PURCHASING PRACTICES AND LABOR CONDITIONS IN GLOBAL ELECTRONICS SUPPLY CHAINS

A Thesis

Presented to the Faculty of the Graduate School

of Cornell University

In Partial Fulfillment of the Requirements for the Degree of

Master of Science

by

Ning Li

AUGUST 2022

ABSTRACT

This research examines the impact of brands' purchasing practices on suppliers' shop floor labor conditions in global electronics supply chains. Through a case study of a second-tier supplier to Apple, the correlation analysis of matched attendance records with datasets of demand, production, and purchasing volumes and the qualitative findings via 51 stakeholder interviews and two months of participant observations as an intern at the supplier factory suggest that: The buyer's highly volatile purchasing practices are the origins of labor violations in the forms of excessive overtime and extensive use of student interns. Meanwhile, the management systems of disconnected sourcing and compliance working mechanisms within the buyer itself impede the possibility of linking future sourcing decisions in tandem with compliance performance. These findings implicate that better labor conditions in global supply chains cannot be achieved without a fundamental change in buyers' purchasing behaviors and working mechanisms of sourcing and compliance.

BIOGRAPHICAL SKETCH

Ning Li joined the School of Industrial and Labor Relations at Cornell University as a M.S/Ph.D. student in Fall 2019. She acquired a Master's degree in Human Resources and Organisations with a focus in International Employment Relations stream from the London School of Economics and Political Science in 2018 and a Bachelor's degree in Labor Relations from the Renmin University of China in 2017. Her current research interests center on labor practices in global supply chains.

ACKNOWLEDGMENTS

Memories threw me back to the afternoon of January 17, 2018, in a corner office on the fifth floor of the New Academic Building of the London School of Economics, Prof. Sarosh Kuruvilla was writing down the essential components of a research paper on a small whiteboard and describing what elements high-quality research entails. This invaluable one-on-one coaching experience far exceeded my expectation of an office hour, and that is right where my dream of becoming a professional scholar sprouted. My deepest gratitude goes to Sarosh Kuruvilla, without whom this research would not have been possible. Sarosh rarely praises his students, but he cares about them most deeply. He has the highest standards but also the most dedicated support with a warm heart. I must be honest, it is a difficult process but extremely beneficial. Thus, I owe Sarosh a great deal for his generosity in offering me invaluable support and guidance.

I am also deeply indebted to Prof. Diane Burton, who took me on in the middle but treats me as her own student. I am very grateful for her continuous encouragement, great patience, outstanding mentorship, and rich insights. Also, I would like to convey my heartfelt appreciation to Prof. Eli Friedman for his generative questions and constructive suggestions on my work.

Outside my committee, a lot of faculties and my cohorts have offered me incredibly helpful advice not only about research but also on how to grow into a better person and a strong woman. It has been my great luck to have them at ILR school.

In addition, I would like to express my gratitude to everyone involved in my fieldwork. I cannot mention their names here, but it is their participation that made this

research possible. I deeply appreciate them for sharing their expertise and insights. The summer I worked together with them was an unforgettable experience for me.

Lastly, special kudos to my husband Chi Huang and our entire family. Thank you for your love, companionship, and support.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

Working on an electronic parts manufacturer's shopfloor is so hard. For so many reasons. And especially at the height of summer production before a new product launch, during a lingering pandemic, after going through weeks of night shifts, and while a student intern. You are likely to be up all night without much to do right after your line manager urges everyone to boost production to follow the pacing of upper-tier assembling factories, in that raw materials from the factory's next-tier suppliers are not ready yet; you may probably be transferred to another workshop or even dismissed if your employer is receiving continues shrinking orders. And all these uncertainties are driven by how the buyer's weekly purchasing practices ebb and flow.

Nearly ten years after Apple joined the Fair Labor Associations in 2012 – a turning point that signaled global electronic brands' public commitment to be responsible for the workers of their suppliers (Distelhorst, Locke, Pal & Samel, 2015), my examination of the labor conditions at a second-tier supplier to Apple through two month's fieldwork in summer of 2021 showcased that shop floor labor conditions continued to be worrisome: Excessive overtime to nearly 70 working hours a week, only one day off every two weeks, over half of the labor force composed of student interns, having student interns on night shifts…and a combination of quantitative analysis and qualitative findings indicates that these labor violations originate in Apple's purchasing practices. Furthermore, this also reveals that Apple's management systems – isolated working mechanisms of sourcing and compliance – make it impossible to make sourcing decisions in tandem with social compliance performance.

These phenomena are not exclusive to Apple or the global electronics industry. It has been 30 years since global brands began privately regulating their international suppliers' labor practices through codes of conduct in response to anti-sweatshop social pressures. The empirical studies (such as Barrientos & Smith, 2007; Locke, 2013; Bartley & Egels-Zanden, 2015; Morris, Jenkins & Donaghey, 2021; Kuruvilla, 2021), anecdotal evidence, investigative reporting by journalists, along with tragedies such as 1132 workers killed by Rana Plaza factory collapse along prove that this private regulation model has had little or no impact on effectively improving labor conditions in global supply chains of many industries.

To explain the ineffectiveness of private regulations, some scholars have attempted to tackle the problem from purchasing practices. Some studies suggest the purchasing practices as a source of some labor violations (Locke, 2013; Locke & Samuel, 2017; Anner, 2018; Anner, 2019; Anner, 2020). Also, some research questioned the linkage between labor compliance results and future sourcing decisions and hypothesized that this weak linkage provides little incentive for suppliers to make improvements (such as Engels-Zanden, 2007; Locke, 2013; ILO, 2017; Amengual, Distelhorst, and Tobin, 2019). For instance, the result of the International Labor Organization (ILO)'s 2017 survey of 1026 sample suppliers covering nearly 1.5 million workers shows that working conditions rank the least concerned criteria for suppliers assigning orders compared to other factors including delivery speed, previous relationship, price, and product quality. And in Amengual, Distelhorst, and Tobin' s (2019) study of an apparel brand that tried to assign more orders to suppliers

who have improved labor compliance, the brand failed to deliver those rewards because the rigid commercial relationships hindered the flexibility of timely order relocations.

Notwithstanding those rich insights provided by previous scholars, given buyers' unwillingness to share their sourcing details, the interaction between sourcing and compliance still remains the least researched in the field (Kuruvilla et al, 2020). Existing literature rarely looked at the inside dynamics to show the mechanics of how buyers' sourcing decisions affected compliance. We know little about how this weak linkage between purchasing practices and compliance efforts comes into place. Lastly, existing investigations primarily stay in large first-tier suppliers. The lower-tier suppliers' labor conditions in global supply chains remain relatively unobservable to the public.

Based on a mix-method case study of a second-tier supplier to Apple, this study provides the first-of-kind evidence to unpack how purchasing practices impact labor conditions of lower-tier supplier factories in global electronics supply chains. Specifically, I argue that a) volatile purchasing practices are the root cause of labor violations in the forms of excessive overtime and extensive use of student interns, b) the isolated auditing and sourcing working mechanisms in buyer's management systems impede the possibility of linking future sourcing decisions in tandem with compliance performance. I arrive at this argument by content analysis of this supplier's auditing records spanning ten years, correlation analysis of matched individual attendance records and datasets of demand, production and purchasing

volumes of half year range, as well as qualitative narratives through 51 stakeholder interviews and 2 months of participant observations in levels both of managements and shopfloors.

In terms of generalizing the implications to a broader context, the critical management system problem of disconnected sourcing and compliance within the buyer itself is a quite universal management system issue across industries. Compared to industries such as apparel and agriculture, the electronics sector is a setting where one would expect better-improved working conditions in its supplier factories, given its higher technology, larger scale, greater operational capabilities, and better capital resources (Locke & Samel, 2017; Kuruvilla, 2021). And the limited pool of qualified electronics suppliers (Chen & Lee, 2017) and relatively a smaller number of well-known electronics brands are supposed to nurture a closer form of buyer-supplier relationships. All these advantages give the buyer in electronics better leverage and more coverage to manage more suppliers, however, they do not make a big difference regarding social compliance performance progress. The key obstacle here is the same issue of isolated sourcing and compliance working mechanisms within the buyer itself as what has been showcased in Amengual et al.'s (2019) study of the apparel industry.

Below, I start by reviewing the existing literature and practical developments regarding purchasing practices and labor conditions in global supply chains. This is followed by describing the study's setting, data collection, and analysis strategies. I then present the findings of this supplier's compliance picture in a decade by tracking the annual auditing records, which exposes this supplier's data falsification of working

time records. I then accordingly examine how fluctuated working schedules are determined by volatile purchasing practices, which also illustrates an additional, but not unexpected, form of labor violations aroused by volatile purchasing practices - extensive use of student interns. The last part of the findings provides the dynamics of how the disconnection between purchasing practices and compliance efforts come into play, which explains why private regulation failed to motivate compliance improvements. After that, I discuss the contributions to the literature. Following this, I conclude by summarizing the limitations and proposing opportunities for future research.

LITERATURE REVIEW

Purchasing practice is a much-discussed term used in many fields, including labor studies, research on production and operation management, and industry studies. Labor scholars examined purchasing practices in global supply chains from the perspectives of private regulation on labor standards or global labor governance. Operation and supply chain management studies work on "responsible sourcing" strategies to minimize the costs and risks for global brands both economically and socially. Industry-level investigations specify how supply chain is governed in disparate sectors and provide insights into how purchasing strategies vary in different sectors.

The rationale for purchasing practice synthesizing these differed research interests together is its nature as an economic transaction that connects the players in global supply chains tier by tier. In David Weil's (2014) words, one form of the fissured workplace is a tiered structure of the global supply chain as a result of off-shoring and outsourcing of productions since the 1990s. Given it is purchasing practices that tie these fissured working environments together through commercial transactions, purchasing practices consequently have become a critical subject to understand regarding the dynamics of how different tiers interact via global supply chains.

This chapter reviews the critical literature concerning purchasing practices in global supply chains, especially in the setting of global electronics industry. The review starts with examining the growing body of labor literature investigating

purchasing practices' role in the model of private regulation of labor standards. Next is reviewing the existing empirical studies of labor conditions in the electronics industry. After that, this chapter briefly supplements relevant perspectives from the field of supply chain management. Before developing the argument of this study, it also introduces contemporary developments of civil groups' advocating for responsible sourcing in global supply chains.

Purchasing Practices and Private Regulation of Labor Standards in Global Supply Chains

It has been three decades since leading global brands used Codes of Conducts (CoCs) to privately regulate their global suppliers' social compliance performance concerning labor conditions and environment issues. As Amengual and Kuruvilla (2020) summarized, the typical private regulation model has three pillars: a) setting the standards through corporate Code of Conduct, b) conducting audits to assess suppliers' compliance with the CoCs, and c) making improvements by linking the auditing results with future sourcing decisions. After 30 years' development, researchers have well-acknowledged the failure of this private regulation model in making effective labor compliance improvements (such as Barrientos & Smith, 2007; Bartley & Egels-Zanden, 2015; Locke, 2013; Morris, Jenkins, Donaghey, 2020; Kuruvilla et al., 2020).

To explain the ineffectiveness of private regulation, existing studies have investigated each of the model's three components. Among those investigations, the weak linkage between compliance records and future sourcing decisions has been the

least researched, by virtue of brands' unwillingness to share their sourcing data (Kuruvilla et al., 2020). Until recent years, with more purchasing data becoming accessible, scholars' hypothesis of lack of linkage between buyer's sourcing and compliance strategies has gradually developed into more evidence-based verifications rather than the well-acknowledged speculations in the early years.

To date, one of the early discussions on the impacts of buyers' purchasing strategies on codes of conduct compliance performance can be found in Egels-Zandén's case study of nine Chinese suppliers for Swedish toy retailers in 2007. Through 108 unannounced interviews with suppliers' employees, Egels-Zandén (2007) discovered a problem of buyers' poorly aligned incentives which prevents suppliers from making compliance improvements. And accordingly, he suggested a better integration of non-economic criteria into future purchasing processes. Similarly, Locke, Amengual, and Mangla (2009) questioned the faulty assumptions of private regulations, one of which referred to "the appropriate incentives required to change behavior and promote improvements in labor standards" (p. 320). Specifically, using a case study of a leading global apparel brand's global suppliers, Locke and his co-authors raised doubts about whether and how "audit information is translated into purchasing decisions" (2009, p. 334) after interviewing stakeholders from both the buyer and suppliers, observing auditing activities, and analyzing auditing records.

These two early years' case studies have showcased scholars have long contested the separation of purchasing decisions from monitoring activities within

buyers themselves. However, this hypothesized problem of flaw incentives is hard to empirically test, again, given the lack of detailed sourcing data.

