local partners, so that their local partners could continue and expand them to additional factories throughout Bangladesh (Alliance, 2018). In June 1st, 2020, the Accord transitioned its operations to "RMG Sustainability Council" (RSC) (The Accord, 2020) and closed its operations in the country (Dhaka Tribune, 2020).

According to a press release by RSC (2020) it is, "a permanent national organization with equal representation from RMG manufacturers, global apparel companies, and trade unions representing garment workers". RSC will initially conduct its workplace safety programs at the 1600+ factories covered under the Accord and eventually would cover all RMG exporting factories. The initiative aspires to also include industrial relations, skills development, and environmental standards into its agenda. Furthermore, under RSC, the Accord covered factories would be able to complete their CAPs (RSC Press Release, 2020).

Other Initiative: NTPA

The government of Bangladesh (GoB) adopted several action plans to improve worker safety conditions in the RMG sector. The most comprehensive was the "National Tripartite Plan of Action on Fire Safety and Structural Integrity in the Ready-made Garment Sector in Bangladesh" (NTPA). The government took such initiative in the face of pressure from the US regarding suspension US Generalized System of Preferences (GSP) in 2013 (Fattah, 2013) and similar threats from the European Union (EU). The NTPA was a national agreement jointly signed by Ministry of Labor and Employment (MoLE), and representatives of workers and of the owners, with the assistance from ILO. It was designed to ensure, in the long run, workplaces with internationally accepted safety and health standards across the RMG sector (Khan, & Wichterich, 2015).

All of these initiatives are appreciable and have made some impact, in avoiding immediate to long term dangers from lack of safety measures in RMG factories in Bangladesh. However, the question still remains if these initiatives are enough and what roles the Accord and Alliance have actually played in ensuring OSH through influencing supplier factory management. Also, it remains to see how the Accord and Alliance's roles helped in changing worker productivity.

2.4. Relationship between OSH and Labor Productivity: How Accord and Alliance Connect with Labor Productivity

Better working condition is one of the key factors in improving worker productivity. Increased human productivity can also lead to increased profits. In operational terms, higher productivity in any manufacturing plant means, more product is produced with fewer labor hours of input (O' Donnell, 2000). Also, O'Donnell (2000) suggested that people being able to work emotionally and physically leads to higher human preface, which in turn leads to higher productivity. So, it becomes important to observe the relation between OSH and worker productivity. Also, the discipline of *ergonomics* provides some insight to why there are more successful engagements with business community over the link between OSH and productivity. In words of MacLeod (1995) this can be described as:

> Improving the fit between humans and tools inherently means a more effective match. Good ergonomic improvements often result in better ways of performing a task. An ergonomically designed workplace (or product) is a more productive workplace (or product). Not exceeding human capabilities does not mean reducing output or doing less. On the contrary, good design permits more output with less human effort.

Although, good working conditions lead to more labor productivity, concerns are raised for costs associated with OSH interventions or implementation of OSH regulations. There are views that OSH interventions are expensive, and impose non-productive investments (Shearn, 2003; De Greef & Van den Broek, 2004). Also, in most funding arrangements, factory owners/management have to bear the expenses of OSH interventions (Hopkins, 2014).

A study by Samaddar (2016) on OSH management in the RMG sector in Bangladesh reveals that there is a close and positive relationship between the productivity of workers and the working

space environment. Also, the study shows that accidents in the working place negatively affect worker productivity. An independent assessment of the Better Work program published in 2016 shows evidence from Better Work Vietnam that, better working conditions lead to a higher level of worker productivity. Also, it has been found that workers from factories with a better working environment, reach daily production target by forty minutes earlier than workers working in factories with a worse working environment. Furthermore, the impact assessment has found a direct link between better working conditions and higher profits in firms.

Both the Accord and Alliance had the objective of implementing worker safety through factory inspections on fire, electrical, and building safety, suggesting, and monitoring factory remediation process and safety training for fire and building safety (the Accord, 2018, 2013; Alliance, 2018). Similar to ILO's aim of developing a set of tools for factory management for sound management of OSH (Alli, 2008), the two transnational initiatives created a powerful set of tools for implementation of safety regulations through their operations So, when the question of implementing OSH standards comes in factories, the necessity of studying the two initiatives' impact on labor productivity arises.

2.5.Contribution to Academic Literature and Research Gap

Several studies have been conducted to assess the impact of the Accord and Alliance on a variety of issues. In the context of Bangladesh's garment industry, the Accord and Alliance have focused very specifically on health and safety conditions (Kabeer, Haq, & Sulaiman, 2019). Barett, Baumann-Pauly, & Gu (2018) in New York University stern report titled, *Five Years After Rana Plaza: The Way Forward* have reported that a large number of factories covered by the Accord and Alliance saw the improvement of their fire, electrical, and structural safety conditions. And this improvement could be achieved by only those factories that could afford to make these improvements. Kabeer, Haq, & Sulaiman (2019) also found that factories affiliated with the Accord and Alliance show significant differences in health and safety conditions. Their study also reports workers' perspectives regarding changes in the Accord and Alliance affiliated factories. They report that "workers in factories with AA affiliation were significantly more likely than those in nonaffiliated factories to report improvements in building safety, the healthiness of environment, safety training."

Also, there has been a study on the impact of the Accord and Alliance on the Bangladeshi RMG industry from the perspectives of the managers in the industry (Rahman & Rahman, 2020). The study found that managers were better able to understand the maintenance of safety in their factories by working closely with the Accord and Alliance. Furthermore, Donaghey, & Reinecke (2015) have shown how production-based power and consumption-based power played complementary roles in creating a coalition of power to form the Accord and Alliance. Also, they assessed the roles of global unions and public movement organizations. On the other hand, Zajak (2017) assessed how domestic trade unions in Bangladesh attempted to implement several changes after the inception of the Accord and reported that, the Accord helped in capacity building of the local trade unions.

Although, some scholars have argued that the Accord is a "game-changer" (Hensler & Blasi, 2013), the initiative has also faced criticisms. Smith (2014) emphasized that the Accord has not touched the most pressing issues in the garment industry; wages and general working conditions. Khan & Wichterch (2015) have found in their critical assessment of the implementation efforts of the Accord that, it has shown limitations in addressing power relations in the production network.

It is apparent that, there have been many studies on the impact of the Accord and Alliance from different aspects such as; on improvements in working conditions, impact from the perspectives of supplier factory managers. Also, few studies have been done linking OSH and worker productivity in the Bangladeshi RMG sector. Samaddar (2016) has shown a negative relationship between accidents and worker productivity. However, no empirical study has been conducted involving changes in worker productivity due to the influence of the Accord and Alliance in improving OSH conditions in supplier factories. This thesis will help in filling the gap in the literature by assessing the impact of the Accord, and Alliance on worker productivity.

This study can help policymakers in getting an idea of how initiatives like the Accord and Alliance can make an impact on worker productivity. This can work as a base for the latest initiative, RSC that has recently taken over from where the Accord and Alliance left. This study can work as a base for the RSC to assess their impact on labor productivity, compare their findings with the Accord and Alliances' impact, and how this can be improved further.

Chapter 3

Methodology

In this chapter, I have described the statistical methods used in this thesis, data collection methods, and summary statistics. At first, I have talked about the data source, then a brief description of the two methods used for empirical study; "ordinary least squares" (OLS) and multinomial logistic regression, along with their corresponding tests have been given. Finally, the profile of factories' in the sample and descriptive statistics used in the thesis are written. I have discussed the analysis and results in the following chapters.

3.1.Data Source

The data was used from *Changes in the Governance of Garment Global Production Networks: Lead Firm, Supplier and Institutional Responses to the Rana Plaza Disaster*. It is a novel, exciting, international, interdisciplinary research project that seeks to understand the challenges of improving labor and environmental standards in global production networks. This research was conducted by five universities – BRAC University, London School of Economics and Political Science (LSE), The University of New South Wales (UNSW), Gothenburg University, and Freie University. This unique, three years (2016-18) project combines a systematic, and comparative analysis of developed country lead firm policies and practices with comprehensive, on-the-ground research among managers, workers, government and civil society organizations in Bangladesh. The project was Funded mainly by Volkswagen Foundation.

Field work was conducted in 2016-17 under conditions of confidentiality and anonymity. Surveying garment managers in Bangladesh is particularly difficult because of management sensitivity to labor issues, unfamiliarity with social research, time pressures arising from buyer requirements, and communication and transport problems accessing factories. The survey consisted of a sample of 152 export factory managers – one manager per factory. These comprised 75 senior managers (Owners, Managing Directors, and Directors) and 77 middle managers (HR, Compliance and Finance managers). Managers were selected from outside the Export Processing Zone (which accounts for around 10% of garment production) by

snowballing[3] broadly according to workforce size and institutional affiliation. The smallest export factories (< 250 manufacturing employees) -- those most likely to resemble 'sweatshop' regimes -- are probably underrepresented, although these are declining relative to the number of larger, better-resourced workplaces, thereby imparting a long-term positive regulatory dynamic to the industry structure (Koenig-Archibugi, 2017). Overall, the factories employed an average of 70 per cent female manual workers in contrast to a predominantly male (>90 per cent) management cadre. Also, the factories surveyed for this study are diverse in terms of size and location. The factories are located in five destinations; Dhaka, Narayanganj, Chottogram, Savar, and Gazipur. Factory size was categorized by number of workers/size of workforce. Factories consisting of workers less than 600, were considered as small, factories having workers 600 to 2,500 were categorized as medium, and factories with more than 2, 500 workers were categorized as large factories.

The survey consisted of interviews of around 1.5 hours' duration, conducted in Bangla, usually by two researchers and occasionally by trained research assistants. The interview schedule was piloted with four managers and amended accordingly. Quantitative answers to questions were checked by the researchers and entered in a spreadsheet for subsequent analysis using STATA while open-ended questions were translated into English and examined for consistency by two researchers fluent in Bangla and English.

For the quantitative analysis section of the thesis, I have separated variables related to worker productivity and the safety issues for the member factories of the Accord and Alliance, NTPA, and other initiatives from the raw dataset. Also, due to the presence of missing values, I had to omit observations, and the total number of observations used in this study stood at 105 from the original observation size of 152. Since the data was collected using snowball sampling approach instead of random sampling, it should be noted that, the samples suffer from selection bias from snowballing broadly according to factory size and institutional affiliation. Also, as mentioned above, smallest export factories are underrepresented in the sample. Atkinson, & Flint (2001)

[3] Snowball sampling or chain-referral sampling is defined as a non-probability sampling technique in which the samples have traits that are difficult to find. The following steps were taken while they conducted their snowball sampling: the researchers were given permission to enter factory premises for our survey in two ways — BKMEA introduced them to the factory owners and they provided information for some factories. When the researchers approached those factories, they also introduced them to other factories. Often they got access to factories by using their social media network contacts (Rahman, & Rahman, 2020).

suggest, snowball sampling is usually used for qualitative analysis. However, it can be used to make inferences about a population of individuals, "who have been difficult to enumerate through the use of descending". They suggest collecting a large sample to partially address to the problem of selection bias which arises from snowballing approach (Atkinson, & Flint, 2001). However, the original sample size of the above-mentioned project is only 152 and due to the presence of missing values, sample size reduced to 105, which is not large. So, these issues can get reflected in the following inferences.

For the qualitative analysis, I have used interviews from *Rana Plaza and its Aftermath: Multi-actor Initiatives after Rana Plaza: Factory Managers' Views* by Rahman, & Rahman (2020). The paper was produced using the data and interviews collected under the abovementioned project. Due to lack of time for going through all the interviews collected under the project, I chose the published paper's interviews and information relevant to the topic of the thesis. Following Rahman, & Rahman's (2020) work, I have considered the Accord and Alliance together in the qualitative study, instead of considering them separately. The qualitative analysis would help in understanding the challenges faced by factory managers/owners during remediation works and funding. Data on costs associated with remediation works assigned by the Accord and Alliance could not be availed. Evidence from Gray's (1987) study also points to a similar problem where it says, there is lack of good measures of compliance costs for OSH measures. So, the qualitative analysis will also serve the purpose of providing an understanding of the costs associated with remediating works from experiences of factory owners/managers.

In the following sections of this chapter, I have discussed the models used in the thesis, necessary tests, relevant to the analysis, and the formation and limitation of the model of productivity used in the study.

3.2. Methods Used for Statistical Analysis

3.2.1. OLS Regression Model

Following *Introductory Modern Econometrics: A Modern Approach* by Wooldridge (2015), I estimate the following OLS regression

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + \varepsilon \qquad (1)$$

where, Y is labor productivity, β_0 is the intercept, and β_k is the parameter associated with k number of regressors and ε is the error term.

To detect possible problems in the data, I plotted squared residuals against the estimated labor productivity from the regression model.

