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Connecting labour standard compliance to factory survival in a globalized value chain

The case of the Cambodian garment sector

by

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The fear of a loss in competitive advantage due to increasing costs and prices is an argument often brought up against compliance to human rights and labour standards. On this basis, the present thesis is researching the association between compliance to labour standards and factory survival in the Cambodian garment sector. The latter is an important driver of industrialization in the country. At the same time Cambodia has a unique legal framework which requires regular auditing of labour standards by the International Labour Organization's *Better Work* programme for all garment exporting factories. The analysis applies a Cox Proportional Hazard Model on the monitoring data in a time frame between 2006 and 2015. Findings across seven categories of labour standards suggest no systematic relationship between an increasing probability of factory closure and compliance, except for compliance to standards of *Compensation* and *Modern Human Resource Management*.

Key words: Labour Standards, Factory Survival, Social Sustainability, Better Work, Cambodia

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Abbreviations

AFWA	Asian Floor Wage Alliance
AJCEP	ASEAN-Japan Comprehensive Economic Partnership
ASEAN	Association of Southeast Asian Nations
BFC	Better Factories Cambodia
BW	Better Work
CC	Change in Compliance
EBA	Everything But Arms
EU	European Union
FDI	Foreign Direct Investment
GLWC	Global Living Wage Coalition
GSP	Generalized System of Preference
IDE-JETRO	Institute of Development Economies, Japan External Trade Organization
IFC	International Finance Corporation
ILO	International Labour Organization
LC	Level of Compliance
MFA	Multi-Fibre Arrangement
MFN	Most-favoured-nation status
MHR	Modern Human Resource Management
NGO	Non-Governmental Organisation
OSH	Occupational Safety and Health
ROO	Rules of Origin
Std. Dev.	Standard Deviation
TATA	Textile and Apparel Trade Agreement
TFP	Total Factor Productivity
UN	United Nations
WCED	World Commission on Environment and Development
WTO	World Trade Organization

1 Introduction

For many of today's developing countries the garment sector provides an opportunity for setting in motion a process of industrialization. It is mainly its high intensity in low-skilled labour, a low capital-intensity and its export orientation that make it an attractive industry for initiating a process of structural transformation towards increased manufacturing production (ed. Fukunishi & Yamagata, 2014, p.1). Providing the labour market with job opportunities, especially for female rural labour, and connecting the economy to the global market has the potential to provide a lever out of poverty for many individuals and a chance for economic development. This process, without doubt, was and is important to many industrializing economies, especially in East and Southeast Asia. However, the employment conditions in low-skilled manufacturing have been under scrutiny since the 1990s. The garment sectors' so-called *"sweatshops"* again gained increasing academic and public attention in recent years. The *"race to the bottom"* argument goes that industrialization and economic development happen at the expense of decent working conditions, as workers' bargaining power is dwarfed in relation to multinational corporations. The criticism mainly addresses global production networks of consumer goods – such as clothes and textiles – in so-called buyer-driven value chains. Buyer-driven value chains thereby describe global sourcing networks set up by corporations in developed countries. The goods produced in those chains are mainly labour-intensive goods from low-cost suppliers in the Global South. While multinational corporations do not directly own production factories, their ability to set prices, product specifications, process standards and delivery schedules allows them to exercise control over producers (Barrientos, Gereffi & Rossi, 2011; Dolan & Humphrey, 2000). The supply chains are often dominated by a system of contracting and subcontracting to low-wage countries. The prevalent practices of disaggregating production into a multitude of steps carried out by different economic agents are accused of accumulating large pressure on producers' costs translating into exploitative working conditions (Asuyama et al., 2013; Goto, 2011).

While the argument for improving working conditions is one of human and labour rights, for companies facing the pressure of the international market, it is also an economic question. As mentioned above, the garment sector is not only a popular choice for early industrialization but moreover a very competitive market. It is the same factors that allow developing countries to quickly build up garment industries, which contribute to its competitive nature. Its labour intensity provides a chance of formal employment for low-skilled labour, but also makes wages a large factor in the cost equation. Increases in wages thereby raise the overall costs significantly. At the same time, production is easily reallocated to other low-wage countries due to limited sunk costs (Mosley & Uno, 2007). The labour and human rights argument of improving working conditions is therefore challenged by the claim that an improvement in labour conditions will lower a company's competitiveness due to rising costs and put factory survival at risk (Arnold & Shih, 2010; Jetha & Linsen, 2015). At the same time, research has found that compliance to labour standards is accompanied by rising productivity, which has

the potential to level out the cost increases (Antolin & Wen, 2020; Asuyama, Fukunishi & Robertson, 2017; Brown, Dehejia & Robertson, 2013; Lollo & O'Rourke, 2018).

The present thesis uses data on the Cambodian garment sector to estimate the effects of compliance to labour standards on factory closure between 2006 and 2015. Following research question will be guiding through the thesis: "*Is compliance to labour standards associated with an increased probability of factory closure in the Cambodian garment sector?*" It thereby tests the above-stated argument accusing compliance to labour standards to increase the likelihood of factory closure through increasing costs. The definition of labour standards and its compliance have their main basis in the core ILO conventions and additionally in the Cambodian labour law when referred to the Cambodian context (ILO, 1999). Labour standards encompass a multitude of factors including working time, remuneration, physical conditions and mental demands (ILO, 2021). Overall, the study is connected to the 8th Sustainable Development Goal, which underlines the importance to ensure employment under decent working conditions worldwide: *Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all* (UN, 2020).

The paper aims to bring several contributions to existing research on factory survival, which is scarce especially in developing countries and in connection to labour standard compliance. The first contribution is the extended time frame between 2006 to 2015. To the best of the author's knowledge, no research has been conducted for that time frame in the context of Cambodia. Its beginning is marked by increasing liberalization of the international garment market due to the termination of the quota regulations of the Multi-fibre Arrangement (MFA), previously regulating the access of trade exporters to the markets of the European Union (EU) and the United States (US). Small exporters like Cambodia feared to lose out against large producers like China and India. However, Cambodian exports have grown continuously since (Harvard University, 2021). The end is marked by the latest available data, ending four years prior to the beginning of the Covid-19 pandemic which came with economic and social consequences many of which are yet unknown. The time period incorporates two other events of importance: One is the 2008/09 financial crisis, which will be controlled for in the model. It was associated with decreasing exports and larger financial constraints (Dasgupta, Poutiainen & Williams, 2011, p.34). The second contribution centres around another factor that is assumed to also have impacted the productivity and thereby profitability of Cambodian garment factories, namely the renewal of the Rules of Origin (ROO) in the Everything But Arms (EBA) regulations in 2011. It is based on a study by Tanaka (2020) which found productivity enhancement following the positive trade shocks of the 2011 change in the EBA regulations' Rules of Origin. Furthermore, previous research found changes in trade agreements to be relevant for the probability of factory survival (Baggs, 2005; Bernard et al., 2003). The changing policy is assumed to have exerted influence on factories' probability to survive through further productivity improvements and cost reduction. Previous research on improved working conditions has not controlled for the changes in the trading scheme. In present thesis it will be controlled for in the econometric model with a binary variable. This is of particular interest as the EU has partly withdrawn the EBA preferences in 2020, reacting to the violation of the rights to political participation and freedom of expression (European Commission, 2020). A third way through which present paper adds new insights to existing

literature is the inclusion of the category of labour standards, namely *Equality and Parental Rights.* It follows the emphasis of the United Nations (UN) Global Compact on equality and female empowerment and is especially relevant in a sector with a predominantly female labour force (UN Global Compact, 2021).

The surge in calls for change of exploitative working conditions and detrimental ecological impact is reflected in the growing sector of sustainable apparel brands produced under compliance to ecological and labour standards. The relevance of the topic is further expressed in ongoing debates in civil society and new policies in the EU and in several member countries. The policy ideas mainly concern new regulations on labour rights compliance along global supply chains (European Parliament, 2020; Francaise, 2017; German Federal Government, 2021; Staatsblad, 2019). The latter introduced a new discussion on how to deal with complicity in human rights abuses and asks multinational corporations to take more responsibility in the implementation and monitoring of social and ecological sustainability standards. These changes are especially relevant in globalized buyer-driven supply chains, such as the garment and textile industry. In this context, present thesis aims to feed information on firm-level consequences in developing countries into the debate, to better be able to create effective policies and regulations for working condition improvement without putting factory survival at risk. The thesis clearly focusses on factory compliance with labour standards. However, it is important to mention that there is a discussion concerned with similar questions on compliance to environmental standards and the existence of *Pollution Havens* (Levinson & Taylor, 2008; Wagner & Timmins, 2009).

The motivation for the selection of Cambodia as a case study is twofold. First, the garment sector takes on the role of a leader of industrialization in the country, with textiles being the main export good. It thereby provides a representative example of an export-oriented garment sector leading the industrialization process in a developing country. Second, its unique legal and institutional framework solves some issues related to selection bias. In Cambodia all garment factories have to participate in the monitoring programme in order to obtain an export license. Therefore, selection of already compliant firms into the programme, which would cause endogeneity, is not feared in the case of Cambodia. *Better Factories Cambodia* (BFC) is part of the *Better Work* (BW) programme. It is run by the ILO in several other countries, namely Bangladesh, Egypt, Ethiopia, Haiti, Indonesia, Jordan, Nicaragua and Vietnam. However, participation in those countries is not legally required, except for Jordan and Haiti. Selection bias would certainly be of relevance for data on other countries but is not an issue in Cambodia. This unique feature of the data improves the results' external validity.

The outline of the thesis is as follows. First, the *Theory* section will summarize the debate around the *"race to the bottom"* and discuss research findings on the connection between the compliance to labour standards and economic indicators of garment factories. On this basis, the channels through which compliance to labour standards potentially impacts on factory survival will be described. A chapter on the development of the Cambodian garment sector follows to set the stage for the case study. Further, the *Data* and *Method* are described. The *Result* section summarises the findings of the two main models and tests their validity in several robustness models. The results are discussed in the context of relevant academic literature in the section *Discussion.* The *Conclusion* sums up the major findings and gives implications for policy and future research.

2   Theory and Previous Research

After introducing the topic and research aim, the present section intends to put it into the context of the academic debate and summarise relevant research findings and concepts. The theoretical and empirical underpinnings start with a global perspective summarising the "*race to the bottom*" debate. It is followed by an overview of the most important literature around the economic consequences of compliance to labour standards. Due to the lack of a comprehensive theoretical framework linking labour conditions and factory survival, the section on previous literature provides a description of the channels through which compliance to labour standards is connected to the risk of factory closure. Furthermore, other important determinants of factory survival are summarized. Altogether, this is setting the stage for the empirical strategy laid out in the method section.

2.1   The *"Race to the Bottom"* Debate

The debate on a *"race to the bottom"* evolves around the question of whether trade in a globalized world is beneficial for developing countries in general, and for their workers more specifically. While a definite answer can hardly be found the following section contrasts the two main stands in the debate. Thereby, the focus lies on the effects of increasing global market integration on working conditions and labour rights including wage payments, as well as its effects on economic parameters such as profits, trade volumes and profitability.

While globalization economically benefitted a *"rising global middle class"*, wage prospects still largely differ depending on whether a person was born in the Global South or in the Global North. This partly roots in the manifestation of globalization today: while production, goods, technology and ideas almost entirely freely cross borders, this is far from true for labour (Milanovic, 2016, pp.131–2; 143). The argument observing a "*race to the bottom*" underlines the weakened bargaining power of workers and producers in global value chains. Thereby it mainly focusses on buyer-driven commodity chains, which are largely dominated by labour-intensive industries set up in developing countries associated with low-cost production. The *"race to the bottom"* side counters that the heavy competition in global supply chains incentivises multinational corporations to put downward pressure on prices at the cost of lacking compliance to basic human rights and labour standards (Goto, 2011; Mosley & Uno, 2007). The supporters of a *"race to the top"* hypothesis underline the economic potential of increased intensities in trade and foreign direct investment (FDI) which are associated with technology transfer, improved employment opportunities and economic growth (Friedman, 2005). In many cases, low-skill intensive industries stimulated industrialization and economic growth with prominent examples of success, such as the Republic of Korea or Taiwan (Barrientos, Gereffi & Rossi, 2011; Hamilton & Gereffi, 2009).

Harsh labour conditions are sometimes argued to be an inevitable step on the ladder of industrialization. With the ongoing process of structural transformation, a decrease of surplus labour and further technological upgrading labour conditions are hypothesized to improve (Vogel, 1997).