In recent years, with the utilization of novel datasets, researchers have shed more light on the relationship between sourcing and compliance more directly. Distelhorst and Locke (2018) analyzed a large-scale firm-level trade dataset to examine how the economic transactions respond to compliance performance. And they revealed that achieving compliance is associated with an average increase of 4% annual purchasing, according to difference-in-differences estimates from over 2000 manufacturing facilities in 36 countries, primarily covering the apparel and retail industry.

On the contrary, Amengual, Distelhorst, and Tobin (2019) found that purchase orders did not increase when suppliers' labor standards improved. Their argument stepped out from a first-of-its-kind data set from a U.S. apparel brand, which allows them to link detailed auditing and compliance records of over 100 suppliers with specific order details (concerning the date, price, and volume) sourced from these same group of factories. This more granular matched data set from the buyer end did not show the same incentives mechanism verified in Distelhorst and Locke's (2018) firm-level trade data analysis. And based on interviews with the buyer company managers, Amengual and his co-authors further attributed the buyer's failure to reward factories that improved labor compliance to the rigid commercial relationships in the supply chains (2019). They explained that this inflexibility inhibited buyers' capacity

to reallocate the orders when trying to provide incentives/punishments in response to its suppliers' compliance performance (Amengual, Distelhorst & Tobin, 2019).

In addition, Anner's series of seminal papers (2018, 2019, and 2020) have also paid particular attention to purchasing practices and workers' rights in the context of the global apparel industry. He uses "predatory purchasing practices" to describe the power imbalances between buyers and suppliers (Anner, 2019). This refers to the ability of buyers to play one supplier off against another to lower cost, shorter lead times, and adjust order volumes. He further summarized these impacts into two mechanisms: A pricing squeeze concerning the price and a sourcing squeeze concerning lead time, order volume, and order volatility (Anner, 2020). And both mechanisms further impact downstream workers in the form of lower wages, increased work intensity, forced overtime, and unauthorized outsourcing to unsafe factories (Anner, 2018, 2019, and 2020).

In these papers, Anner showcases the chain effects of squeezing dynamics in three different national contexts with a shared focus on the apparel industry: Vietnam, Bangladesh, and India. Also, all these three papers share a similar research design. He tested his argument through trade data to capture the pricing decline, and survey data is complemented with interviews to illustrate the sourcing squeeze experienced by suppliers and workers. For instance, in the case of Vietnam, the price U.S. buyers paid for Vietnam's top export, cotton blouses, experienced a 29% drop from 2005 to 2016. And regarding the work intensity, 52% of 340 surveyed Indian factories chose "increase overtime hours" in response to buyers' peak orders, with 51% choosing to

use contingent workers such as home workers. However, notwithstanding Anner, who has provided insightful explanations of the squeezing mechanisms among sourcing, pricing, and workers' rights, the datasets utilized could not directly link these chain effects together. This weakness is rooted in the separated data sources – regional trade data on sourcing and pricing, with qualitative findings on suppliers' and workers' perspectives.

In summary, existing literature on the weak linkage between sourcing and compliance has evolved into more evidence-based examinations than acknowledged speculations over time. Take all these above-reviewed empirical case studies together, the relationship between purchasing practices and compliance strategies delineated by these researchers contains two sub-streams chronologically, a) the relationship between sourcing and labor compliance – how purchasing squeeze has contributed to labor violations in Anner's papers, and b) the relationship between compliance results and future sourcing – how a lack of linkage of the two provides little incentives for improvements, such as Egels-Zandén, Locke, Amengual, and Distelhorst' s papers.

Concerning the relationship between sourcing and compliance performance, existing literature rarely looks at the inside dynamics to show the mechanics of how buyers sourcing decisions affects compliance; then, in terms of the relationship between compliance results and future sourcing decisions, although researchers normally have supplemented the quantitative analysis with evidence from interviews or surveys to contextualize the poor alignment, the focus stays on proving the fact of disconnection as an outcome. The process of how this apparent segregation comes into

play, and why it exists remains unexplored. Apart from this, another commonality shared in those cases is their common focus on the garment and textile industry. Then, what do we know about labor conditions in global electronics?

Labor Conditions in Global Electronics

The global electronics industry is a setting where one would expect better overall labor compliance and improved working conditions (Kuruvilla, 2021; Locke & Samel, 2017). Locke and Samel (2017) attributed this higher expectation to in contrast to typical images of apparel and footwear suppliers from the global south, suppliers in this higher technology sector of electronic supply chains possess "considerable capital resources and operational capabilities" (P3). However, the working conditions in electronics supply chains are often highlighted by heart-breaking tragedies, one example is 14 workers jumping to their deaths in Foxconn, one of Apple's largest leading suppliers (Ngai & Chan, 2012). Smith and Chan (2015) revealed that student interns in China, as a type of constrained labor, are subject to dual controls from school teachers and workplace managers. Lately, in the seminal book "Dying for an iPhone" (2021), Chan, Selden and Ngai vividly demonstrated how workers, especially student interns, are suffering from Apple and Foxconn's business model. The book is tightly followed by a round-table discussion of eight scholars (Chan, et al., 2021) to reflect what can be done by different roles of workers, buyers, NGOs and consumers to assure the protection of workers' interests after the Foxconn suicides. And at the end of this collaborative discussion paper, they call for more new labor studies of

procurement policies and practices for implementing ethical purchasing behaviors in global electronic industry.

In 2015, China Labor Watch investigated the labor conditions in Pegatron, another leading supplier to Apple. Its analysis of Pegatron workers' pay stubs revealed the phenomenon of excessive working hours even after the suicides in Foxconn: An average of 60+ working hours per week for each worker, and 52% of workers completed more than 90 hours of overtime per month. China Labor Watch (2015) accentuated that the media attention has improved labor conditions, not Apple's self-monitoring.

Apart from Apple, Hewlett-Packard (HP) is another electronics brand that several scholars have examined. Locke, Rissing, and Pal (2013) emphasized that the interactions between private regulations and public state regulations are contingent on the ground within and across different national settings. This is supported by an analysis of HP suppliers' auditing records and fieldwork at a matched pair of suppliers in Mexico and the Czech Republic. Adopting a similar research design of HP's global suppliers, Distelhorst, Locke, et al. (2015) highlighted that national context is the key predictor of workplace social compliance performance. In their paper, the analysis of HP suppliers' audit results revealed that the item of working hours has the worst performance at around a 22% - 30% compliance rate among all 20 items concerning labor, health & safety, and environment.

Still using HP as a critical case analysis, Locke and Samel (2017) changed their focus to upstream business decisions and the corresponding impacts on labor

issues. Specifically, they summarized the characteristics of electronics industry as broad selection of products, fast product introductions, low inventory of unpopular products, quick response to consumers' demands. As a result, electronic industry requires downstream manufacturers guarantee a flexible labor supply with fast reaction to time-sensitive adjustments to support this business model. International Labor Organization (ILO)'s working paper (McFalls, 2016) also provided insights of how the specific procurement practices in the electronic global supply chain featured as a "bull-whip effect" have translated into a demand for a highly flexible workforce, with an extensive use of temporary workers.

It is worth mentioning that Locke and Samel (2017) use upstream and downstream differently compared to some supply chain management researchers. That is, some researchers like John Thorbeck and Rachel Henderson use up/downstream in a reverse way. They call suppliers at the early stage of producing a product "*upstream*" and recognize brand buyers and individual consumers as "*downstream*" markets concerning the final mature stage of a completed product. Their perspective is based on the sequences of product development. In contrast, Locke and Samel emphasize the top-down procedure of buyers' making commercial decisions from upstream which will ultimately impact shopfloor activities. In this research, I will follow Locke and Samel's approach.

In sum, a review of the literature includes those who have noticed how purchasing practices may lead to various forms of labor violation. However, this reasoning process lacks robust data that could directly build the relationship and

document the mechanics of how sourcing influences compliance. Also, all we know remains in giant first-tier suppliers like Foxconn and Pegatron. Admittedly, some researchers have entrenched their arms in lower tiers of electronics manufacturers (such as Navdi & Raj-Reichert, 2015; Raj-Reichert, 2013). Their focus here is on health and safety governance. Investigations into labor standards in low-tier suppliers remain scarce.

Responsible sourcing in global supply chain management

Scholars of production and operation managements have also studied purchasing practices. In a review paper that traces the evolution of purchasing research, Mogre, Lindgreen and Hingley (2017) highlighted the transition of purchasing "from a single business function to a cross-functional business process" (p. 251). The diffused area including corporate strategies, marketing, as well as supply chain management. This holistic view goes beyond purchasing as a singular business function, and encompass an integration of purchasing and supply, operations and logistics together. This integrative approach aims at tracking the problem that "purchasing may act in its own best interest, rather than in the best interest of the organization or team" (Ellram, Tate, & Choi, 2020, p. 3)

Supply chain management researchers investigated responsible sourcing strategies either from the buyer's or shareholders' perspectives, but not the workers. For example, Kim, Wagener and Colicchia (2019) proves that supplier sustainability risks are associated with a 1% reduction in shareholder wealth. Out of the concerns for supplier responsibility risk for buyers, some scholars termed the supplier social

responsibility issues as a "soft quality" problem of the products. Chen and Lee (2014) categorized violations by unethical suppliers into two types, material violations and process violations. In contrast to material violations that can be detected by quality inspections of the final product, process violations, such as how labor are treated the in the process of productions, is often unobservable and made known later by whistle blowers or an actual accident. In a very similar vein as private regulation scholars, Chen, Yao, and Zhu (2020) critiqued the efficacy of auditing practices to avoid errors in suppliers' screening process, and Chen and Lee (2014) also suspected that once audits identify potential problems in the screening process, whether incentives such as price premium, increased future businesses, or investments in training can be realized to change supplier behaviors.

Chen and Lee (2014) further proposed contingent payment contracting arrangements to help strengthen the incentive mechanisms. This contingent pay includes an upfront payment and a second part withheld in process violations situations, either a bonus or a penalty. These forms of substantiative economic incentives ideally would help tackle the "factory manager dilemma" in Khan, Ponte, and Lund-Thomsen' s (2020) examination of the double challenges faced by factory managers – "absorb the consequences of global buyers' unsustainable purchasing practices and reduce their own profitability – all in the name of sustainability" (p. 766).

Regarding research on low-tier suppliers, supply chain management scholars seem to have more investigations. Villena and Gioia (2018) investigated nine tier-one

suppliers and 22 lower-tier suppliers covering the automotive, electronics, and pharmaceutical industries. They revealed how passively lower-tier suppliers are involved in environment and labor sustainability management as the riskiest suppliers. Using the same dataset, Villena (2019) further contested the critical role of procurement in building sustainable supply chains - a missing link where the lack of collaboration between procurement and internal (i.e., sustainability and R&D) and external stakeholders (i.e., industry associations) limits MNC's effort to promote sustainability throughout the supply network" (p. 1149).

It is not surprising that some supply chain scholars have reached a very similar conclusion to labor scholars on the impacts of purchasing strategies and practices, even though their primary focus on stemmed from products and productions rather than workers. What lacks is a cross-disciplinary integration to provide a more comprehensive picture to delineate the dynamics of how purchasing matters in the process of production and the corresponding effects on the labor process.

And it is inspiring to see some labor scholars (such as Kuruvilla and Li, 2021) have made exemplary interdisciplinary attempts to set research agenda for researchers from both labor and supply chain management scholars in addressing some fundamental labor rights of freedom of association and collective bargaining. Similarly, tackling the systematical problems aroused by purchasing behaviors would not be possible without the perspectives of supply chain management, given it is closer to the industry.

Civil Society Calling for Responsible Sourcing

In the practical world, practitioners have also acknowledged the significance of responsible purchasing practices in providing decent labor conditions in global supply chains. And multi-stakeholder organizations have initiated various monitoring programs, specifically focusing on the purchasing practices. One critical case is Better Buying. By creating an index of Purchasing Practices based on seven categories, including Planning and Forecasting, Cost and Cost Negotiation, Payment and Terms, Win-win Sustainable Partnership, Design and Development, Sourcing and Order Placement, and Management of the Purchasing Process, Better Buying encourages suppliers anonymously to rate their buyers' purchasing behaviors via an online rating system. The index's overall scoring is calculated by the average of the scores of 0-100 in each of the seven categories.

Better Buying's annual report for the past two years indicates that purchasing practices experienced by suppliers is quite dismal. Specifically, the overall score reached at only 66 based on 918 received ratings in 2021, which has almost no improvements, compared to the overall score of 64 in 2020 (n=873). In both years, the lowest rating came in the category of Sourcing and Order Placement, with a range of 25 to 30 on a 100-point scale. And this category is also the only one that has decreased from 2020 to 2021. Notably, so far, Better Buying’s programs still stay primarily in the apparel, footwear, and household textile industry.