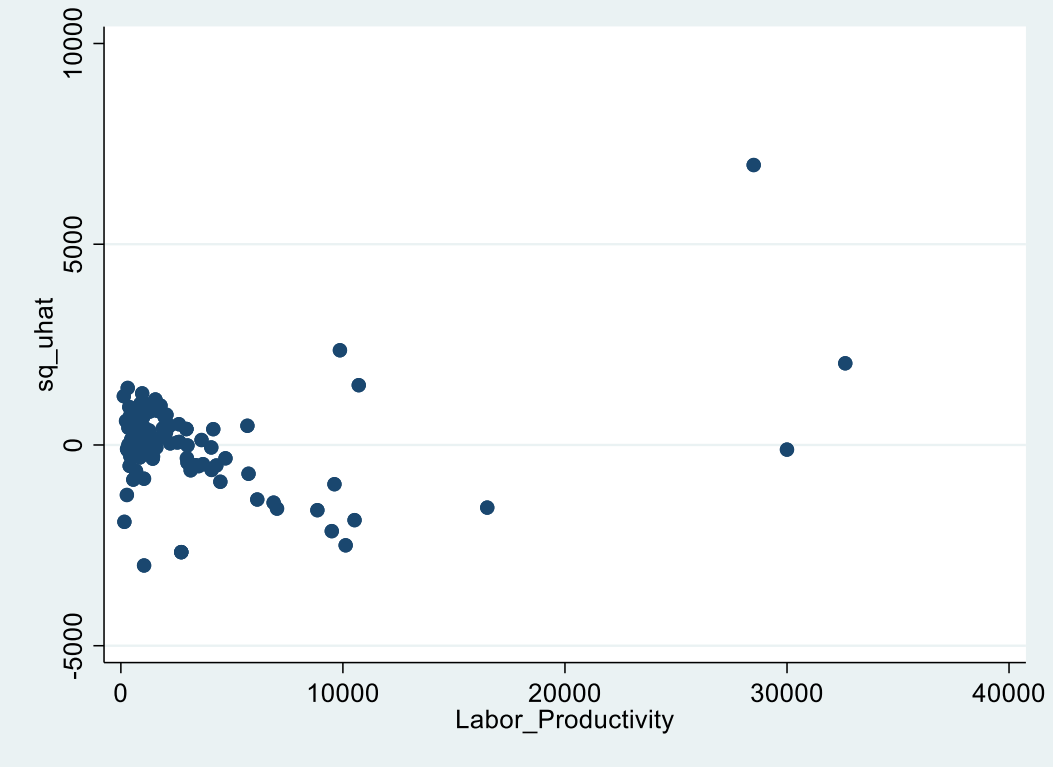

Figure 3: Scatterplot showing heteroscedasticity when squared residuals (sq_uhat) are plotted against estimated labor productivity

The scatterplot suggested heteroscedasticity (see figure 3). To confirm it, I conducted a formal test called the Breusch-Pagan Test for Heteroscedasticity. I conducted the test by following the theoretical frameworks in *Introductory Modern Econometrics: A Modern Approach* by Wooldridge (2015) and *Econometrics by Example* by Gujarati (2011).

At first, the OLS model is estimated and the squared residuals, $\hat{u}^2$ are obtained (one for each observation)

where, $Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + u$ is the OLS model

here, β_k is the OLS estimator and x_k is the independent variable.

Then the regression using equation (a) is run on k regressors included in the model (to see if the squared residuals are related to one or more x variables), keeping the R-squared from this regression, $R^2_{u^2}$ ($R^2_{u^2}$ is the auxiliary R-squared obtained from equation (a))

where, equation (a) is $\hat{u}^2 = \delta_0 + \delta_1 x_1 + \delta_2 x_2 + \cdots + \delta_k x_k + \text{error}$.

The idea behind equation (a) is to find out if the squared error term is related to one or more regressors, which can indicate the presence of heteroscedasticity in the data.

Here, the null hypothesis of homoscedasticity is $H_0 = \delta_0 = \delta_1 = \cdots \delta_k = 0$, which means that the error variance is homoscedastic- that is all slope coefficients in equation (a) are simultaneously equal to zero.

If the p-value falls below the 5% significance level, then the null hypothesis would be rejected.

Then an F statistic is formed using the formula, $F = \frac{R^2_{u^2}}{k} / (\frac{1 - R^2_{u^2}}{n-k-1})$ and the p-value is calculated

where, k is the number of regressors and n is the number of observations.

It should be noted that heteroscedasticity does not alter the unbiasedness and consistency properties of the OLS estimators. However, the OLS estimators no longer show minimum variance. As a result, the F-test and t-test may no longer show reliable results. Which in turn, causes erroneous conclusions regarding the statistical significance of the estimated regressor coefficients (Gujarati, 2011).

3.2.2. Remedial Measure for Heteroscedasticity

As the data shows the presence of heteroscedasticity. So, I have used "White's heteroscedasticity-consistent standard errors or robust standard errors" (see table 7) following theoretical framework from *Introductory Modern Econometrics: A Modern Approach* by Wooldridge (2015).

For equation (1), a valid estimator of $Var(\hat{\beta}_k)$ is,

$$\widehat{Var(\beta_J)} = \frac{\sum_{i=1}^{n} \widehat{r_{ij}^2}\, \widehat{\varepsilon_j^2}}{SSR_j^2} \qquad (2)$$

where $\hat{r}_i$ denotes the *i*th residual from regressing x_j on all other independent variables, and SSR*j* is the sum of squared residuals from this regression. The square root of the quantity in (2) is called the heteroscedasticity-robust standard error for β_j . This method holds for data with a large sample. For a general regression model if there are k+1 parameters and sample size (n) is less than k+1 (n<k+1), this method would not hold (Wooldridge, 2015). Fortunately, the data set used for analysis in this thesis has a sample size of 105 which is greater than the number of parameters imposed on the data.

Other methods like the "weighted least squares" (WLS) estimation is avoided as it requires the form of the variance (as a function of explanatory variables) has to be correctly specified (Wooldridge, 2015). Researchers try to find out what can be the correct variance and transform the original regression model in such a way that the error variance of the transformed model is homoscedastic. However, it is sometimes difficult to determine which regressor should be picked for a transformation when there are several regressors. To avoid this issue, the outcome variables are used. Here, it must be noted that all of the transformation methods used for WLS is somewhat *ad hoc* (Gujarati, 2011). To avoid such issues, I have avoided the usage of WLS as a remedial measure for heteroscedasticity.

3.2.3. Labor Productivity Function (Outcome Variable for OLS Estimation)

Labor productivity is a widely studied topic. It is usually measured in the simplest fashion, which is by dividing output by labor input and is measured in levels or in growth rates. It is often studied in a comparative context, for example; a comparison between two firms in terms of productivity (Van Biesebroeck, 2015).

The purpose of this thesis is to find out the effect of the Accord and Alliance's impact on the labor productivity of the supplier factories in the sample. However, the survey data used for analysis in this thesis does not include the number of total output produced by the sample factories. To address this issue, I have taken a different approach to developing the labor productivity function which is used as the outcome variable in the OLS estimation. The data included information on the number of unskilled, semi-skilled, and skilled workers, working in each factory in the sample and their respective average monthly wages (the wage also includes the extra wage earned from overtime).

So, I have used the approach of "quality weighting" following *How tight is the link between wages and productivity? A survey of the literature* by Johannes Van Biesebroeck (2015). This approach considers the quality dimension of labor services to production processes. According to Van Biesebroek (2015):

> To increase output, a firm can use more workers or employ more productive workers. To express labor productivity in efficiency units, the output value created by a benchmark worker, differences in the composition of the workforce need to be controlled for. When we measure productivity growth, we want to know how much the output of a typical or average worker has increased. If a firm has adjusted the type of workers it employs, for example by employing a more educated workforce, we may want to filter out the contribution of the human capital and only identify the output increase that a comparable workforce would have generated. Similarly, when comparing two firms, we may want to adjust their workforce to make them comparable and identify output differences that are tied to the firm (pp. 6).

The productivity adjusted labor aggregate can be calculated as the weighted sum of the number of employees' overall categories. The relative wage for each category relative to the benchmark, lowest wage, worker category serves as weight. The formula can be expressed in the following form

$$\tilde{L} = \sum_k \frac{W_k}{W_0} L_k$$

where, k=3 (there are three categories of labor in the data; skilled, semi-skilled, and unskilled), $\tilde{L}$ = Labor productivity expressed in productivity units, W_k= relative wage for each worker category, W_0= lowest wage, and L_k= number of workers over all categories.

Usually, labor productivity is measured by dividing output by the total number of hours worked by all workers in a firm (Van Biesebroek, 2015). However, a worker's contribution to the

production process not only consists of his/her 'raw' labor but also services from his/her human capital (OECD, 2001). So, one hour worked by one worker does not necessarily constitute of same amount of labor input as one hour worked by another worker. There can be differences in skills, health, education, and professional experiences that lead to a large difference in the contribution of different types of labor. In this case, labor input by type of skills is desirable to capture the effects of a changing quality of labor on the growth of productivity. And, conceptually, labor income should reflect the compensation paid to labor, from producer's perspective (OECD, 2001). Hence, in this way "quality weighting" function of labor productivity can help in measuring labor productivity in this study.

In short, I have used OLS to measure the effect of the Accord and Alliances' influence to improve OSH conditions, on labor productivity of the firms in the sample and "quality weighting" equation as labor productivity function, which is the outcome variable of the OLS regression as data for total output and total input are absent in the dataset.

3.2.4. Multinomial Logistic Regression Model

All the terms and definitions of the logistic regression model described here is based on the text *Generalized linear model* by Dobson & Barnett (2008); & Gujarati (2011).

Although, the issues of selection bias and small sample size, exist, this estimation is used for a better understanding of Accord, and Alliances' effect on labor productivity. The logistic regression model is used when the outcome or the response variable is a categorical variable. For my second method of analysis, I have used the logistic regression model as my response variable, 'measure of productivity' is a categorical variable. Let,

$$\mathrm{E}\left(Y_{ij}\middle|x_i\right) = \pi_{ij}(x_i)$$

be the conditional mean of the dependent variable given explanatory variable X. Then the multinomial logistic regression model is,

$$\pi_{ij} = \mathrm{p}\left(Y_{ij} = 1\right) = \frac{exp(\alpha_j + \beta_j x_i)}{1 + exp(\alpha_j + \beta_j\, x_i)}$$

and

$$1 - \pi_{ij}(\mathrm{x}) = \mathrm{p}\left(Y_{ij} = 0 \middle| \mathrm{x}\right) = \frac{1}{1 + \exp\left(\alpha_j + \beta_j\, x_i\right)},$$

where, subscript *j* on the intercept and the slope coefficient shows that the values of these coefficients can differ from choice to choice. All the categories in the outcome variable cannot be estimated at once. The common practice is to choose one category as the base, reference, or comparison category and set its coefficient values to zero. So, if we choose the first category and set α_1 = 0 and β_1 = 0, we obtain the following estimates of the probabilities for the three choices:

$$\pi_{i1} = \frac{1}{1 + e^{\alpha_2 + \beta_2\, x_i} + e^{\alpha_3 + \beta_3\, x_i}}$$

$$\pi_{i2} = \frac{e^{\alpha_2 + \beta_2\, x_i}}{1 + e^{\alpha_2 + \beta_2\, x_i} + e^{\alpha_3 + \beta_3\, x_i}}$$

$$\pi_{i3} = \frac{e^{\alpha_3 + \beta_3\, x_i}}{1 + e^{\alpha_2 + \beta_2\, x_i} + e^{\alpha_3 + \beta_3\, x_i}}$$

If the three probabilities are added, then we get value 1. Now, if we take the anti-log of $ln = \frac{\pi_{i2}}{\pi_{i1}}$ we get the relative risk ratio (RRR). Relative risk ratio expresses the multiple of risk of the outcome in one group compare with another group (Zhang, 1998). The outcome variable for the multinomial logistic regression is self-described "measure of productivity".

3.2.5. Chi-Square Test

A Chi-square test is used to learn if two or more variables are independent or not. An observed set of frequencies is compared against a corresponding expected set of frequencies under the null hypothesis. The null hypothesis is:

H_0= No association exists between the two attributes

H_1=The attributes are associated

The test statistic can be defined as:

$$\chi^2 = \sum_i^n \sum_j^k \frac{(o_{ij} - e_{ij})^2}{eij},$$

where, o_{ij} (i=1,…,n and j=1,….,k) stands for the observed frequencies and e_{ij} (i=1,…,n and j=1,….,k) stands for expected frequencies. This test statistic follows the chi-square distribution with (n-1)(k-1) degrees of freedom (Dobson, & Barnett, 2008).

The following section gives a brief profile of the factories in the sample and the summary statistics of the indicators used in the analysis.

3.3. Formation of Empirical Model

Following Tekleselassie, Berhe, Getahun, Abebe, & Ageba's (2018) model in their research paper *Productivity Determinants in the Manufacturing Sector in Ethiopia: Evidence from the Textile and Garment Industries*, I have used size of firms, age, location, export information, the wage of skilled labor, education level of managers, type of ownership; to measure labor productivity of the factories in the sample. Along with these indicators, I have added the membership status of the factories, CAP progress, importance of change in building safety perceived by factory managers, and training for building safety. I have added the latter set of indicators to measure the influence of the Accord, Alliance, NTPA on worker productivities of the factories. Samaddar (2016) used indicators; membership, safety-related inspection, health and safety training, and some other working condition and health hazard indicators in his study on OSH management in the RMG sector in Bangladesh. However, these indicators were used for BGMEA, BKMEA, member factories. In this thesis, I have used similar indicators as Samaddar (2016) and adjusted them to the purpose of my study. Nonetheless, I could not use indicators related to working conditions and health hazards as data related to these indicators was unavailable in the dataset used in this study. Furthermore, quality of management-related indicators; location of the factories in the sample, type of ownership, and education level of the management were used following Moazzem, & Khandaker (2018).