While exploitative labour conditions with forced labour, inadequate compensation and insufficient safety regulations are still endemic among producers of consumer goods in developing countries, there is growing awareness on issues broadly summarized by the term *social sustainability*. It was introduced in the "*Brundtland Report*" as one of three elements of sustainability besides environmental and economic sustainability (UN, 1987). While definitions vary across academic literature (Vallance, Perkins & Dixon, 2011), in this context it conceptualises the provision of basic needs and compliance to the International Bill of Human Rights (UN, 1948) and the core ILO conventions (ILO, 1999). The research on compliance to social sustainability mainly consists of qualitative research on the rationale of producers behind the improvement of labour conditions in developed countries, but findings on developing countries are increasingly available (Mani & Gunasekaran, 2018). The main drivers for compliance to social sustainability standards are found to be pressure from the changing preferences of external stakeholders underlining the power of buyers in global supply chains (Berik & Rodgers, 2010; Dickson & Chang, 2015; Huq, Stevenson & Zorzini, 2014; Mani & Gunasekaran, 2018). The main obstacles to improvement are found to be a lack of financial and managerial resources, as well as an unfavourable institutional framework (Akbar & Ahsan, 2021; Asuyama & Neou, 2014, pp.14–16; Huq, Stevenson & Zorzini, 2014; Palley, 2004). Akbar and Ahsan's (2020) findings furthermore suggest that worker organizations' efforts to improve working conditions are often hindered by the opposition of top-level management. While studies have found that innovations in worker management can be productivity and profitability enhancing, incomplete information and lacking awareness of these potential consequences introduce hurdles to improvements in labour conditions (Dunlop & Weil, 1996; Hanna, Mullainathan & Schwartzstein, 2012; Ichniowski, Shaw & Prenushi, 1997).

2.2   Previous Literature on the Economic Effects of Compliance to Labour Standards

While the previous section aimed at setting the stage by broadly introducing issues of human and labour rights abuses in competitive global value chains, this section zooms into the producers perspective and aims at revealing the channels through which improved labour conditions impact on various factory-level economic indicators, such as trade volumes, costs, profits, productivity and employment. While some research estimates the effects of programmes incentivising working condition improvement (such as *Better Work* (BW); Anatolin & Wen, 2020; Brown et al. 2017), others will more directly consider the effects of improved working conditions on economic outcomes (Asuyama et al. 2017; Distelhorst & Locke, 2018; Levine et al., 2012; Jetha & Linsen, 2015, Robertson et al., 2021). Still, studies that obtain their data from programmes incentivising improvements in compliance to labour standards do not allow to clearly disentangle the effect of the programme and compliance to

working conditions. As the case of BW programme monitoring occurs through the programme that is accompanied by recommendations on how to improve working conditions and easily accessible offers for training.

Among the most recent and prominent studies feeding into the labour standard aspects of the "*race to the bottom*" debate was Distelhorst and Locke (2018). Their research concerns how firm-level trade in labour-intensive industries (including the garment sector) is impacted by information about labour standards. The research allows for a transnational picture including 2,000 manufacturing firms across 36 countries and estimations are obtained through a difference-in-difference method that exploits variation in changes in working conditions. Their findings point against the *"race to the bottom"* arguments, suggesting growing trade volumes for factories that improve their compliance. Furthermore, the trend seems to be largely driven by the apparel sector. Their findings suggest that the relationship is strongest and statistically significant in garment manufacturing (Distelhorst & Locke, 2018). What their data does not allow to disentangle is whether improvements in labour conditions were accompanied by increasing costs. Furthermore, their research relies on data of an intermediate agent. The agent is providing multinational corporations, 92 % of which are located in Europe or North America, with information on prices and labour standards of producers mainly located in developing countries. While this provides continuity in the monitoring data, there details about monitoring items and process are limited. This is arguably the main limitation of the otherwise insightful study.

While above study mainly concerned compliances' effect on trade volumes, several studies used *Better Work* data to connect it to other economic indicators, such as costs, productivity, prices and employment. Among those are Brown, Dehejia and Robertson (2017). They assess the impacts of the *Better Work* programme on costs, profits, productivity and business terms for the countries Vietnam, Indonesia and Jordan between 2010 and 2017. Their study is aimed at finding out whether programmes to improve working conditions for factory workers, such as *Better Work*, are leading to improvements in factory performance. Brown, Dehejia and Robertson (2017) estimate the treatment effect of BW on costs and profits with a difference-in-difference method by exploiting cyclical variation in participation. They found that for Vietnam participation in BW did lead to an increase in costs, however, productivity was rising and factory profitability did not suffer. The latter indicates other potential benefits from compliance, for instance, larger or more stable orders and/or fewer penalties for production errors, as similarly indicated by Distelhorst and Locke (2018). The results for Indonesia reveal a similar trend under stable productivity. The results for Jordan differ from both former countries, with an effect on costs turning from negative to positive throughout the observed years. Furthermore, the compliance to labour standards in Jordan has a negative effect on profits, even though it decreases towards the end of the observed period. A major difference between Vietnam, Indonesia and Jordan is that in the latter, as in Cambodia, participation in the *Better Work* programme was mandatory. It was imposed due to grave human and labour rights concerns, especially the exploitation of migrant workers. The authors connect the downturn in profits with the end of forced migrant labour that potentially lead to large cost increases while not being balanced out by productivity improvements. Still, profits were rising in the Jordanian case and potential adverse effects from negative reputation of the country's industry was dammed (Brown, Dehejia & Robertson, 2017). It must be noted though, that the results are only significant at a 10-15 % level, partly due to small sample size.

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The results underline the importance of local circumstances and their interaction with programme features.

Similar to above strategy of Brown et al. (2017), Antolin and Wen's (2020) paper focusses on the consequences of the social auditing programme *Better Factories Cambodia* (BFC)[1] for workers, estimating its impact on wages, work hours, work concerns, life satisfaction and productivity. It is among the most recent research outcomes and based on a fieldwork conducted in Cambodian garment factories between 2015 and 2018. Exploiting strategic timing of data collection, they estimate the treatment effect of the program in a fixed-effect model. They find an increase in hourly pay for factories with improving working conditions. While it is of low statistical significance, workers consistently reported needing to work less overtime in order for their income to cover living costs. They furthermore find a rise in productivity. Connecting it to profits, they state that "*the increase in hourly pay was at least as large as the increase in productivity. Therefore, labour's cost share rose with social compliance, leaving an ambiguous impact on profits.*" (Antolin & Wen, 2020, p.2)

In contrast to the two studies above estimating the impact of participation in a monitoring programme, Asuyama et al. (2017) research on the effect of compliance to labour standards more directly on profits, productivity and employment of Cambodian garment firms. They consider the years 2001-2002 and 2006-2008 and combine data from BFC with IDE-JETRO (Institute of Development Economies – Japan External Trade Organization) survey data. They estimate a positive association overall compliance to labour standards and higher labour productivity and employment, despite the end of the Textile and Apparel Trade Agreement (TATA) and thereby the termination of the quota system conditional to labour standards. The results indicate a positive association of compliance with factory performance, at foremost profits.

Asuyama et al. (2017) furthermore underline an important finding of numerous studies on the economic effects of compliance to labour standards, namely that effects differ across compliance categories. They additionally provide more disaggregated findings for two categories of labour standards: *Modern Human Resource Management* (MHR) is positively associated with profits and productivity, *Occupational Safety and Health* (OSH) and MHR are positively associated with employment (Asuyama, Fukunishi & Robertson, 2017). In

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[1] *Better Factories Cambodia* (BFC) is part of the overarching *Better Work* (BW) programme.

contrast to Antolin and Wen (2020), who measure productivity by the efficiency rate[2] Asuyama et al. (2017) use total factor productivity (TFP) as a proxy of productivity. However, both find positive effects for the different periods considered. Similarly, Asuyama et al. (2013) find increasing wages of low-skilled workers along with productivity improvements and increasing exports in the Cambodian garment sector between 2002/03 and 2008/09.

Relating to Asuyama et al.'s (2017) diverging findings across different categories of labour standards, Levine et al. (2012) solely focus on *Occupational Safety and Health* (OSH) standards. They estimate how randomly assigned OSH inspections in Californian firms affect injury rates and costs connected to them. Even though their work includes solely one among several categories of labour standards and is researching in the context of a developed country, the paper is relevant as it is among the very few that claim a causal relationship. Their findings suggest that injury rates and costs are reduced without negative effects on employment, sales, factory survival and the factory's market value. As for BFC, Miller et al. (2007) find the monitoring programme to entail positive consequences for health and safety practices, as well as forced labour and child labour. Other aspects of labour standards covered by the BFC monitoring have shown little improvement in the early years of the programme: freedom of association and collective bargaining, discrimination, living wages and working hours (Miller et al., 2007).

Jetha and Linsen (2015) and Robertson et al. (2021) represent the most relevant research for present analysis as they connected compliance to labour standards directly to factory survival, rather than other economic indicators such as costs, productivity, profits or employment. Jetha and Linsen (2015) compare factories' probability of closure among Cambodian factories with high and low levels *Social Protection Compliance* with a discrete-time survival model. Their social protection compliance indicatory includes issues of sick leave, employment injury compensation, unemployment benefits and maternity leave. In addition, they include five other categories, based on Brown, Dehejia and Robertson (2013), similar to the categorization of labour standards used in this paper. Their findings suggest that higher social protection compliance is associated with a reduced risk of factory closure. The results point in the same direction for the categories *Communication & Workplace Systems*, *Occupational Safety & Health* (OSH), *Compensation* and *Core Labour Standards*. Compliance to standards of *Modern Human Resource Management* and *Unions*, on the other hand, are associated with an

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[2] The efficiency rate is calculated as a ratio of the actually realized and planned production (Antolin & Wen, 2020)
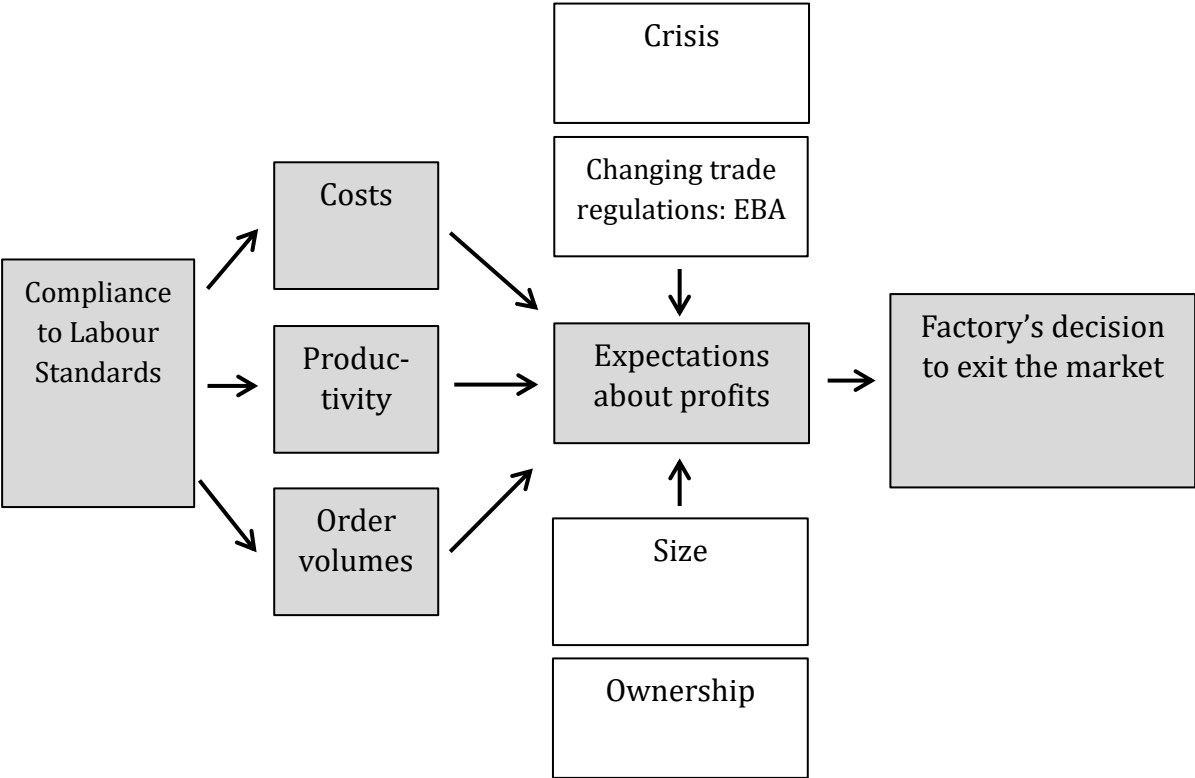
increased risk of factory closure. However, only estimates for *Social Protection Compliance* and *OSH* are statistically significant at a 5-10 % level.

