Labor and Migration:

Essays on Opportunities, Vulnerabilities, and Worker Agency in Emerging Markets

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Abstract

Creating suitable employment opportunities while ensuring safe working conditions is one of the most significant challenges facing labor markets of emerging economies in the Global South. Workers in these countries are amongst the most vulnerable and at-risk populations, whether they choose to remain and work in their countries of origin or migrate to other destinations. My dissertation focuses on studying labor markets characteristics in the context of two contemporary phenomena confronting populous, low-income countries, namely, large scale labor migration and employment relations in global supply chains. In the first chapter, I estimate the local labor market and socio-economic spillover effects of large-scale migration from Bangladesh on non-migrant households living in migrant-prone regions. My results show a significant, positive but relatively small impact on hours worked and household income with limited effects on other socio-economic outcomes. In the next chapter, I address the health and economic risk exposure caused by the COVID-19 pandemic for low and middle-income countries as a result of their exposure to migration. We find that exposure to migration is a strong predictor for spatial variation of the effects of COVID-19. Finally, in my third essay, I study the effectiveness of worker-management committees to meaningfully engage worker voice that can help to address non-compliance with health, safety, and labor issues in factories that engage in low-wage, manufacturing factory work. I find that worker-management committees with union representation and fair electoral processes have a positive, significant effect on addressing such compliance issues. However, the effectiveness of these structures are limited by the broader institutional context of the states in which they operate. My research deepens our understanding of the challenges facing labor markets in developing countries with important implications for future policy measures in these contexts.

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My PhD journey started long before I started the MIT Sloan doctoral program in 2015, when I was still in school in Bangladesh. While in hindsight, the completion of the degree seems predictable, the journey was far from straightforward. I had many adventures along the way, which played an important role in shaping the dissertation that follows and creating the scholar I am today. Notable ones include a stint in investment banking; field work in rural Bangladesh and Uganda; implementing a project to improve working conditions for Bangladeshi workers alongside key policy-makers; running two world major marathons; countless hours printing analog photography; travel trips with friends and family; braving the streets of Boston and Cambridge and learning how to ride a bike; and, a global pandemic. I am grateful to finally be at the end of this journey and at the start of the next.

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Introduction

The size of the global labor force was 3.4 billion in 2019 with about 80 percent of the employed population originating from low- and middle-income countries (LMICs). The majority of workers in these LMICs work in the informal sector where social protection and decent working conditions are far from adequate (ILO 2022). Despite the significant size of this population from emerging and developing countries relative to the global labor force, rigorous research on labor market issues in these contexts continues to be underrepresented in the fields of labor economics and employment relations.

One of the most significant challenges for labor markets in the Global South is ensuring suitable employment opportunities and ensuring safe working conditions. Studies show that workers and their families are amongst the most vulnerable and at-risk populations in LMICs, which are at the forefront of trade and globalization (Stiglitz 2004; Rodrik 2018). This is true regardless of whether they choose to remain and work in their countries of origin or migrate for work opportunities. The unthinkable death tolls in recent industrial catastrophes such as the 2013 collapse of the Rana Plaza building in Bangladesh (The Associated Press 2013), and at countless construction sites of Qatar's Football World Cup stadiums (Pattisson et al. 2021), highlight enormous workplace risks. Furthermore, the latter implies that even for those who manage to escape the substandard employment conditions in their home countries, low wages and a lack of voice and power, continue to put them in precarious conditions (Naidu, Nyarko, and Wang 2016; Shrestha and Yang 2019). As a result, even with higher relative economic returns of migration, they are unable to substantially improve the living standards for their families and their communities

My dissertation focuses on labor markets issues in the context of two contemporary phenomena confronting populous, low-income countries on high growth trajectories. The first is large scale labor migration from countries in the Global South to primarily destination countries in the recently industrialized South-East Asian Tigers or Persian Gulf countries (e.g. see overview in Iskander (2021)). The second delves into the domain of global supply chains where well-established Western consumer brands are increasingly sub-contracting their manufacturing processes to populous, low-cost countries with tenuous employment relations systems (e.g. see overview in Locke (2013)).

In the first two chapters, I study opportunities and vulnerabilities for labor-sending countries in the context of large-scale international labor migration. Historically, labor migration played a critical role in the development and economic growth of much of the developed nations, particularly the Americas and Australia (Rodríguez-Pose and Berlepsch 2014). However, the past several decades witnessed a major transformation in the rates of movement and the countries of origin of migrants: three times more people live outside their countries of birth compared to half a century ago while workers today are far more likely to come from LMICs in Latin America, Asia and Africa as opposed to Europe (IOM 2020a). These recent trends in migration are dominated by large-scale, temporary, guest-worker programs where bi-lateral agreements between governments are used to facilitate labor migration from developing to newly emerging economies (Ruhs 2006). Consequently, the past two decades have seen a significant growth in remittances, majority of which are driven by remittances to LMICs (see Figure 1-2a). In light of these new trends, not only is there an imperative to update the old economic models of migration but also study the broad, spillover effects of these remittances for the migrants' countries of origin (Clemens 2022). My first two essays respond to this gap in the migration literature by first focusing on estimating the economic spillovers of large-scale migration from Bangladesh in migrant-prone regions. I, along with co-authors[1], then address the health and economic risk exposure caused by the COVID-19 pandemic for LMICs as a result of their exposure to large migrant stocks residing in COVID-19 exposed destination countries at the start of the pandemic.