Detailed description of all the dependent and independent variables used in the quantitative analysis (see Table 2)

Table 2: List of Independent and Outcome Variables Used in both Models

Outcome Variable for OLS estimation: Labor Productivity (formed from the labor productivity function stated in section 3.2.3.) Variable Description: Labor Productivity	Outcome Variable for Multinomial Logistic Regression: Measure of Productivity (self-described productivity measure by factory manager) Variable Description: Productivity in Terms of Quantity and Quality	
Independent Variables Used in Both of the Models		
Variable Name	Description	Remarks
WorkForce	Size of work force in factory	Proxy for factory size
Membership	Membership of Accord, Alliance, NTPA, other initiatives	
Ownership_type	Type of Ownership	
Ownership_edu	Education Level of Owners/Managers	
Export	Export Status	
Chn_building_safety	Importance attached to change in building safety in past 3.5 years by factory owners/managers	
CAP_prog	Current Status of CAP	Stands for the progress of implantation of remediation works that were assigned
Location	Location of Factories	
Working_Years	Managers/owners working years at a factory since its inception	Proxy for factory age
Wage_skilled	Wage of skilled workers	
Training_bs	Money spent on training for building safety	Stands for investment made by factories on training for building safety

3.4.Factory Profile and Summary of Statistics

3.4.1. Profile of Factories and Management

Key characteristics of the sample (N=105) firms and their managers are discussed in this section (see Table 3). Location wise, the majority of the factories (77.17%) belong to Dhaka or locations near to Dhaka, and only a small portion (22.86%) firms are located in Chattogram. The majority of the factories (83.81%) factories fall under woven type. More than half (57.14%) of the factories have owners/managers that studied until the post-graduation level. Almost all factories (92.38%) are privately owned. Followed by almost half (51.43%) of the factories not being a part of a group of companies. Almost all of the factories (98.10%) are exporting

factories. Well over half (67.62%) of the factories report growth in profit by 7-12% or more than 12%.

Table 3: Factory and Manager Profile

Characteristic	Number of Observations	Frequency	Percentage
Location	105		
Chottogram		24	22.86
Dhaka		30	28.57
Gazipur		22	20.95
Savar		15	14.29
Narayanganj		14	13.33
Type of Factory	105		
Knit		17	16.19
Woven		88	83.81
Level of Education of Owners/Managers	105		
Up to HSC/ Graduation Level (BBS, BSc), Business Studies (BBA), Engineering		45	42.86
Post Graduation Level (MSc or higher)		60	57.14
Type of Ownership	105		
Foreign Owned		2	1.90
Joint Venture		2	1.90
Privately Owned		97	92.38
Other		4	3.81
If Part of a Group of Companies	105		
Yes		51	48.57
No		54	51.43
Membership	105		
Accord		57	54.29
Alliance		11	10.48
Accord and Alliance		20	19.05
NTPA		15	14.29
Accord and NTPA		1	0.95
Other		1	0.95
If Factory is an Exporting One	105		
Yes		103	98.10
No		2	1.90
Annual Rate of Change in Profit (last 1 year)	105		
Between 0 to 5 percent		34	32.38
Between 7 to 12 percent or more than 12 percent		71	67.62

Most importantly, more than half of the factories (54.29%) are members of the Accord, Alliance has a small number of members (10.48%) and NTPA is positioned just over Alliance in terms of

membership (14.29%). Also, some factories (19.05%) are members of both the Accord and the Alliance.

3.4.2. Summary Statistics of the Variables Used in the Analysis

Table 4: Summary statics for the dummy variables used in the analysis

Name of Variables	Categories Included in a Given Variable	Number of Observations	Frequency	Percent	Cumulative	Total Parentage	Coding
Productivity in Terms of Quantity and Quality (Measure of Productivity)	More Productive	105	55	52.38	52.38	100	1
	About the same		27	25.71	78.10		2
	Less Productive		23	21.90	100.0		3
Membership of Accord, Alliance, NTPA, other (Membership)	Accord	105	57	54.29	54.29	100	1
	Accord and Alliance		20	19.05	73.33		2
	Accord and NTPA		1	0.95	74.29		3
	Alliance		11	10.48	84.76		4
	NTPA		15	14.29	99.05		5
	Other		1	0.95	100.00		6
Type of Ownership (Ownership_type)	Foreign-Owned	105	2	1.90	1.90	100	1
	Joint Venture		2	1.90	3.81		2
	Other		4	3.81	7.62		3
	Privately Owned		97	92.38	100.00		4
Education Level of Owners/Managers (Ownerhip_edu)	HSC/ Graduate(BSS,BSc)/Business Graduate	105	45	42.86	42.86	100	1
	Post Graduate(MSC or higher)/MBA		60	57.14	100.00		2
Export Status (Export)	Yes	105	103	98.10	98.10	100	1
	No		2	1.90	100.0		2
Impotence attached to change in building safety.	Important	105	90	85.71	85.71	100	1

(Chn_building_safety)	Indifferent		15	14.29	100.00		2
Current Status of CAP (CAP_prog)	On Track	105	25	23.81	23.81	100	1
	Behind Schedule		14	13.33	37.14		2
	Completed		66	62.86	100.00		3
Location of Factories (Location)	Chottogram	105	24	22.86	22.86	100	1
	Dhaka		30	28.57	51.43		2
	Gazipur		22	20.95	72.38		3
	Savar		15	14.29	86.67		4
	Narayanganj		14	13.33	100.00		5

Table 5: Summary statistics for the continuous variables used in the analysis

Variable	Obs.	Mean	Std. Dev.	Min	Max
WorkForce	105	2138.18	2956.34	95	17000
Working_Years	105	11.65	7.03	0.9	28
Labor Productivity	105	3289.12	5490.74	133.96	32625
Wage_skilled	105	12181.9	2876.22	6800	20000
Training_bs	105	268571.4	649729.1	0	5000000

Most of the variables used in both the OLS and multinomial logistic models are categorical or dummy variables. The indicator "Measure of Productivity" (see Table 2) is the outcome variable for the multinomial logistic model. The indicator 'Labor Productivity' (see Table 2) is the outcome variable for the OLS estimation. "Labor Productivity" was formed using "quality weighting" function following Van Biesebroek's (2015) study.

Chapter 4

Research Findings: Quantitative Analysis

In this chapter, firstly I have presented the test results for the two models. Secondly, I have shown the results found in the OLS regression model and the multinomial logistic model. Then, I have compared the results of the two models to find similarities or dissimilarities. Finally, I have discussed the outcomes from both of the models.

4.1.Test Results

4.1.1. Breusch-Pagan Test for Heteroscedasticity

At first, comes the "Breusch-Pagan Test for Heteroscedasticity" for the OLS model. Considering the null hypothesis that the error variance is homoscedastic at 5% significance level. If the p-value falls below the 5% significance level, then the null hypothesis would be rejected. After the Breusch-Pagan Test for Heteroscedasticity is run, the p-value for F-statistics falls well below a 5% significance level (see Table 6), which means the null hypothesis is rejected. So, the data shows heteroscedasticity.

Table 6: Breusch-Pagan Test for Heteroscedasticity

Variables	Null Hypothesis (H_0)	df	F	P
WorkForce Wage_Skilled member_dum1 1.Cap_prog 2.Cap_prog 3b.Cap_prog 1.chn_building_safety 2b.chn_building_safety 1b.export_dum 2.export_dum 1b.Location 2.Location 3.Location 4.Location 5.Location training_bs 1b.Ownership_edu 2.Ownership_edu	Constant variance	Model 13 Residual 91	4.27	0.0000

Sample size: 105

The p-value 0.0000<0.05 so, the null hypothesis is rejected. Thus, the data shows the presence of heteroscedasticity. As mentioned, in the previous chapter, I have chosen robust standard errors as a remedial measure for this problem.

4.1.2. Chi-Square Test

A Chi-square test was run to see which variables are independent.

The chi-square analysis shows if the factors are independent and are fit for the logistic analysis.

Table 7: Chi-Square test of independence.

Factors	Productivity Measure			Chi-Square Value	P-value
	Increased (Count)	Same (Count)	Decreased (Count)		
Membership				22.46	0.013*
Accord	29	21	7		
Alliance	5	0	6		
Accord and Alliance	13	4	3		
NTPA	7	2	6		
Accord and NTPA	1	0	0		
Other	0	0	1		
Location				26.69	0.001***
Chattogram	7	4	13		
Dhaka	15	10	5		
Gazipur	13	6	3		
Savar	13	1	1		
Narayanganj	7	6	1		
Change in Building Safety				11.53	0.003***
Important	52	18	20		
Indifferent	3	9	3		
CAP Progress	13	7	5	31.31	0.000***
Status	2	1	11		
On Track	40	19	7		
Behind Schedule					
Completed					
Export Status				0.916	0. 632
Yes	54	26	23		
No	1	1	0		
Type of Ownership				4.45	0.615
Foreign	1	0	1		
Joint Venture	2	0	0		
Other	3	1	0		
Privately	49	26	22		
Education Level of Managers/Owners				0.49	0.781
HSC/Graduation	22	13	10		
Post Graduation	33	14	13		

**** p<0.01, ** p<0.05, * p<0.1*

Membership of Accord, Alliance, NTPA is statistically significant. Also, the location of the factories, if there is a change in building safety and progress of CAP are statistically significant. On the other hand, ownership type, export status, education level of owners/managers are statistically insignificant.

4.2. OLS Regression

I have run the OLS regression to see if members of the Accord, Alliance, NTPA, or other initiatives have made an impact on the worker productivity of the factories in the sample. At first, I have presented OLS regression without robust standard errors. Then I have presented OLS regression with robust standard errors. Here, the outcome variable is "Labor Productivity" formed from the labor productivity function which uses "quality weighting" (see Section 3.2.3. in Chapter 3). Details of the dependent and independent variables used in the OLS can be found in the previous chapter (see Table 2).

Table 8: OLS regression (with and without robust standard errors)

	OLS	Robust
	Labor Productivity	Labor Productivity
	(1)	(2)
WorkForce	1.813***	1.813***
	(0.050)	(0.105)
Wage_skilled	0.179***	0.179***
	(0.050)	(0.050)
Membership(Acc)[4] (Reference)		
Membership(AA)[5]	582.326	582.326*
	(362.054)	(313.996)
Membership(Acc,N)[6]	1185.577	1185.577*
	(1349.180)	(622.380)
Membership(All)[7]	75.725	75.725
	(474.229)	(310.014)
Membership(N)[8]	562.840	562.840**
	(412.666)	(265.000)
Membership(O)[9]	914.206	914.206
	(1373.574)	(623.565)
CAP_prog(On Track)	-193.950	-193.950
	(321.960)	(438.624)
CAP_prog(Behind Schedule)	346.214	346.214
	(495.621)	(386.640)
CAP_prog(Completed, reference)		
Chn_building_safety(Important, reference)		
Chn_buiding_safety(Indifferent)	24.985	24.985
	(405.161)	(368.992)

[4] Acc stands for the Accord
[5] AA stands for the Accord and Alliance
[6] Acc, N stands for the Accord and NTPA
[7] All stands for Alliance
[8] N stands for NTPA
[9] O stands for other initiatives

Export(Yes, reference)		
Export(No)	39.938	39.938
	(978.279)	(1295.652)
Location(Chattogram)	-373.962	-373.962
	(410.303)	(351.833)
Location(Dhaka,Reference)		
Location(Gazipur)	-167.127	-167.127
	(397.987)	(402.945)
Location(Savar)	-124.025	-124.025
	(423.400)	(482.094)
Location(Naraynganj)	-1047.847**	-1047.847
	(516.678)	(775.416)
Training_bs	-0.00010	-0.00012
	(0.00020)	(0.00029)
Ownership_edu(HSC/Grad)	438.617	438.617
	(294.751)	(296.574)
Ownership_edu(Post Grad, Reference)		
Ownership_type(Foreign)	366.544	366.544
	(947.099)	(907.564)
Ownership_type(Joint)	140.446	140.446
	(936.270)	(265.174)
Ownership_type(other)	-1239.015*	-1239.015
	(697.464)	(838.473)
Ownership_type(Private, reference)		
Working_Years	-20.861	-20.861
	(20.884)	(22.265)
Constant	-2588.846***	-2588.846***
	(626.610)	(688.552)
Obs.	105	105
R-squared	0.959	0.959

Standard errors are in parenthesis
**** p<0.01, ** p<0.05, * p<0.1*

The result (see table 8) in column (1) gives the normal OLS result (without robust standard errors). Here, except for the workforce, the wage of skilled labor, and the dummy variables for ownership type (other), and Location(Narayanganj), all other variables are statistically insignificant. This is caused by heteroscedasticity which causes erroneous conclusions regarding the statistical significance of the estimated regressor coefficients (Gujarati, 2011). As a solution to the problem, I have presented an OLS regression estimation with robust standard errors in column (2). In column (2), workforce, the wage of skilled labor, and dummy variables representing memberships of both the Accord and Alliance, NTPA, both the Accord and NTPA show statistical significance. These variables show changes in standard errors from the original

OLS model. Hence, I have presented the next table consisting of OLS regression with robust standard errors

Table 9: OLS regression showing the effect on the Accord, Alliance, NTPA member factories separately