Similarly, Robertson et al. (2021) estimate the effect of improved working conditions on factory survival for Cambodian garment producers using panel data for the years of 2001-2011. They start with showing the correlation between improved working conditions and factory survival with a Kaplan-Meier survival function and expand the analysis by a Cox Proportional Hazard estimation with time-varying covariates to control for other determinants of factory survival. They disaggregate labour standards into six categories, and find that only the level of compliance to standards concerning *Compensation* is associated with a higher risk of factory closure. Improvement in compliance to labour standards is found not to be systematically related to an increased risk of closure. Their findings therefore suggest a negative correlation between labour standard improvements and factory closure, especially when communication, problem solving and transparent compensation practices are encouraged.

2.3   Linking Labour Standard Compliance to Factory Survival

A commonly observed feature is that the decision to exit the market largely depends on the factory's prospect for profits (Baggs, 2005; Harris & Li, 2010). Compliance to labour standards and its improvements have been found to increase uncertainties about expected profits (Akbar & Ahsan, 2021; Asuyama & Neou, 2014, pp.14–16; Huq, Stevenson & Zorzini, 2014). It is therefore relevant to connect social sustainability compliance to factory survival. Above literature has found compliance to impact on profitability in the following ways: While compliance and/or participation in BW/BFC are connected to higher costs (Brown, Dehejia & Robertson, 2017), the consequences are in many cases levelled off by higher productivity and more stable trade volumes (Antolin & Wen, 2020; Asuyama et al., 2013; Brown, Dehejia & Robertson, 2017; Distelhorst & Locke, 2018). Profits are therefore determined by whether higher costs are outweighed by higher productivity and more stable and larger orders (Antolin & Wen, 2020). However, the consequences have also been found to depend on the local context of the market and the institutional framework (Brown, Dehejia & Robertson, 2017). In the case of Cambodia, Asuyama et al.'s (2017) research indicate positive correlations between compliance to labour standards and profits for 2001-02 and 2006-08. They also found the impacts to differ across various categories of labour standards. Levine et al. (2012) have found *Occupational Safety and Health* inspections to reduce costs connected to injuries. Robertson, Brown and Dehejia (2021) find that across six categories only the level of compliance to *Compensation* standards is related to an increased probability of factory closure, but not the improvement in compliance. Jetha and Linsen's (2015) findings suggest that complying with *Union* standards is associated with an increased risk of closure.

Figure 1*: Factors theorized to affect factory survival*

Source: Compiled by the author based on previous literature

Based on previous literature, the main channels through which improved labour conditions impact factory survival are summarized in Figure 1 above. Compliance to labour standards is found to mainly affect productivity, costs and order volumes. Those factors, in turn, create expectations about profits which determine a factory's decision to exit the market. The relationship between labour condition improvement and the risk of factory closure remains ambiguous. Other determinants of factory closure expressed through control variables in the model (Figure 1, white boxes) are elaborated below.

2.4   Other Determinants of Factory Survival

As for exporting factories in developed countries, several studies found the factory age, size, factor productivity, changing trade barriers, liquidity and ownership to be the main determinants of factory survival (Baggs, 2005; Bernard et al., 2003; Bernard & Jensen, 2007; Disney, Haskel & Heden, 2003; Doms, Dunne & Roberts, 1995; Harris & Li, 2010; Jovanovic, 1982; Melitz, 2003; Olley & Pakes, 1996). The effect of factory size on firm survival overall is more ambiguous in the context of developing countries. Some studies indicate that small size is no disadvantage (Biggs, Shah & Srivastava, 1995; Little, Mazumdar & Page, 1987; McPherson, 1995), while others found larger size to be associated with

increased survival (Frazer, 2005; Fu & Wu, 2013; Mengistae, 2006; Nor et al., 2007; Söderbom, Teal & Harding, 2006). In the context of Indonesia Behrman and Deolalikar (2010) found size and age to matter. Furthermore, foreign ownership was found to be a determinant of the probability of closure (Fu & Wu, 2013). The model will control for size by the number of employees and furthermore for ownership introducing a categorical variable on the nationalities of owners.

The model will include a dummy variable for the changes in the trade scheme Everything But Arms (EBA) in 2011. Despite the overall relevance of changing trade agreements, found by Baggs (2005) and Bernard et al. (2003), Tanaka's (2020) research has furthermore established a link between the 2011 changes and increasing productivity in Cambodian garment factories. An additional control variable is included as a dummy on the financial crisis. The latter was found to increase impact credit constraints of Cambodian garment exporters and is associated with decreasing exports as shown in Figure 2 in the following chapter (Dasgupta, Poutiainen & Williams, 2011, p.34).

Based on previous literature on the association between compliance to labour standards and factory survival, as well as other determinants of factory survival, the following hypotheses are derived and will be tested in subsequent analysis:

H1: Improved compliance to the Better Factories Cambodia *labour standards is not associated with an increase in the probability of factory closure.*

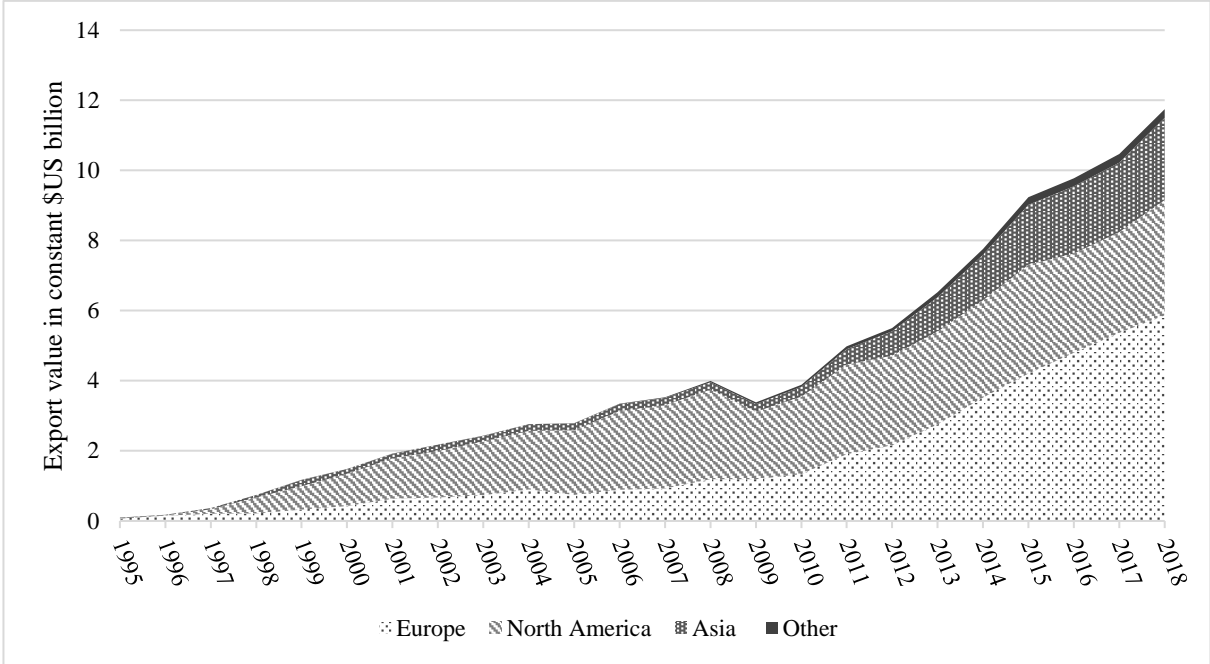*H2: The effect of compliance on factory survival differs across various categories of labour standards.*

H3: The change in the Everything But Arms Rules of Origin in 2011 is associated with decreasing probability of factory closure.

3   The Development of the Cambodian Garment Sector

Cambodia is regarded as a classic example of export-industrialization driven by the garment sector. Furthermore, the conditional monitoring of labour conditions in order to obtain an export license provides a distinct legal and institutional framework as well as an advantage for the analysis. In contrast to factories in other countries participating in similar programmes, self-selection of already well-performing factories is not feared. This improves the study's external validity by eliminating selection bias.

For Cambodia the garment sector yielded an opportunity for industrialization and economic growth following the rule of the Khmer Rouge and the Vietnamese occupation. The Cambodian garment industry emerged in the 1990s and was set up largely through investments from Taiwan, China, Hong Kong, South Korea, Malaysia and Singapore (Bargawi, 2005). Foreign investment from the above countries continues to be of great importance. Today the country is ruled by a one-party state and corruption is persistent. The government's policies heavily incentivise Foreign Direct Investment (FDI) (Asuyama & Neou, 2014). In the data used in this study, hardly four percent of all garment factories are owned by Cambodian nationals (Better Work, 2021). Furthermore, the large majority of the Cambodian garment industry's production is destined for export, mainly to the US and the EU. Export has grown continuously as illustrated in Figure 2 below (Harvard University, 2021). In 2017 Cambodia was the nineth largest producer of garment, textile and footwear worldwide, the main destinations being the EU and the US. In the national economy the garment, textile and footwear sector made up 74 % of the national exports in 2018 and is largely dominated by garments. The latter make 82 % of the export value, compared to 11 % footwear and 7 % textiles. In 2018 the garment, textile and footwear sector employed over 660,000 workers in total (Schill, 2019). This represents 41.7 % of manufacturing employment (*authors calculation based on* Schill (2019) *and* ILOSTAT (2018)). The incomes of the workers, a large number of them being females of rural origin, support not only themselves but also their families through remittance payments (FIAS, 2005; USAID, 2005).

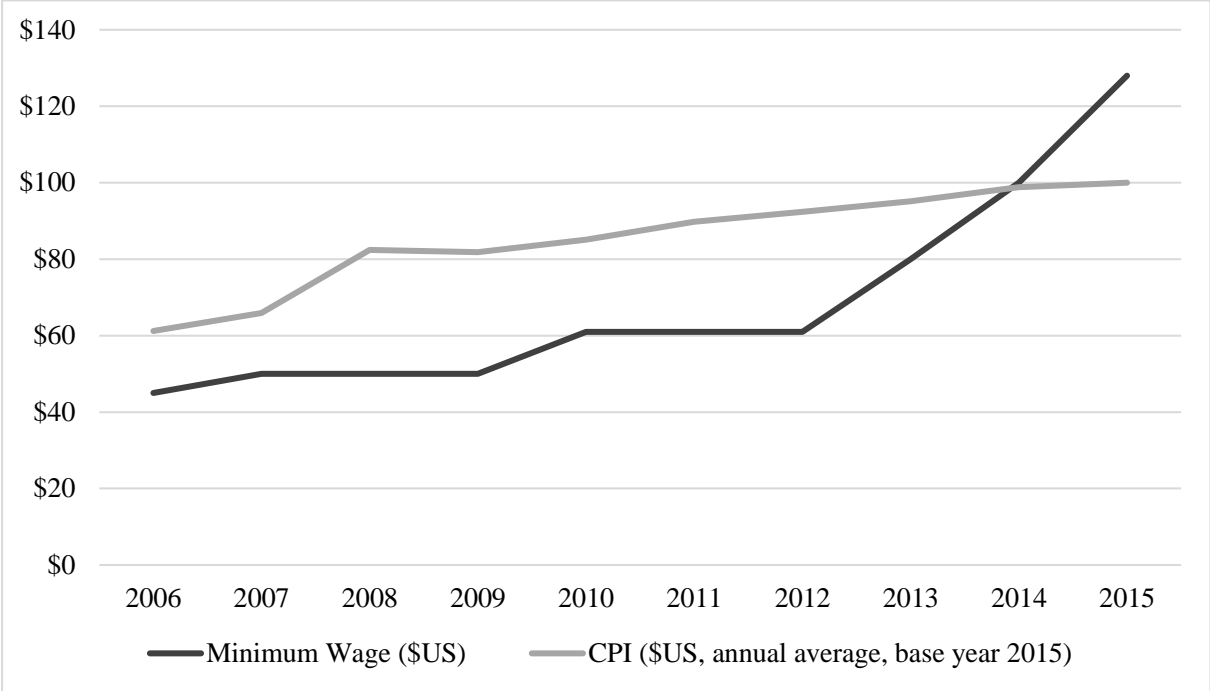**Figure 2:** *Cambodian exports by destination, 1995-2018*