In the first essay, I estimate the local labor market and socio-economic spillover effects of large-scale migration from Bangladesh on non-migrant households residing in migration-prone regions. International labor migration offers significant employment opportunities for migrant workers from populous, low-income countries through increased wages and improved economic conditions of their household members. However, the extent of spillovers for non-migrants in regions with high

[1]Co-authors: Reshad Ahsan (University of Melbourne); Kazi Iqbal (Bangladesh Institute of Development Studies (BIDS)); Ahmed Mushfiq Mobarak (Yale University, NBER, CEPR and Deakin University); and, Abu Shonchoy (Florida International University)

rates of out-migration remains largely unexplored with the exception of some notable work in Mexico (Mishra 2007), Nepal (Shrestha 2017) and Poland (Dustmann, Frattini, and Rosso 2015). Specifically, I study the change in labor supply, household wage income, and socio-economic outcomes between 2011 and 2019 for non-migrating households as a consequence of regional variation in international labor migration rates between Bangladeshi sub-districts (*upazilas*). I use the insight that variation in the sub-district level exposure of migration to the different destination countries in the prior decade (*i.e. the base period*) can predict subsequent migration rates in order to create an exposure-based instrumental variable to estimate the causal impact of migration. Each region-destination pair for the base-period exposure is subsequently used to weigh each region's exposure to national level growth in migration to the respective destinations. The national growth in migration is further impacted by bi-lateral agreements and visa policies that regulated the entry of Bangladeshi migrants to each of these countries. The proposed instrument helps to address the endogenous nature of the regional out-migration rate and causally predict the impact of regional differences in out-migration on changes in household-level outcomes. I find that non-migrating households in migrant-prone sub-districts experience modest wage increases while increasing labor supply in non-farm-based activities. They also experienced improvements in access to safe water and sanitation facilities. However, economic improvements are limited to labor effects with no notable changes in expenditure, access to financial resources and other socio-economic measures of development.

My results show that large scale labor migration has a significant though small impact for labor market outcomes of non-migrating households located in high migration prone regions in the short run. Local wages increase with corresponding increases in hours worked by members of the non-migrating households to compensate for the loss in local labor supply through out-migration. However, this positive increase is not very significant or large. The limited effects on wages are likely due to a combination of the low wages that characterize rural agricultural markets in Bangladesh and the low rates of regional out-migration relative to total sub-district population. The primary development effects manifest from increased opportunities for labor in non-farm activities, implying some structural transformation out of the farming sector. However, the broader developmental impact predicted by government and economists remain elusive in Bangladesh with no significant impact found on a broad range of socio-economic indicators including consumption and financial access.

While household models of labor migration (Stark and Taylor 1989) predict linkages between migration, remittances and socio-economic development for the remaining members of migrant households, the exact mechanism for spillovers into non-migrating households remain underdeveloped. My paper contributes to the migration literature by exploring the economic spillovers for non-migrants. The paper also demonstrates the need for more integrated theories of migration that can explain the empirical results for both migrants and non-migrants and make more nuanced predictions of the conditions under which spillover effects of large-scale labor migration can be observed.

Results can inform policy-makers when facing other development-related trade-offs for scarce state resources to promote labor migration as an active labor market policy in LMICs. Improving theoretical and empirical predictions of migration is critical for policy-makers in light of the growing climate crises, which is predicted to significantly increase the number of economic migrants from climate-vulnerable LMICs in Asia and Africa. Bangladeshis migrants already comprised the second largest group amongst illegal boat-crossings in the Mediterranean route in the last few years (IOM 2022). Reports from qualitative research indicated that many of them left Bangladesh on legal work permits when they started their migration journeys but resorted to these dangerous routes when faced with low wages and dire working conditions in the Persian-Gulf countries. These reports point to the need for national policies to address the skill-gap amongst migrants, and improve the migration process by empowering workers on their rights prior to their migration journeys from Bangladesh as well other similar contexts.

In the subsequent essay, we address the health and economic risk exposure caused by the COVID-19 pandemic for LMICs as a result of their exposure to migration. The COVID-19 pandemic significantly impacted global health and economic outcomes including labor markets. While the economic recovery to pre-pandemic levels is predicted to be slow for all types of economies, the trends in LMICs are observed to be well below those in their developed counterparts. The disparity in the economic recovery can largely be attributed to lower vaccination rates and constraints in fiscal budgets, which further exacerbate existing inequality, weak social protection systems and divergent working conditions that existed prior to the pandemic (ILO 2022; Walker et al. 2020; Tondl 2021;

Lee et al. 2020). With the pandemic continuing to forge onwards and virologists warning of future infectious disease outbreaks, it is crucial to get a better understanding of the early exposure risk, especially those posed by the emigrant labor force, both across and within countries.

In our paper, we propose a method to infer the spatial distribution of COVID-19 risk using readily-available data on mobility and migration. For our analysis, we use the insight that labor migration is an important phenomenon characterizing LMICs, and that during the initial onset of lockdowns, these returning migrants were an important vector for the early spread of COVID-19 at the countries of origin. Using this insight, we build a model to predict regional and country-based risk to COVID-19. We construct a country-level index of COVID-19 risk exposure to predict the countries that were at the greatest risk of exposure early in the pandemic based on their migrant stocks. We also prove that our risk index using migration-based linkages can be a strong predictor of the early spread of COVID-19. We then construct sub-national indices for Bangladesh and the Philippines based on pre-COVID migration links to demonstrate the applicability of our approach at the sub-national level. We validate our measure using subsequent COVID-19 case and fatality data and show that our indices accurately predict the spread of COVID-19. The lack of reliable, comparable testing data for COVID-19 in the early stages of the pandemic in LMICs, made it difficult to rapidly predict the spatial transmission of the disease and suppress its spread. Consequently, widespread global lockdowns were implemented, and in most cases, when community spread was already underway. Our method provides a novel approach for global and local policy makers to predict at-risk areas by accounting for global labor migrant stocks, thus enabling them to implement more targeted lockdowns in the future. The latter would minimize the economic fallout as well as conduct more spatial targeting of economic and health resources whenever testing data are inadequate. Furthermore, the analysis can be integrated with epidemiological modelling to improve the detection of future disease spread within and across countries.

Finally, my third essay addresses the role of worker voice in addressing workplace safety, a key employment relations issue for developing countries where human rights violations are commonplace (Freeman 2010). Research from developed countries show that facilitating worker voice can play an important role in improving compliance with social and safety standards in the manufacturing sector (Kochan, Katz, and McKersie 1994; Weil 1996; Black and Lynch 2001; Pohler and Luchak 2015). Mandated health and safety committees can play an important role in activating voice when more traditional forms of labor organizations such as unions are incorporated into the structure. The literature on global supply chains highlight the challenges in implementing legitimate and empowered worker organizations under different institutional contexts (Distelhorst, Hainmueller, and Locke 2017; Amengual and Chirot 2016; Piore and Schrank 2008). As a result, the efficacy of worker-management participation committees to meaningfully engage worker voice in these contexts remain open to discussion.