Building on Better Buying's efforts, a large working group of MSIs have collaborated in drafting a "Common Framework for Responsible Purchasing Practices

(CFRPP)." This collaborative team compasses representatives from many influential MSIs such as the Ethical Trading Initiates, Ethical Trade Norway, Fair Wear, the German Partnership for Sustainable Textiles (PST), and the Dutch Agreement for Sustainable Garments (AGT), Fair Wear, and Better Work, etc. Although the current CFRPP is focused on textile and footwear, this working group is visioning expanding to other industries in the future. Furthermore, recent discussions have taken place about responsible purchasing as part of the EU's mandatory due diligence laws, covering every sector, including electronics.

In short, all these recent developments of civil society groups indicate that more and more practitioners have increasingly put purchasing practices in a critical place of effectively enhancing labor conditions in global supply chains.

Towards an Argument on Purchasing Practices and Labor Conditions

The studies and reports reviewed here have exposed several research opportunities in extending our current knowledge of purchasing practices and labor conditions in global supply chains. First is a lack of direct data that could particularly showcase the relationship between purchasing activities and labor violations. Then, lower-tier suppliers' labor conditions are scarcely investigated. Lastly, but most importantly, there is a separated locus of workplace and production process among different fields that have conducted purchasing research. Understandably, labor scholars dive into factories because it is "where workers are employed and where we observe the vast majority of the violations in labor standards and worker rights" (Locke & Samel, 2017, p. 2-3). However, efforts to trace the upstream commercial

decisions as sources of poor working conditions are relatively rare. On the other hand, supply chain scholars stand from the point of upstream business strategies of minimizing risks of product and production, less from the supplier and workers' perspectives. Inspired by all these research opportunities, in this study, I examined a second-tier supplier to Apple with matched auditing, production, and commercial records, also complemented with two-month fieldwork, to first document the relational developments between purchasing, labor compliance, and future purchasing, and further explain the inside dynamics of these interactions. And it will argue that purchasing practices are the origins of some labor violations, and the managements system problem of disconnection between sourcing and compliance further hinders compliance improvements.

RESEARCH SETTING AND METHODS

I conducted a multi-method, inductive case study of a second-tier supplier of Apple to examine the impacts of Apple's purchasing practices on the supplier's shop floor labor conditions. I collected data through various sources, including 51 stakeholder interviews, two-month observations and participations, the supplier's archival datasets covering 10-year annual auditing reports, and half-year range of attendance records, production, and delivery records, as well as Apple's publicly available online reports regarding its supplier management. After data collection, I adopted a three-step analysis strategy — the results that emerged from the former step inform the research subjects of the following step. In detail, I first generated a compliance picture of this supplier by tracking its 10-year auditing records. I then examined the impacts of purchasing practices on labor violations with both quantitative and qualitative evidence. Lastly, I provided qualitative findings to explain how the disconnection between sourcing and compliance were formed during the production and purchasing process.

The following sections provide details about the selected case, the collected data, and the analysis strategies used.

Research Site

I undertook my research at XYZ (a pseudonym), a top electronic components manufacturer in China. At the time I conducted my field research in the year of 2021, XYZ had a yearly sales revenue at over 300 million dollars, with around 7000 contracted employees in three different cities in China. The main electronic parts

produced by XYZ include cables, hinges, lenses for all kinds of computers, communications, and consumer electronics for leading brands such as Apple, Microsoft, Google, Amazon, etc. Notably, XYZ has been supplying to Apple for more than 10 years. And with a decade of development, Apple has become the biggest customer of XYZ, contributing around 60 percent of XYZ's yearly income**.**

XYZ as a second-tier supplier in Apple's global supply chains. In typical global supply chains, major brands tend to outsource (and offshore) the manufacturing of their products to multiple factories. This outsourcing is organized in a tiered structure, from raw materials to the final packaging. Thus, "first-tier suppliers" refer to the factories that supply to brands directly. Lower factories that supply to the first-tier suppliers are recognized as "second-tier suppliers" because they supply to brand indirectly. It is quite common that brands will allow first-tier suppliers to screen and source from among their very own suppliers as their choices, as long as the final product meets the standards of the brand. Global electronics supply chains generally follow this approach of organizing multi-tier suppliers but distinguish from other industries like apparel or agriculture, because electronic parts are customized and require the highest precisions.

Specifically, in electronics global supply chains, first tier suppliers primarily consist of large assembling, testing, and packaging factories, where the final stage of a complete product that is ready for the consumer market undertakes. As for the parts being assembled at the first tier, considering the technology and mechanical engineering standards needed for mass production of these highly accurate parts,

electronic brands will extend their reach to monitor how the first tier would source from lower-tier suppliers. For instance, in Nadvi and Raj-Reichert's study (2015) of Hewlett Packard (HP), they demonstrated how HP monitor and train some of its first-tier suppliers to govern these suppliers' own (second-tier) suppliers.

In the case of Apple, Apple is extremely dominant over its entire supply chain. Unlike how HP helps first-tier suppliers managing their own suppliers, Apple achieves its dominance by directly designating each tier's supplier for the parts they care about most. In detail, when sourcing for the critical electronic parts, Apple screens lower-tier suppliers on behalf of the first-tier suppliers and co-sign with the first-tier suppliers to make sure every part is produced in an Apple-designated factory. XYZ as a core mechanical parts manufacturer, directly communicates with Apple regarding the R&D, the demand, the price and all the order details. However, in most of cases XYZ will not paid by Apple directly[1]. XYZ receives final economic transactions of delivered orders from its next upper tier supplier – the final assembling testing and packaging centers. This is how XYZ serve as a second-tier supplier also experiences massive direct interactions with Apple.

The access to XYZ and the selection of case. I gained access to XYZ through the introduction of an informant who knows the general manager of XYZ. From winter 2020 to spring 2021, I made three phone interviews with this general manager to learn more about XYZ's general information, then describe my research interests

[1] Exceptions are XYZ's cost of injection molding, demo productions and all R&D related spendings.

and request for access. After these communications via phone calls which lasted nearly 5 hours in total, I was allowed to conduct my research at XYZ as a summer intern in 2021 with confidentiality agreements[2]. Apart from the internship, XYZ also offered me access to all the archival datasets concerning its employee attendance records, production and delivery records, correspondences of their managers with Apple, also annual auditing records. This unprecedented exhaustive accessibility makes this case selection fit into Yin's (2009) rationale of a revelatory case, where "an investigator has an opportunity to observe and analyze a phenomenon previously inaccessible to scientific investigation" (p. 42). Admittedly, the use of a single case also yields limitations, especially regarding the generalizability of the findings. To establish the trustworthiness of this research, I will provide a "thick description" with useful details to enhance the transferability of the case (Lincoln & Guba, 1985).

As an electronic parts manufacturer supplying for multiple different brands who are actually major competitors in the individual consumer market, XYZ is required to meet different buyers' high confidentiality requirements concerning the product designs. Hence, XYZ separates its production first based on the type of parts and then further specify the production lines for different brands. In other words, XYZ has separated exclusive production lines for different parts of different brands, without any mix of products. Among all XYZ's sites in three different cities, nearly half XYZ's workforce of more than 3000 contracted employees work in a factory located

[2] The primary purpose is to prevent any information from being disclosed that would reveal the identity of manufacturer XYZ.

in a city of the Yangtze River Delta region. Given this is the largest and prominent factory of XYZ, and where most of Apple's products are produced, I conducted my fieldwork there.

Then, in terms of the selection of a specific production line, I narrowed down by comprehensively reviewing the situations of all accessible production lines in this factory. Specifically, in the early weeks of my fieldwork, I spent the afternoons exploring different production workshops, including injection molding, cable production, hinge production, lens production, Factory Automation department, and Quality Control department. In each department, I observed the scale of its production lines, the specific stage of electronic parts being produced, who is the buyer, and how busy the production activities were. Apart from this, I also casually conversed with workers, department managers, and line managers during their break time to learn their thoughts of the working environments. After comparing and contrasting the similarities and differences of what I observed and interviewed on different workshops, one production line which is producing a certain part for Apple's 2021 newly launched product emerged as an ideal site for further in-depth investigations. In that this production line was right in the production peak time to meet Apple's 2021 Fall new product launching. This unlaunched status before fall provided analysis advantages that can purely capture the impacts of brand's purchasing practices by precluding the impacts of individual consumer behaviors in the final markets.

In sum, an exclusive production line for a specific part of an unlaunched Apple product provides an ideal setting to track how the buyer's purchasing practices of one given product impact the labor conditions more precisely.

Apple and its Supplier Responsibility Management. The buyer in this case study is Apple, Inc., the largest information technology company with revenue totaling 365.8 billion dollars in 2021. According to Apple's supplier list on its website in 2020, Apple has 193 global suppliers that cover 98% of its direct cost for materials, manufacturing, and assembly. Also, 152 of these suppliers have manufacturing activities in Mainland China. Apple adopts a typical private regulation model to monitor its suppliers' social responsibility behaviors. As Apple's report "How we work with suppliers" claims, Apple conducts a yearly visit to its suppliers to assess how those suppliers comply with Apple's Codes of Conduct (CoCs). Apple's CoCs are themed in five groups, including Labor and Human Rights, Health and Safety, Environment, Ethics, and Management teams. Each year, Apple's in-house assessors work with third-party auditors to conduct assessments through management interviews, employee interviews, document reviews, and site walk through. Based on the discovered violations, Apple will help the supplier make a Corrective Action Plan (CAP) and follow up with 30- 60- 90-day check-ins.

As above described, Apple highly dominates its supply chain and is not transparent about its purchasing practices. Though Apple has published several reports related to its supplier information on its website, including a supplier list, an annual supplier responsibility progress report, how Apple works with suppliers, and an annual

statement on efforts to combat modern slavery in its business and supply chains, we still know little about the actual purchasing practices. The rationale for Apple giving high confidentiality to its sourcing activities may be to protect its commercial information from competitor brands. Given Apple's unwillingness to share its sourcing details, the best way we can capture Apple's purchasing practice is from the supplier end.

Data Collection

Data collection involved both primary and secondary sources. I conducted interviews, participant observations during the two-month field work at XYZ. In addition, I also conducted archival work concerning the auditing reports, attendance records, working time records, as well as sets of schedule, production, and delivery records. Below I introduced each of these data sources. A summary of collected data can be found in Appendix A.

Ethnographic Data. I interned at XYZ in July and August 2021 for a total of 48 days. In July, I did participant observations as an HR intern, during which I observed how production activities and compliance practices are arranged through inter-actions of different departments and different production sites within XYZ. I also observed XYZ's weekly meetings with its buyers, with local government officials and one safety issue auditing from Apple. During the first month, I also detailed toured every accessible production line in this factory to help narrow down the specific production site for more in-depth exploration. In August, I worked as an operator on a production line for one of Apple's 2021 new products. I did two weeks of day shifts

and one week of night shifts. During this period, I worked and lived with workers and technicians together, which allows me generated a deep understanding of how daily production activities are organized in a typical electronics global supply chain and the impacts on an individual's work and life from an emic perspective.

The observations and participation as an intern also helped me better engage with XYZ and be more involved in XYZ's employees' community, which helped me build rapport with these employees and build the trust that we can communicate freely. In total, I conducted 51 interviews with different stakeholders in this two-month field work. The data collected through interviews were "open-ended, in-depth exploration of an aspect of life about which the interviewee has substantial experience, often combined with considerable insights" (Charmaz, 2002, p. 676). This exploration includes more structured ones in the meeting rooms with XYZ's middle managers from different production departments, Production Engineers, HR managers, product managers and the General Manager. These employees have more directly inter-actions with brands and provide a management level perspective on their working experiences with both first-tier suppliers and the brands. Apart from this, interview activities also compass small talks with line managers, operators, technicians and engineers working on production lines during our lunchtime and the walks to commute to the factory, to learn about their individual thoughts on the working environments such as their individual working time schedules, workload intensities, compensation, and also their experiences of participating auditing activities. The insights of different stakeholders

help triangulate a more comprehensive and trustworthy picture. A summary of primary interview protocols can be found in Appendix B.

All the interviews varied from twenty minutes to four hours, with an average at around one hour and a half. During the communications, I "tweaked and honed" the questions in the moment of conversation, following the insights as they emerged from the interviews (Pratt, Kaplan &Whittington, 2019). To keep a record of data gained through interviews, instead of using a recorder, I decided to take shorthand notes of my interviews to give participants more room to talk freely. I further organized my field notes into a time-ordered transcripts for analysis. Lastly, I also did member checks through reporting my summaries to several key informants, to avoid possible misunderstandings or potential personal bias.

The Ethnographic Data collected through interviews, observations, and participations are recorded in the form of 74 pages of hand-writing notes in two different notebooks. And I kept the copy of those notes for later analysis.