Source: Compiled by the author based on Harvard University (2021)

The early development of the Cambodian garment sector benefitted from the Multi-fibre Arrangement (MFA), a quota system that regulated garment imports from most large Asian producers to the US and the EU. Cambodia was excluded from the quota-system and in addition enjoyed the most-favoured-nation (MFN) status from the US after 1996 and the Generalized System of Preference (GSP) status from the EU after 1997. These all together facilitating Cambodian firms' access to European and US markets (Bargawi, 2005; Neak & Robertson, 2009). Quota restrictions on Cambodia were introduced through the US Textile and Apparel Trade Agreement (TATA) in 1999. The quotas were connected to improvements in working conditions to incentivise better compliance to Cambodian labour law (Bargawi, 2005; Kolben, 2004). Two years later, an exhaustive monitoring system was established by the ILO and IFC together with the obligation of monitoring to obtain an export license (Asuyama & Neou, 2012). The effect of the quota system tied to compliance to labour standards could act as a constraint to businesses as it could increase their costs. At the same time it might correct for the market failure of monopsonic exploitation of low-skilled female labour in production networks (Brown, Dehejia & Robertson, 2013, p.2). While one motive behind the quota restrictions was to moderate Cambodian garment imports to the US, trade grew despite due to the generosity of the quota system (Arnold & Shih, 2010; Asuyama & Neou, 2014). The quota restrictions under the TATA terminated at the end of 2004, but the monitoring project remained active as *Better Factories Cambodia* (BFC). It is presently led by the ILO and the International Finance Corporation (IFC) and belongs to the umbrella programme *Better Work* (BFC, 2021a). Improvements in the labour conditions are at the core of the programme, to assure decent and secure employment to the garment sector's predominantly female employees. They are to be achieved by creating platforms for the dialogue between workers, employers, the Cambodian government and multinational companies. Furthermore, the programme includes regular monitoring, training and advisory,

all at a factory level, as well as research and advocacy (BFC, 2018). For reasons of transparency and accessibility of information to consumers, the monitoring reports are published from the second visit onward. The open-source publishing of monitoring data was paused between 2006 and 2014. Its reintroduction is connected to the findings that disclosure incentivises compliance with labour regulations (Robertson, 2019). BFC is much praised and implemented similarly in other countries through the overarching *Better Work* (BW) programme. Participation in the programme was found to be connected to reductions in working hours, higher wages and improvements in workers satisfaction (BFC, 2020). However, several studies criticise its marginal impact on the empowerment of workers, unions and broader political issues such as corruption (Arnold & Shih, 2010; BFC, 2021a; Hall, 2010; Marshall, 2019; Shea, Nakayama & Heymann, 2010).

The end of the MFA in 2005 brought the fear of increased competition especially for small garment-producing countries such as Cambodia. During a transition period Chinese exports to the EU until 2005 and to the US until 2007/08 were restricted. Despite liberalization, Cambodian garment exports continuously grew, as shown in Figure 2 above (Asuyama & Neou, 2014). Furthermore, the negative effects of the global financial crisis in 2008/09 were weakened for Cambodia as wage increases and labour shortages in China and Vietnam relocated some of their production to Cambodia (Asuyama & Neou, 2014). But the changes and shock to the market did not pass without consequences, unit prices declined after the termination of the MFA while at the same time labour costs increased by 56.1 % between 2000 and 2010. The latter is connected to increasing wages and other statutory allowances recommended by BFC. However, the minimum wages increased along with the consumer prices index (CPI, *see* Figure 3), resulting in little changes in real wages (FAO, 2021; ILO, 2016; Schill, 2019). Since 2013 the minimum wage increased at a larger share than the consumer price index though. Operating costs were pushed up further by increasing material prices (Asuyama & Neou, 2014; Kang & Dannet, 2009). Altogether, this resulted in a high turnover of firms along with productivity increases. According to Asuyama et al. (2013), only firms with high productivity survived, the new entrants also were more productive.

Figure 3: *Development of minimum wage and consumer price index*

Sources: Compiled by the author based on FAO (2021), ILO (2016) and Schill (2019)

Furthermore, Cambodia was eligible to the EU Everything But Arms (EBA) treatment since 2001, providing duty-free access to Cambodian garments that fulfil certain conditions, such as the Rules of Origin (ROO). EBA is an agreement under the umbrella of the EU's Generalised Scheme of Preferences (GSP). Until 2011 many factories were not eligible, as the ROO required them to use fabric produced within Cambodia and textile production within the country was very low. The majority of producers used cheaper and more widely available imported fabrics. In 2011 the EU changed the ROO, allowing duty- and quota-free trade also for those who used imported fabric in production. This resulted in increased exports to EU countries (Arnold & Shih, 2010; Asuyama & Neou, 2014). The changing regulations and subsequent increases in trade are found to be associated with productivity improvements (Tanaka, 2020). The latter are assumed to be associated with factories risk of closure. Another important change in trade agreements was the ASEAN-Japan Comprehensive Economic Partnership (AJCEP) becoming effective in December 2009. It leads to an expansion of exports to the Japanese market (Asuyama & Neou, 2014, pp.43–44). However, in absolute numbers exports to Europe are still substantially larger compared to the ones to Japan and other Asian countries (Figure 2). Therefore, the model in section 4 will control for the changes in the EBA ROO, but not for the changes in AJCEP.

The most significant events in the development of the Cambodian garment sector are summarized in Table 1. Events prior to 2005 does not lie in the period concerned in this study. The last three items are situated within the analysed period. The termination of the Multi-Fibre Arrangement marks the beginning of the study period, while the changing EBA regulations are controlled for by a dummy variable. An important aspect to the acquisition of the numerous trade agreements and preferences schemes, as well as the importance of foreign investment, are the government's FDI-friendly policies and their active lobbying, together

with the garment industry. According to Asuyama and Neou (2014), persistent corruption, high electricity cost and high factory turnover which is connected to the liberal investment policies remain the main challenges in the Cambodian garment sector.

Table 1: *Most significant events in the development of the Cambodian garment sector*

1990s	Establishment garment sector
1996	US Most-Favoured-Nation Status
1997	EU Generalized System of Preference
1999	Quota system under the US Textile and Apparel Trade Agreement (TATA)
2001	Cambodia gained Everything But Arms treatment status
2001	Establishment Better Factories Cambodia
2004	Cambodia became World Trade Organization member and gained MFN/GSP status from all WTO members Termination TATA
2005	Termination Multi-Fibre Arrangement
2005-2007/08	Quota restrictions on Chinese garment imports to EU and US
2011	EBA change in Rules of Origin

Source: Compiled by the author based on Asuyama and Neou (2014: 41)

4   Data

The analysis is based on detailed monitoring data from the ILO *Better Work* Programme. Following application to the ILO office in Geneva the data was provided through the independent researcher R. Robertson on behalf of *Better Work* (Better Work, 2021). In order to obtain the data the author had to proof the relevance of the research to the programme. The dataset contains information on all Cambodian garment exporting manufacturing firms, as since the labour standards clauses in the 1999 US-Cambodia Textile and Apparel Trade Agreement (TATA) all factories must allow regular assessment of working conditions through the BFC programme (Asuyama et al., 2010).

The data covers the period from 2006 until 2015 and provides a unique factory-level panel dataset on working conditions. Factories are monitored every ten months on average through unannounced visits of two Khmer-speaking monitors trained by the BFC programme. They interview management, supervisors and workers separately and request access to business documents, such as contracts, leave records and payroll (Antolin & Wen, 2020; Miller et al., 2007). Based on the interviews and documents 405 questions and their answers are filled out for each assessment, which are grouped in 51 issues and further combined into categories. A compliance variable is coded for each question by factory and visit, indicating whether the answer testifies compliance. Zero thereby indicated non-compliance, whereas one indicates compliance[3]. The monitoring questions and compliance indicators are based on the Cambodian labour law and the core ILO conventions (ILO, 1999). In addition, the dataset contains information on factory names, addresses, dates of visits and a corresponding number of assessments, the country of ownership, employment size overall as well as by gender breakdown of the workforce, suggestions for improvements, and information on name changes and closing dates.

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[3] The compalince indicator from the original Better Work dataset was inverted. In the original dataset zero indicates compliance, while one indicates non-compliance.

Table 2: Assessment number by year

Assessment Number	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
1	239	32	36	29	17	53	40	91	85	22	644
2	75	185	36	30	15	22	29	42	73	38	545
3	0	214	45	27	28	15	12	34	32	25	432
4	0	16	197	29	21	24	6	23	28	9	353
5	0	0	85	103	24	25	22	9	16	10	294
6	0	0	3	111	54	27	16	22	10	2	245
7	0	0	0	20	88	51	14	21	22	6	222
8	0	0	0	1	31	77	30	19	15	7	180
9	0	0	0	0	4	35	48	34	22	5	148
10	0	0	0	0	0	8	26	45	29	6	114
11	0	0	0	0	0	0	5	28	39	10	82
12	0	0	0	0	0	0	0	7	24	9	40
13	0	0	0	0	0	0	0	0	5	6	11

Source: Author's compilation based on Better Work (2021)

The dataset includes information on 668 factories with a number of visits ranging from 1 to 13. Table 2 shows the number of assessments by year. It ought to be mentioned that some factories were inspected twice a year. The average number of visits per factory before closure or end of the sample period is 4.3, but the high standard deviation of 2.9 indicates large variation in the number of assessments across factories. Ownership is displayed in Figure 4. Less than 4 % of factories are owned by Cambodians, while owners from Taiwan, China, Hong Kong and Korea dominate the sector, together representing 64 % of owners.

Figure 4: *Factory shares by ownership*

Source: Author's compilation based on Better Work (2021)

4.1 Data Alternations

As a first step, the questions on compliance to labour standards were grouped into issues. Those were further grouped into seven categories, six of them corresponding to Brown, Dehejia and Robertson (2013) and the ILO categorization. Results on the overall effect of compliance to labour standards will not be drawn as previous literature indicates that the differences in size and direction of the effect across categories are substantial. However, an additional category named *Equality and Parental Rights* is added, including issues that had not been co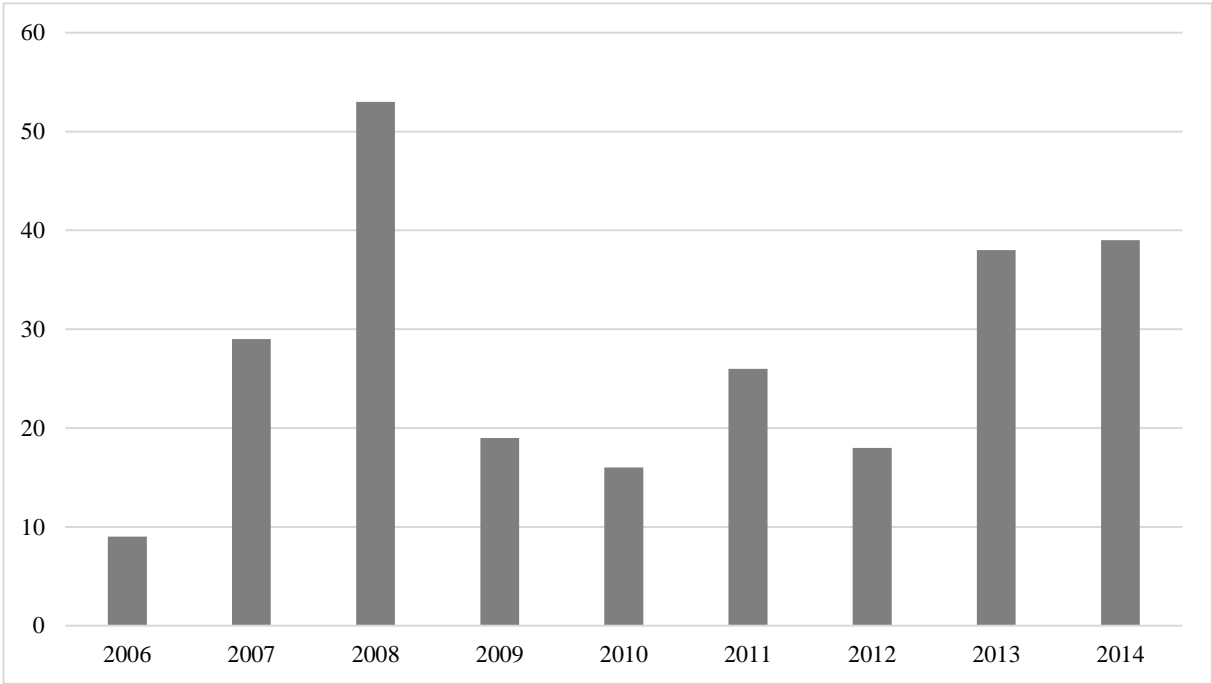nsidered before (Nursing Room/Day Care Centre and Breast-Feeding), as well as some issues previously grouped in other categories (Discrimination, Maternity Benefits and Sexual Harassment). The extension of the categories compared to previous literature grounds in the following reasoning: First, the UN Global Conduct, an important advocate of social sustainability in global supply chains, in its principles underlines the crucial importance of equality and women's empowerment (UN Global Compact, 2021). Second, this is believed to be especially relevant to a sector in which 90 % of employees are female, as in the data of the Cambodian garment sector used in this study.