Using data from the International Labour Organization (ILO), I study the effectiveness of the worker-management committees to address safety and social compliance issues and complement the role of traditional labor organizations to improve working conditions in the context of the Better Work program, a multi-country transnational regulatory initiative led by the ILO. Specifically, I analyze the association between the different qualities of these committees and outcomes of factory-level compliance with social and safety standards. I use detailed reports on the process of committee formation to identify four characteristics to signify committee quality, namely, union representation, fair election of candidates, gender balance, and management support of its activities. My findings show that union representation and fair electoral processes in committee selection is associated with a positive, significant effect on raising and resolving issues of violations in factory standards while gender representation and management support are relevant only for certain subsets of the violations. However, the most striking finding comes from the heterogeneity of impact across the different country contexts, thus indicating that the local institutional context plays an important role in limiting the committees' ability to engage worker voice. These findings confirm prior literature, which points to the limitations of mandated committees in replacing traditional forms of worker voice such as unions. The results show that these committees have some potential to facilitate worker voice when there are enabling conditions but cannot fully replace the role of traditional labor organizations. The interaction between state limitations and firm or management behavior provides important areas for future work in this topic.

The three studies outlined above deepen our understanding of the challenges facing labor markets in developing countries under two main settings, large scale labor migration, and, global supply chains. The findings from these essays combined with the current global challenges build a strong framework for undertaking a research agenda to address emerging issues pertinent for developing and developed countries. The results have important implications for policy makers and practitioners working in the respective fields of labor migration, worker agency, and economic development. The world of work is experiencing significant transitions due to demographic shifts in the developed countries, technological disruptions including automation and the app-based economy, climate effects and the current COVID-19 pandemic. Globalization and increased human mobility mean that economic outcomes between countries are intricately and increasingly interlinked. Consequently, research on the future of work in labor markets of high-income countries should incorporate the findings from LMIC contexts to better predict the general equilibrium effects of these changes.

COVID-19 presents significant new challenges and growth opportunities for LMICs. With lower access to vaccination and social protection schemes, the demand downturn in high income countries can increase vulnerabilities for workers in LMICs. Also, the pandemic-driven production shocks are predicted to increase the rate of automation in these countries, which will compound these effects. However, the demographic dividend for LMICs may enable them to counteract these negative effects. For example, the shortage of caregivers seen in the developed countries presents a significant labor mobility opportunity that can be a triple-win solution for workers, origin and destination countries: large labor exporting countries with low-skilled workforce can benefit from strategic labor mobility partnerships combined with up-skilling opportunities(Clemens 2015). The Philippines has developed a strong state-led initiative to promote skills of their labor migrants. Consequently, studies have shown that migration from the Philippines tend to have large improvements in the wages of migrants with positive spillovers amongst the non-migrating members (Yang 2008; Mckenzie and Yang 2014). With labor migration continuing to play a major role in LMICs, there are important lessons to be gained from the Philippines case. These issues provide important avenues for future research and policy intervention for Bangladesh and other countries using labor migration as a development strategy.

My dissertation makes an important contribution to the field of industrial relations (IR) by extending the growing scholarship on employment relations and labor market issues in the context of LMICs such demonstrated by studies of labor standards in emerging markets (Piore and Schrank 2008; Locke 2013) and globalization of service work (Batt, Holman, and Holtgrewe 2009). My study of the labor market and development effects of migration mandates a need to revisit the phenomenon of temporary labor migration, which was prevalent in the guest worker programs of the 1950s (Piore 1979) and have gained significant traction amongst LMICs in the last two decades. The findings of my research make an important contribution to the academic literature of the respective fields of study while also offering insights for policy makers, a combination that follows in the greater spirit of the IR tradition as a problem-centered field.

Chapter 1

Migration and Development: Evidence from Bangladesh

1.1 Introduction

International labor migrants comprised over half of the world's migrant population with remittances in low- and middle-income countries surpassing USD 450 billion in 2018, which is more than three times the size of official development assistance over the corresponding period (*Bangladesh: Survey on drivers of migration and migrants' profile* 2020). For populous, low-income countries, international labor migration (hereafter referred to as migration), can provide significant macroeconomic benefits by easing unemployment pressure and augmenting capital inflows through remittances sent by migrants abroad. While the direct effects on migrants themselves are now established at the mirco-economic level, the spillover effects on those remaining behind at the origin communities remain under-studied in the migration literature (Clemens 2022; Mckenzie and Yang 2014; Ruhs 2006). Migration is widely promoted as a popular active labor market policy with significant public resources spent to promote migration in many low-income countries like Bangladesh, Indonesia, Nepal, Pakistan, the Philippines and Sri Lanka where remittances account for more than 5 percent of the countries' GDP. Furthermore, given the economic and cultural incentives of migration, incomplete financial markets (Taylor 1996), and elevate social status (Ruiz, Siegel, and Vargas-Silva 2015), there is strong grass-roots support for such policies.

Despite the broad acceptance of migration as a development strategy in low- and middle-income countries (Wickramasekara 2015), questions still remain on the widespread effects of migration especially for the non-migrant households in regions with high migration rates (McKenzie 2017; Gibson, Mckenzie, and Rohorua 2014; Taylor 1996). Migration has a direct impact on migrants and their households by affecting labor supply, consumption, and investment decisions. Migration can also have second-order effects on non-migrating households in regions with a stronger exposure to out-migration through labor market and remittance channels. Economic models of migration remain inadequate for incorporating the pluralistic and transitory nature of migration decisions (Dustmann, Frattini, and Rosso 2015) to adequately predict spillover effects for non-migrating individuals (Clemens 2022). This notable gap in the theoretical literature is accompanied by data limitations in the countries of the Global South, which drives a significant portion of recent labor migration flows ((*Bangladesh: Survey on drivers of migration and migrants' profile* 2020). The combined theoretical and empirical limitations created a large bias in early studies to focus on labor market effects at the countries of destination (Borjas 1996; Card 2001a), a trend which has only shifted in the past two decades (see review in Mckenzie and Yang 2014). Consequently, there still remains large gaps in understanding origin country effects in the context of migration research.