Outcome Variable: Labor Productivity	(1) Accord	(2) Accord and Alliance	(3) Accord and NTPA	(4) Alliance	(5) NTPA	(6) Other
WorkForce	1.811***	1.796***	1.818***	1.810***	1.820***	1.810***
	(0.102)	(0.100)	(0.105)	(0.103)	(0.103)	(0.103)
Wage_Skilled	0.177***	0.182***	0.192***	0.192***	0.187***	0.195***
	(0.050)	(0.050)	(0.053)	(0.053)	(0.052)	(0.054)
Membership	-521.613**	505.200*	1153.349*	-228.253	406.360**	874.080
	(253.311)	(279.177)	(634.554)	(247.788)	(197.169)	(602.228)
CAP_prog(On Track)	-206.840	-154.615	-146.028	-162.152	-187.293	-209.326
	(400.861)	(416.429)	(421.810)	(419.984)	(415.185)	(433.635)
CAP_prog(Behind Schedule)	245.708	494.171	510.195	524.278	367.765	450.143
	(344.658)	(342.407)	(339.662)	(352.628)	(326.172)	(337.515)
CAP_prog(Completed, reference)						
Chn_building_safety(Important, reference)						
Chn_building_safety(Indifferent)	60.085	71.288	102.808	36.643	25.511	-7.866
	(325.322)	(339.285)	(354.539)	(342.687)	(341.426)	(365.316)
Export(Yes, reference)						
Export(No)	23.528	-86.098	-144.231	-175.827	-123.536	-131.857
	(1277.487)	(1260.599)	(1210.846)	(1228.536)	(1241.046)	(1235.423)
Location (Chattogram)	-451.411	-378.280	-478.529	-428.016	-456.031	-459.648
	(357.704)	(347.728)	(359.148)	(348.986)	(355.252)	(360.152)
Location(Dhaka, Reference)						
Location(Gazipur)	-174.704	-172.255	-265.287	-262.107	-241.831	-313.119
	(408.366)	(408.691)	(435.853)	(437.625)	(433.645)	(438.101)
Location(Savar)	-175.377	-186.224	-290.671	-254.044	-223.676	-280.175
	(486.445)	(474.913)	(506.293)	(498.694)	(500.630)	(506.541)
Location(Naraynganj)	-980.434	-936.093	-1242.701	-1136.674	-1142.217	-1128.211
	(719.712)	(722.740)	(825.640)	(773.952)	(770.026)	(771.460)
Training_bs	-0.00008	-0.0001	-0.0001	-0.0001	-0.00007	-0.00009
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Ownership_edu(HSC/Grad)	476.189	456.522	402.046	424.388	445.914	427.571
	(298.576)	(295.310)	(290.960)	(297.399)	(297.363)	(299.936)
Ownership_edu(Post Grad, Reference)						
Ownership_type(Foreign)	484.562	199.525	386.567	331.482	508.348	401.799
	(867.363)	(896.206)	(742.761)	(751.000)	(729.110)	(745.948)
Ownership_type(Joint)	237.246	368.519**	489.358*	450.672*	332.630	464.075*
	(282.126)	(155.451)	(264.438)	(249.831)	(393.080)	(261.633)

Ownership_type(other)	-1224.255	-1224.828	-1317.939	-1329.752	-1363.016	-1269.485
	(829.962)	(843.513)	(918.750)	(883.288)	(856.534)	(888.584)
Ownership_type(Private, reference)						
Working_Years	-22.382	-19.495	-22.372	-22.278	-24.858	-21.700
	(21.602)	(22.009)	(22.892)	(23.030)	(22.688)	(23.068)
Constant	-2035.58***	-2519.29***	-2470.03***	-2445.7***	-2448.30***	-2481.5***
	(584.773)	(664.989)	(657.142)	(648.749)	(644.802)	(655.077)
Obs.	105	105	105	105	105	105
R-squared	0.958	0.957	0.956	0.956	0.957	0.956

Standard errors are in parenthesis
**** p<0.01, ** p<0.05, * p<0.1*

In the previous table, I have presented the difference in standard errors between the original OLS model and the latter model with robust standard errors (see table 8). Table 9 presents the effect of each membership dummy variable through columns (1) to (6). The outcome variable is again the labor productivity. It can be seen that, compared to factories affiliated with other initiatives, the member factories of the Accord face a reduction in labor productivity by 521.613 units, ceteris paribas. However, factories that are affiliated with both the Accord and Alliance have shown an increase in labor productivity by 505.200 units compared to factories that are affiliated to the Accord, Alliance, NTPA, or other initiatives separately, holding all other variables constant. The same case is true for the factories that are affiliated with both the Accord and NTPA and show an increase in labor productivity by 1153.349 units compared to the reference group, ceteris paribus. Factories affiliated with NTPA also show an increase in labor productivity by 406.360 units compared to the reference group, ceteris paribus. On the other hand, estimates for Alliance and other initiative affiliated factories are statistically insignificant. The effects of different indicators are discussed in details at the end of this chapter.

4.3.Multinomial Logistic Regression

The multinomial logistic regression is run using a self-described "measure of productivity" (for the workers) by the factory management as the outcome variable. The category "more productive" is considered as the baseline category. Details of the dependent and independent variables used in the estimation can be found in the previous chapter (see Table 2).

The results are presented as β coefficients (see Table 10). The β coefficients show the effect of the independent variables on the dependent variable. A positive coefficient β shows a positive impact while a negative coefficient shows a negative impact. A positive β value shows that the category is more likely to impact the category of the dependent variable with respect to the reference category. A negative value shows the opposite effect.

Also, results consisting of relative risk ratios (RRR) are presented (see Table 11). If the RRR is less than 1, the outcome is more likely to be in the referent group. If RRR is greater than 1, the outcome is more likely to fall in the comparison group

The multinomial logistic regression model using all the independent variables used in the OLS regression is presented in Tables 9 and 10.

Table 10: Multinomial Logistic Regression Model Using All Independent Variables from OLS Regression Model[10]

Outcome Variable: Measure of Productivity	(1) Accord	(2) Accord and Alliance	(3) Accord and NTPA	(4) Alliance	(5) NTPA	(6) Other
More Productive(Base Outcome)						
About the Same						
Membership	1.487**	-0.517	-16.494	-1.448	-1.448	-3.640
	(0.685)	(1.009)	(7884.131)	(1.083)	(1.083)	(11273.118)
Location (Chattogram, reference)						
Location(Dhaka)	-0.216	-0.114	-0.165	-0.573	-0.111	-0.101
	(0.911)	(0.875)	(0.872)	(0.939)	(0.879)	(0.886)
Location(Gazipur)	-0.848	-0.564	-0.601	-0.911	-0.580	-0.383
	(1.005)	(0.966)	(0.967)	(1.000)	(0.969)	(0.978)
Location(Savar)	-4.841**	-4.014**	-3.941**	-4.364**	-4.211**	-4.042**
	(2.077)	(1.872)	(1.851)	(1.934)	(1.899)	(1.900)
Location(Narayanganj)	-0.012	0.192	0.610	-0.204	0.396	0.316
	(1.166)	(1.112)	(1.158)	(1.133)	(1.129)	(1.114)
Chn_building_safety(Important, reference)						
Chn_building_safety(indifferent)	3.182***	3.130***	3.039***	3.046***	3.352***	3.241***
	(1.088)	(1.071)	(1.088)	(1.079)	(1.122)	(1.099)
CAP_prog(On Track, reference)						
CAP_prog (behind	0.412	0.121	-0.187	-0.119	0.504	0.061

[10]An alternative multinomial logistic model using indicators from the statistically significant indicators in the chi-square test (see Table 6) is presented in the Appendix section.

schedule)	(1.889)	(1.795)	(1.837)	(1.903)	(1.799)	(1.788)
CAP_prog(completed)	0.102	0.214	0.254	0.016	0.144	0.089
	(0.728)	(0.718)	(0.718)	(0.747)	(0.732)	(0.715)
Wage_skilled	-0.00015	-0.000*	-0.000*	-0.000*	-0.000	-0.000*
	(0.0001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
WorkForce	-0.00009	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.0001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Working_Years	0.010	-0.002	-0.003	0.009	0.003	-0.005
	(0.049)	(0.046)	(0.046)	(0.048)	(0.048)	(0.047)
Ownership_edu(HSC/ Grad, reference)						
Ownership_edu(Post Grad)	0.004	-0.187	-0.325	-0.145	-0.096	-0.195
	(0.671)	(0.658)	(0.666)	(0.670)	(0.659)	(0.660)
Export (Yes, reference)						
Export(No)	-0.291	0.116	0.107	-0.009	0.030	0.033
	(1.692)	(1.661)	(1.659)	(1.663)	(1.672)	(1.659)
Training_bs	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ownership_type(Foreign, reference)						
Ownership_type (Joint)	0.870	-0.404	-0.467	0.003	0.386	-0.341
	(4962.536)	(3158.315)	(7168.120)	(9134.276)	(5224.464)	(3355.571)
Ownership_type(Other)	15.767	14.226	15.950	17.079	15.743	14.361
	(3295.766)	(2226.015)	(5066.794)	(6421.052)	(3736.012)	(2358.886)
Ownershi_type(Private)	16.494	15.001	16.586	17.733	16.399	15.152
	(3295.766)	(2226.015)	(5066.794)	(6421.052)	(3736.012)	(2358.886)
Constant	-16.052	-13.201	-14.636	-15.385	-14.692	-13.136
	(3295.766)	(2226.015)	(5066.794)	(6421.052)	(3736.012)	(2358.886)
Less Productive						
Membership	0.043	-0.517	-16.494	0.068	-0.044	15.815
	(0.743)	(1.009)	(7884.131)	(1.160)	(1.023)	(6468.730)
Location (Chattogram, reference)						
Location(Dhaka)	-0.873	-0.848	-0.968	-0.868	-0.867	-0.930
	(0.955)	(0.977)	(0.959)	(0.998)	(0.973)	(0.942)
Location(Gazipur)	-1.011	-1.006	-1.020	-0.953	-0.933	-1.305
	(1.119)	(1.108)	(1.104)	(1.119)	(1.115)	(1.154)
Location(Savar)	-2.163	-2.176	-2.171	-2.166	-2.141	-2.190
	(1.474)	(1.474)	(1.463)	(1.473)	(1.483)	(1.428)
Location(Narayanganj)	-0.738	-1.029	-0.583	-0.972	-0.715	-0.911
	(1.562)	(1.553)	(1.601)	(1.563)	(1.571)	(1.519)
Chn_building_safety(Important, reference)						
Chn_building_safety(indifferent)	2.244*	2.466**	2.400*	2.605**	2.449*	2.146
	(1.234)	(1.248)	(1.269)	(1.268)	(1.276)	(1.326)
CAP_prog(On Track, reference)						
CAP_prog (behind	3.327**	3.293**	3.145**	3.137**	3.369**	3.230**

schedule)	(1.414)	(1.399)	(1.365)	(1.371)	(1.431)	(1.384)
CAP_prog(completed	-0.465	-0.585	-0.557	-0.664	-0.603	-0.439
	(0.797)	(0.786)	(0.787)	(0.789)	(0.791)	(0.812)
Wage_skilled	-0.000*	-0.000*	-0.000*	-0.000*	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
WorkForce	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Working_years	0.008	0.001	0.001	-0.000	0.005	0.007
	(0.057)	(0.056)	(0.056)	(0.056)	(0.057)	(0.057)
Ownership_edu(HSC/ Grad, reference						
Ownership_edu(Post Grad)	-0.422	-0.565	-0.614	-0.541	-0.488	-0.548
	(0.816)	(0.816)	(0.820)	(0.813)	(0.831)	(0.808)
Export(Yes, reference)						
Export(No)	-15.704	-14.655	-16.294	-16.768	-15.718	-14.645
	(3663.585)	(2211.255)	(4954.620)	(6424.749)	(3650.622)	(2350.106)
trainng_bs	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ownership_type(Foreig n, reference)						
Ownership_type(Joint)	-14.573	-13.508	-15.154	-15.647	-14.411	-13.761
	(4051.374)	(2474.919)	(5531.781)	(7124.252)	(4069.745)	(2607.159)
Ownership_type(other)	-16.028	-14.978	-16.623	-16.814	-16.030	-14.935
	(1955.946)	(1182.958)	(2637.323)	(3437.149)	(1947.333)	(1228.479)
Ownersip_type(Private)	1.385	1.264	1.397	1.383	1.491	1.399
	(1.851)	(1.816)	(1.841)	(1.878)	(1.900)	(1.847)
Constant	1.550	2.011	2.051	1.893	1.756	1.558
	(2.771)	(2.624)	(2.664)	(2.651)	(2.718)	(2.684)
Obs.	105	105	105	105	105	105
Pseudo R^2	0.354	0.329	0.335	0.343	0.339	0.337

Standard errors are in parenthesis
**** p<0.01, ** p<0.05, * p<0.1*

.