Archival Datasets. XYZ also provide to me access to sets of datasets that cover its auditing practices, workers' attendance records, order details and production volume related records. In the following, I will explain how each set of data were stored and how I made them ready for analysis.

The first set of data concerns XYZ's auditing reports. XYZ's auditing practices with Apple in the past 10 years (with one year missing) are detailed documented in Apple's annual auditing reports spanning from 2012 to 2021. I supplemented the auditing records with Apple's publicly available online reports regarding Apple's

CoCs, Apple's approach of working with its suppliers. These two sources of data help generate a longitudinal compliance picture of XYZ.

Secondly, XYZ also gave me the access to workers' attendance records. Outside each production site, there is an attendance machine that every worker swipes their worker ID card to check-in and check-out every workday. This system detailed recorded workers' individual daily attendance information. And after deleting the identifiable information, XYZ provided me with the authentic working time records in Excel sheet books that were directly downloaded from the attendance machine.

The third set of archival data concerns the records of Apple's demanding volumes, XYZ's actual production volumes, and Apple's final purchasing volumes of my focal production line – the line producing a core mechanical part for a 2021 Fall newly launched Apple product. Notably, apart from these numeric records, I also collected some correspondences between Apple's Global Supplier Manager and XYZ's product managers. These correspondences are kept in the form of screenshots of emails and text messages after deleting identifiable information. The correspondences supplement how Apple communicates the changes of weekly order volumes and why Apple wanted such adjustments. The rationale for collecting this set of data is that these records provide the dynamic interactions and development process of purchasing practices. That is, how Apple notifies its demands for XYZ, which provides a base for XYZ's production plans, how XYZ manages production capacities, working schedules, and workload intensities to make production progress, and how the final purchasing decisions are made. These provide comprehensive lenses to capture

Apple's purchasing behaviors and also delineate how purchasing practices impact XYZ's shopfloor production activities and, accordingly, workers' labor conditions.

In detail, as Figure 1 illustrates, once the design of a product is finalized, Apple's demanded volume is sent out directly by Apple's global supplier manager (GSM) to each tier's suppliers in the form of weekly Mass Production Schedules (MPS). This demand dataset notifies XYZ about how many pieces of parts Apple will need by a certain week. In other words, it informs and guides XYZ to make production plans to meet the demands. Then, the production records documents how many XYZ produced each day. Lastly, the third dataset of delivery records is the number of pieces that Apple notifies XYZ to deliver to the Final Assembly, Testing and Packaging (FATP) centers each week. That is to say, these delivery records indicate how many pieces are eventually purchased by Apple each week. In preparation for analysis, I first aggregated the daily production volumes into the corresponding week to match the demand and purchased volumes which are recorded on a week base.

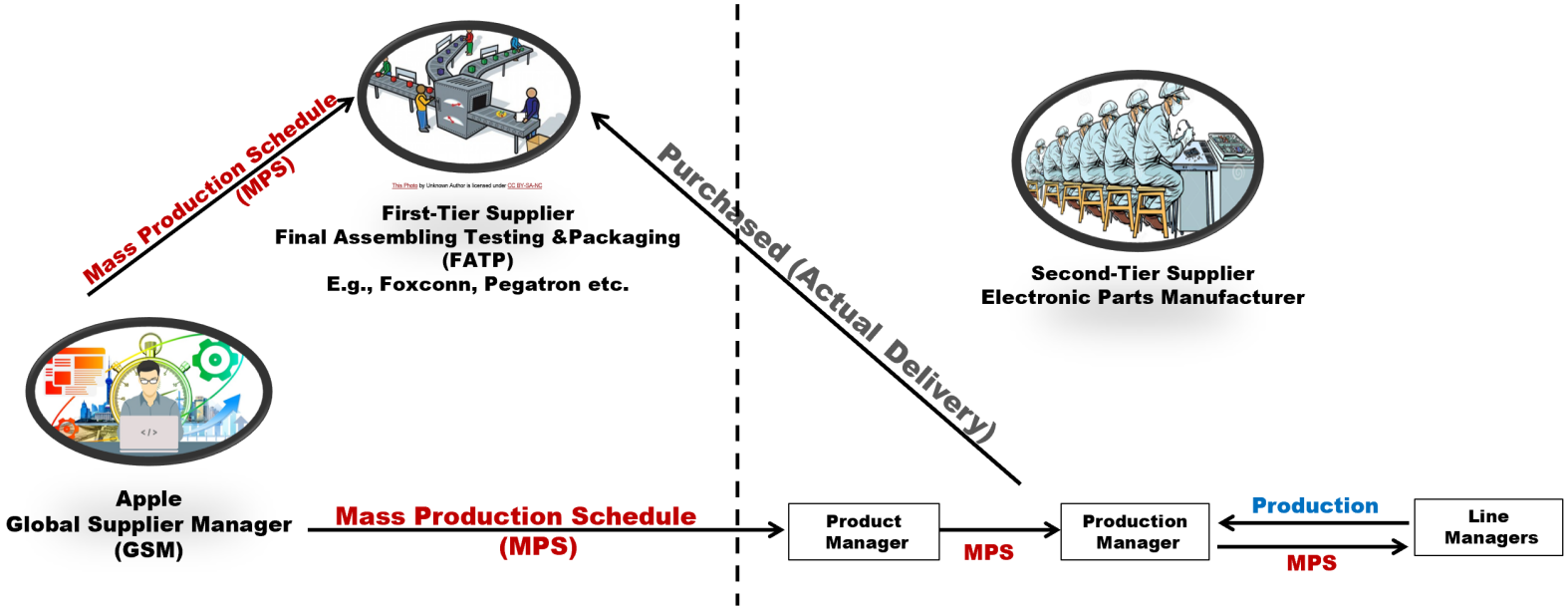

Figure 1. Schedule, Production and Actual Delivery of a Second-Tier Supplier

Data Analysis

I applied inductive techniques to analyze the data. Adopting a three-step analysis strategy, the research subject of each step is informed by the findings emerged from the previous step. Procedurally, I started from reviewing the auditing records to track how XYZ has behaved in the past years' auditing initiated by Apple. This longitudinal tracking provides an overall compliance picture, also reveals the issue of working-time violations. Following that, I did correlation analysis to explore the interactions between sourcing and production activities, especially working time management. I also triangulated this correlation with ethnographic data to show how purchasing practices contributes to of excessive overtime. And an additional but not unexpected finding concerns the abusive use of student interns, another violation raised by fluctuated purchasing practices. Lastly, my qualitative findings generate an explanation of how the supplier experiences the disconnection of Apple's sourcing and compliance monitoring, and even take advantages of this disconnection.

FINDINGS

Compliance Picture Over a Decade

I started the data analysis from reviewing XYZ's auditing reports going back 10 years. Each year, one assessor from Apple worked with 2 to 5 third-party auditors to conduct a one to two days assessment at XYZ. After each assessment, XYZ received a report which contained this supplier's performance assessment in terms of every item listed in the Apple's codes of conduct.

To better utilize XYZ's archival auditing reports and also figure out how to interpret these reports, I referred to Apple's publicly available online report "How We Work Suppliers". On Page 6, the report states that Apple has developed a 100-point scale to rank assessed facility's performance in different categories, and one facility's final composite score of the year is the average of those scores. Apple further explains how to interpret these results on page 9. Suppliers with a full score of 100 will be labeled as "High-performer", suppliers with scores of 89-60 will fall into the categories of "Medium-performer", and suppliers whose scores are less or equal to 59 will be recognized as "Low-performer".

Unfortunately, when analyzing XYZ's ten years' Apple auditing reports, I could not find any above-mentioned scores. I then contacted the HR director and EHS manager to see whether they have been informed of their scores of assessments or at least what kind of performer they belonged to in any of forms in the passing 10 years. Their reaction indicated that they had no clue about both the 100-point scale scoring system and the three categories of performance evaluation. After I explained how the

high-, medium-, and low-performer are categorized, they suggested me to interpret XYZ as a medium performer,

> *We are not high-performer for sure, we have violations detected every year, full score of 100 never happened…and we are not low-performer either, we still got orders which means we passed the audits…I think we are closer to the middle group. . ..*

Then, how did a self-claimed medium performer behave over the decade?

Table 1 summarizes XYZ's number of violations in each section from 2012 to 2021. I did not see a clear trend of XYZ's overall compliance over the past ten years. On the positive side, the violations of CoCs on Health and Safety and Management System had decreased. However, there existed ongoing violations in Labor and Human Rights and Environment related issues.

Table 1. Number of Violations in Annual Auditing Results, 2012 - 2021(with one year missing)

Year	2012	2013	2015	2016	2017	2018	2019	2020	2021
Labor and Human Rights	4	5	9	4	2	5	1	4	3
Health and Safety	12	5	8	5	8	3	1	2	3
Environment	3	5	6	7	3	4	1	4	3
Ethics	0	0	0	0	0	0	0	0	0
Management System	4	1	0	0	1	0	0	0	0
Total Violations	23	16	23	16	14	12	3	10	9

I further reviewed the XYZ's specific violations of Labor and Human Rights for each year, which are summarized in Table 2. It was surprising to see there were no violations of working hours since 2017, while other violations seemed to never

completely be resolved. And the reported working time violations are all centered around overtime, as can be seen in Table 3.

Table 2. Number of violations on Labor and Human Rights, 2012 - 2021(with one year missing)

Year	2012	2013	2015	2016	2017	2018	2019	2020	2021
Anti-discrimination	0	1	2	0	0	1	0	0	1
Working hours	2	1	1	1	0	0	0	0	0
Wage, Benefits and Contracts	2	3	3	3	1	3	1	2	1
Prevention of Involuntary Labor	0	0	1	0	1	0	0	1	1
Total Number of violations on Labor and Human Rights	4	5	9	4	2	5	1	4	3

Table 3. Summary of violations of working hours, 2012-2016

Year	Violations of Working Hours
2012	Weekly working hours exceed 60 hours, monthly overtime exceeds 36 hours; Monthly overtime exceeds 36 hours.
2013	Weekly working hours exceed 60 hours.
2015	Inaccurate working hour system.
2016	Weekly working hours exceed 60 hours.

Given this, I interviewed the HR director to see what kind of actions XYZ had taken since 2017, that they have avoided any working time violations in the following 5 years. The HR director explained as follows,

In the early years, we insisted on exposing our OT situation to the customer, because we wanted to make the assessor realize that it is impossible to deliver the orders they want without OT. However, after years of reported violations without any change..., we decided to follow the trend..., since the year of 2017, we keep a separate set of working time records prepared for the audit. . ., OT violation is never a problem again . . ..

Therefore, what makes overtime become the Achilles' heel that XYZ has no choice but to falsify the data to pass the audit? How are working schedules arranged? In order to understand how working time are managed, it is first necessary to explore how production activities are organized on the shop floors.

Productions In Volatility - How Purchasing Practices Impact Labor Conditions

The evidence I used to delineate the dynamics between purchasing practices and production activities concerns three sources of data. These three sets of data respectively documented the volume that Apple initially demanded, XYZ actually produced, and Apple eventually purchased, on a weekly base, over a half year range in 2021.

I started by comparing this predicted demanded volume with actual pieces that were eventually purchased by Apple. This demanded volume is the official reference for each tier supplier's production managers to make official production plans, and accordingly assign materials, machines, as well as labor force to a certain production line of a given week. As the Figure 2 below shows, the demanded volume first steadily grew to nearly 100,000 pieces from week 24 to week 35. After it slightly decreased to

60,000 pieces at week 41, the demand climbed back to nearly 100,000 pieces, and then keep steady at that level for the following weeks. In contrast, the actual purchased volume reflected by the delivery data, in the grey line, was highly fluctuated. Notwithstanding it is understandable and quite common that there would be a gap between the volume Apple initial demanded and Apple actual purchased, it is still shocking to see how large that gap can be.

Figure 2. Weekly Changes of Demanded and Purchased Volume

Figure 3 illustrates a week-to-week change of actual purchasing volume. These weekly deviations range from nearly 1.5 times increase to an 88% decrease from the

previous week.