As mentioned before, the dataset contains a compliance indicator coded as a dummy variable in which zero indicates non-compliance and one compliance. The compliance indicator is available for each question and each assessment. Based on that, average compliance was calculated for each issue and further summarized into average compliance by category. Change in compliance was calculated by subtracting the compliance level of the previous visit. On this basis a dummy was created indicating whether a factory improved compliance. It takes the value zero if worsening or no change occurred, and the value of one in the case of improvement. The average level and changes of compliance were calculated by issue and category for each factory at each assessment to be able to observe the level of compliance and its change over time.

Table 6 in Appendix A summarizes issues by categories and gives an example question for each issue. Table 3 at the end of this section presents a summary statistic of the mean and standard deviation in compliance by issue and category. The mean compliance to issues is calculated by factory by assessment, using the mean compliance across concerned questions. Therefore, the numbers are ranging between zero and one, the latter indicating full compliance across all questions relevant to concerned issue. Mean compliance is lowest in the issue *Nursing Room/Day Care Centre,* followed by *Overtime, Heat and Ventilation, Payment of Wages* and *Employment Contract,* with compliance means ranging from 0.59 to 0.67. Compliance is highest in *Collective agreement*, *Anti-Union Discrimination*, *Eating Area, Sexual Harassment* and *Forced Labour,* ranging from 0.97 to 0.99. However, the high compliance to standards of sexual harassment must be treated with care, as other studies suggest that the prevalence of derogative statements against women and unwanted physical contact is higher (Miller et al., 2007). The reporting of incidences of sexual harassment remain stigmatized and are very likely underreported (UN, 2006, p.68). Considering category compliance means, the lowest compliance is observed among questions considering *Occupational Safety and Health* (0.75) while compliance is highest among *Core Labour Standards* (0.90) and *Unions* (0.96).

In theory the factories are monitored every 10 months, however, the actual periods vary and are often longer. Factory closure is listed in the dataset, however, information provided by the ILO stated that firms that stopped appearing in the dataset can be assumed to have stopped operating. Therefore, all factories not surveyed after March 2014 were excluded from the dataset. March 2014 is chosen as a threshold as it indicates a similar survival rate in 2014 compared to 2013. The choice of a later point in time largely inflates the factory deaths in 2014, which seems highly unlikely when considering different macroeconomic indicators, as for instance rising export volumes shown in Figure 2. It is rather assumed that extended periods between visits and data input at a later point in time are likely to have caused an artificial inflation of factory deaths. All factories which had their last visit after March 31, 2014 are assumed to have survived. The numbers of factories leaving the market by year is shown in Figure 5 below. Furthermore, closing and reopening factories under another name is a commonly observed practice. The ILO keeps track of these changes and provided the author with a list of factories that changed names, rather than left the market. Factories that merely changed names were thereby identified and coded as a single factory continuing to operate.

Figure 5: *Annual number of factories leaving the market*

Source: Author's compilation based on Better Work (2021)

Control variables that allow to control for time-specific events were created. A crisis dummy covers the main period of the financial crisis 2008/09 which is associated with increased pressure from the worsened macroeconomic environment and difficulties to obtain financing (ILO, 2016). Also, for the case of the garment sector in Sri Lanka, Ruwanpura and Wrigley (2011) have found increasing unwillingness of international buyers to reward factories for compliance to labour standards during the global financial crisis. Similar factors are assumed to be at work in Cambodia. A dummy indicator on the change in the EBA Rules of Origin (ROO) was created for the years after 2011. Additionally, ownership countries of origin were

regrouped in eight categories including *Cambodia*, *China*, *Korea*, *Hong Kong*, *Taiwan*, *Other Asian*, *Anglo* and *Other Foreign*. Cambodian ownership acts as a reference category. The total number of employees is used as a proxy for factory size.

Table 3: Mean compliance and standard deviation by issue and category

Issue	Mean	Std. Dev.	Category
Liaison Officer	0.80	0.36	Communication and workplace systems
Shop Stewards	0.85	0.13	Communication and workplace systems
Incident Behaviour	0.77	0.42	Communication and workplace systems
Drinking Water	0.68	0.39	Occupational Safety & Health
Eating Area	0.99	0.11	Occupational Safety & Health
Emergency Arrangements	0.79	0.31	Occupational Safety & Health
First Aid	0.81	0.27	Occupational Safety & Health
Heat and Ventilation	0.63	0.37	Occupational Safety & Health
Machine Safety	0.74	0.37	Occupational Safety & Health
Policy	0.75	0.36	Occupational Safety & Health
Sanitation Facilities	0.71	0.32	Occupational Safety & Health
Storage and Use of Hazardous Substances	0.69	0.37	Occupational Safety & Health
Discipline	0.96	0.11	Modern HR practices
Informing Workers/Record Keeping	0.74	0.30	Modern HR practices
Ordinary Hours	0.94	0.24	Modern HR practices
Overtime	0.59	0.23	Modern HR practices
Termination of Employment Contracts/Suspension of Work	0.71	0.33	Modern HR practices
Compensation for Work-Related Accidents and Illnesses	0.97	0.11	Compensation
Employment Contract	0.67	0.29	Compensation
Internal Regulations	0.87	0.31	Compensation
Minimum Wage, Overtime, Sunday, Public Holiday, and Night Work	0.89	0.20	Compensation
Payment of Wages	0.66	0.40	Compensation
Anti-Union Discrimination	0.97	0.16	Unions
Collective Agreement	0.97	0.16	Unions
Collective Disputes	0.91	0.26	Unions
Strikes and Lockouts	0.93	0.18	Unions
Child Labour	0.95	0.20	Core labour standards
Forced Labour	0.99	0.10	Core labour standards
Breast-Feeding	0.76	0.40	Equality and Parental Rights
Discrimination	0.77	0.26	Equality and Parental Rights
Sexual Harassment	0.99	0.10	Equality and Parental Rights
Maternity Leave	0.87	0.26	Equality and Parental Rights
Nursing Room/Day Care Centre	0.59	0.44	Equality and Parental Rights

Category	Mean	Std. Dev.
Communication and Workplace Systems	0.80	0.18
Occupational Safety & Health	0.75	0.16
Modern Human Resource Management	0.79	0.15
Compensation	0.82	0.15
Unions	0.96	0.12
Core Labour Standards	0.90	0.14
Equality and Parental Rights	0.80	0.17

Source: Author's calculation based on Better Work (2021)

4.2   Data Limitations

An issue with research regarding compliance to social sustainability standards and labour conditions is that "*compliance*" is not universally defined and transparency in monitoring practices differs widely. For most compliance indicators, however, the International Bill of Human Rights (UN, 1948) and the core ILO conventions (ILO, 1999) provide a general basis, be it of NGO's or the codes of conduct of multinational corporations. Especially the monitoring practices of multinational corporations and their private auditing firms are under scrutiny as their monitoring processes in many cases seem to facilitate hiding non-compliance. While not flawless, monitoring programmes of NGOs and International Organizations such as the ILO have better reputation (Dickson & Chang, 2015; Huq, Stevenson & Zorzini, 2014). Advantages of programmes like the ILO's *Better Work* programme compared to private auditing firms are the assessments are conducted by locals who are familiar with the national context, legislation and language. The auditors have to pass a competitive hiring process and intensive training assuring high quality of monitoring (Oka, 2010).

While the dataset allows for detailed analysis of working conditions across a large number of issues and a long period of time, its nature does not allow to disentangle the effects of the participation in the BW programme and the changing working conditions, as the aim of the programme is to facilitate the improvement of working conditions. The ILO has no power to sanction the noncompliance but gives out recommendations for areas of improvements and offers training to companies. This feature is rather something that needs to be considered in the interpretation, than a source of diminished value of studies using BW data. However, one weakness of the data associated with its nature is that it allows to control for the duration of participation in the programme, but not for the age of the factories before entering the dataset in 2006. Despite, concerned factories make up only a minor share of total factories and are assumed to assert limited influence on the results.

Another weakness compared to other studies is that the version of the dataset received did not include information on buyers. Therefore, it did not allow to include an indicator for reputation-sensitive buyers, that has been found to be relevant to the level of compliance and its connection to factory survival in other studies (Oka, 2010; Robertson, Brown & Dehejia, 2021). This is likely to lead to omitted variable bias.

The thesis is written in the awareness that programmes such as BFC face criticism in some parts of the scientific community. It mainly concerns its initial introduction by a trade agreement with an industrialized economy - the US in the case of BFC – and led some scientists to question the interest behind building up Cambodia's image of an "ethical producer" (Arnold & Shih, 2010). While the present paper does not aim at engaging deeply into this discussion, it will briefly be described in the interest of transparency. While BFC and BW more generally are overall regarded as a successful programme to improve working conditions in the garment industry in countries of the Global South, the main criticism comes from its limited reflection of workers' voices (Arnold & Shih, 2010; Dickson & Chang, 2015; Huq, Stevenson & Zorzini, 2014). The argument ties back into the "*race to the bottom*" debate, highlighting another aspect of the power imbalances between multinational corporations in the Global North and workers in the Global South. Are standards rather aligned to the growing demand of ethically produced goods in industrialized economies, with limited consideration of workers' voices and context-specific solutions? Or is an immediate power shift towards producers in presently buyer-driven value chains an illusion and therefore the implementation of a programme through a trade agreement run by a recognized international organization still the best solution for workers? The latter is resulting in a mix of monitoring compliance to standards claiming universality and their adaption in cooperation with local unions and worker initiatives. While this might leave the reader with some question marks, a clear advantage of the *Better Work* programme and its extensive data collection is that it allows for detailed long-term research. Its findings are still believed to allow drawing parallels to other labour-intensive industries in developing countries and economic consequences of improved working conditions. The latter is the main aim of this study.

5 Method

The method chosen to estimate the relationship between compliance and risk of factory closure is a Cox Proportional Hazard Model with time-varying covariates (Cox, 1972). It belongs to the methods of survival analysis. Survival analysis was originally developed in biostatistics but is increasingly applied in social sciences. A set of subjects are followed over a certain period of time until they either experience an event of interest – in this case factory closure – or until the sample period ends. The latter are referred to as censored observations. Survival analysis allows estimating the probability of the occurrence of the failure event in connection to other covariates. Its advantage compared to commonly used methods of regression analysis are as follows. First, it enables the inclusion of information for subjects that remain in the dataset until the end of the observed period without the event occurring. Second, the distribution of survival data is usually non-symmetric. In the case of our dataset, the distribution is left truncated as all factories initially operate at the first visit and some subsequently leave the market. Therefore, using a regression model that assumes normal distribution would lead to biased results (Allison, 1982; Foster, Barkus & Yavorsky, 2006).

The Cox Proportional Hazard Model is among the most widely used methods of survival analysis. One main reason is its semi-parametric nature meaning it does not make assumptions about the distributional form of the survival function and is therefore flexible. Furthermore, the Cox Proportional Hazard Model with time-varying covariates allows variables to fluctuate over time. Another advantage compared to the otherwise similar Kaplan-Meier model is that several covariates can be included, which reduces the omitted variable bias (Mills, 2011; Persson, 2002).

The Cox Proportional Hazard Model uses a partial likelihood approach. The outcome is the hazard rate h(t), defined as the likelihood to close at visit (t) under the condition that the factory has survived until t. The baseline hazard $h_0(t)$ is unspecified in the Cox model. It can be understood "*as the hazard function for a subject whose covariates all have the value of zero*" (Mills, 2014, p.3). The unspecified baseline hazard is the reason for which the model does not have a constant.