Table 11: Multinomial logistic regression with relative risk ratio (RRR)

Outcome Variable: Measure of Productivity	(1) Accord	(2) Accord and Alliance	(3) Accord and NTPA	(4) Alliance	(5) NTPA	(6) Other
More Productive(Base Outcome)						
About the Same						
Membership	4.425**	0. 804	1.45e-08	5.77e-08	0.235	0.026
	(3.032)	(0.640)	(0. 0001)	(0.0001)	(0.254)	(296.087)
Location (Chattogram, reference)						
Location(Dhaka)	0. 805	0 .891	0. 847	0.563	0. 895	0.903
	(0. 733)	(0. 780)	(0.739)	(0.529)	(0.786)	(0.800)
Location(Gazipur)	0. 428	0.568	0. 548	0.402	0. 560	0.681
	(0 .430)	(0. 549)	(0.530)	(0.402)	(0.542)	(0.666)
Location(Savar)	0 .007**	0 .018**	0.019**	0.012**	0.014**	0.017**
	(0 .016)	(0.033)	(0. 035)	(0.024)	(0 .028)	(0.033)
Location(Narayanganj)	0. 987	1.211	1.840	0.815	1.485	1.371
	(1.151)	(1. 347)	(2.130)	(0.924)	(1.677)	(1.528)
Chn_building_safety(Important, reference)						
Chn_building_safety(indifferent)	24.100***	22.873***	20.874***	21.035***	28.567***	25.554***
	(26.222)	(24.500)	(22.717)	(22.701)	(32.061)	(28.077)
CAP_prog(On Track, reference)						
CAP_prog (behind schedule)	1.510	1.128	0.829	0.888	1.655	1.062
	(2.852)	(2.024)	(1.523)	(1. 689)	(2.977)	(1.900)
CAP_prog(completed)	1.107	1.238	1.288	1.015	1.154	1.093
	(0. 806)	(0. 888)	(0. 925)	(0. 758)	(0.845)	(0. 782)
Wage_skilled	0 .999	0.999*	0 .999*	0.999*	0 .999	0 .999*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
WorkForce	0. 999	0.999	0.999	0.999	0. 999	0 .999
	(0.0001)	(0.000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Working_years	1.009	0.999	0.999	1.009	1.002	0.994
	(0.049)	(0.046)	(0.046)	(0.048)	(0.048)	(0.046)
Ownership_edu(HSC/ Grad, reference)						
Ownership_edu(Post Grad)	1.004	0. 829	0. 722	0.865	0 .908	0.822
	(0.673)	(0. 546)	(0. 481)	(0.579)	(0. 598)	(0. 543)
Export(Yes, reference)						
Export(No)	0.747	1.122	1.113	0.990	1.030	1.033
	(1.264)	(1.865)	(1. 847)	(1.647)	(1.723)	(1.714)
Training_bs	1	1	1	1	1	1
	(4.76e-07)	(4.44e-07)	(4.43e-07)	(4.47e-07)	(4.49e-07)	(4.40e-07)
Ownership_type(Foreign, reference)						
Ownership_type(Joint)	2.385	0. 667	0. 627	1.003	1.471	0.710
	(11840.42)	(2108.31)	(4495.16)	(9164.598)	(7686.834)	(2385.444)

Ownership_type(Other)	7040353	1508174	8452298	2.61e+07	6871929	1724734
	(2.32e+10)	(3.36e+09)	(4.28e+10)	(1.68e+11)	(2.57e+10)	(4.07e+09)
Ownersip_type(Private)	1.46e+07	3271007	1.60e+07	5.03e+07	1.32e+07	3805217
	(4.80e+10)	(7.28e+09)	(8.09e+10)	(3.23e+11)	(4.95e+10)	(8.98e+09)
Constant	1.07e-07	1.85e-06	4.40e-07	2.08e-07	4.16e-07	1.97e-06
	(0. 0003)	(0.004)	(0.002)	(0.001)	(0.001)	(0.004)
Less Productive						
Membership	1.043	0. 596	6.86e-08	1.070	0.957	7381776
	(0.775)	(0.601)	(0.0005)	(1. 242)	(0.979)	(4.78e+10)
Location (Chattogram, reference)						
Location(Dhaka)	0.417	0. 428	0.379	0.419	0.420	0.394
	(0. 398)	(0. 418)	(0.364)	(0.419)	(0.408)	(0.371)
Location(Gazipur)	0.363	0. 365	0.360	0.385	0.393	0.271
	(0.407)	(0. 405)	(0 .397)	(0.431)	(0.438)	(0.313)
Location(Savar)	0.114	0. 113	0 .114	0.114	0.117	0.111
	(0.169)	(0. 167)	(0.166)	(0.168)	(0.174)	(0.159)
Location(Narayanganj)	0. 478	0. 357	0.558	0 .378	0.489	0.401
	(0.747)	(0. 555)	(0.894)	(0.591)	(0.768)	(0.610)
Chn_building_safety(Important, reference)						
Chn_building_safety(indifferent)	9.431*	11.770**	11.017*	13.537**	11.578*	8.550
	(11.640)	(14.694)	(13.979)	(17.159)	(14.777)	(11.335)
CAP_prog(On Track, reference)						
CAP_prog (behind schedule)	27.843**	26.931**	23.217**	23.023**	29.038**	25.278**
	(39.367)	(37.685)	(31.700)	(31.560)	(41.563)	(34.975)
CAP_prog(completed	0 .627	0. 556	0.573	0.514	0.546	0.644
	(0.500)	(0. 437)	(0. 451)	(0.405)	(0.432)	(0.523)
Wage_skilled	0.999*	0. .999*	0.999*	0.999*	0.999*	0.999
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
WorkForce	0.999	0. .999	0.999	0.999	0.999	0.999
	(0.0001)	(0.0002)	(0.0020)	(0.0001)	(0.0002)	(0.0001)
Working_Years	1.007	1.0006	1.001	0.999	1.004	1.007
	(0.057)	(0.056)	(0.056)	(0.056)	(0.057)	(0.057)
Ownership_edu(HSC/ Grad, reference)						
Ownership_edu(Post Grad)	0. 655	0.568	0 .541	0.582	0.614	0.578
	(0. 534)	(0. 463)	(0. 443)	(0. 473)	(0.510)	(0.467)
Export(Yes, reference)						
Export(No)	1.51e-07	4.32e-07	8.39e-08	5.22e-08	1.49e-07	4.36e-07
	(0.0005)	(0 .0009)	(0.0004)	(0.0003)	(0.0005)	(0.001)
Trainng_bs	0.999	0.999	0.999	0.999	0.999	0.999
	(6.79e-07)	(6.63e-07)	(6.58e-07)	(6.70e-07)	(6.66e-07)	(6.57e-07)
Ownership_type(Foreign, reference)						
Ownership_type(Joint0	4.69e-07	1.36e-06	2.62e-07	1.60e-07	5.51e-07	1.06e-06
	(0. 001)	(0.003)	(0.001)	(0.001)	(0.002)	(0 .002)

Ownership_type(other)	1.09e-07	3.13e-07	6.03e-08	4.99e-08	1.09e-07	3.26e-07
	(0. 002)	(0.0003)	(0.0001)	(0.0001)	(0.0002)	(0.0004)
Ownership_type(Privat)	3.994	3.539	4.044	3.985	4.442	4.049
	(7.393)	(6.428)	(7.446)	(7.484)	(8.442)	(7.478)
Constant	4.711	7.468	7.772	6.638	5.789	4.748
	(13.055)	(19.600)	(20.705)	(17.597)	(15.735)	(12.744)
Obs.	105	105	105	105	105	105
Pseudo R^2	0.354	0.329	0.335	0.343	0.339	0.337

Standard errors are in parenthesis
**** p<0.01, ** p<0.05, * p<0.1*

Across all the groups, only the categorical variable for the Accord member factories under the 'about the same' level of productivity is statistically significant at a 5% significance level and shows a positive effect. This suggests in comparison to non-accord member factories, the Accord member factories are more likely to remain at the same productivity level compared to more productive factories (see Table 10). This categorical variable has a RRR of 4.425. So, For the Accord member factories compared to non-accord member factories, the relative risk of remaining at about the same level of productivity relative to being more productivity is expected to increase by a factor of 4.425 units, given other variables are held constant (see Table 11).

The categorical variable for Savar under the location category is statistically significant across all columns for the same productivity group and shows a negative effect. This suggests, across all columns, factories located in Savar, in comparison to factories located in other areas are less likely to remain at the same productivity level in comparison to factories in more productive factories (See table 10). This categorical variable shows RRR of 0.007, 0.018, 0.019, 0.012, 0.014, 0.017 for same productivity group. All of the RRRs are less than 1. So, in general, it can be said that, across all columns, the relative risk of maintaining about the same level of productivity relative to maintaining more productivity is, less likely for factories in Savar compared to factories in other locations, holding all other variables constant (see Table 11).

The categorical variable for factories that are indifferent regarding the change in building safety shows statistical significance at 1% level of significance across all columns for the same productivity group and shows a positive effect. This variable shows statistical significance at 5% and 10% levels of significance across columns (1) to (5) for the less productivity group and shows a positive effect. In column (6) it shows insignificance. This suggests, across all columns, factories that are indifferent regarding the change in building safety compared to factories that

attach importance to change in building safety, are more likely to remain at the same productivity level in comparison to factories more productive factories, holding all other variables constant. Also, except for column (6), factories that are indifferent regarding the change in building safety compared to factories that attach importance to change in building safety, are more likely to remain in the less productive level in comparison to more productive factories, holding all other variables constant (see Table 10). This categorical variable shows RRRs of 24.100, 22.873, 20.874, 21.035, 28.567, 25.554 for the same productivity group. All of the RRRs are more than 1. So, in general, it can be said that, across all columns, the relative risk of remaining at about the same level of productivity relative to being more productive is, more likely for factories that are indifferent about change in building safety compared to the factories that attach importance to it, holding all other variables constant (see Table 11). This categorical variable shows RRR of 9.431, 11.770, 11.017, 13.537, 11.578 (the value for column (6) is statistically insignificant) under the less productive group. All of the RRRs are more than 1. So, in general, it can be said that across all columns (except column (6)), the relative risk of remaining at a lesser level of productivity relative to being more productive is, more likely for factories that are indifferent about change in building safety compared to the factories that attach importance to it, holding all other variables constant (see Table 11).

The categorical variable for factories that show CAP progress as "behind schedule" is statistically significant at a 5% level of significance for only less productive group and shows positive effect across all columns. This suggests, across all columns, factories that are behind schedule in terms of CAP progress compared to the reference group (on track), are more likely to remain at a lesser productivity level in comparison to more productive factories, holding all other variables constant (see Table 10). This categorical variable shows RRR of 27.843, 26.931, 23.217, 23.023, 29.038, 25.278. All of the RRRs are more than 1. So, in general, it can be said that, across all columns, the relative risk of remaining at a lesser level of productivity relative to maintaining more productivity is more likely for factories that are behind schedule in terms of CAP progress compared to the reference group (on track), holding all other variables constant (see Table 11).

The effect wage for skilled labor is statistically significant at 10% level of significance for only columns (2), (3), (4), and (6) under the same productivity group and for columns (1), (2), (3), (4), and (5) under. They show negative effects (see Table 10) with almost similar values.

All the other independent variables show statistical insignificance.

4.4. Comparison between the Two Models

Firstly, the difference between the two models used in this thesis is in their outcome variables. I have used labor productivity formed following the function of "quality weighting" presented by Van Biesebroeck (2015) study. I have used a self-described "measure of productivity" by factory management as the outcome variable, which has three categories.

Secondly, the two models give different outcomes for different indicators. The "Membership" categorical variables give more significant outcomes in the OLS model than the logistic regression. Variables; "WorkForce", "Wage_skilled" also give important significant results in OLS estimation. Variables; "CAP_prog", "Chn_building_safety", "Location" show some important and significant outcomes in the multinomial logistic model. These indicators failed to show a significant effect in the OLS regression.

The similarity between the two models is that both use the same set of independent variables.

In conclusion, it can be said that due to the different specifications of the two models give somewhat different but important outcomes. Hence, outcomes from both of the models are used in the discussion of the outcomes.

4.5.Determinants of Productivity: Discussion of Results

4.5.1. Membership

The categorical variable for membership of the factories is the main focus of this thesis. I have presented the effect of each categorical variable separately on labor productivity (see Tables 9, 10, and 11). Here, I have discussed in detail about the estimations for each category and some possible reasons for the results.

Accord:

In the OLS regression, the Accord shows a reduction in labor productivity. On average, the Accord affiliated factories see a reduction in labor productivity by 521.613 units compared to the

reference group, holding all other variables constant (see Table 9). In the multinomial logistic model, the Accord member factories compared to non-accord member factories, face the relative risk of remaining at about the same level of productivity relative to more productive factories is expected to increase by a factor of 4.425 units, given other variables are held constant (see table 11). Such results can be attributed to how the Accord operated. The Accord was a legally binding initiative. Dominated by the European brands, the group required that all of its signatory factories must make sure that, their supplier factories took part in remediation work. If any supplier failed to do so, they would receive warnings and termination of business relations with the Accord member brands (Khan, & Wichterich, 2015). If any Accord affiliated factory had to be closed down, the employers would have to take the responsibility of paying compensation to workers under the Accord's worker and employer negotiation approach (Donaghey, & Reinecke, 2018). Now, these remediation works have proved to be quite expensive for many factories. According to an article published in the New York Times, "Alan Roberts, the Accord's executive director for international operations, said, the cost for some factories would be $1 million for safety improvements". Also, the article mentioned that, International Finance Corporation (IFC) an arm of the World Bank at that time said, it would give low-interest loans to Bangladeshi factory owners for safety improvements on the condition that overseas factories of those companies guarantee the loan (Greenhouse, 2014). However, Sarah Labowitz, coordinator for N.Y.U. Stern Center for Business and Human Rights wrote in the opinion section of the New York Times that, IFC's demand for a guarantee on loans by western brands was highly unlikely. So, who would actually pay for the remediation works in Bangladeshi factories was very uncertain (New York Times, 2014). This indicates the high expenditure and lack of funds for remediation work by the supplier factories.

Labor productivity does require safe and healthy working conditions for it to increase. However, labor productivity also requires investments in worker training for skill improvement, the factory's physical plant, new production process (Hohenegger, Miller, & Curley, 2018). As the remediation work recommended by the Accord proved to be quite expensive, it may have been the case that many factories could not invest in workers and capital to improve labor productivity so, the Accord member factories saw a reduction in labor productivity.

Alliance and Other Initiatives:

The effect of both of the variables; Alliance and other initiatives were statistically insignificant in both OLS and multinomial logistic regression. As the result is based on cross-sectional analysis with a limited number of observations, a further study is required to investigate the effect of both Alliance and other initiatives' memberships on the labor productivity of their member factories.