Thus, while it is well established that international migration and development are closely linked, existing studies show considerable variation in the impact of large-scale migration on regional labor markets and economic outcomes for households remaining behind in the communities of origin (Clemens and Tiongson 2017; De Haas 2006). Only a handful of earlier studies have explored the non-migrant effects at a micro-economic level (Mishra 2007; Dustmann, Frattini, and Rosso 2015; Shrestha 2017; Akram, Chowdhury, and Mobarak 2017) and my paper contributes to this growing empirical literature.

In this paper, I estimate the labor market and broader socio-economic impact of large-scale migration from rural Bangladesh between 2011 to 2019. I study the impact of migration on household-level labor market outcomes and indicators of development including expenditure on food and non-food items, financial access and other socio-economic measures of living standard using panel data from an integrated national survey representative of rural Bangladesh.

Directly comparing households in regions with different migration rates can lead to biases when estimating the effects of migration on development. For example, unobserved or non-measurable factors such as negative shocks can lead to both higher rates of migration as well as changes in participation in labor markets. This is especially relevant in the context of migration decisions, which are subject to many unobservable regional characteristics. To mitigate the bias in the estimation and causally identify the effect of migration on a household's labor and development indicators, I use an instrumental variable approach to address the endogenous nature of migration, an outline of the endodeneity issue is illustrated in Figure 1-1.

I use the insight that there is regional variation in the pre-study period exposure to out-migration to different destination countries for devising my instrument. Specifically, I combine two sources of variation at the regional and national level to calculate a weighted "*Bartik style*" (Bartik 1991; Blanchard et al. 1992; Card 2001b: Autor, Dorn, and Hanson 2013) instrument to predict each region's rate of contemporaneous out-migration rate. The first is variation in a region's (*subdistrict level*) exposure to different destination countries at a period prior to the study, which is the "*share*" component. The second comprises of national level demand for Bangladeshi migrant to each destination country as a consequence of their respective visa policies during the study period, which is the "*shift*" component. For each region, I first weigh the latter "*shift*" with its respective initial "*share*", and then aggregate the interactions to compose the weighted instrument.

Using this "*shift-share*" instrumental strategy [1], I identify the causal impact of out-migration on the labor and socio-economic indicators for rural non-migrating households in regions that are more strongly impacted by migration over the last decade. This identification strategy relies on the initial regional share of migrants for each destination to be independent of the change in the outcome variable. I establish the credibility of this strategy and highlight the limitations in my study context subsequently in the paper noting the potential effects for the interpretation of the results.

Bangladesh provides a unique context for studying the broader labor market and socio-economic impacts of migration given the significance of labor migration to the national economy. The government focused on implementing bi-lateral contracts that facilitated an average of 700,000 Bangladeshis to migrate to over 150 destinations in the past ten years beating even the government's own annual target of 400,000. Bi-lateral agreements between the government of Bangladesh and a

[1] Notable recent studies that have also exploited similar types of instruments include estimating the labor market effects of international trade (Autor, Dorn, and Hanson 2013) and immigration (Card 2007; see Jaeger, Ruist, and Stuhler 2018 for a review), firm productivity and migration (Imbert et al. 2018), and, immigration and innovation at US universities (Stuen, Mobarak, and Maskus 2012a).

number of countries in the Middle East and South-East Asia enable migration using temporary work visa contracts. Furthermore, as clearly stated in the government's Eight Five Year Plan, the rationale to continue to promote labor migration as a policy instrument is driven by the strong assumption that, "*The multiplier effects of remittance inflows are a major contributor to rural transformation and diversified employment and income base for the rural poor.*" (GoB 2020)

My results show that international migration has significant consequences for the supply of labor by non-migrating households in high migration regions but limited effects on consumption and other socio-economic indicators. The average hours worked by employed household members significantly increased. However, these increased hours of work do not translate into strong income effects. Neo-classical theories (Lewis et al. 1954; Harris and Todaro 1970) would suggest that the local labor market conditions in communities with high emigrant population should tighten, increasing wages of the remaining households. However, these effects may be less relevant in the context of rural, developing countries with large surplus of low-skill workers leading to persistent low wages and underemployment. My results do indicate some positive effects development in the form of redistribution in hours worked from farm to non-farm activities. A structural shift out of agricultural activity is an important indicator of economic development in the context of developing countries (Clark 1940; Rostow 1960; Kuznets and Murphy 1966; Gollin, Parente, and Rogerson 2002; Gollin, Parente, and Rogerson 2007).

Despite the high remittances reflected in the national accounts during the study period, these remittances did not translate into large multipliers into the local economy as predicted in earlier macro-economic studies (Taylor 1996; Taylor 1999; Taylor 2006). I find limited evidence of spillovers for non-migrating households through increased food and non-food expenditure, access to better financing opportunities, and, improved living standards. Spillovers occur when remittances are not just used for consumption but also spent on local investments by the remittance-receiving migrant households. Systemic evidence of such investments remains elusive in other contexts. Although Yang (2008) showed that a positive shock in migrant remittances lead to increased levels of entrepreneurial investment by migrant households in the Philippines, there is negative or no impact of remittances on likelihood of owning a business by migrant households in Dominican Republic (Amuedo-Dorantes and Pozo 2004) and Ecuador (Vasco 2013) (review by Naudé, Siegel, and Marchand 2017). Consequently, the lack of spillovers in the context of rural Bangladesh is conceivable. These remittance driven investments and spillovers may also take longer periods to manifest, indicating a large lag between the out-migration, remittance and subsequent development motivating future studies of long-term impact of international migration.

This paper is a significant contribution to two main strands of literature: international migration and economic development. The empirical evidence of the impact of migration on the non-migrating population at the origin remains limited (Mckenzie and Yang 2015). Some comparative studies find varied effects of small bi-lateral migration programs between Pacific Islands nations and New Zealand (Gibson, Mckenzie, and Rohorua 2014). Positive wage effects of international migration have been found in Mexico-US migration (Mishra 2007), which has a significantly greater proportion of mid- to higher skill migration compared to Bangladesh. Also, positive consumption effects were found for remaining households in Nepal (Shrestha 2017), with a significantly smaller migrant and labor force population relative to Bangladesh. While these studies offer important motivation for my research, my paper offers greater generalizability for larger, more populous, developing countries that act as a significant source of labor migrants globally. My paper also motivates an important area for future theoretical research to explicitly model the link between migration and non-migrant development outcomes. Finally, by focusing on a labor migration model that is driven almost entirely by bilateral agreements, I provide a better understanding of the value of pursuing temporary migration programs (Piore 1979; Massey 1987; Dustmann and Görlach 2016) as an active labor market policy by developing countries and implications for the future of these policies.