For the estimation of the covariates' association with the probability of failure in the model below, factory visits are set as the time-dimension rather than years in which the visits were conducted. This choice connects to the nature of the data collection, which only occurs with participation in the BFC programme. The duration of participation in the programme is further used as a time dimension as the programme incentivises compliance and the level of compliance as well as its change are the main independent variables in both main models. This strategy is coherent with other studies and confirmed by the comparison of presently estimated model with a model using years as a time dimension, which fit the data less well (Jetha & Linsen, 2015; Robertson, Brown & Dehejia, 2021). Other time-dependent exogenous events believed to impact on factory survival are controlled for by binary control variables.

Based on the empirical and theoretical background described in the theory section, the Cox Proportional Hazard Model with time-varying covariates is constructed as follows.

(1) $h(t) = h_0(t) \; \exp\,(\beta_1 \text{Compliance}(t) + \beta_2 \text{EBA}(t) + \beta_3 \text{Crisis}(t) + \beta_4 \ln \text{Employees}\,(t) + \beta_5 \text{Ownership})$

$h(t)$	Hazard rate
$h_0(t)$	Baseline hazard
Compliance(t)	Vector across different categories of labour standards indicating the compliance level at visit t (Model 1) or change in compliance between visit t and t-1 (Model 2)
EBA(t)	Binary variable indicating the period after the change in the Rules of Origin (ROO) in the EU Everything But Arms (EBA) Trade Scheme regulations in 2011
Crisis(t)	Binary variable indicating the 2008/09 financial crisis
Employees(t)	Logarithm of number of a factory's employees at visit t
Ownership	Categorical variable on the nationality of owners

The estimation strategy described through both equations is used for the estimation of two different models in the main result section. The distinct part is the vector of compliance indicators C, all other covariates are identical. In the first model estimated in the following section, C comprises the level of compliance observed for each category by factory at each assessment t. The probability of closure h(t) is determined by the level of compliance in the first model. In line with Robertson, Brown and Dehejia (2021), a second model is estimated to control for the fact that the level of compliance and the probability of closure are potentially both impacted by other factory-specific characteristics, such as the quality of management. Aiming to control for this issue, the compliance vector in the second model represents the change in compliance between visit t and t-1. The probability of closure is thereby assumed to be determined by the improvement (or lack of improvement) in compliance between prior and present visit.

Based on equation 1 the estimates are represented in hazard ratios, namely exponentiated coefficients $e^{\hat{\beta}}$. Equation 2 illustrates the hazard ratio for the levels of compliance (Collett, 1994). It thereby represents the ratio of the hazard rates between observations that are fully compliant to labour standards (C = 1), as well as those who are not compliant at all C* (C = 0). The equivalent applies to the second model in which improvement is coded as one and non-improvement is coded as zero in the compliance indicators.

(2) $\widehat{HR} = \dfrac{h_0(t)\, e^{\hat{\beta}\,C^*}}{h_0(t)\, e^{\hat{\beta}\,C}} = e^{\hat{\beta}\left(C\text{-}C^*\right)} = e^{\hat{\beta}\,(1\text{-}0)} = e^{\hat{\beta}}$

The model's key assumption is the proportional hazard assumption. It states that "*the hazard for any particular* factory *is a fixed proportion of the hazard for any other factory*" (Mills, 2011, p.4). In the case of our model the assumption is relaxed, as all coefficients except for ownership vary over time. This is done by including interactions between the covariates and time, as commonly proposed in the literature (Allison, 2014). Including interaction leads to identical results as using STATA's default command for time-varying covariates. Both allow the hazard ratio for concerned covariates to change over time. The former strategy furthermore allows to test the relaxed proportional hazard assumption for the model. The commonly used test of the proportional hazard assumption estimates the Schoenfeld residuals for each event and each explanatory variable. The residuals should be uncorrelated with time. The Null hypothesis that the Schoenfeld residuals are correlated with time can be rejected for all coefficients on a 5 % confidence level, as indicated by all Prob>chi2 being larger than 0.05 (see Table 7 Appendix B). Therefore, the proportional hazard assumption is met.

6   Results

The results of the two main models are stated in Table 4 below, as well as illustrated through Figure 6. Table 4 displays the estimated hazard ratio of the different covariates. The hazard ratio is the exponentiated coefficient and therefore always takes on a positive value. A hazard ratio below 1 indicates a decreasing probability of factory closure, while a hazard ratio above 1 indicates an increased risk of market exit. Its advantage compared to the coefficient is a more straightforward interpretation of the size of the effect. A hazard ratio of 2 suggests that full compliance or improvement is associated with a probability of closure twice as high as for non-compliant or non-improving factories. To further facilitate the interpretation of results, hazard ratios indicating an increasing probability of factory closure are written in bold in Table 4. More detailed results of both models are found in Table 8 and 9 in Appendix B. As the baseline hazard is unspecified the model does not have a constant. The nature of the model only allows for the calculation of relative hazards between groups, it does not allow to draw conclusions on the basic risk of survival for factories whose covariates are all zero. Figure 6 shows how the hazards of improving and non-improving factories develop over time across categories (Model 2). The upper line represents the factories with a higher risk of closure.

Starting with the results for the different compliance indicators, a higher level of compliance in the category *Communication & Workplace Systems* is associated with decreasing probability of factory closure. The same is true for an improvement in compliance in the same category, which indicates that improvement is associated with a 57 % lower chance of closure compared to non-improvement in compliance, as illustrated in Figure 6. The latter is significant at the 10 %-level. The opposite is true for *Occupational Safety & Health* (OSH) where a higher level of compliance is associated with an increased probability of a factory exiting the market. Likewise, improving compliance in the OSH category correlates with a probability of closure that is twice as high as for factories that did not improve or even worsened their OSH standards between visit t and t-1. Still, the estimates are not statistically significant and therefore do not indicate a systematic relationship between factory survival and OSH compliance. Compliance to and improvement in *Modern Human Resource Practices* are also associated with an increased probability of factory closure. The hazard ratio for the level of compliance is especially high and significant at a 5 % level. According to Model 1, the chance to go bankrupt is 16 times higher for a factory with full compliance to standards of *Compensation* compared to a factory non-compliant to minimum wage practices and other forms of compensation, ceteris paribus. However, the effect of improvement in compliance is less strong, as illustrated in Figure 6. The probability to die is slightly higher for factories which improved compliance, but the gap between compliant and non-compliant factories is smaller compared to other categories.

Table 4: Main regression results

Compliance Indicators	(1) Level of Compliance	(2) Change in Compliance
Communication & Workplace Systems	0,849	0,429*
	(0,817)	(0,217)
Occupational Safety & Health	**2,255**	**2,022**
	(2,433)	(0,994)
Modern HR Practices	**35,235****	**1,901**
	(49,097)	(0,971)
Compensation	**16,279****	**1,041**
	(19,247)	(0,520)
Unions	0,125*	0,778
	(0,140)	(0,454)
Core Labour Standards	**1,584**	0,610
	(2,104)	(0,344)
Equality & Parental Rights	0,571	0,692
	(0,521)	(0,368)
EBA	**1,333**	**1,527****
	(0,270)	(0,299)
Financial Crisis (2008-2009)	**2,037*****	**2,152*****
	(0,445)	(0,466)
Log Workers	0,634***	0,613***
	(0,048)	(0,044)
Ownership China	0,820	0,850
	(0,249)	(0,257)
Ownership Hong Kong	**1,046**	**1,049**
	(0,327)	(0,328)
Ownership Taiwan	0,708	0,750
	(0,217)	(0,231)
Ownership Korea	0,585	0,613
	(0,195)	(0,204)
Ownership other Asian	0,778	0,781
	(0,267)	(0,268)
Ownership Anglo	**1,096**	**1,208**
	(0,495)	(0,543)
Ownership other Foreign	**1,407**	**1,335**
	(0,612)	(0,575)
Observations	3,295	3,295

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

A high level, as well as increases in the compliance to *Union* standards, are associated with a lower risk of factory closure. The estimate for Model 2 is significant at a 10 % level. The results for the category of *Core Labour Standards* are ambiguous. A high level of compliance seems to be correlated with increased risk of closure, while the opposite is true for an improvement in compliance to core labour standards. Both estimated effects are of similar size. However, both are not statistically significant. One can therefore result that compliance to *Core Labour Standards* is not systematically associated with an increased probability of factory closure. Similarly, the results for compliance to the category *Equality & Parental*
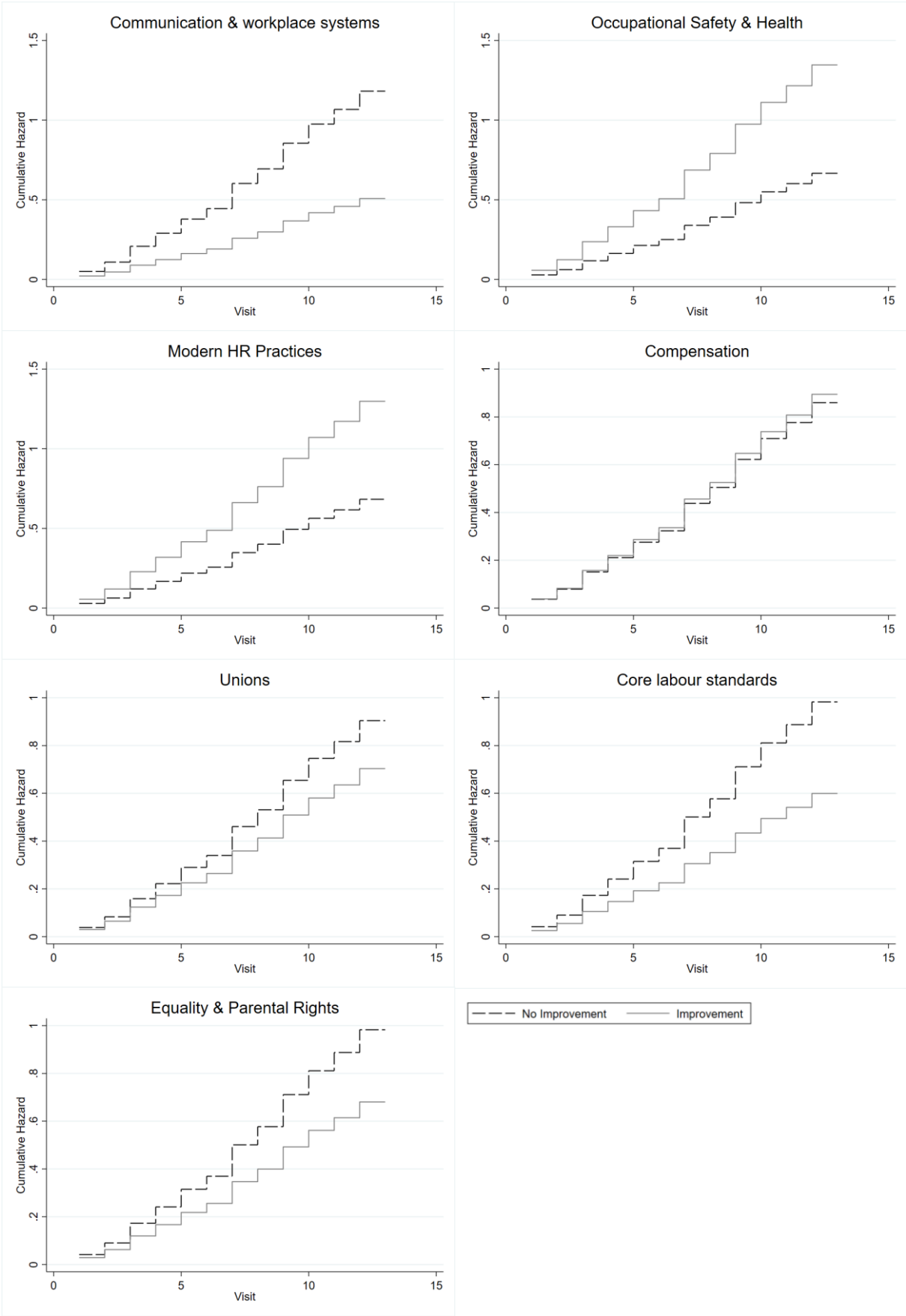
Rights are not statistically significant. Both estimates point towards a reduced probability of factory death associated with the level of compliance and its change in compliance.

The results for the dummy variable on the change in the Everything But Arms agreement's Rules of Origin point towards an increased risk of factory closure post-2011. In the second model the estimate is significant at a 1 % level and indicates that the period after 2011 is associated with a 50 % higher chance of closure compared to pre-2011.

The covariates on the financial crisis and factory size (*Log Workers*) point in the expected direction. In both models, the financial crisis is associated with a probability of factory closure twice as large as for the period prior and post the global financial crisis of 2008/09. A larger number of workers, on the other hand, is connected to a decreased probability of factory closure. Both hazard ratios of the financial crisis and the number of workers are statistically significant at a 1 % level.