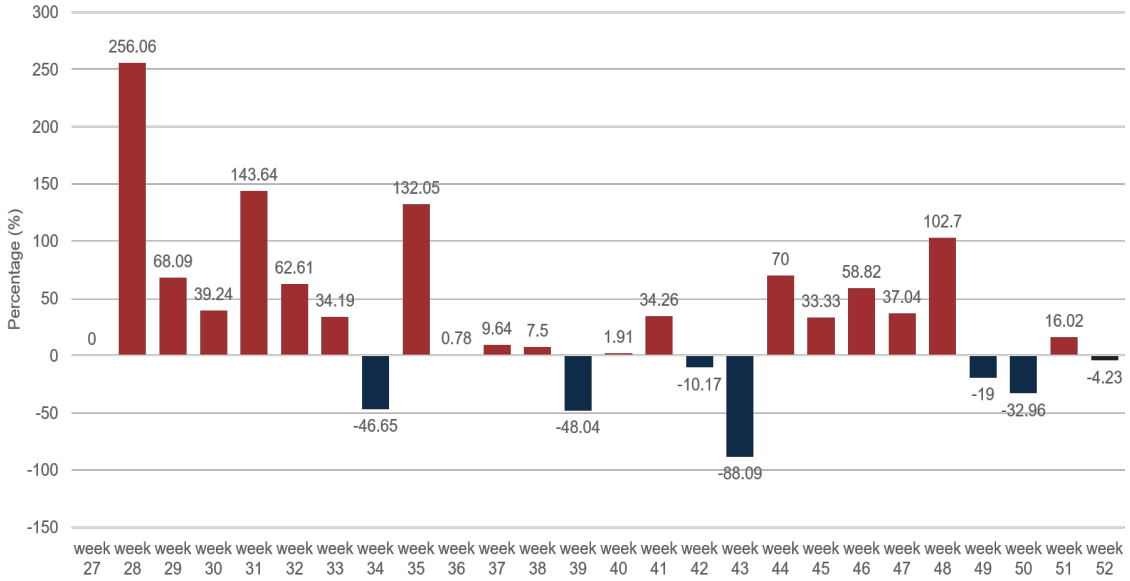

Figure 3. Week to Week Changes of Actual Purchasing Volume (Percentage)

Then why weekly purchased volumes could be so fluctuated and deviated a lot from the previously informed demands? Given this production line is supplying a new Apple product that has not been launched by Fall 2021 (Week 43), the uncertainty from individual consumer demand in the final electronics market cannot fully explain Apple's highly fluctuated sourcing behaviors. I interviewed the product manager and production managers to understand how Apple would notify them of the changes in order information and how they would react to that. Based on their correspondences with Apple's Global Supplier Manager (GSM) during that half-year, in general, Apple would adjust its weekly sourcing amount at XYZ in response to both upstream FATP centers' assembling progress and XYZ's competitors' production situations.

As Figure 4 demonstrated. In week 26, the messaged conveyed was to keep the progress as scheduled. Then in week 29, Apple's GSM informed XYZ to "slow down the production, we met FATP problems." Just three weeks later, the GSM sent out a Ramp Plan to rush up the production given it was getting close to the product launch day. And in this same Week 32, Apple urged XYZ to double the volume, and this time it is due to the occurrence of quality issues at the competing company who is supplying the same part as XYZ. And XYZ's product manager further explained,

We would do best to fulfill any changes from Apple. How quickly you can react to the adjustment is a good opportunity to prove your production capacity and management efficiency. . .. The maximum share Apple would give one supplier is normally around 60%. However, if other competitors meet any quality issues, that is the time we need to stand-by. This will win more favors from Apple and make us a trustworthy supplier.

This dynamic of weekly adjustments based on evaluating both FATP's assembling progress and every low-tier's production situation reasonably minimizes Apple's own supply chain risks. And rational suppliers like XYZ can take advantage of this mechanism to win more orders. Then, after the products were finally launched of week 43, Apple immediately informed the ending of Ramp Plan, since consumer’s preferences and market expectations were still unclear. And the purchased volume kept at a very low level for months until Week 47 when Apple suddenly asked more pieces to be shipped to FATPs to get prepared for the upcoming spending spree in Thanksgiving and Christmas Holiday gifts season.

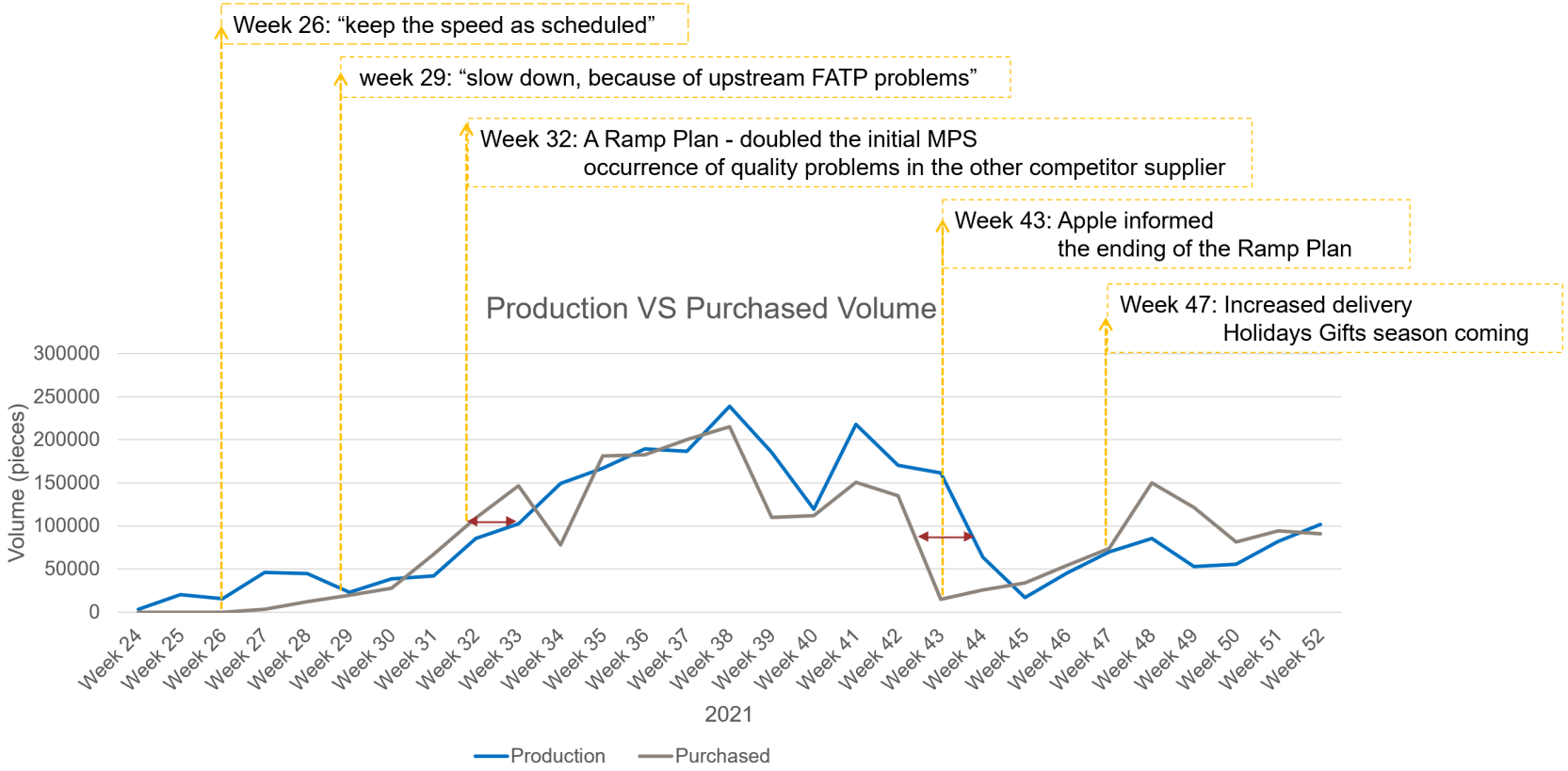

Figure 4. Week to Week Changes of Actual Purchasing Volume (Percentage)

What's more, as Figure 5 shows, the production is accordingly in high volatility to meet this fluctuated purchasing volume. And there is a clear time lag between the purchased volume and the production, which suggests the production closely follows the changes of fluctuated purchased volume. Then how did XYZ manage its production activities to "successfully" fulfill the need despite the variations between demand and actual purchasing?

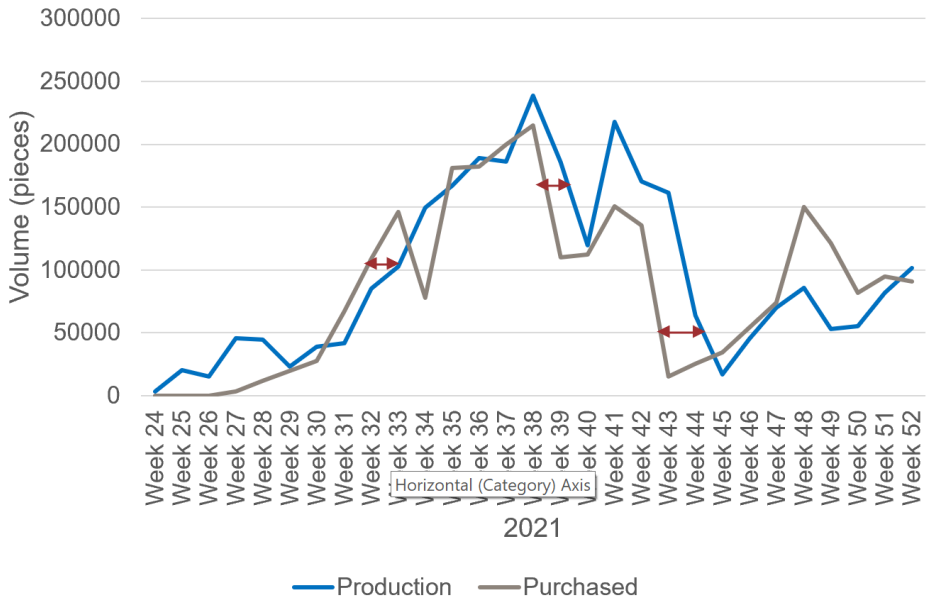

Figure 5. Weekly Changes of Purchased Volume and Production

To answer this question, I analyzed the total labor inputs and individual working time records. The results indicate that XYZ achieves the volatile needs from Apple through excessive overtime of existing workers and the use of student interns as buffers ar. In the following sections, I will present both quantitative and qualitative findings regarding each of these two forms by referring to relevant Apple 's Codes of

Conduct on Working Hours Management and Educational Program Management, also relevant local labor law.

Excessive Overtime of Existing Workers

According to Apple Supplier Code of Conduct on working time management:

> *A Workweek shall be restricted to 60 hours, including overtime, and Workers shall have at least 1 day off every 7 days except in Emergencies or Unusual Situations. Regular Workweeks shall not exceed 48 hours. Supplier shall follow all Applicable Laws and Regulations with respect to working hours and Days of Rest, and all overtime must be voluntary.*

Notably, the setting of Apple's CoC of maximum 60 hours per workweek has apparently violated the local China's Labor Law which states that employees should work not more than eight hours a day and no more than 44 hours a week, on average.

In the real world, XYZ's standard working schedule is organized with consecutive day shifts and night shifts, to fulfill the needs of a 24 hours on production line. Workers rotate every two weeks between day shifts and night shifts. For each individual worker, they work 11 hours per shift, and 6 shifts a week. In total, a worker has to work 66 hours per week. And workers may only take one day off every two weeks during production peak seasons. This apparently has violated Apple's CoC, and clearly the local laws.

I first assess the total labor input of the production line. I used the number of total labor hours by aggregating each worker's daily working hours into a sum of the corresponding week. As is reflected in Figure 6, the labor hours roughly stay in sync

with production as one would expect, which indicates that total labor input correspondingly follows the ups and downs of purchasing practices just as produced volume.

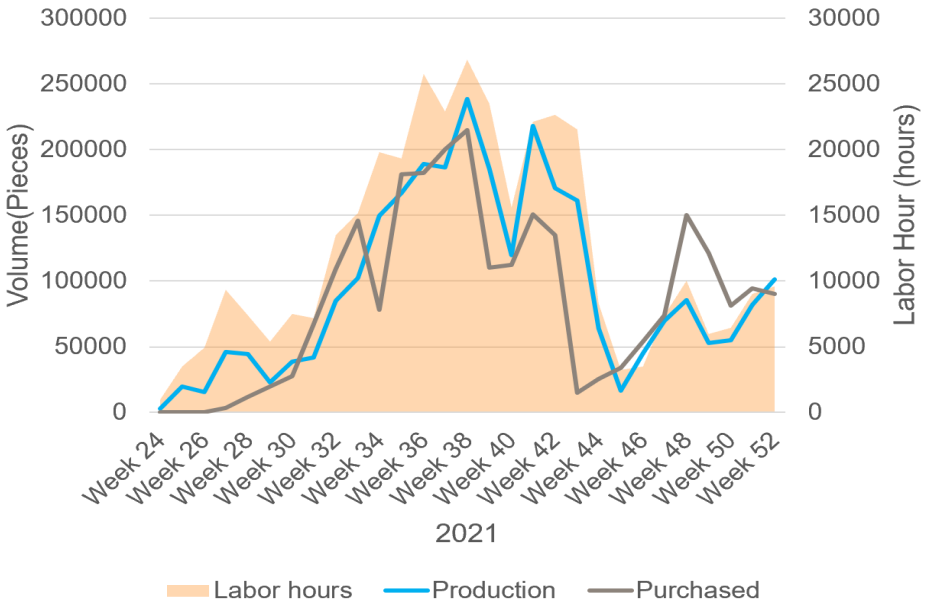

Figure 6. Impacts of Purchasing on Labor Hour Inputs

I further used correlational analysis to quantify this relationship between labor input and purchased volume. The results of Pearson correlations in Table 4 suggest a positive correlation between labor hours and same week purchased volume ($r(29) = 0.73$, $p < .001$) and a higher positive correlation with the previous week's purchased volume ($r(29) = 0.82$, $P < .001$). Both results are statistically significant. The higher correlation with the previous week's purchased volume explains the time lag we observed. That is to say, the previous week's sourcing result informs XYZ's expectation of the following week's sourcing. And the reaction time for XYZ to rearrange the production to align with its perceived sourcing is within a week.