In the remaining paper, I proceed as follows: I provide a literature review of the relevant theoretical and empirical work to motivate my study and highlight the deficiency in the current literature. I then provide a contextual background of migration from Bangladesh and why it demands attention in the migration literature. I follow with a section on data and methods that provide: a description of the data; construction of the variables; empirical strategy; and, framework for predicting the outcomes. I then discuss my results and finally conclude with implications for policy and further research.

1.2 International Migration Literature: Past, Present and Future

Research on international migration evolved significantly in the past few decades. Estimating the impact of immigration on the destination countries dominated the early research and was based on the canonical model of immigrant selection (Roy 1951; Borjas 1987; Borjas 1994; Borjas 1995; Hu 2000; Chiswick and Miller 2005). Outcomes were limited to wages and the assimilation trends between incomes of natives and immigrants. These studies followed from the neoclassical theories (Lewis et al. 1954; Todaro 1969; Harris and Todaro 1970), where migration is modelled as an individual optimization problem: the decision to migration is permanent and undertaken as an investment in human capital accumulation to maximize earnings. Consequently, skill-specific wage-differentials between the origin and destination serve as the dominating push factor in determining migration decisions. The model predicts that migration flows should equilibrate as the countries of origin develop and wages equalize. While these traditional models predict impact on local labor markets, they do not address the characteristics of the recent migration trends from low- and middle-income countries (LMICs) including temporary migration decisions (Dustmann and Görlach 2016); non-economic migration pull from the destination countries initiated by guest worker programs and dual labor markets (Piore 1979); role of migrant social networks (Massey and España 1987); and, the phenomenon of remittance trends described earlier.

My paper contributes to migration research focusing on effects at the countries of origin. This strand of migration research has grown in importance over the past two decades in line with the emerging trends of temporary labor migration from LMICs and the associated remittance flows (Taylor 1996; Clemens, Ozden, and Rapoport 2014; McKenzie, Theoharides, and Yang 2014). Remittances are a especially significant phenomenon of temporary migration from LMICs and an important channel for economic development in migrant-sending communities (see Figure 1-2a). I combine two main frameworks that prevail in understanding the effects of migration at the origin to estimate the spillover effects for non-migrant households. The first focuses on modelling the direct effects of out-migration on wages and labor supply on the non-migrating individuals (Akram, Chowdhury, and Mobarak 2017; Shrestha 2017; Dustmann, Frattini, and Rosso 2015; Mishra 2007), and the second uses the remittance channel to estimate the effects of migration on socio-economic outcomes like consumption, investment, education, health and women's empowerment (Clemens 2011; De Haas 2006; Rapoport and Docquier 2006). The predicted effect of migration on development can diverge in two directions (Taylor, 1999): a pessimistic "Dutch disease" or "migrant syndrome" perspective arising from the adverse effect on capital to labor (Rivera-Batiz 1982) versus an optimistic model of development via the remittance channel in the pluralistic model of migration developed in the New Economics of Labor Migration (NELM) (Djajić 1986). While the economic developmental impact at the origin skews towards being largely positive, the extent of the impact is contingent on various conditions at the origin such as such as labor market tightness, skill distribution of the migrants, sectoral productivity, use of remittances (Lucas 2005).

The link between out-migration and wages of non-migrating workers at the countries of origin was developed by Dustmann, Frattini, and Rosso (2015) using a traditional two-factor economic model with multiple labor types. The model predicts that out-migration is associated with wage improvements regardless of the skill distribution of migrants and non-migrants as long as capital is imperfectly mobile. They find that out-migration from Poland between 1998 to 2007 led to a slight increase in wages for high- and medium-skilled workers, which are the two groups with the largest relative out-migration rates whereas workers at the low end of the skill distribution might have experienced wage decreases. These results for Polish non-migrant wages correspond to findings from another middle-income country Mexico, which also has a significant skill variation amongst its migrant population. Mishra (2007) finds that emigration from Mexico to the US between 1970 and 2000 led to a strong and positive effect on Mexican wages, although with adverse distribution effects. It is notable here, that skills variations in these two studies are not applicable to the Bangladesh context, where almost all of the labor migration is concentrated in unskilled or very low-skilled occupations. In the neighboring migrant-sending South Asian country of Nepal, Shrestha (2017) finds that non-migrants experienced improvements in wage and labor force participation in Nepal. With an economy about a tenth of the size of Bangladesh and significantly different proportions of out-migrants to natives, the implications of migration for Bangladesh and Nepal can vary significantly and warrants a separate exploration. Finally, Akram, Chowdhury, and Mobarak (2017), who study the general equilibrium effects of internal migration from north-west Bangladesh, show that increased seasonal migration from Bangladesh increased wages and the availability of jobs in migrant-sending villages while pushing up food prices. My paper builds on these latter results by extending the scope of the study to all of rural Bangladesh. Furthermore, I study the effects of the large scale international program, which goes beyond the experimental set up of Akram, Chowdhury, and Mobarak (2017). On aggregate, while these studies predict generally positive income effects for non-migrants in migrant-prone areas, the degree of effect may vary with local factors like skill distribution and relative size of migrants.

The second framework I use builds on the NELM models, which fundamentally changed the theoretical underpinnings of migration research by modelling decisions at the household rather than at the individual level (Stark and Levhari 1982; Stark and Bloom 1985; Katz and Stark 1986; Stark 1984; Stark 1991). In this framing, the decision to migrate can address, (i) various financial and other market failures in developing countries; and, (ii) provide an alternative source of capital for families to smooth consumption and facilitate investment. The household model can explain the phenomenon of temporary migration and associated remittances, which subsequently create second order effects of migration on the non-migrating members of migrant-sending communities. Research on the motivation to remit money back to the migrant households show that remittances can be driven by altruism (Agarwal and Horowitz 2002), exchange (De La Brière et al. 2002), both altruism and exchange, (Brown and Jimenez 2011), insurance (Yang and Choi 2007), and, loan repayment (Ilahi and Jafarey 1999). Remittances can sometimes be earmarked for specific purposes (De Arcangelis et al. 2015) although in most cases they remain fungible across various categories ranging from consumption to investment in human and business capital (Rapoport and Docquier 2006; pg 1177). In credit constrained rural economies, remittances can generate growth linkages by providing liquidity through informal loans to non-migrant households (Stark 1991). These results underscore the importance of the remittance channel. The household model can make predictions of the remittances on the consumption and investment decisions of the non-migrating members at the origin (see Clemens, Ozden, and Rapoport (2014) for review).