The categorical variable *Ownership* captures the effect of the nationality of owners on factory survival. The reference category is Cambodian ownership. First, none of the hazard ratios across the category is statistically significant, indicating that foreign ownership does not systematically change the probability of factory closure. With the exception of Hong Kong, the results indicate that Asian ownership is associated with a decreased probability of factory closure. Non-Asian ownership, on the other hand, is associated with an higher probability of factory closure compared to Cambodian ownership.

Figure 6: *Graphical illustration of the results for the compliance indicators in Model 2*

6.1   Robustness

Five alternative models are measured to account for the robustness of the results presented above. Model 3 considers only whether improvement of labour standards occurred between the first and the second visit. This is motivated by the fact that the largest changes occur between the first and second visit, as similarly observed by Robertson, Brown and Dehejia (2021). This feature is assumed to be connected to the nature of the *Better Factories* transparency policy. From the second visit onward factories' compliance to 21 critical issues are published in the open-access transparency database. The first visit is not publicly reported, to give factories some time to adjust and follow the recommendations by the *Better Factories* programme (BFC, 2021b). A large amount of improvements between the first and second visit is likely to be incentivised by this policy. On the other hand, research has shown that the probability of factory closure is expected to decrease with age (Frazer, 2005; Fu & Wu, 2013; Mengistae, 2006; Nor et al., 2007; Söderbom, Teal & Harding, 2006). Thereby, factories which have just entered the market could be more vulnerable to the increasing costs that are associated with some improvements in labour standards.

Models 4 and 5 in the robustness analysis test whether the effects from the level or the improvement of working conditions affect the probability of factory closure with a larger time lag. Thereby, the covariates at t-1 are assumed to affect the probability of closure at t. While especially improvement in compliance might be connected to high initial costs, a positive effect on productivity might occur with a time lag.

Model 6 tests whether the effects of improved compliance on the risk of factory closure differs for factories with a compliance level below the mean level of compliance in regarded category. The large reduction in the number of observations stems from the fact that medians across all compliance categories are higher than the mean, indicating that there is a large number of highly compliant factories pushing the mean upward. Their exclusion largely reduces the sample size.

Model 7 includes controls with the initial level of compliance (not displayed in the table). It follows the assumption that the level from which an improvement in compliance is taking place matters. E.g. improvements in *Occupational Safety & Health* of a factory with initial compliance at very low levels might require larger investment than a change from an already high level to a slightly improved one.

Table 5: *Results robusness models*

Compliance Indicators	(3) CC between 1st and 2nd visit	(4) LC with time lag	(5) CC with time lag	(6) CC for factories below compliance mean	(7) CC with initial compliance levels controls
Communication & Workplace Systems	**1,096**	**1,040**	0,549*	0,125	0,328**
	(0,192)	(0,801)	(0,169)	(0,210)	(0,172)
Occupational Safety & Health	**1,002**	**1,679**	**1,392**	**1,770**	**1,958**
	(0,169)	(1,379)	(0,416)	(2,223)	(0,986)
Modern HR Practices	**1,449****	**11,715****	**1,477**	**2,477**	**1,502**
	(0,259)	(12,371)	(0,457)	(4,990)	(0,795)
Compensation	0,815	**7,248****	**1,054**	**7,454**	**1,083**
	(0,145)	(6,627)	(0,319)	(15,457)	(0,564)
Unions	**1,273**	0,155**	0,937	**4,059**	0,761
	(0,214)	(0,133)	(0,333)	(8,028)	(0,446)
Core Labour Standards	0,962	0,585	0,700	**2,791**	0,446
	(0,169)	(0,576)	(0,244)	(5,836)	(0,262)
Equality & Parental Rights	**1,152**	0,846	0,675	0,020*	0,802
	(0,204)	(0,631)	(0,220)	(0,045)	(0,445)
EBA (2011 onward)	**1,086**	**1,450***	**1,526****	**1,294**	**1,706****
	(0,233)	(0,292)	(0,299)	(0,851)	(0,359)
Financial Crisis (2008-2009)	**1,728****	**2,101*****	**2,150*****	**1,843**	**2,250*****
	(0,395)	(0,460)	(0,465)	(1,316)	(0,513)
Log Workers	0,589***	0,626***	0,613***	0,502***	0,620***
	(0,049)	(0,048)	(0,044)	(0,124)	(0,046)
Ownership China	0,776	0,853	0,844	0,094**	0,878
	(0,250)	(0,258)	(0,255)	(0,098)	(0,278)
Ownership Hong Kong	**1,119**	**1,091**	**1,039**	0,159*	**1,038**
	(0,369)	(0,341)	(0,324)	(0,159)	(0,346)
Ownership Taiwan	0,721	0,735	0,745	0,100**	0,808
	(0,237)	(0,225)	(0,229)	(0,095)	(0,264)
Ownership Korea	0,496*	0,603	0,608	0,114**	0,672
	(0,182)	(0,201)	(0,202)	(0,106)	(0,232)
Ownership other Asian	0,820	0,809	0,776	0,103**	0,875
	(0,298)	(0,277)	(0,266)	(0,113)	(0,314)
Ownership Anglo	**1,283**	**1,146**	**1,180**	**1,830**	**1,324**
	(0,619)	(0,516)	(0,530)	(2,572)	(0,609)
Ownership other Foreign	**2,486****	**1,458**	**1,318**	0,864	**1,419**
	(1,144)	(0,631)	(0,567)	(1,073)	(0,626)
Observations	3,295	3,295	3,295	460	3,106

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The probability of closure for compliant or non-compliant and improving or non-improving factories in *Communication & Workplace Systems* is suggested to be almost equal in Models 3 and 4. This is indicated by a hazard ratio close to 1. The hazard ratio of Model 5 indicates that factory closure at visit t decreases for factories that improved compliance in *Communication & Workplace Systems* between t-2 and t-1. Factories with below-average compliance similarly show a lower probability of factory closure. While Model 3 and 4 do not find a systematic relationship, 5, 6 and 7 confirm the relationship found in the two main models suggesting that improvement in compliance is associated with a decreased chance of factory closure. The latter estimate is significant on a 5 %-level. The hazard ratios for the category *Occupational Safety & Health* associate compliance and its improvement with increased likelihood of factory closure. However, the results are not fully conclusive, as none of the coefficients is statistically significant and the hazard ratio of Model 3 is close to 1. Similar to the results of the two models in the main result section, compliance to and improvements along *Modern Human Resource Practices* are associated with an increased probability of factory closure. The results are statistically significant level (5 %) for the Models 3 and 4. A change in the *Compensation* practices between the first and the second visit, on the other hand, does not seem to systematically affect the probability of a factory to close (Model 3). The relationship concerning *Compensation* observed in the two main models is confirmed for all remaining robustness models. It is interesting to note that the effect of the compliance level in Model 4 is about half of the effect in Model 1. This supports the assumption that complying to labour standards of *Compensation* might have an immediate cost effect, but a more long-term effect on productivity.

For *Unions* the results of the robustness test are ambiguous, as the estimates vary across all five models. The statistically significant estimate in Model 4 supports the findings of the main models. It is suggested that complying to standards of *Unions* is associated with a decreasing probability of factory closure. The robustness analysis sheds new light on the inconclusive results on the compliance to *Core Labour Standards*. While again none of the results are statistically significant, they point towards the direction of a decreasing probability of closure with increasing compliance in Models 3, 4, 5 and 7. The case seems to differ for factories with below-mean compliance level, whose improvement in core labour standards are associated with an increased risk of closure. The results for *Equality & Parental Rights* in the robustness model confirm a non-systematic relationship between (improved) compliance and factory closure and support the assumption of a decreasing probability with improved compliance. The latter is especially indicated by the 10 % statistically significant estimate in Model 6. The estimates for remaining covariates indicate effects of equivalent direction and size as in the main Models 1 and 2. An exception are the *Ownership* categories in Model 6. For factories below mean-compliance Asian ownership is associated with a decreasing probability of survival. All Asian ownership estimates are significant at a 5-10 % level.

One of the main limitations of this study is the lack of information on reputation-sensitive buyers. As shown by Oka (2010) and Robertson, Brown and Dehejia (2021) reputation-conscious buyers incentivise and facilitate compliance to labour standards. For economic indicators and factory survival increasing and stable orders are especially relevant. However, the lack of information on buyers in the dataset did not allow to control for reputation-sensitive buyers. It is therefore likely to be subject to omitted variable bias. Furthermore, there might be other factors that are causally connected to the probability of closure, as well as the level of compliance to labour standards that were not accounted for in the non-experimental study design. Another shortcoming is the construction of the dummy variable for the changing EBA regulations. The binary variable simply indicates whether an assessment took place in prior or post-2011 and is thereby likely to absorb other factors. Overall, the results cannot claim causality. However, they still allow for an impression on how compliance to labour standards is (not) systematically linked to compliance to labour standards across a variety of categories.

6.2   Discussion

This section summarizes the findings including the results from the robustness models and connects them to previous literature and theory on the association between compliance to labour standards and economic performance in the garment sector.

The first hypothesis tested in the model was that compliance to labour standards is not associated with an increased risk of factory closure. Our results indicate the first hypothesis to be confirmed for the categories of *Communication & Workplace Systems*, and more hesitantly due to statistical insignificance for *Unions, Core Labour Standards* and *Equality & Parental Rights*. The results for *Occupational Safety & Health* are inconclusive but point towards an increased risk of closure for compliant factories and those who improve. Compliance to standards of *Modern HR Practices* and *Compensation* is correlated with an increased probability of factory closure at a statistically significant level. As the effects differ in direction and size across categories, the second hypothesis is confirmed across both models. Hypothesis number three assumes the change in the EBA Rules of Origin (ROO) to be associated with a decreased risk of factory closure. It was tested by the inclusion of a binary variable switching from zero to one in 2011. Surprisingly, the opposite effect was found as the period after the change in the EBA Rules of Origin is associated with a higher probability of factory closure in both models. Hypothesis 3 is therefore not confirmed. However, the variable for the change in EBA regulations captures not only the direct impact of the changing regulations on factories, but most likely absorbs additional factors influencing on the probability of factory closure between 2011 and 2015. A simple period dummy variable might therefore not be adequate to capture the effect of the policy change. Information on the share of a factories' goods exported to the EU under the preferred condition of the EBA trade scheme would allow future research to better isolate the effect of changes in the trading scheme.

The estimates for the categories *Communication & Workplace Systems*, *Unions*, *Core Labour Standards* and *Equality & Parental Rights* support what previous studies have found, namely, that compliance to labour standards in those categories is not systematically associated with worsening economic outcomes, in this case represented by factory survival (Asuyama, Fukunishi & Robertson, 2017; Distelhorst & Locke, 2018; Jetha & Linsen, 2015; Levine, Toffel & Johnson, 2012). The assumptions for *Equality & Parental Rights* are similar as for *Core Labour Standards*, reducing discriminative practices and supporting parents in taking care of their children is assumed to increase productivity and positively affect a factory's chance to survive. While the results indicate the assumptions hold, statistical insignificance does not allow to draw fully conclusive results. The results for *Occupational Health & Safety* are ambiguous, point towards an increase in the probability of closure but at a non-statistically significant level. The findings on OSH thereby point in the opposite direction from what was suggested by Levine et al.'s (2012) study on Californian factories. However, they are in line with Asuyama et al.'s (2017) research on Cambodia suggested a negative association between the level of compliance to OSH standards and profitability. Therefore, the suggested direction of our results seems plausible. The two categories systematically associated with a growing likelihood of closure are *Modern HR Practices* and *Compensation*.

The association of *Modern HR Practices* with an increased probability of factory closure is especially interesting. Asuyama et al.'s (2017) findings suggest profit and productivity-enhancing effects. They assume that *Modern HR Practices* promote trust and motivation and thereby increase productivity. Similarly, Robertson et al.'s (2021) results indicate a decreasing probability of factory death for factories compliant to *Modern HR Practices*, however, only statistically significant for the changes between the first and the second assessment. Interestingly, Jetha and Linsen's (2015) results are similar to what the present study has found. One possible explanation for the ambiguous results is that selection bias is at play. Assuming that more profitable factories are able to provide their managers with more competitive wages, the "best" managers will be employed in profitable factories. Selection of good managers into profitable factories potentially inflates the negative correlation between low compliance to *Modern HR Practices* and a higher probability of factory closure. Another factor that could impact on the association between compliance and factory closure is found when taking a closer look at the issues and questions that this category is compiled of. Especially the issue of overtime work seems relevant. A reduction of overtime work might have a cost-increasing effect as it reduces the number of hours worked and might require hiring new workers. However, workers are also assumed to be more productive when not working overtime.