Table 4. Results of Correlations between Purchased Volume and Labor Hour

	Result	**Labor Hour**
Same week purchased	Pearson Correlation	0.7265***
	Sig.(2-tailed)	8.12E-06
Previous week purchased	Pearson Correlation	**0.8157*** **
	Sig.(2-tailed)	1.23E-07

**P<0.01 ***P<0.001

Behind all these are the workers who bear the burden. Figure 7 describes the percentage of workers who work more than overtime standards allowed per Apple's CoCs and local labor law. In the vast majority of the weeks, 70% to 90% of workers' working time exceeds 60 hours, and a higher ratio of workers worked over 44 hours, except for week 40 of China's National Day Holiday. And again, the overtime situation is quite correspondent with the changes in purchased volume reflected as a grey area in Figure 7.

Figure 7. Purchased Volume and Percentage of workers overtime situation per Apple's CoCs and China Labor Law

The Use of Student Interns as Buffer

My intern experience on the production line further helps me understand how individual workers would be influenced at the end of these escalated dynamics.

In the workshop I worked in, there is a blackboard on the west wall right facing the entrance. This board is where the line manager would write down the number of each shift's production goal, actual output, and the yield rate. And I copied down those numbers in my field notes every day during my stay. It noted that when I finished two weeks of day shifts and rotated to the first week of night shifts, the production goal on that blackboard doubled. And during the regular pre-production meeting that night, there were more workers than usual, and a lot of them were new faces to me. The line manager motivated us by stating "our competitor met quality issues, if we can make up their part, we probably would get a larger share for future orders." However, it took time to get doubled raw materials delivered from XYZ's supplier as well. As a result, though the labor force had been so ready, workers did yet have many materials to work on. And I almost had nothing to do since 4 am and ended up chatting with the operator sitting next to me until dawn. Surprisingly, he is a student majoring in accounting at a vocational school in Yunnan province. This conversation aroused my attention to the fact that many of the newly added workers are student interns from other regions.

As the aforementioned conversation indicates, apart from excessive overtime, another consequence is the use of student interns as a buffer to meet the increase and decrease of purchasing practices. After the tragedy of student interns committing

suicide at the famous Apple's leading supplier factory, Foxconn, Apple became more cautious about the use of student interns in their global supply chain. One example is a more detailed section specifies the codes of conducts on the use of interns, categorized as Educational Program Management. However, Apple's efforts seem to remain on paper. At least, what I observed suggests student interns still make up a bulk of Apple's production line at XYZ. And it is not hard for suppliers to hide student interns from Apple. For instance, at XYZ, student interns' worker ID number starts with a unique letter, which can be easily filtered out just by one click. Any documents containing IDs starting with this special letter will be invisible to auditors.

In this half year range, according to the attendance records, there are 797 workers that have ever worked on this production line; however, only 390 of them are contracted workers of XYZ. The rest half are composed of student interns, temporary workers and/or part-time workers. Table 5 summarized the proportion of student interns in each month. During summer and winter holidays, 58.08% to 74.84% of the work force were student interns.

Table 5. Monthly Usage of Student Interns on this Production Line, 2021

	Total number of workers	Number of Contracted Workers	Number of Student Interns	Percentage of Student Interns
June	155	39	116	74.84%
July	129	50	79	61.24%
August	410	279	131	31.95%
September	452	275	177	39.16%
October	76	60	16	21.05%
November	93	68	25	26.88%

December	229	96	133	58.08%
Over the half year	797	390	407	51.07%

This is also triangulated from my interview findings. The General Manager at XYZ complained about the increasingly severe labor shortage in the market and worried about the risks of using student interns,

> *Using student intern is the least we want. It is too risky, especially after the suicides happened at Foxconn . . .And students will always post negative on social media . . .. But I really could not find that amount of people in such short period. . .. Summer and winter vacations are right the peak of our production given when new product will be regularly launched. And that's right when student interns are in the market. . ..*

The general manager's concern about students using social media to arouse public attention is not unwarranted. XYZ purchased the service from a labor agency that claims to grasp unlimited resources and personnel connections with vocational schools to facilitate the cooperation between schools and XYZ. Anytime XYZ is in a labor shortage, a quick backup could be realized with the support of this labor agency. And once student interns are involved, unlike contracted workers, they are not only supervised by front-line managers; there are on-site teachers dispatched by schools to help the labor agency on managing the student labor at XYZ in the name of taking care of students' safety.

Rather than employer-employee conflicts, I observed a tension between on-site teachers and students. For instance, there is a group of students who do not want to

participate in this internship and have got permission to quit from both line managers and H.R. staff. The teacher still forced the students to stay by holding their ID cards. One of those students posted their experience on Weibo anonymously. And this post hit the first position as a trending topic on Weibo very soon. As a result, government officials concerning internet safety, labor inspections, and education all contacted XYZ to investigate in one day. XYZ felt confused since they have approved the quit and notified the labor agency to work on this. Then, why the on-site teacher won't let the students leave?

After chatting with a group of student interns and triangulating the findings from interviews with the H.R. director, the way how on-site teachers' working performance pay is managed becomes essential to explain why the teachers forced their students to stay. In detail, the on-site teacher's performance evaluation is calculated based on the number of students working on production lines. And even the teacher's salary is directly linked to the number of student interns who stay active on production lines. Simply put, an on-site teacher will be rewarded for better performance if more students work the production line. In the students' word, "*teachers are making money off us, just like a foreman*". Specifically, though the HR director confirmed that XYZ paid the same piece rate of student interns as other contracted workers, the final hourly rate each student intern will earn is 5 RMB less than a contracted XYZ worker. This 5 RMB is shared by the labor agency as the middle fee and the school as administrative expenses such as on-site teachers' salaries.

In reaction to this social media post, XYZ immediately changed the schedule of student interns from 8:00 am – 8:00 pm, to 8:00 am – 5:00 pm and asked each student intern to sign an agreement on voluntary participation. If anyone refuses to sign, he/she must leave. The students' responses were quite varied. Some of them perceive this as a victory of their post on social media, and they can finally get rid of the intern in electronic factories. However, I also saw two girls crying and requested to change the schedule back to 11 hours a day because they need to earn more money during the holidays to support their families. Otherwise, they begged their on-site teacher and the labor agent to introduce them to other factories where they could do more and earn more. I found a chance to comfort one of the girls: she was complaining about the on-site teacher and her classmates, *"My classmates are rich . . . they just need the certificate of this degree. The teacher should just let them go. My case is different. My family needs this support."*

In sum, this section has documented how fluctuated purchasing practices can be and the impact of this high volatility on labor conditions. The findings suggest that purchasing practices are the root cause of labor violation, especially in the forms of excessive overtime and extensive use of student interns as buffers. Then the question remains why Apple's assessment is not capable of correcting those violations? Apparently, one reason is that XYZ's management team has great experience in cooking a set of books to be audited. And this makes the violations difficult to be detected. However, it still remains questionable: why suppliers like XYZ choose to falsify the data rather than substantively make some change? Remember, in the years

before 2016, XYZ insisted on exposing its violations to Apple and even wanted to persuade Apple that some problems are stemmed out from Apple's own business decisions. What make data falsification become the only choice for XYZ? Are there any incentives that could motivate to make substantive progress instead of cooking books to hide the authentic situations?

Work In Silos – Missing Incentives because of Disconnected Sourcing and Compliance

Though scholars have long acknowledged the weak link between sourcing and compliance, we know little about the dynamics of how this disconnection formed. To tackle this problem, I interviewed everyone I could locate at XYZ who has ever directly worked with people from Apple. I asked them generally how often they meet with Apple's staff, how they work together, and how they would describe their relationship with Apple. These qualitative findings help me explain the form of this disconnection between sourcing and compliance during the procedure of production and procurements. And

Co-Operated Team for Production and Purchasing

Co-operation. That's the most frequently used word XYZ engineers used to describe their relationship with Apple. Since electronic parts have high precisions and require a highly accurate final product, Apple has a team of manufacturer engineers who work closely with suppliers to monitor the production and quality. Specifically, for every single project, a product development cycle normally encompasses stages including Phase One, Phase Two, Engineering Verification Test, Design Verification

Test, then finally develops to the mass production stage. At every stage, Apple would have a Global Supplier Manager, a Quality Control Manager, and several manufacturing engineers meet regularly with XYZ's product manager, quality engineers, mechanical engineers, and production managers. This collaborative team works closely to negotiate product design, price per unit, production capacity, order demand, lead time, delivery details, etc. What is missing is the supplier's social responsibility.

In addition to this regular frequent meeting set ups, Apple would invite XYZ's engineers to work in the Apple Park in California for months in the very early product design stage. And once the product is ready for mass production, Apple will even dispatch its own manufacturing engineers to work on-site at XYZ. This kind of involvement and endeavor is very rare in the case of monitoring supplier social compliance performance.

An Isolated Silo for Compliance Monitoring Activities

While Apple's manufacturing and sourcing team are collaborating closely in one silo, the team of assessing supplier social compliance performance is left alone in another silo. In contrast to co-operation, the Environment and Health Safety (EHS) manager and HR director at XYZ use "cat and mouse" to describe their relationship with Apple's assessor. The EHS manager emphasized how much effort Apple has paid on suppliers' social responsibility training: *"They paid for an 18-month training for both me and my colleague from [the] HR department. And we have to take exams to pass this training activity."* However, except for these so-called capacity building

programs, Apple would only send out one assessor per year to visit a single supplier no matter how many different products Apple is sourcing from this supplier.

More specifically, Apple's manufacturing and sourcing team are specified on different projects for specific products even sourcing from the same supplier, and they visit suppliers frequently during every stage of each product's development process. In contrast, the supplier social responsibility team is assigned based on different suppliers, but not projects, and normally will only conduct one audit every year on a supplier no matter how many different projects the supplier is working with Apple. This supplier-based approach fundamentally differs from the project-based manufacturing and sourcing mechanism. And consequently, the auditing activities are decoupled from the actual production process.

Missing Incentives due to Isolated Sourcing and Compliance

The disconnected auditing and sourcing working mechanisms make it impossible to link future sourcing decisions in tandem with compliance performance. To be more precise, compliance managers do not have a say in order placements. Orders are made on a week-base while compliance performance will only be updated yearly. Even in an ideal scenario where auditing results could inform the order placements to a certain degree, there still exists a vast disparity concerning the information update pace between the two. Only yearly checked supplier' compliance profiles cannot be compatible with informing the weekly updated order details of different products.

One product manager from XYZ used a metaphor of fence to let me understand how much auditing activities weigh,

> *"Let's say all Apple's suppliers are standing on a platform fenced by the social compliance performance. So, passing the audit means you did not fall out of the platform. You are still in the safe zone. There is no substantive difference between sitting in the center and riding on the fence of this platform if only you don't break the fence."*

That is to say, passing the audit is only an admission ticket to getting involved. To what extent you comply with CoCs and how much the compliance has improved has nothing to do with future sourcing decisions. Suppliers like XYZ have clearly noticed this disconnection between sourcing and auditing, and have even taken advantage of this. A line manager proudly summarized his experiences to deal with different people from Apple as following,

> *When the GSM comes, I armed my line with workers and machines as many as possible. I need to prove my production capacity; when the quality managers come, I post Statements of Procedure (SOP) everywhere on my line, this conveys a good signal that you are following Apple's instructions; when the social responsibility assessor audit, I will only have contracted work commute to the facility...and hide the water bottles and any private belongings of my temporary workers. . ..*

In addition to the consequence of missing incentives that provides no motivation for supplier to make compliance improvements, this disconnected working

mechanisms between Apple's sourcing and social compliance teams may reflect as conflicting tensions in extreme cases. I observed a regular Apple's seasonal price cut-down meeting regarding an essential part of an already launched products at XYZ. When realizing there exist almost no room to lower the cost from other aspects, one sourcing manager from Apple questioned the labor component of the pricing proposal,

> *This is not a new product for your company, your workers must have been more skilled on producing this, the downtime should have been reasonably shorted. Why not we use a stop watch to re-test the uph (units per hour) on your production lines*

This suggests that, in extreme cases, the purchasing strategies-rationalized as the lower the cost, the better a deal- already violate the workers' benefits at the moment of order placement. In response to this sourcing manager, the product manager of XYZ replied in a quite embarrassing tone to remind "*the labor cost per unit of this product is almost as low as less than 1 dollar…and it is a whole line of workers to share this dollar…if we keep lowering labor cost, I am afraid some workers' wages may not meet the local minimum wage standard…*" Apple's sourcing manager is very confident of his logic that workers should have been more productive, he immediately interrupted and claimed again "*But downtime is shorter, they can do more pieces…don't ask me about how about your workers' wages, that is your issue. All other suppliers like ***, they could achieve this, why you are the exception…you can figure this out*".