In general, results from various studies indicate positive effects of migration on the migrant themselves given wage improvements. A comparison between winners and losers in national lottery for low-skill migration from Bangladesh to Malaysia found improvements in migrant income with corresponding increase in the consumption of household members and female involvement in household decision-making (Mobarak, Sharif, and Shrestha 2020). Not only might the level of consumption be affected, but also the type of consumption as Pessar (2005) shows that remittances and earnings of lower skilled temporary migrants are usually spent on conspicuous non-productive assets in Mexico.

However, the effects for non-migrating household members with regards to consumption and other socio-economic indicators can vary implying that the effects via the remittance channel is less straightforward and can depend on the conditions at the origin. Households of migrants from the Pacific Islands to New Zealand experienced contrasting effects in the studies of small-scale bi-lateral programs of seasonal migration between these countries (Gibson et al. 2018; Gibson and McKenzie 2014a; Gibson and McKenzie 2011a). The direction of the effects depends on the duration and size of the programs, and, outcomes of interest. There was reduced consumption with deterioration in socio-economic indicators for migrant-sending households in the short-term (Gibson and McKenzie 2011b) and in Vanuatu (Rohorua et al. 2009). On the other hand, there was reduction in poverty, and improvements in income, savings, and expenditure in the medium term (Gibson and McKenzie 2014b; Gibson and McKenzie 2011b). In Nepal, where there is a relatively high proportion of migrants in the labor population, Shrestha (2017) finds rural households with migrants benefited directly from the increased earnings of migrants leading to significant reduction in poverty: migrant households experienced increase in consumption and children's school enrollment.

Impact on agricultural investment is of particular interest in the context of these largely rural and agro-based economies in the origin countries. Agricultural productivity may be impacted by the loss of labor to migration that negatively impact labor supply. Remittances by migrants can relax credit constraints in the local economy and induce over investment in agricultural short-term. An important empirical test of the household migration model links migration and agricultural production (Rozelle, Taylor, and DeBrauw 1999). The study finds evidence of a negative and significant relationship between migration and agricultural yield in China part of which is offset by increased remittances.

In addition to income, consumption and agricultural outcomes, studies have looked into a wide variety of outcomes for migrant households such as investments in education, health and assets. Increased expenditure on education by migrants can improve long-term outcomes through human capital accumulation in communities with greater migrant exposure (Dinkelman and Mariotti 2016). Similarly, higher expenditure on health can improve the productivity of the future workforce (Gibson et al. 2018). There can be additional improvement on gender parity if there is greater schooling for girls and better gender parity with regards to female income (Anjali 2016). Meanwhile, positive regional shocks to remittance earnings were found to increase assets, schooling, education investments, hours in self-employment and likelihood of starting a capital-intensive enterprise amongst migrant households in the Philippines (Yang 2008).

Much of the recent empirical work on migration and development has focused on migrants and their households without sufficiently extending to the spillover effects of remittances on non-migrating households. Non-migrating households can be impacted by large-scale migration through first-order effects on income and labor as well as second-order effects through the remittance channel. The household model predicts second-order implications for non-migrant households with outcomes pertaining to consumption, incomes, agricultural investment and production, education, health and gender. The mechanism for these effects work through the spin offs of remittance spending by migrant households or through peer-to-peer social network effects. High levels of consumption spending by remittance receiving households can trigger investments by non-migrating households in regions of high intensity of out-migrants. The degree of impact depends on the type and size of the consumption of the migrant households. For example, consumption, and nonproductive investment provides limited spin offs for non-migrants in the community while investment in entrepreneurial activity can generate more positive effects of temporary migration. Similarly, rural households who have a higher propensity to spend income in the local market can have a stronger multiplier effect than urban recipients.

The earlier studies found large multiplier effects of remittances on development using macro-models (see review in Taylor 1996). Recent studies (Dustmann, Frattini, and Rosso 2015; Shrestha 2017; Akram, Chowdhury, and Mobarak 2017) have started to build on the macro-level results using micro-level household data. However, this remains understudied and my paper adds to this growing evidence base for the non-migrant effects by extending the scope of past studies and providing evidence for one of the largest low-skilled labor migration programs globally to estimate the causal effects of migration for non-migrants at the national level. The results are representative of rural Bangladesh, which covers two-thirds of Bangladesh's 160 million people. Furthermore, this paper goes beyond wages and labor supply and offers insights into the role of migration in shifting workers from farm to non-farm activities.

1.3 Context: Labor Migration from Bangladesh and Why It Matters

Bangladesh is a populous, developing country with a population of 160 million with a significant proportion (about 60 million) in the working age range. The country, despite starting with high poverty levels at its independence in 1971, has grown through its exports in the textile sector and reached lower middle-income status in 2015. Despite these improvements, Bangladesh continues to have about two-thirds of its population living in rural areas and 40 percent of its population living at or below the poverty line. With the goal to reaching middle-income status by 2031, the government faces significant challenges in creating jobs and employment opportunities for its large workforce (World Bank, 2021). The workforce suffers from notable skills deficiency with low levels of completion of secondary education and, only about a fifth of those who complete, enroll into tertiary education (Statistics 2019). The low literacy level significantly affects the pipeline of workers entering into employment as they lack the foundational skills needed to be productive and engage in a knowledge-based economy.

The combination of a large, low-skilled workforce makes international labor migration an attractive development and labor market policy for the Government of Bangladesh. The commitment to *"make a comprehensive push to expand overseas employment and remittance earnings through G2G negotiation,..."* (GoB 2020; pg. 13) is based on the *"multiplier effects of remittance inflows (that) are a major contributor (sic.) to rural transformation and diversified employment and income base for the rural poor"*) (ibid.; pg. 10) and *"Unlike domestic job creation, the progress on this count was much better"* (ibid.). Consequently, there are strong assumptions that increasing migration, even into low skill jobs internationally, will increase wages and ease pressure on the local labor market while remittances sent back by migrants will lead to economic development through spillovers.