Accord and Alliance:

In the OLS regression, the Accord and Alliance affiliated factories show an increase in labor productivity. On average, the Accord and Alliance affiliated factories see an increase in labor productivity by 505.200 units compared to the reference group, holding all other variables constant (see Table 9). In the multinomial logistic model, this variable is statistically insignificant in both the same leveled productive group and less productive group.

According to Alliance, when they worked on factories that were shared with the Accord, they did not duplicate inspections already done by the Accord and accepted their inspection reports. Also, they used Accord's recommended CAP to track progress. At the end of remediation work, Alliance officials would perform a final verification visit on all shared factories that had reached the end of the CAP recommended by the Accord (Alliance, 2018). So, it is clear that the Alliance would not put extra pressure on supplier factories regarding remediation work and would follow the Accord's recommendation. This should reduce remediation costs as the factories would not have to follow two sets of instructions.

Furthermore, the Accord is dominated by European brands and the Alliance is dominated by North American brands. So, supplier factories that are affiliated with both the Accord and Alliance export products to both the European and North American markets. Both of the export destinations are technologically advanced. Firms are likely to benefit more in terms of labor productivity due to learning by export than firms exporting to technologically less advanced countries (Fryges, & Wagner, 2007). It could be the case that, the enhancement in productivity achieved from exporting to these destinations might have been able to offset the effects of expensive remediation works on worker productivity observed in the case of only the Accord affiliated factories. So, export destination and the way Alliance and the Accord work with their

shared members; can be the possible reasons for the increased labor productivity of the supplier factories affiliated with both the Accord and Alliance.

NTPA

In the OLS regression NTPA, affiliated factories show an increase in labor productivity. On average, the NTPA affiliated factories see an increase in labor productivity by 406.360 units compared to the reference group, holding all other variables constant (see Table 9). In the multinomial logistic model, this variable is statistically insignificant in both the same productive and less productive groups.

Khan & Wichterich's (2015) observation suggests that the quality of the safety inspections under NTPA and CAPs provided by them were not up to the mark and did not meet the standards of the Accord. They saw no significant difference between the CAPs of different factories, except very few low costing initiatives and some management issues. NTPA affiliated factories had weak workplace safety even after NTPA's CAP measures. This is due to the fact that NTPA was formed by the GoB because of outside pressure (Khan & Wichterich, 2015). So, NTPA's activities were not carried out with sincerity.

Both Better Work (2016); & Samddar (2016) found that a better working condition leads to better labor productivity. Since NTPA affiliated factors did not implement most of the CAPs provided by the initiative (creating the possibility of OSH conditions in NTPA affiliated factories stay almost the same as before) so, the increase in labor productivity in the OLS estimation is the exact opposite of what Better Work and Samaddar found. The effect of NTPA's activities on the labor productivity of its affiliated factories requires further study as the data used in this thesis has limited observations and indicators to measure labor productivity.

The Accord and NTPA

In the OLS regression, the Accord and NTPA affiliated factories show an increase in labor productivity. On average, the Accord and NTPA affiliated factories see an increase in labor productivity by 1153.349 units compared to the reference group, holding all other variables constant (see Table 9). In the multinomial logistic model, this variable is statistically insignificant in both about the same productive and less productive groups.

Although, NTPA affiliated factories did not implement suggested CAPs properly (Khan & Wichterich, 2015). Factories shared by both the Accord and NTPA see a positive effect on labor productivity. A possible reason can be that the Accord required its affiliated supplier factories to mandatorily participate in remediation programs (Khan & Wichterich, 2015). Because of the Accord's strict stance, factories probably had to implement safety measures, although NTPA did not strictly require them to do so. This gave a positive boost to labor productivity as, a better working condition leads to better labor productivity (Samaddar, 2016; Better Work, 2016).

Comparison among the Findings of Membership Indictors

The accord affiliated factories saw a reduction in labor productivity. Compared to the factories affiliated with only Accord, factories affiliated with both the Accord and Alliance saw rise in labor productivity. The same was true for factories affiliated with both the Accord and NTPA. Factories affiliated with NTPA only, also saw a rise in labor productivity in contrast to the Accord.

4.5.2. Factory Size, Wage of Skilled Labor, Age of Factory

The data set used in this thesis considered factory size by the size of the workforce of the factories in the sample. So, the variable "workforce' is the proxy used for factory sizes. As a measure of incentive system, I have used the wage of skilled labor following Tekleselassie et al. (2018) 's example. Also, I used the variables 'working years' to define the age of the factories in the sample.

Both of the indicators show strong statistical significance in the OLS estimation across all groups of factory categories (see Table 9). Both of them show positive effects in the OLS estimation. In the multinomial logistic regression only wage for skilled labor shows significance at a very small scale (see Tables 10 and 11).

The finding for "wage for skilled labor" in OLS estimation, goes on par with the finding of Tekleselassie et al. (2018). They also found a positive relationship between the higher wage of skilled labor and labor productivity, being highly significant across all of the groups they studied.

In the OLS estimation, the size of the factory ("WorkForce") has a positive effect on labor productivity. This finding can be backed by the World Economic Forum's study by Islam &

Amin (2015), where they suggest, in the formal sector, larger firms are more productive. In the multinomial logistic model, it is statistically insignificant.

The age of factories is statistically insignificant in both OLS and multinomial logistic regression models, so I could not show any effect of factory age on labor productivity.

4.5.3. CAP Progress, Change in Building Safety, Investment on Training for Building Safety

"CAP progress" (CAP_prog), "importance of change in building safety perceived by managers" (chn_building_safety), and "investment on training for building safety" (Training_bs); all three of the variables are statistically insignificant in the OLS regression (see Table 9).

However, in the multinomial logistic regression, CAP progress and importance of change in building safety (Chn_building_safety) show statistical significance. Training for building safety is statistically insignificant for the multinomial logistic regression.

The categorical variable for factories that are indifferent regarding the change in building safety shows statistical significance for the same productivity group (for all columns) and the less productivity group (except column (6)), with positive effect (see Table 10). This suggests, across all columns, factories that are indifferent regarding the change in building safety compared to factories that attach importance to change in building safety, are more likely to remain at the same productivity level in comparison to more productive factories, holding all other variables constant. Also, except for column (6), factories that are indifferent regarding the change in building safety compared to factories that attach importance to change in building safety, are more likely to remain at the less productivity level in comparison to more productive factories, holding all other variables constant.

The categorical variable for factories that show CAP progress as "behind schedule" is statistically significant for only the less productive group and shows positive effect across all columns (see table 10). This suggests, across all columns, factories that are behind schedule in terms of CAP progress compared to the reference group (on track), are more likely to remain at the less productivity level in comparison to more productive factories, holding all other variables constant.

If factory owners remain indifferent for making changes in building safety, their labor productivity should in fact remain the same as before or degrade to a lower level depending on the conditions of their factories before any type of inspection or remediation took place. Because, an increase in productivity requires a better working condition (Samaddar, 2016; Better Work, 2016). So, the result is on par with expectations.

Furthermore, the reason for factories being behind schedule in CAP progress is that those factories had CAP in implementation but some items recommended in CAP were behind scheduled timeline (the Accord, 2020). If those behind schedule activities under CAP are essential for ensuring a safe working place, it is natural for those factories to be more likely in the same productive or less productive group. Because, to enhance worker productivity a factory needs to have essential safety improvements, completed. So, in the state of CAP being in progress and some items in CAP being behind schedule would cause the factory to have the same productivity as before or less productivity than before and the finding supports this point.

4.5.4. Management Factors and Their Effects on Productivity

In both the OLS estimation and multinomial logistic regression, categorical variables for location of factories, education status of factory owners/managers, type of ownership were used to show the effect of management factors.

In OLS regression, except for categorical variable “ownership_type (joint)” in columns (2), (3), (4), and (6); all other categorical variables of the above-mentioned indicators are statistically insignificant (see Table 9). Usually, the education level of managers, the location of factories, and the type of ownership of factories do show significant effects on labor and firm-level productivity (Tekleselassie et al., 2018; & Moazzem, & Khandker, 2018). Although, finding for “ownership_type (joint)” is on par with Tekleselassie et al., 2018; & Moazzem, & Khandker, 2018’s findings, other variables could not show a significant effect on labor productivity. Again this could be attributed to the fact that the result is based on cross-sectional analysis with a limited number of observations and there is presence of selection bias.

In multinomial logistic regression, the categorical variable for Savar under the location category is statistically significant across all columns for the same productivity group, only. So, across all factories with affiliation with one or more initiatives working on worker safety, factories that were located in Savar, in comparison to factories located in other areas are less likely to remain

at the same productivity level in comparison to factories more productive factories (See table 10). So, this finding does support the findings by Tekleselassie et al. (2018).

4.5.5. Export

This indicator is used in both the OLS estimation and multinomial logistic regression (see Tables 9 and 10). The two regression models fail to detect any significant correlation between export behavior and labor productivity. This contradicts with results found in other studies where export plays an enhancing role in productivity. A study by Van Biesebroeck (2005) on Sub-Sahara Africa and De Loecker (2007) on Slovenia found the productivity-enhancing role of exporting.

In this study, only a dummy variable indicating if a factory is exporting or not is used with limited observations. Data on export volume, profit made from it could not be availed for the sample factories. So, the actual effect of export could not be determined.

Chapter 5

Research Findings: Qualitative Analysis

Usually, labor productivity is studied through quantitative analysis only. The aim of this thesis is to observe how the implementation of safety measurements by RMG supplier factory management under the membership of the Accord and Alliance, effects labor productivity. This also involves the perceptions of supplier factory managers and their experiences regarding their work with the Accord and Alliance, and costs associated with the remediation works, which can help in developing a better understanding of how the findings on labor productivity occurred due to the involvement with the two initiatives.

Wong (2008) stated, "qualitative methods explore the perspective and meaning of experiences, seek insight and identify the social structures or processes that explain people's behavioral meaning". Also, he argued that qualitative study relies on extensive interaction with the people involved in the study and often helps researchers to uncover unexpected or unanticipated information which cannot be done by quantitative analysis (Wong, 2008). Hence, this chapter helps in learning the experiences of managers while implementing safety measurements, assigned by the two initiatives. It helps in understanding some of the reasons behind the change in labor productivity in the supplier factories from the sample, that cannot not be understood from the quantitative analysis, alone.

5.1. Evaluation of Experiences Shared by Supplier Factory Managers/ Owners

5.1.1. Why Compliance is Important?

After the Rana Plaza accident, compliance started to become more and more important for the business. 48.03 per cent of the managers said that compliance was required by their buyers, to stay in business, while 44.74 per cent of the managers said that compliance was good for their workforce, to improve productivity and to do good business. Only, 7.24 per cent managers said that compliance was unnecessary as they thought they had Bangladeshi government for instructions and did not need foreign buyers and their governments to tell them what to do. Also, a change in managers' perceptions regarding building safety is observed. 86 per cent of the managers attached importance to change in building safety while only 14 per cent were indifferent in seeing a change in the safety conditions of their factory buildings.

To explain the importance of compliance, one of the managers said:

> After the Rana Plaza incident, buyers are interested not only in the products but also in the factory environment and worker's condition. The inability to meet those requirements can lead to going out of business. So, compliance has become an important issue not to be overlooked.[11]

In order to meet the compliance requirements of the buyers, most of the factories got affiliated with the Accord, and Alliance. After the affiliation, they saw a rise in business and earned buyers' satisfaction by following the CAP assigned by the initiatives. 68 per cent of the buyers expressed satisfaction on the CAP progress of their supplier factories, while, 27 per cent were indifferent about the CAP progress made by their suppliers and only, 6 per cent expressed dissatisfaction on the CAP progress made by their supplier factories. As a result, the supplier factories found it very beneficial to be affiliated with the Accord, and Alliance. For example, 62 per cent of the factory managers thought it was important to be affiliated with the Accord, and Alliance; while only 38 per cent were indifferent to getting affiliated. To explain the importance of being affiliated with such initiatives, one of the managers said, "buyers are not willing to do business anymore without ensuring such affiliation[12]". Another manager said, "Fire, electric and structural safety was not my concern at all, even my buyers never checked this, but after Rana Plaza, you can't get an order without getting approval from Accord/Alliance on building safety[13]" (Rahman, & Rahman, 2020).

5.1.2. Issues Regarding Inspection and Remediation

97 per cent of the factories were audited, while only 3 per cent were not audited. Among the audited factories, 94 per cent were assigned CAP, while only 6 per cent were not assigned with any CAP. Although, compliance has become very important for the garment factory owners to stay afloat and export to their foreign buyers, it has created some serious challenges for them.

[11] Interview, manager of a garment factory in Narayanganj, 11 December, 2016.

[12] Interview, manager of a garment factory in Narayanganj, 11 December, 2016.

[13] Interview, director of a garment company, Savar, 12 February 2017.

Two of the major issues were; challenges faced during inspection and relocation for factories that were audited and received CAP.

Challenges Faced During Inspection

Firstly, factory managers faced difficulties in dealing with multiple groups of inspections by their respective inspection teams as those teams had coordination issues among themselves. For example, one group showed satisfaction with a structural issue while the follow-up group included this in CAP. One inspection suggested the location of the fire door on one floor while a second group required a change in the location (Rahman, & Rahman, 2020). One of the managers said:

> In my factory, there was a water reservoir of 150,000-liter capacity approved by my lead buyer. The Accord did not raise any objection about the capacity of that tank, but the Alliance recently recommended increasing the capacity to 300,000 million liters. Almost 1.50 crore taka [US$ 0.18 million[14]] is being spent to increase the capacity of the tank.[15] (Rahman, & Rahman, 2020).