DISCUSSION

In this research, I sought to understand how buyers' purchasing practices shape suppliers' shop floor labor activities and even lead to labor violations. I also intended to explain how the disconnected sourcing and compliance working mechanism within buyer itself come into play based on supplier's experience. The examination datasets concerning production and order volume and qualitative evidence indicate that, a) the purchasing behavior of Apple is highly fluctuated with a weekly deviation ranging from a 1.5 times boost to 88% shrinkage, and these frequent adjustments are based on the first-tier FATP's demand and same-tier competitive suppliers' performance; b) a result of this high volatility of purchasing practices is excessive over time, supported by a high correlation between weekly total labor hours and the previous week's purchased volume ($r(29) = 0.82$, $P \leq .001$); c) another consequence of the purchasing volatility is using student interns as buffers which contribute half of the total labor force; and d) weekly adjusted sourcing decisions vs. yearly updated compliance profile provides little chance to monitor purchasing behaviors in tandem with compliance performance regulations, and even provides a rational supplier the chance to accordingly separate its compliance efforts from substantive productions through data falsification.

Below, I discuss how this study contributes to the literature regarding private regulation, student interns in China, and research on lower-tier supplier management. Then, after discussing the implications for practitioners, I discuss the generalizability of this study and propose future studies.

Purchasing Practices: The Root Origins and the Missing Incentives

This research first contributes to the existing literature on arguing upstream business decisions of purchasing practices as a cause of labor violations (Anner, 2018, 2019, and 2020; Locke & Samel, 2017) by the combined evidence of correlation analysis and qualitative findings. Anner has well demonstrated how sourcing squeeze would escalate the violations of workers' rights. The separated use of regional level trade data and individual surveys on suppliers' and workers' experience limit the potential to a build direct causal relationship between sourcing and labor conditions. Extending Anner's arguments, this study confirms how purchasing practices contribute to labor violations of excessive overtime and extensive use of student interns, and specify this causal relationship by correlational analysis supplemented with qualitative evidence.

This research also extends current private regulation literature, which hypothesizes the missing incentives of purchasing practices. Existing studies (e.g., Amengual et al., 2019; Distelhorst & Locke, 2018; Egels-Zandén, 2007; Kuruvilla, 2021; Locke et al., 2009) have long acknowledged the lack of linkage between buyer's sourcing and compliance strategies as an outcome but do not show the mechanics of how the disconnection comes into place. This study provides a rare look at the inside dynamics. And the source of disconnected production activities and compliance improvements efforts at the supplier end originated from the isolations between the buyer's sourcing and its own compliance teams. More frequent visits of buyer's product and production specialists – in contrast to yearly check-in social compliance

assessors – inform rational suppliers how they could take advantage of this disconnection.

My qualitative narratives have revealed the isolated working silos of product and production vs. compliance within Apple and the corresponding responses from suppliers like XYZ to deal with different people from different silos. This inevitably raises the question of does Apple really care for the workers in their supply chains? It is hard to believe Apple has no hint of how the suppliers could fulfill the volatile purchasing demand without any labor violations. It seems that, from the standing point of Apple's global supplier managers, who are making final decisions on supplier screenings and order placement, how a supplier could pass the yearly audit with its own capabilities in various means is also a criterion for a "good" supplier.

In contrast to Amengual, Distelhorst, and Tobin's (2019) discovery of a supply chain inflexibility that prevents buyers' timely reallocating orders according to compliance results in the apparel industry, the case of XYZ and Apple elaborates it is the flexibility – that buyer can make suppliers compete against each other to minimize buyer's own costs and risks (Anner, 2020) leads to the highly volatile production activities and labor violations. This study of XYZ reveals that, at least in the context of the electronics industry, the rigid commercial relationship cannot justify the missing incentives of compliance improvements from future purchasing decisions. It is more plausible to assume compliance managers have no influence over order placements. And adding a fraction of Apple's current inputs in product design, quality control, price negotiation, and information confidentiality to its efforts to monitor supplier

social compliance would make a huge difference.

Student Interns in China

This study also extends our understanding of student internships as an insecure labor force in China. The evidence regarding XYZ using student interns from vocational schools provides insights on new development after Smith and Chan's (2015) discovery of student interns "working for two bosses." In addition to dual control from the factory employer and teacher supervisors, this study reveals a third role of the labor agency that builds the bridge between schools and factories. Unlike traditional labor agencies, this type of agent works exclusively on student internships, even via direct investment in vocational schools to compete for the student labor force. Unlike the factory-to-vocational school interactions, the existence of these specialized agents results in the commercialization of student interns, through which student interns can be easily employed by a new factory directly after a former employer deploys them. And in contrast to substantive benefits in terms of students' personal developments, the recent developments here go even further in the opposite direction of the initial principle of providing students with enough industry experience to combine theory and practices. They are treated as employees with no true vocational "training."

Another new development concerns the diverse needs of the group of student interns. In the case of XYZ, my communications with student cohorts revealed that while some students are forced to work in factories as a qualification for getting their degrees, there are students who are voluntary and even eager to earn money quickly to

support their families. This example reminds us to be critical and cautious when criticizing the utilization of the student labor force. Students' attitudes and needs concerning their internships in factories are far more nuanced in the real world.

One more case of insecurity and exploitation experienced by precarious student interns also raises the reflection on whether and how China's current vocational school internship programs could benefit the students by any chance. The answer to this question requires to at least listen to the students. Students at XYZ who utilized social media as a channel to let their voices be heard by the public verified how their viewpoints had been neglected. The first step to making a change is to take the students' voices into account when making decisions, rather than completely determined, and controlled by schools, agents, and employers.

Lower-Tier Supplier Management

This research is one of the first efforts to investigate the labor conditions of lower-tier suppliers in global supply chains, in addition to Raj-Reichert and her co-author (2013, 2015) studies of health and safety issues at low-tier suppliers. On the positive side, they differed from Villena and Gioia's (2018) examinations that emphasized how low-tier suppliers are passively involved by being monitored by their upper-tier suppliers instead of buyers. That is, suppliers like XYZ are directly covered by Apple's suppliers' management practices. However, even with a better coverage is offered direct from the buyer, we could not see substantive advantages for compliance performances at lower-tier suppliers. In contrast, the complexity increased the volatility and accordingly raise the possibilities for labor violations. In this study, the

interactions between Apple, the first-tier suppliers of final assembling testing and packaging factories and second-tier manufacturers documented by three datasets of demand forecasting, actual production, and eventually purchased volume is one example of this volatility. The rationale behind this is Apple's dominance of this entire supply chain, but only for sake of its products and productions. And it is clear that a better extension of buyer's compliance practices covering more low-tier suppliers per se is not useful enough to improve the labor conditions unless better integrate and coordinated the compliance efforts with the functions of product productions and purchasing practices.

Implications for Practice

The implication for buyers is apparent if the buyer really cares about the labor conditions of the people who are producing for them. The action that appears clear is to change the purchasing practices fundamentally, avoid making purchasing decisions that already violate labor standards at the moment of order placements, and give more credit to compliance results for future sourcing. Achieving this requires a lot of adjustments to how different functional departments work and interact internally with the buyer. In detail, this internal alignment could be realized by the compliance department giving more training to the sourcing managers to at least respect the labor when placing an order and having compliance assessors participate in the frequent buyer-supplier meetings on product productions and procurements. Coordinating compliance performance in purchasing decisions could take the various forms that would motivate the suppliers. For instance, "contingent payment" on labor conditions

suggested by Chen and Li (2014) would be a good supplement to incentives in order volumes, lead time, and price negotiations. Once better co-ordination within buyer forms, there would ideally remain fewer chances for suppliers to falsify the audits but to couple its compliance effort with substantive production activities.

This research also suggests multi-stakeholder initiates and private regulation practitioners that break the constrained locus within compliance practices. Talking to sourcing managers and letting them realize the need for more socially responsible purchasing decisions is in great need. For instance, if the purchasing index and purchasing evaluation reports by Better Buying would only be circulated with the brand's CSR issue-related staff, we still could not expect substantive changes in purchasing behaviors, given CSR managers are not the order placers.

Generalizing beyond Single Case

One could reasonably be wary of the generalizability of this single case inquiry, considering XYZ is only one of Apple's nearly two hundred global suppliers in 2021. But notably, XYZ has been supplying for Apple for more than 10 years. All in all, the value of this case study is revelatory in nature, where researchers rarely have a chance to observe and analyze a social phenomenon that used to be inaccessible to scientific investigations (Yin, 2009). Rather than statistical generalization, the strength of this study is based on the relevance of "analytic" explanations (Yin, 2014) with enough details. To increase the trustworthiness of the evidence (Lincoln & Guba, 1985), I also spent three days in the last week of my fieldwork in another supplier factory to Apple in a different province of China. This triangulation confirms that the

dynamics discovered in the case of XYZ are not unique.

Admittedly, the weakness that cannot be overcome in the current research design is the lack of investigation inside Apple. The perspectives from supplier and its employees' point of view could be biased. And the argument would be more robust if more direct observations and explorations could happen within Apple itself to see how the buyer's different functional departments communicate and cross their paths at the suppliers.

With that being said, this case study still offers some transferable insights beyond Apple and across the electronics industry, especially in regard to the management system problem of disconnected sourcing and compliance within the buyer itself. Specifically, in the case of Apple, the most influential leading brand in consumer electronics, it advances all the best level of the electronics industry's so-called advantages compared to other industries, such as closer buyer-supplier relationship because of a limited pool of qualified suppliers, better coverage to lower-tier suppliers, suppliers generally possess better capital resources and operational capabilities comparing with typical apparel suppliers. However, all of these do not provide much influence toward improving suppliers' labor conditions substantively. This is because the critical problem of buyer's inner management system – disconnected sourcing and compliance working mechanism- remains the same as what has been implied in Locke and his coauthors' series' studies of HP and in Amengual et al. (2019)'s investigation of the apparel industry.

Future Research on Student Interns in Global Supply Chains

An additional but not unexpected exploration of student interns in this study aroused my research interest for future in-depth investigations. As a result of the severe labor shortage in China, with the impacts of the platform economy, which attracts more labor employed as food deliverers or uber drivers, the traditional manufacturing industry is facing considerable challenges in absorbing and retaining enough labor force to maintain its production scale. The group of student interns, who are supposed to be taken good care of with good education for personal developments, is ridiculously left to be the "reliable" buffer that can even back up more than half of the needed labor force.

Though brands have been developing more programs and stricter codes of conduct to monitor the use of student interns in their supplier factories, we should be clear that it seems that the use of students as workers in global supply chains is an inevitable phenomenon. Given this, it is essential to see if there would exist any successful case that really benefits the student interns. If so, what could we learn from the best practices? And what are the voices of those students? How could we incorporate the needs of students into future developments? Those meaningful questions remain for future examinations.

CONCLUSION

Through a mixed-method case study of a second-tier supplier to Apple, I have illustrated the buyer's volatile purchasing practices in global electronics supply chains would lead to labor violations of excessive overtime and extensive use of student workers. The findings also explain the dynamics of how disconnection between sourcing and noncompliance are formed based on the supplier's experience. The disconnected working mechanisms concerning procurement and corporate social responsibility within the buyer itself underpin the decoupling of compliance efforts from production activities at the suppliers' shop floors. In light of these findings from the first-of-kind dataset, this research confirms the importance of responsible sourcing in improving labor conditions in global supply chains. Better integration of compliance strategies with other commercial activities needs to be achieved within the buyer itself. More importantly, I hope this study will serve as an early step to promoting ongoing conversations and cooperation for scholars from disciplines of labor studies, production operations, and sustainable supply chain management, as well as for practitioners of different business functional departments, who all share the common goal of improving the labor standards for workers who are producing our daily indispensable electronic goods.

REFERENCES

Amengual, M., & Kuruvilla, S. (2020). Editorial essay: Introduction to a special issue on improving private regulation of labor in global supply chains: Theory and evidence. *ILR Review, 73*(4), 809-816.