Consequently, remittance earnings and international labor export has played an important role in the country's growth over the past few decades. Temporary migration is an integral part of economic development process in Bangladesh with about 700,000 migrant workers leaving the country for various destinations over the past ten years[2]. It is the sixth largest country of origin for international migrants globally with close to 8 million Bangladeshis living abroad in 2019 with remittances

[2]Patterns of migration from Bangladesh are illustrated in Figures 1-3a and 1-4

contributing to over 5 percent of the GDP. The Government of Bangladesh (GoB) set up Bureau of Manpower, Employment, and Training (BMET) in 1980s to formalize the migration process. Bangladeshi migrants travelled to over 150 destinations over the past decade with countries in the Persian Gulf and South-East Asia being the main destinations, namely, Saudi Arabia (KSA), United Arab Emirates (UAE), Qatar, Oman, Bahrain, Kuwait, Malaysia and Singapore. Almost all migrants are considered low- or unskilled with less than two per cent of all migrants being in the "professional"category (IOM 2017; BMET n.d.).

GoB has set up a number of bi-lateral agreements that account for the majority of labor migration from Bangladesh into temporary work contracts that vary between the two to three years in duration. Consequently, migration from Bangladesh is largely temporary and technically legal as they all pass through licensed private recruitment agencies – no migrant worker can travel on a work visa without a corresponding work authorization (*SMART*) card issued by the BMET to the migrant worker. Based on interviews with BMET officials, the vast majority of migrant workers who apply for *SMART* cards are represented by registered recruitment agencies.

While bi-lateral agreements facilitate the passage of migrants to various destinations, migrant social networks and visa restrictions imposed by destination countries further facilitate or impede the out-migration process. While all migrant workers have to process their administrative documents and permits through licensed agencies, a large proportion of migrants (about 50-70 percent based on various surveys) rely on migrant networks at the destination countries to inform them about job opportunities before approaching the agent. Furthermore, despite existing agreements, a number of major destination countries imposed unexpected restrictions on the issues of work permit visas for Bangladeshi nationals that caused an exogenous shock to the inflow of Bangladeshi migrant workers to those destinations.

The majority of the jobs are in the no and low-skill category with average wages USD 200-300 per month (KNOMAD 2018) (Figure 1-4). In comparison, the textile and ready-made garments sector, the largest manufacturing sector in Bangladesh that accounts for over 80 of its export earnings, has a minimum wage of USD 95 per month. Based on recent World Bank surveys, costs of migrating from Bangladesh ranges widely from USD 2000 to USD 7000 depending on destination, local demand, and layers of intermediaries amongst others (*Bangladesh: Survey on drivers of migration and migrants' profile* 2020). Descriptive reports on high migration costs amongst Bangladeshi migrants indicate that migrant families and communities use large portions of remittances to pay back debts incurred to fund migration journeys during the first few years following the migration journey (Rahman 2015). Consequently, this implies that local spillovers may not take place at the origin despite high rates of migration.

Despite the significant annual out-migration, the inflow of remittances, and the importance of international migration in the national policy debate, evidence of the impact of migration for non-migrant households in the origin remain based on extrapolations from other country context or descriptive studies. Furthermore, anecdotal reports indicate that official remittances can be under counted as remittances are sent though unofficial channels, indicating that studying only the direct effects of remittances is insufficient and a more general study on the impact of out-migration maybe more relevant for capturing the spillover effects. Consequently, by studying the effects of out-migration on a nationally representative rural sample and focusing on the spillover effects for non-migrating households, my study fills an important gap in the literature and the results have important implications for future migration and development policy for Bangladesh.

1.4 Empirical Strategy, Data and Framework

In the following section, I describe the empirical strategy along with the data and framework used to operationalize the strategy. I present the data used to construct the main dependent variable, the regional out-migration rate. I then describe the national integrated household survey data panel from International Food Polic Research Institute (IPFRI) that is used for constructing the main outcome variables (IFPRI 2013; IFPRI 2016; IFPRI 2020). I then describe construction of the instrumental variable to predict the change in migration rate using historical regional exposures to different destination countries and the exogenous shifts in national growth in migration to these destinations and present a simple framework justifying the rationale for using historical regional exposures for predicting contemporaneous out-migration.

1.4.1 Empirical Specification

I estimate the impact of migration on non-migrant household outcomes, y_{hrt}, by comparing non-migrant households in sub-districts with different migration rates, m_{hrt}, using the specification below. The unit of observation is a household, h, in region, r (the region is a sub-district, the third level of administrative division in Bangladesh), measured at time t. Outcomes are measured at three different points, that is, $t = 2011, 2015, 2019$ allowing me to estimate the within-household changes in outcome between the start and end of the period.

$$y_{hrt} = \alpha + \beta_1 m_{rt} + \gamma_t + \eta_h + X_{hrt} + \varepsilon_{hrt} \tag{1.1}$$

In the above equation, γ_t and η_h are time and household fixed effects, respectively. m_{hrt} is the regional (sub-district level) out migration rate. Note that this rate, which is a measure of the *intensity to of the migration treatment*, is at the regional level, r, while outcomes are observed at the household level. Accordingly, standard errors for all regressions are clustered at the appropriate regional level. X_{hrt} are a set of household level controls that can impact the outcomes directly [3].

Directly comparing households in regions with different migration rates can lead to biases when estimating the effects of migration on labor and development outcomes of households. For example, unobserved or non-measurable factors such as negative shocks can lead to both higher rates of migration as well as impact participation in labor markets. To mitigate the bias and causally identify the effect of migration on a household's labor and development indicators, I estimate the equation above using a 2SLS specification, where the endogenous net migration rate is predicted by an instrument, $\tilde{z}_{hrt}$, which is defined as below.

$$\tilde{z}_{rt} = \Sigma_D D_{dt} \frac{M_{rd2009}}{M_{r2009}} \frac{\Delta M_{dt}}{Pop_{rt-1}} \tag{1.2}$$

where, $\frac{M_{rd2009}}{M_{r2009}}$ is the share of migrants from region r in the pre-study period, ΔM_{dt} is the national migration growth to destination d, at time t, at the national level, and, Pop_{rt} is the local population at period t. The dummy, D_{dt}, is equal to 0 if destination d had restrictions or limitations for Bangladeshi migrants to enter the country at time t, and set to 1 otherwise.