This paragraph concerns the second category that was found to be systematically related to an increasing chance of factory closure, namely *Compensation*. For compliance to compensational standards, the results of present study are similarly observed by other studies. For instance, Robertson et al. (2021) find a similar effect with the coefficient for the level of compliance being substantially larger than for improvements (their results are displayed as coefficients and need to be exponentiated in order to obtain the hazard ratio and compare the size of the effect). Mosley and Uno (2007) provide a useful explanation for the negative effect of complying with standards of wages, sickness benefits etc. As mentioned before, wages represent a substantial share in the overall production costs, as garment production is highly labour-intensive. Raising wages and other forms of payments is therefore associated with a

large cost increase and a higher risk of factory closure. Especially when the gap between actual and legally required wage payments is large, the increases might not be balanced out by productivity increases. The "*race to the bottom*" debate reflects a vivid academic discussion on whether globalization puts downward pressure on wages and labour standards (Brown, Deardorff & Stern, 2003; Goto, 2011; Mosley & Uno, 2007). While negative impacts have been found, awareness of production conditions in low-income countries is increasing among consumers and so is demand for more "*ethically*" produced goods (Berik & Rodgers, 2010; Dickson & Chang, 2015; Huq, Stevenson & Zorzini, 2014; Mani & Gunasekaran, 2018). Also, unions and organizations advocating for workers' rights promote a higher wage level to allow for a life in dignity. Examples are the concepts of a living wage and an Asian floor wage (AFWA, 2021; Anker, 2005; GLWC, 2021).

As for the variable in the changing Everything But Arms (EBA) policy the estimates point in a different direction than expected. Previous research suggests changing trade policies are related to the probability of factory survival (Baggs, 2005; Bernard et al., 2003). Furthermore, Tanaka (2020) has found the changing EBA regulations and the trade shock associated with it to be associated with increased productivity. However surprising, according to the estimates the changes are associated with an increased probability of closure. As discussed above, a simple time dummy is likely to absorb other determinants of factory closure.

Considering further control variables, the paper feeds into research on the association between size and factory survival. In the literature on developing countries the relationship is ambiguous depending on the national context and industry, however, many studies point towards a decreasing probability of closure with increased size (Frazer, 2005; Fu & Wu, 2013; Mengistae, 2006; Nor et al., 2007; Söderbom, Teal & Harding, 2006). This is supported by the findings of this study and furthermore in line with microeconomic theory assuming economies of scale. Also, it is suggested that external shocks in trade and credit constraints are associated with an increased risk of factory closure (Dasgupta, Poutiainen & Williams, 2011, p.34). It is confirmed by the coefficient on the global financial crisis, suggesting a larger probability of closure for the years 2008 and 2009. While the control variable for ownership is not systematically associated with closure probability, the robustness model for factories below mean compliance suggests that Asian ownership is associated with a decreasing probability of factory closure. This interesting detail could be investigated through further research.

7 Conclusion

The aim of present research grounds in the tension between compliance to labour standards and economic indicators in the context of globalized buyer-driven value chains. Industrialization in developing countries is often led by the production of low-skill intensive manufacturing goods, giving the industry substantial weight in national development strategies. However, working conditions in those sectors are often detrimental. The argument goes that compliance to labour standards is associated with costs unbearable in the face of the price pressure of the global market, as production is easily reallocated to countries with lower production costs. The present thesis tested this argument in the context of the Cambodian garment sector, which is characterized by an interesting legal framework. All garment exporting factories have to participate in an ILO programme that monitors labour standards and aims at incentivising its compliance.

The results overall confirm what other studies have found. Compliance to labour standards across most categories, namely *Communication and Workplace Systems*, *Unions*, *Core Labour Standards* and *Equality and Parental Rights*, is not systematically related to an increased risk of factory closure. The estimate for *Occupational Safety and Health* indicates that compliance is associated with an increased probability of closure, but at a non-statistically significant level. This leaves ambiguity to the relationship. However, two categories have found to be systematically associated with a higher likelihood of closure for compliant and improving factories: *Modern HR Practices* and *Compensation*. The links between the former and factory survival are not yet fully explained and deserves more attention in research in the context of a developing country. In spite of that, the results for compliance to labour standards of *Compensation* are less surprising. Thereby, present findings underline the urgency of new policies and mechanisms to detach compliance to minimum wage laws or the payment of a living wage from the risk of factory closure. An important point raised by Arnold and Shih (2010) is the criticism that the costs of compliance are solely borne by producing factories that are under price pressure. A greater commitment of buyers to compliant factories and willingness to pay slightly higher prices is needed. If effectively designed, the new laws currently designed on an EU level and in some member countries have the potential to shift responsibilities on abuses in human rights, labour and environmental standards more towards buyers. This could incentivise them to accept higher prices for the compliance to human rights and labour standards.

Research on the economic consequences of compliance to labour standards is scarce, and therefore offers much potential for future research to test the relationship in different contexts of labour-intensive industries. Among the main obstacles is the availability of data. While the *Better Work* database provides a comprehensive source, more creative solutions involving private sourcing agents could also be considered as in Distelhorst and Locke (2018). Another topic of similar urgency and relevance is how compliance to ecological standards of production impact on economic indicators at the factory level. Extensive research is required

in order to mitigate the consequences of climate change especially in contexts of developing countries, many of which are arguably more vulnerable to climate change-related risks. In the light of the other most pressing global crisis, the Covid-19 pandemic, research on its effects on workers and factories' compliance levels are further relevant topics for future research, as soon as data is available.

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Appendix A

Table 6: Issues by categoy and related sample questions

1 Communication and workplace systems

Incident Behaviour	Does management, including line supervisors, treat workers with respect?
Liaison Officer	Do workers have easy access to the liaison officer?
Shop Stewards	Does the factory have shop stewards elected by workers?

2 Occupational Safety and Health

Drinking Water	Does management provide safe drinking water?
Eating Area	If food is provided, is it of reasonable quality?
First Aid	Are there any first-aid boxes in the workplace?
Heat and Ventilation	Are heat levels in the factory acceptable?
Machine Safety	Are workers trained to use machines and equipment safely?
Policy	Do workers and supervisors understand the health and safety policy?
Sanitation Facilities	Are all the toilets working properly?
Storage and Use of Hazardous Substances	Are chemicals properly stored in a separate area of the workplace?
Emergency Arrangements	Are all emergency exit doors unlocked during working hours, including overtime?

3 Modern HR practices

Discipline	What does management deduct? Disciplinary fines
Informing Workers/Record Keeping	Do workers understand the calculation of wages?
Ordinary Hours	Are normal working hours more than 8 hours per day, 6 days per week?

Overtime	Are workers punished if they refuse to work overtime?
Termination of Employment Contracts/Suspension of Work	Does management give workers proper notice of termination before their contracts expire when workers' contracts are not renewed? (only for contracts of longer than 6 months; no agreement to terminate; no serious misconduct by worker)

4 Compensation

Compensation for Work-Related Accidents and Illnesses	What types of compensation owed to workers has management failed to pay correctly? Example answer: wages for work missed due to work-related accidents or illnesses
Employment Contract	Do the employment contracts comply with Cambodian labour law?
Internal Regulations	Have the internal regulations been posted in the workplace?
Minimum Wage, Overtime, Sunday, Public Holiday, and Night Work	Is the piece rate set at a level that permits a worker of average ability working normal hours to earn minimum wage?
Payment of Wages	Does management pay workers at least once per month?

5 Unions

Anti-Union Discrimination	Does management get permission from the labour ministry before dismissing union leaders or candidates for union leadership?
Collective Agreement	Is the collective agreement at least as good for workers as the Labour Law?
Collective Disputes	If there is no collective agreement, did the parties inform the Labour Inspector about the collective dispute(s), so the dispute(s) could be conciliated?
Strikes and Lockouts	How many total days were workers on strike since the last visit?

6 Core labour standards

Child Labour	Does management use reliable documents to verify the age of workers prior to hiring?
Forced Labour	In what form is forced labour is occurring?

7 Equality and Parental Rights

Nursing Room/Day Care Centre	Does management pay the childcare costs of women employees?
Maternity Leave	Are women workers aware of their right to maternity leave?
Sexual Harassment	What is the nature of this conduct? Example answer: unwelcome physical contact of a sexual nature
Discrimination	On what basis has management discriminated against workers? Example answers: sex, race, HIV/AIDS, ancestry, social origin etc.
Breast-Feeding	Are women aware of their right to one hour of paid time off for breast-feeding?

Source: Author's compilation based on Better Work (2021)

Appendix B

Table 7: *Test of the proportional hazard assumption*

	Model 1	**Model 2**
Communication and Workplace Systems	0.76	0.60
Occupational Safety & Health (OSH)	0.33	0.47
Modern HR Practices	0.48	0.85
Compensation	0.38	0.66
Unions	0.45	0.44
Core Labour Standards	0.07	0.48
Equality & Parental Rights	0.22	0.22
EBA	0.90	0.52
Crisis	0.93	0.81
Workers	0.31	0.87
Ownership[4] China	0.83	0.95
Ownership Korea	0.57	0.41
Ownership other Asian	0.73	0.73
Ownership Anglo	0.41	0.59
Ownership others	0.15	0.23
Ownership Hong Kong	0.79	0.96
Ownership Taiwan	0.46	0.63
Global Test	0.21	0.57

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[4] Cambodian ownership is omitted as a reference category as in the models below.

Table 8: Model 1 – Level of compliance

	(1)	(2)	(3)
Compliance Indicators			
Communication & Workplace Systems	0,716	0,761	0,849
	(0,663)	(0,739)	(0,817)
Occupational Safety & Health	2,327	2,359	2,255
	(2,508)	(2,576)	(2,433)
Modern HR Practices	25,507**	38,660***	35,235**
	(34,093)	(53,881)	(49,097)
Compensation	19,576***	13,789**	16,279**
	(22,470)	(16,371)	(19,247)
Unions	0,345	0,175	0,125*
	(0,382)	(0,194)	(0,140)
Core Labour Standards	0,919	1,495	1,584
	(1,134)	(1,955)	(2,104)
Equality & Parental Rights	0,737	0,557	0,571
	(0,662)	(0,508)	(0,521)
EBA (2011 onward)		1,266	1,333
		(0,250)	(0,270)
Financial Crisis (2008-2009)		1,945***	2,037***
		(0,420)	(0,445)
Log Workers		0,654***	0,634***
		(0,048)	(0,048)
Ownership China			0,820
			(0,249)
Ownership Hong Kong			1,046
			(0,327)
Ownership Taiwan			0,708
			(0,217)
Ownership Korea			0,585
			(0,195)
Ownership other Asian			0,778
			(0,267)
Ownership Anglo			1,096
			(0,495)
Ownership other Foreign			1,407
			(0,612)
Observations	3,295	3,295	3,295

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: *Model 2 – Change in compliance*

	(1)	(2)	(3)
Compliance Indicators			
Communication & Workplace Systems	0,419*	0,409*	0,429*
	(0,210)	(0,206)	(0,217)
Occupational Safety & Health	1,699	1,859	2,022
	(0,831)	(0,917)	(0,994)
Modern HR Practices	2,103	1,977	1,901
	(1,077)	(1,010)	(0,971)
Compensation	1,076	1,056	1,041
	(0,535)	(0,528)	(0,520)
Unions	0,623	0,752	0,778
	(0,363)	(0,439)	(0,454)
Core Labour Standards	0,529	0,608	0,610
	(0,299)	(0,343)	(0,344)
Equality & Parental Rights	0,617	0,678	0,692
	(0,330)	(0,360)	(0,368)
EBA (2011 onward)			1,527**
			(0,299)
Financial Crisis (2008-2009)			2,152***
			(0,466)
Log Workers		0,604***	0,613***
		(0,042)	(0,044)
Ownership China		0,845	0,850
		(0,255)	(0,257)
Ownership Hong Kong		1,020	1,049
		(0,318)	(0,328)
Ownership Taiwan		0,720	0,750
		(0,221)	(0,231)
Ownership Korea		0,615	0,613
		(0,204)	(0,204)
Ownership other Asian		0,765	0,781
		(0,262)	(0,268)
Ownership Anglo		1,182	1,208
		(0,531)	(0,543)
Ownership other Foreign		1,102	1,335
		(0,471)	(0,575)
Observations	3,295	3,295	3,295

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1