Coordination issues among the inspection teams led to many other similar wastage of expenses from the funds of the factories. There was also the issue of managers not being able to understand the technical instructions given by the Accord and Alliance as they (managers) did not have engineers among their staff (Rahman, & Rahman, 2020). Furthermore, at the initial stage, the Accord and Alliance did not accept, each other's inspection reports, so if a factory was inspected by both of the initiatives, its issues were addressed differently. Only, after managers raising their voice about this problem, did the two initiatives started to use the same inspection model (Rahman, & Rahman, 2020). The survey found out that, many of the managers were critical of the inspection process. They preferred the same inspection team to be given the charge of the same factory throughout the process — from the first inspection to the last. However, the

[14] US$ 1 = 85 Taka.
[15] Interview, factory manager, Chittagong, 16 January 2017.

Accord disagreed with the issues raised by managers, believing them to be 'without merit', according to a senior member of Accord[16] (Rahman, & Rahman, 2020).

Secondly, managers found it challenging to complete CAPs in time. Managers argue that a lot of reasons are not taken into account as valid reasons for the delay in completing CAPs. The survey found that orientation towards adopting a new system, complications in retro-fitting, bureaucratic processes, poor port facilities, delay in receiving safety equipment on time, and scarcity of reputed engineering firms to carry out DEAs[17] (Rahman, & Rahman, 2020); were some of the major issues for delays in implementing CAPs.

Relocation

The relocation was also a major challenge, faced by the supplier factory managers. Almost, all the small factory owners in the sample rented floors in multi-purpose buildings. Many issues of safety; ranging from the electrical installation to the fire escape routes, from fire and smoke compartments to smoke doors, do not lie within the purview of the factory owner but are the responsibility of the building owner. Many of these buildings were not designed to be garment factories so that it often became difficult to fix the financial terms regarding those CAP measures that were relevant to the safety of the entire building with the owner of the building and other factory owners (Rahman, & Rahman, 2020). One solution for a factory owner was to relocate to secure compliance. However, that presented the risks attached to relocating workers at short notice, which threatened the disruption in the living arrangements of the workers (Rahman, & Rahman, 2020).

Managers thought they would receive financial assistance from buyers and the Bangladesh government to help them relocate their factories to safer buildings: however, it was found that they were often disappointed with the lack of cooperation from both parties and faced the possibility of either closing down their business or becoming a subcontractor (Rahman, & Rahman, 2020).

[16] Interview, senior staff of the Accord, Dhaka, 20 January 2018.
[17] A detailed engineering assessment is a detailed structural engineering investigation and reporting of a building structure. A DEA is necessary when there is insufficient information and documentation on the building structure to determine the safety of the structure. https://dife.portal.gov.bd/sites/default/files/files/dife.portal.gov.bd/page/cdf085fa_1643_44e9_bfce_486d88359e16/3.%20DEA%20Guidance.pdf

5.1.3. Who Pays for Remediation Work?

The remediation works were expensive and the factory managers felt a huge burden while paying for the CAPs. None of the factories in the sample have received any financial assistance from buyers. Although larger factories were able to bear the cost of remediation work, it was often hard for smaller factories. Bangladeshi suppliers expected that buyers would share the financial burden of remediation work, but they got the opposite experience. According to one of the garment factory owner:

> Everything that Accord has done is worthy of applause. I do not have any dissent with Accord in any way. But I . . . resent the buyers for their insensitivity to the suppliers' problems and for their reluctance to share the costs of complying with Accord requirements. The buyers have never come forward to help me with compliance issues. They always say it is your problem, not mine. They do not advance us loans in order to carry out the CAPS or even commit to giving us guaranteed orders[18] (Rahman, & Rahman, 2020).

Supplier factory managers had to bear huge costs for being compliant, which was often very difficult for them and many of them were unsure of how they would manage funds. One owner said:

> I need 60 lac taka [US$ 71,428.5] to fix the factory to be compliant, [I] can't make any arrangement. Last four months I lost 32 lac taka [US$ 38,095.3] due to not getting adequate orders, also 3.5 crore taka [US$ 4,16,666.67] is my liability. If my factory is compliant I would continue good business, but I can't afford to be compliant. If I get money from the bank as a soft loan I will survive. I am thinking to shift the factory but still where will I get money[19] (Rahman, & Rahman, 2020).

[18] Interview, factory owner, Chittagong, 17 January 2017.
[19] Interview, factory owner, Chittagong, 16 January 2017.

Although, suppliers were supposed to receive financial support from their buyers, factory managers reported that, they did not receive any supports from buyers in terms of advance payment of orders.[20] (Rahman, & Rahman, 2020). Also, financial assistance fund formed by IFC did not help much either. According to ILO and IFC:

> Until recently, there were no financial products specifically available to the RMG sector for remediation. Factory owners faced a long bureaucratic loan application process and could only accept available term loans with high-interest rates. Interest rates for loans in local currency can range from 11 per cent to 18 per cent. One significant disadvantage for many factories is their inability to present proper, reliable audited financials to banks; this has a direct effect on the amount of collateral requested by financial institutions to guarantee the loan (Rahman, & Rahman, 2020).

In addition to that, factories did not receive fair prices, given their special circumstances. Managers wanted the buyers to understand their situation. One manager commented, "we want our buyers to understand our situation as we are investing quite a lot on compliance issues. This should reflect on pricing"[21].

Managers often had to spend a large amount of money for training in building safety. The survey has found the maximum amount invested into training for building safety was 50,00,000 in BDT and on average factories had to spend 2,68,571 BDT.

5.2. Discussion

The qualitative study was done to learn why managers found compliance to be important, the challenges faced by them at the time of remediation work, and who paid for the remediation work. This study has enabled me to better understand, the experience of the managers and learn how these experiences might have an impact on the labor productivity of the factories.

At first, the study reveals why compliance became important after the Rana Plaza accident. The majority of the factory managers in the sample reported that compliance was important for their

[20] Interviews, factory managers, Savar, 3 January 2017.
[21] Interview, manager of a garment factory in Narayanganj, 11 December, 2016

businesses. So, the surveyed factories became affiliated with the Accord and Alliance. As the factory managers saw, buyers expressing satisfaction on their CAP progress, they started to perceive the affiliation with the Accord and Alliance, valuable. This shift in the managers' perceptions is due to the conditions laid down by the Accord and Alliance. According to Khan, & Wichterich (2015):

> All signatory companies have to make sure that their supplier factories will take part in the inspection process, make necessary renovations according to the remediation plans, and allow training activities. If any supplier disregards these rules, the signatory company will promptly provide a warning and has to terminate the business relationship if the respective supplier still ignores the instructions.

So, it is easy to understand, why the managers perceive compliance to be important and consider their affiliation with the Accord and Alliance, valuable.

Although supplier factory managers have shared why compliance became important for them, they faced many challenges during the process of remediation work. Mostly, they have reported the challenges they faced during the inspection and relocation process. Many of the managers complained about the lack of coordination among inspection groups and how this caused the loss of a large amount of money. Also, they have complained about the different inspection reports and suggestions of different remediation works for factories that were affiliated with both of the initiatives, in the early days of operation of the two initiatives. This created confusion among factory owners/managers, eventually the two initiatives abandoned this faulty system but by then, the factory managers had to incur loss of money in a large amount, unnecessarily. Evidence of similar problems can also be found in a newspaper article. According to an article in *The Daily Star* (2017):

> Even though the Accord and Alliance originally agreed to avoid duplications, almost 300 garment factories fell under the jurisdiction of both the schemes. The overlap confused many garment factory owners who preferred uniform standards. The Accord and Alliance later reached a consensus about not inspecting a factory twice once done by either one.

Also, many of the managers reported that it was hard for them to implement CAPs in time. They have listed some reasons for their delay, for example; orientation towards adopting a new system, complications in retro-fitting, bureaucratic processes, poor port facilities, delay in receiving safety equipment on time, and scarcity of reputed engineering firms to carry out DEAs (Rahman, & Rahman, 2020). Khan, & Wichterich (2015) have found one of the most decisive factors in determining the implementation and timely progress of CAPs to be, the availability of funds. Also, the Daily Star article reported that, despite cheaper alternatives being available, the Accord suggested expensive retrofitting options. Furthermore, the article reported that the Accord and Alliance often suggested safety and security measures from a western point of view, not considering local specificities (The Daily Star, 2017). So, these evidences support the experiences of factory managers while implementing CAPs.

Relocation is another major issue reported by many factory managers in the survey. According to Donaghey, & Reinecke (2018), whenever factories faced closures or relocation, both the Accord and Alliance made it clear, that the workers would receive compensation. The Alliance required both brands and supplier factories to pay two months' compensation, each. The contribution by the brands was paid through Alliance-member funded "Worker Safety Fund". On the other hand, the Accord required its member supplier factories to pay six months' compensation, and Accord took a negotiation approach between the workers and their employers, where employers were made to take the responsibility. Many of the surveyed managers reported that they hoped to get financial help from their buyers and GoB but they were left without any help. So, in reality, neither Alliance nor the Accord helped them in this regard.

Funding can be considered the most important issue in regards to compliance and it can have a profound effect on worker productivity. Each signatory company had to contribute to the funding of the Accord led programs according to their annual volume of garment production in Bangladesh (Khan, & Wichterich, 2015). However, the finding says, none of the factories in the sample received any financial assistance from their buyers. Often they had to bear the burden of large expenses for remediation work by themselves. They also had used to large amount of money on training their staff on building safety. Furthermore, managers often could not take loans from the assistance fund formed by IFC. Sarah Labowitz's statement, (Co-director of N.Y.U. Stern Center for Business and Human Rights), reinforces this finding. The co-director

commented, IFC demanded guarantees from the western brands for making low-cost loans, which was highly unlikely. She also stated that the real issue was, who would pay for the huge repair and replacement costs (The New York Times, 2014). In addition to that, the study found that they often did not receive fair prices. Barette, Baumann-Pauly, & Gu (2018) have shared a similar finding to the findings of this thesis. They reported many factory owners pointed towards the irony in brands and retailers offering financial help as at the same time they put continuous downward prices on garment products. For example, the price of cotton men's price reduced by 13 per cent since the collapse of Rana Plaza.

Chapter 6

Conclusion

The objective of this thesis is to find the effect of the Accord and Alliances' membership and their activities on labor productivity. Also, I am interested to see if the findings of this study follow the findings by Better Work (2016); Samaddar (2016) or the finding by Gray (1987). The concluding chapter is divided into four parts. In the first part, I have provided a summary of findings and connected the findings of quantitative and qualitative Analysis. In the second part, I have recommended policies to improve labor productivity under the future monitoring body, RSC. In the third part, I have discussed the limitations of this study, and finally, I have discussed further scope of study.

6.1.Summary of Findings

The main focus of the quantitative study is the impact of the membership of the Accord, Alliance on labor productivity. I have also compared the finding for the Accord and Alliance members with NTPA affiliated factories. In general, labor productivity reduced for factories affiliated with the Accord and more than half of the factories in the sample were affiliated with the Accord. In contrast, labor productivity increased for factories that were affiliated with both the Accord and Alliance. Similarly, factories affiliated with both the Accord and NTPA showed an increment in labor productivity. In contrast to the Accord, factories affiliated with only NTPA saw their labor productivity rising. I could not show a significant impact of Alliance and other initiatives. In short, it can be said that there is no strong positive relationship between labor productivity and factories being affiliated with the Accord and Alliance and their activities for implementing safety regulations. Apart from building safety other factors such as; factory size (workforce), and wage of skilled labors, show strong effect on labor productivity.

Reduction in labor productivity for the Accord affiliated factories follow the finding by Gray (1987). On the other hand, increase in labor productivity for factories affiliated with both the Accord and Alliance, and NTPA, and Accord, and NTPA (only) follow the findings by Better Work (2016); Samaddar (2016).

In order to learn the reasoning behind the findings in the quantitative section, I have also conducted a qualitative analysis, to find clues from the experiences of factory owners/managers

in the sample. Most of the factory owners/managers have agreed that compliance had become essential for them to remain in business. Also, they attached importance to their affiliation with the Accord and Alliance. However, they have reported major challenges in terms of inspection and relocation while implementing CAPs. They also expressed their disappointment in terms of funding for remediation work as none of them received any financial assistance from their buyers. Furthermore, they did not get fair prices at the time of remediation work for their products. So, supplier factory managements had to divert most of their resources to ensuring building safety. The findings from qualitative analysis is reinforced by the views shared by other researchers that, implementation of OSH regulations are usually expensive, impose non-productive investments, and under most funding schemes, factory owners have to bear the expenses by themselves (Shearn, 2003; De Greef & Van den Broek, 2004; Hopkins, 2014).