Amengual, M., Distelhorst, G., & Tobin, D. (2019). Global purchasing as labor regulation: The missing middle. *ILR Review*, *73*(4), 817-840.

Anner, M. (2020). Squeezing workers' rights in global supply chains: Purchasing practices in the Bangladesh garment export sector in comparative perspective. *Review of International Political Economy*, *27*(2), 320-347.

Anner, M. (2019). Predatory purchasing practices in global apparel supply chains and the employment relations squeeze in the Indian garment export industry. *International Labour Review*, *158*(4), 705-727.

Anner, M. (2018), CSR Participation Committees, Wildcat Strikes and the Sourcing Squeeze in Global Supply Chains. *British Journal of Industrial Relations*, 56(1), 75-98.

Apple. (2022). *Apple Supplier Codes of Conducts*. https://www.apple.com/supplier-responsibility/pdf/Apple-Supplier-Code-of-Conduct-and-Supplier-Responsibility-Standards.pdf

Apple.com. (2022). *Apple Supplier List*. https://www.apple.com/supplier-responsibility/pdf/Apple-Supplier-List.pdf

Apple.com. (2022). *How We Work with Suppliers*. https://www.apple.com/supplier-responsibility/pdf/How-We-Work-With-Suppliers.pdf

Barrientos, S., & Smith, S. (2007). Do workers benefit from ethical trade? Assessing codes of labour practice in global production systems. *Third World Quarterly, 28*(4), 713-729.

Bartley, T., & Egels-Zandén, N. (2015). Responsibility and neglect in global production networks: The uneven significance of codes of conduct in Indonesian factories. *Global Networks, 15*(s1), S21-S44.

Better Buying.org. (2022). https://betterbuying.org/wp-content/uploads/2021/11/Better-Buying-2021-Purchasing-Practices-Index-resized.pdf

Chan, J., Distelhorst, G., Kessler, D., Lee, J., Martin-Ortega, O., Pawlicki, P., Selden, M., & Selwyn, B. (2021). After the Foxconn suicides in China: A roundtable on labor, the state and civil society in global electronics. *Critical Sociology, 48*(2), 211-233.

Charmaz, K. (2002). "Qualitative interviewing and grounded theory analysis." In J. F. Gubrium and J. A. Holstein (Eds.), Handbook of interview research: Context & Method (pp. 675-694). Thousand Oaks, CA: Sage Publications.

Chen, L., & Lee, H. L. (2017). Sourcing under supplier responsibility risk: The effects of certification, audit, and contingency payment. *Management Science, 63*(9), 2795-2812.

Chen, L., Yao, S., & Zhu, K. (2020). Responsible sourcing under supplier-auditor collusion. *Manufacturing & Service Operations Management, 22*(6), 1234-1250.

China Labor Watch. (2015). *Analyzing labor conditions of Pegatron and Foxconn*. https://ecommons.cornell.edu/bitstream/handle/1813/102383/CLW_2015_Report_China_Analyzing_labor.pdf?sequence=1

Distelhorst, G., & Locke, R. (2018). Does compliance pay? Social standards and firm-level trade. *American Journal of Political Science, 62*(3), 695-711.

Distelhorst, G., Locke, R., Pal, T., & Samel, H. (2015). Production goes global, compliance stays local: Private regulation in the global electronics industry. *Regulation & Governance, 9*(3), 224-242.

Egels-Zandén, N. (2007). Suppliers' compliance with MNCs' codes of conduct: Behind the scenes at Chinese toy suppliers. *Journal of Business Ethics, 75*(1), 45-62.

Ellram, L., Tate, W., & Choi, T. (2020). The conflicted role of purchasing in new product development costing. *Journal of Supply Chain Management, 56*(1), 3-32.

ILO. 2017. Purchasing practices and working conditions in global supply chains: Global Survey results. INWORK Issue Brief No. 10. Accessed at https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/publication/wcms_556336.pdf (August, 2022)

Khan, M., Ponte, S., & Lund-Thomsen, P. (2020). The 'factory manager dilemma': Purchasing practices and environmental upgrading in apparel global value chains. *Environment and Planning A: Economy and Space, 52*(4), 766-789.

Kim, S., Wagner, S. M., & Colicchia, C. (2019). The impact of supplier sustainability risk on shareholder value. *Journal of Supply Chain Management, 55*(1), 71-87.

Kuruvilla, S. (2021). *Private Regulation of Labor Standards In Global Supply Chains: Problems, Progress, and Prospects*. Ithaca, NY: Cornell University Press.

Kuruvilla, S., & Li, C. (2021). Freedom of Association and Collective Bargaining in Global Supply Chains: A Research Agenda. *Journal Of Supply Chain Management*, *57*(2), 43-57.

Kuruvilla, S., Liu, M., Li, C., & Chen, W. (2020). Field opacity and practice-outcome decoupling: Private regulation of labor standards in global supply chains. *ILR Review, 73*(4), 841-872.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.

Locke, R., & Samel, H. (2017). Beyond the workplace: "Upstream" business practices and labor standards in the global electronics industry. *Studies in Comparative International Development, 53*(1), 1-24.

Locke, R. (2013). *The Promise and Limits of Private Power*. New York: Cambridge University Press.

Locke, R., Amengual, M., & Mangla, A. (2009). Virtue out of necessity? Compliance, commitment, and the improvement of labor conditions in global supply chains. *Politics & Society, 37*(3), 319-351.

Locke, R., Rissing, B., & Pal, T. (2013). Complements or substitutes? Private codes, state regulation and the enforcement of labour standards in global supply chains. *British Journal of Industrial Relations, 51*(3), 519-552.

McFalls, R. (2016). *The Impact Of Procurement Practices In The Electronics Sector On Labour Rights and Temporary and Other Forms Of Employment.* https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_541524.pdf

Mogre, R., Lindgreen, A., & Hingley, M. (2017). Tracing the evolution of purchasing research: Future trends and directions for purchasing practices. *Journal of Business & Industrial Marketing, 32*(2), 251-257.

Morris, J., Jenkins, J., & Donaghey, J. (2021). Uneven development, uneven response: The relentless search for meaningful regulation of GVCs. *British Journal of Industrial Relations, 59*(1), 3-24.

Nadvi, K., & Raj-Reichert, G. (2015). Governing health and safety at lower tiers of the computer industry global value chain. *Regulation & Governance, 9*(3), 243-258.

Ngai, P., & Chan, J. (2012). Global capital, the state, and Chinese workers. *Modern China, 38*(4), 383-410.

Pratt, M., Kaplan, S., & Whittington, R. (2019). The tumult over transparency: Decoupling transparency from replication in establishing trustworthy qualitative research [Editorial]. *Administrative Science Quarterly, 65*(1), 1-19.

Raj-Reichert, G. (2013). Safeguarding labour in distant factories: Health and safety governance in an electronics global production network. Geoforum, 44, 23-31.

Smith, C., & Chan, J. (2015). Working for two bosses: Student interns as constrained labour in China. *Human Relations, 68*(2), 305-326.

The Industry We Want. (2022). *Creating a Common Framework For Responsible Purchasing Practices.* https://static1.squarespace.com/static/601a4cf430876663b0f9c870/t/6217890a87f2bd5fadfb768c/1645709579963/Draft+CFRPP.pdf

Villena, V., & Gioia, D. (2018). On the riskiness of lower-tier suppliers: Managing sustainability in supply networks. *Journal of Operations Management, 64*(1), 65-87.

Villena, V. H. (2019). The missing link? The strategic role of procurement in building sustainable supply networks. *Production and Operations Management, 28*(5), 1149-1172.

Weil, D. (2014). *The Fissured Workplace*: *Why Work Became So Bad For So Many and What Can Be Done To Improve It*. Cambridge, MA: Harvard University Press.

Yin, R. K. (2009). *Case Study Research: Design and Methods* (4th ed.). Thousand Oaks, CA: Sage.

Yin, R. K. (2014). *Case Study Research: Design and Methods* (5th ed.). Thousand Oaks, CA: Sage.

APPENDIX

Appendix A. A Summary of Data Collected and Analyzed

Ethnographic Data	**Interviews**	**51 interviews**	Qualitative Fieldnotes and Memos
	Manager and Directors	7	
	Middle Managers and Engineers	19	
	Shopfloor workers and Student Interns	17	
	Auditor	1	
	Employees of Apple	3	
	Labor Agency	4	
	Participant Observations	**1 month**	
	HR intern	/	
	Observant Participations	**3 weeks**	
	Operator on production line	2 weeks' dayshifts and a week of nightshifts	
Archival Data	Annual auditing records	2012-2021	Qualitative
	Attendance records	6.3 to 12.31 2021	Quantitive
	Demand records (Including correspondences)	6.3 to 12.31 2021	Qualitative and Quantitive
	Production records	6.3 to 12.31 2021	Quantitive
	Purchasing records	6.3 to 12.31 2021	Quantitive

Appendix B. Major Interview Protocols

For supplier's General Manager and Department Directors

Topic	Questions
General background	How long have you been working in this company?
	Concerning the main customers, apart from Apple, what other brands do you also supply for? And who is the biggest buyer in terms of order volumes, and gross profits?
	Concerning the products, what are the main electronic parts you are making?
External - with Apple	When did this company come into Apple's supplier list? Can you describe the process of how the company was selected as a core supplier for Apple?
	Apple is quite famous for its supplier management strategy; can you tell how it differs from other brands that you are working with.
	How often will the company be audited? Generally, who is paying for this king of auditing/ certification activities?
	How would you describe the power relationship with Apple, compared with the case where the company is the single exclusive supplier?
	Who are the departments that you are specifically and directly working with from Apple? Concerning the various requirements from multiple departments including R&D, sourcing, quality control, and social responsibility, etc., how would you coordinate that?
External - with first-tier supplier	How the supply chain is organized? E.g., Once Apple has decided to source a certain part from you, is the volume of this order decided by your higher-tier supplier, or is Apple making the decision?
	Then, what about the payment issues? how would you get paid? By Apple directly or Apple will first pay your part to the first-tier supplier then you get payment later from this supplier?
	How would you describe the leverage and power dynamics between you and the first-tier supplier?
Internal - regarding production activities	How often you will get updated regarding order volume/ price negotiation/ lead time changes?
	How will the production react to the above-discussed changes?
	How often will you be audited?
	What is the preparation procedure for a typical audit?

	Have you heard of any audit consultant service? Did you once use it?
	How much value do you think the buyer is giving to the auditing results?
	Will you get awarded, e.g., more orders/ better price/ longer partnerships or in any form, when the company is doing well in the social compliance performance aspect?
	Do you know any case where a supplier is kicked out just because of the poor performance in social compliance?

For supplier's middle managers and engineers

Type	**Questions**
Product Managers And Product Engineers	Who do you typically work with people from Apple?
	Can you describe the time cycle of a product from demo stage to mass production stages?
	How often you will get updated regarding order volume/ price negotiation/ lead time changes?
	How will you react to the above-discussed changes?
	How much value do you think the buyer is giving to the auditing results?
	As far as you know, what are the determining factors for the order details, such as volume, price, lead time…
Production Managers And Production Engineers	Can you tell me about the production process on the shop floors? What is the labor division? How do you normally organize the production activities?
	How often you will get updated regarding order volume/ price negotiation/ lead time changes?
	How will you react to the above-discussed changes?
Human Resources Managers	What is the recruiting strategy? Are you working with any broker or labor agent?
	How often do you need to recruit new labors?
	How long in advance will you be notified for a coming auditing?
	How do you prepare for an audit?
	How is the labor turnover situation?
	How do you record the work time information? How long does a worker work per day? How many days do they work in a week? What about the situations during the production peak time?
Front Line Managers	How many workers do you have in one production line? What is the composition?

	How you organize your workers' production activities?
	How often you will get updated regarding order volume/ price negotiation/ lead time changes?
	How will you react to the above-discussed changes?
	How many audits have you experienced?
	What do you think of the auditing activities? Do you find it helpful to improve the working conditions?

For shop-floor workers and student interns

Type	**Questions**
General Background	Can you tell me a bit about how you come to work here in this factory?
	How did you find this job with your current employer? • If student intern, ask about major, labor agency and on-site teachers
	Why did you choose to work here?
Working Time Schedules	How many workforce shifts does your production line has? How do you guys shift your work?
	What is a typical day on the shopfloor for you when you are working?
	How many hours do you work in a day? How do you take rests? How long is for a meal break?
	How many days do you work in a week?
	How is the overtime situation? Is it voluntary?
	When is your last overtime experience?
Wage and Salary	How are you getting paid?
	How is the overtime compensated?
	Are you satisfied with your income status?
Experience of auditing activities	Have you ever participated any auditing activities?
	Have you ever been interviewed during an audit? How's that experience?