Here, the financing challenges faced by the managers can help in explaining the result for the Accord, where the factory owners saw a reduction in labor productivity. Since they had to bear the brunt of expensive remediation works, alone; it is natural for them to not to able to spend on skill development of labor, new machinery, etc. to enhance the labor productivity of their factories. A study by 'Fair Wear Foundation' identifies that much of the low productivity in the garment industry can be attributed to reasons such as; lack of investment in skills, new production processes, and a factory's physical plant. Retraining of management and staff, new equipment, new production processes and any of the other tools that lead to better productivity all require investment (Hohenegger, Miller, & Curley, 2018). However, the rise in labor productivity in factories affiliated with both the Accord and Alliance, the Accord and NTPA, and NTPA only; show contrast to the managers' negative experiences related to remediation work. One of the possible reasons for such a rise can be the importance attached to compliance by the supplier factory managers and their attempts of being compliant. If they did not follow rules set by the Accord and Alliance, their signatory factories would terminate business relations with them (Khan, & Wichterich, 2015). So, safety compliance, in general, enabled them to provide better working conditions, and better working conditions may have caused an improvement in labor productivity as other studies on the positive relationship between better working conditions and labor productivity suggest (Better Work, 2016; Samaddar, 2016). Also, another factor may have played a role in increasing labor productivity for factories affiliated with both, the Accord and Alliance, and that reason is the export destination. Although the factory managers had to

bear the huge costs of remediation work by themselves, their export destination might have offset the adverse effect of cost of compliance. Since, such factories export to both the European and North American markets, they likely benefitted in terms of labor productivity due to learning by exports to technologically advanced countries, as evidence suggests from Fryges, & Wagners' (2007) study.

6.2.Policy Recommendations

The findings of this study identify that most of the resources of supplier factories were diverted to remediation works as the supplier factories did not receive financial assistance from the buyers for remediation, and they were assigned with very expensive remediation works; as the key reason for the reduction in labor productivity in many of the sample factories. As improvement in labor productivity requires investments in skill development, and physical capital of the factory (Hohenegger, Miller, & Curley, 2018), if most of the factory income is spent on remediation works, it is very unlikely that the managers would be able to spend money for enhancing labor productivity. To improve the situation and help the economy at large and the garment industry to gain from improved labor productivity, and help the RSC to achieve better outcomes in terms of improving labor productivity in RMG supplier factories, I suggest the following policy measures:

1. To address the unavailability of funds for remediation work, a fund should be created by brands, local manufacturers themselves, governments of buyer countries, multilateral lenders. Sarah Labowitz recommended that Bangladesh needed a global fund to pool resources from global brands, suppliers, Western governments, and the World Bank and International Monetary Fund. Because, working alone by anyone of the entities will not get the job done, but if they tried together, they may succeed (The New York Times, 2014).
2. More investment is needed in training workers for skill development and in upgradation of physical capital in the supplier factories as labor productivity requires investments in skill development and physical capital of the factory (Hohenegger, Miller, & Curley, 2018). All stakeholders of the RMG industry can collaborate in this regard through various means such as; funding assistance, arrangements of joint training sessions, introducing new technology through visiting more productive factories at home and

abroad. RSC, which became operational very recently, includes skill development as one of its agenda (RSC Press Release, 2020). So, RSC can provide support in skill development of workers which could not be done under the operations of the Accord and Alliance.

3. Another source of funding can be fair prices given to supplier factories. Many factories in the study reported not getting fair prices during the implementation of remediation work. A similar finding was reported by Barette, Baumann-Pauly, & Gu, (2018), where they saw downward pressure on garment prices from buyers. Fair pricing can help the suppliers bear the brunt of remediation work. Even it may be the case that, fair pricing may help them continue remediation work without any external financial help.
4. The safety improvements recommended to the supplier factories should be as much cost efficient as possible and suitable for local specificities. Factory managers have complained, safety improvements caused them a large amount of money. The New York Times reported the cost of safety improvements for some Accord affiliated factories reached as high as 1 million USD (Greenhouse, 2014). In addition to this, the Daily Star (2017) reported, the Accord and Alliance arbitrarily decided on safety standards from a Western point of view. These issues made the funds of supplier factories run out or reach very low levels.

6.3. Limitations

The study suffers from the absence of indicators such as; safety-related inspection, health and safety training, skill development training and some other working condition and health hazard indicators in the dataset. Furthermore, the data suffers from selection bias due to snowballing approach used for data collection. A sample size of 105 is not large enough to address to the issues raised by selection bias.

6.4.Further Research

This study could not incorporate indicators related to investment in skill development, and physical capital of factories affiliated with the Accord and Alliance due to lack of sufficient data. So, these indicators can be added in a future study of labor productivity for factories affiliated with these initiatives. Also, this study can be reassessed by using a different labor productivity

function (as outcome variable). In addition to that, a similar study for RSC affiliated supplier factories can be done in the future.

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Appendix

An alternative model to the original multinomial logistic regression model presented in chapter 4 can be a shorter multinomial logistic model where the independent variables are chosen from the statistically significant indicants from the chi- square test (see Table 6).

Table i. Multinomial Logistic Regression Using Statistically Significant Indicators from the Chi-square Test

Outcome Variable: Measure of Productivity	(1) Accord	(2) Accord and Alliance	(3) Accord and NTPA	(4) Alliance	(5) NTPA	(6) Other
More Productive (base outcome)						
About the Same						
Membership	1.510**	-0.216	-15.439	-14.985	-1.561	-3.102
	(0.672)	(0.750)	(2439.699)	(1412.855)	(1.008)	(1915.321)
Location (Chattogram, reference)						
Location(Dhaka)	0.101	0.108	0.085	-0.108	0.152	0.147
	(0.872)	(0.833)	(0.829)	(0.850)	(0.836)	(0.845)
Location(Gazipur)	-0.586	-0.315	-0.275	-0.449	-0.318	-0.090
	(0.943)	(0.906)	(0.897)	(0.909)	(0.906)	(0.915)
Location(Savar)	-3.620**	-3.004**	-2.922*	-3.115**	-3.277**	-2.987*
	(1.626)	(1.517)	(1.502)	(1.541)	(1.574)	(1.528)
Location(Narayanganj)	0.236	0.392	0.747	0.233	0.635	0.541
	(1.092)	(1.045)	(1.072)	(1.025)	(1.054)	(1.037)
Chn_building_safety(Important, reference)						
Chn_building_safety(indifferent)	2.889***	2.736***	2.671***	2.680***	3.027***	2.831***
	(0.951)	(0.904)	(0.906)	(0.908)	(0.975)	(0.916)
CAP_prog(On Track, reference)						
CAP_prog (behind schedule)	0.735	0.222	0.155	0.277	0.468	0.179
	(1.481)	(1.428)	(1.431)	(1.447)	(1.471)	(1.429)
CAP_prog(completed)	0.121	0.172	0.207	0.088	0.140	0.058
	(0.683)	(0.668)	(0.670)	(0.683)	(0.687)	(0.668)
Wage_skilled	-0.00013	-0.00017*	-0.00018*	-0.00018*	-0.00016	-0.00019*
	(0.00010)	(0.00010)	(0.00010)	(0.0001)	(0.0001)	(0.0001)
WorkForce	-0.00009	-0.00012	-0.00006	-0.00004	-0.00008	-0.00004
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Constant	-0.055	1.270	1.297	1.552	1.226	1.416
	(1.538)	(1.378)	(1.373)	(1.429)	(1.375)	(1.388)

Less Productive						
Membership	-0.055	-0.443	-13.185	0.329	-0.159	13.266
	(0.712)	(0.909)	(2643.348)	(1.053)	(0.899)	(1099.049)
Location (Chattogram, reference)						
Location(Dhaka)	-1.017	-0.946	-1.025	-0.880	-0.956	-0.976
	(0.873)	(0.887)	(0.872)	(0.906)	(0.882)	(0.858)
Location(Gazipur)	-0.935	-0.903	-0.859	-0.791	-0.839	-1.189
	(0.972)	(0.959)	(0.949)	(0.967)	(0.956)	(1.016)
Location(Savar)	-3.342*	-3.606**	-3.532**	-3.497**	-3.563**	-3.266**
	(1.708)	(1.735)	(1.711)	(1.725)	(1.753)	(1.639)
Location(Narayanganj)	-1.705	-1.857	-1.546	-1.635	-1.702	-1.703
	(1.382)	(1.389)	(1.406)	(1.391)	(1.405)	(1.362)
Chn_building_safety(Important, reference)						
Chn_building_safety(indifferent)	1.909*	2.032*	1.994*	2.160*	2.106*	1.606
	(1.137)	(1.121)	(1.121)	(1.128)	(1.162)	(1.219)
CAP_prog(On Track, reference)						
CAP_prog(Behind schedule)	2.405**	2.432**	2.368**	2.359**	2.466**	2.444**
	(1.150)	(1.131)	(1.122)	(1.124)	(1.156)	(1.129)
CAP_prog (completed)	-0.489	-0.536	-0.535	-0.566	-0.561	-0.378
	(0.770)	(0.764)	(0.763)	(0.765)	(0.770)	(0.788)
Wage_skilled	-0.00023	-0.00022	-0.00024*	-0.00023*	-0.00023*	-0.00020
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
WorkForce	-0.00002	-0.00002	-0.00005	-0.00003	-0.00003	-0.00002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Constant	2.539	2.540	2.650	2.449	2.584	2.217
	(1.843)	(1.749)	(1.734)	(1.745)	(1.743)	(1.756)
Obs.	105	105	105	105	105	105
Pseudo R^2	0.304	0.275	0.279	0.287	0.288	0.286

Standard errors are in parenthesis

**** p<0.01, ** p<0.05, * p<0.1*

The relative risk ratios for this model are shown in the following table:

Table ii. Multinomial logistic regression with relative risk ratio (RRR)

Outcome Variable: Measure of Productivity	(1) Accord	(2) Accord and Alliance	(3) Accord and NTPA	(4) Alliance	(5) NITPA	(6) Other
More Productive (base outcome)						
About the Same						
Membership	4.528**	0.805	1.97e-07	3.11e-07	0.209	0.044
	(3.042)	(0.604)	(0.0004)	(0.0004)	(0.211)	(86)
Location (Chattogram, reference)						
Location(Dhaka)	1.105	1.113	1.088	0.897	1.164	1.157
	(0.964)	(0.927)	(0.902)	(0.762)	(0.973)	(0.978)
Location(Gazipur)	0.556	0.729	0.759	0.638	0.727	0.914
	(0.524)	(0.661)	(0.681)	(0.579)	(0.659)	(0.836)
Location(Savar)	0.026**	0.049**	0.053*	0.044**	0.037**	0.050*
	(0.043)	(0.075)	(0.080)	(0.068)	(0.059)	(0.077)
Location(Narayanganj)	1.266	1.547	2.109	1.262	1.887	1.717
	(1.383)	(1.547)	(2.261)	(1.294)	(1.989)	(1.780)
chn_building_safety(Important, reference)						
chn_building_safety(indifferent)	17.971***	15.424***	14.459***	14.590***	20.631***	16.958***
	(17.093)	(13.945)	(13.101)	(13.249)	(20.117)	(15.527)
CAP_prog(On Track, reference)						
CAP_prog (behind schedule)	2.085	1.249	1.168	1.318	1.597	1.196
	(3.088)	(1.784)	(1.671)	(1.908)	(2.349)	(1.708)
CAP_prog(completed)	1.128	1.187	1.123	1.091	1.150	1.059
	(0.770)	(0793)	(0.823)	(0.746)	(0.790)	(0.707)
Wage_skilled	0.999	0.999*	0.999*	0.999*	0.999	0.999*
	(0.00010)	(0.00010)	(0.00010)	(0.0001)	(0.0001)	(0.0001)
WorkForce	0.999	0.999	0.999	0.999	0.999	0.999
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Constant	0.946	3.560	3.658	4.721	3.406	4.120
	(1.455)	(4.904)	(5.024)	(1.429)	(4.682)	(5.719)
Less Productive						
Membership	0.946	0.642	1.88e-06	1.389	0.852	577240.6
	(0. 674)	(0.583)	(0.004)	(1.463)	(0.766)	(6.34e+08)
Location (Chattogram, reference)						

Location(Dhaka)	0.361	0.388	0.358	0.414	0.384	0.376
	(0.315)	(0.344)	(0.312)	(0.375)	(0.339)	(0.323)
Location(Gazipur)	0.392	0.405	0.423	0.453	0.432	0.304
	(0.381)	(0.388)	(0.402)	(0.438)	(0.412)	(0.309)
Location(Savar)	0.035*	0.027**	0.292**	0.030**	0.028**	0.038**
	(0.060)	(0.047)	(0.500)	(0.052)	(0.049)	(0.062)
Location(Narayanganj)	0.181	0.156	0.213	0.195	0.182	0.182
	(0.251)	(0.216)	(0.299)	(0.271)	(0.256)	(0.248)
chn_building_safety(Important, reference)						
chn_building_safety(indifferent)	6.743*	7.628*	7.321*	8.674*	8.215*	4.981
	(7.666)	(8.554)	(8.228)	(9.787)	(9.543)	(6.074)
CAP_prog(On Track, reference)						
CAP_prog(Behind schedule)	11.082**	11.385**	10.679**	10.580**	11.780**	11.518**
	(12.740)	(12.875)	(11.982)	(11.895)	(13.618)	(13.0006)
CAP_prog (completed)	0.613	0.585	0.585	0.567	0.570	0.685
	(0.472)	(0.446)	(0.447)	(0.434)	(0.439)	(0.540)
Wage_skilled	0.999	0.999	0.999*	0.999*	0.999*	0.999
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
WorkForce	0.999	0.999	0.999	0.999	0.999	0.999
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Constant	12.665	12.681	14.150	11.575	13.244	9.175
	(23.345)	(22.178)	(24.539)	(20.195)	(23.082)	(16.114)
Obs.	105	105	105	105	105	105
Pseudo R^2	0.304	0.275	0.279	0.287	0.288	0.286

Standard errors are in parenthesis

**** p<0.01, ** p<0.05, * p<0.1*

To avoid complexity, results from the original multinomial logistic regression model (only) are presented in chapter 4.