The expected net migration flow rate $\tilde{z}_{rt}$ is therefore a weighted average of the national net migration rates to each destination country (the "shift"), with weights that depend on the distribution of earlier exposure to migrants from that destination at a time t_0 (the "shares"). The net migration at

[3] Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants.

each period is further interacted with a the visa restriction policy, D_{dt}. I choose $t_0 = 2009$ as the pre-study period reference date for t_0.

1.4.2 Data

I use two main sources of data in implementing the empirical analysis described above.

Firstly, I use an administrative dataset from the Bureau of Manpower, Employment and Training (BMET), which is under the Ministry of Expatriates Welfare and Overseas Employment (MoEW&OE). The data contains details for all out-going labor migrants from Bangladesh to all destination countries from 2009 onwards, which is roughly about 6.4 million observations. For each observation, I know the date of registration, age, gender, address at origin, destination country, and job occupation category at destination. Similar datasets have been used to estimate the the responsiveness of destination GDP shocks on the number and wages of migrants from the Philippines (McKenzie, Theoharides, and Yang 2014) and to estimate the impact on fraud by local recruiting agencies in Sri Lanka (Fernando and Lodermeier 2022). Based on detailed interviews conducted with administrative officers, agents and migrants, date of departure is about 1 to 2 weeks after the registration with BMET.

The second dataset is the Bangladesh Integrated Household Survey (BIHS) that is collected by IFPRI in 2011, 2015 and 2019 panels to construct my outcome variables. The BIHS is an integrated household panel survey that is representative of the rural population of Bangladesh, which accounted on average for about 65 percent of the national population of Bangladesh (WB n.d.). Any other data sources for the sensitivity analysis and robustness checks will be addressed subsequently.

Regional migration rate

Using the BMET dataset, I calculate the number of outgoing migrants at the regional sub-district level, $Migs_{rt}$. Finally, I calculate the growth rate in regional out migration in between 2009-2011, 2011-2015 and 2015-2019, respectively per 1,000 of the sub-district level population.

Region-destination migrant share

In order to estimate the initial share of share of migrants from region r to destination d, that is, $\frac{M_{rd2009}}{M_{r2009}}$, I use the reference period $t_0 = 2009$ that predates t and aggregate data at the originating sub-district and destination pair level, as well as at the sub-district level.

National migration shocks and destination-specific visa policies

The main *shift* or *shock* is estimated by calculating the national level growth in the net number of migrants to each destination, ΔM_{dt}. I calculate the destination specific annual migration growth for the three time periods. I use the same calculation method as used by the parallel immigration literature (Card 2001b; see Jaeger, Ruist, and Stuhler (2018) for a full review) where the growth in immigrants from different origin countries are used as the sources of shock.

I then interact the net migration growth rates with a visa policy variable, D_{dt}, which acts as an additional shock to the demand for migration from the destination country-side. This policy variable acts as an indicator of the openness of the destination to provide temporary work permits to Bangladeshi workers [4]. The specific values of the dummy, D_{dt}, for the different destinations are coded using information about visa restrictions reported in local newspaper articles between 2011 and 2019. I downloaded these articles from Factiva, reviewed them for all the destinations for Bangladeshi migrants for the study period, and, coded the D_{dt} as follows:

- United Arab Emirates (UAE) recruited heavily from Bangladesh following an MOU signed in 2006, however, UAE imposed a ban in 2011 for work permits for migrant workers from Bangladesh and the number of migrants to UAE dropped to negligible levels in that year. These visa were not re-instated in the remaining period of the study. Consequently, the dummy is 1 until 2011, and 0 afterwards when restriction went into effect.

- Kingdom of Saudi Arabia (KSA) was not a major destination for Bangladeshi migrants until 2015 when an MOU was signed between the two governments and recruitment actively went into effect. Consequently, the migration rate jumped from nearly negligible rates at a very

[4] Note that a similar policy dummy interaction was also used in Stuen, Mobarak, and Maskus (2012b) to study the effect of skilled (foreign doctoral students) immigration on innovation at US universities.

steep rate following the MOU. So I code the value of the dummy for KSA as 0 in 2011 and 1 for 2015 and after, when the MOU cleared the path for Bangladeshis to migrate.

- Qatar (QTR) won the lottery for hosting the FIFA World Cup in 2013 and subsequently, starting in 2014, went into a heavy recruitment drive to support the surge in construction work in preparation of the event. During that period, they also signed an MOU with Bangladesh that facilitated a significant increase in the migration to Qatar. As a result, the dummy for QTR is coded as 0 in 2011 and 1 from 2014 onward.

- Kuwait (KUW) placed a ban on the import of Bangladeshi workers in 2006 and the ban remained in effect until early 2015 when restrictions were eased and as a result, the dummy for KUW is 1 from 2015 onward.

- Libya (LIB) announced a ban of Bangladeshi workers entering Libya in 2015 and as a result, the dummy for LIB is 0 from 2015 onward.

- Malaysia (MSA) banned the access of Bangladeshi labor migrants in 2008, which remained in place until a new government-to-government treaty was signed in 2011, with a pilot of entries starting in 2013 and full fledged entry following that, until it was once again stopped in 2018 due to corruption allegations (Mobarak, Sharif, and Shrestha 2020). Consequently, the dummy for Malaysia is 1 in 2015 and 0 otherwise.

- All other countries remain open to entry throughout the period and thus, dummies are 1 for all time periods.

Panel data from households surveys

The outcome variables are measured using three rounds of the Bangladesh Integrated Household Survey (BIHS) that were conducted in 2011, 2015 and 2019. To date, BIHS is the most comprehensive, nationally representative household survey and administered to the same sample of households in all rounds, creating a panel dataset. The BIHS measures indicators of household poverty, income, consumption, investments, savings and financial situation, food security, agricultural development, and various measures of women's empowerment in Bangladesh. Specifically, the BIHS is the only nationally representative survey in Bangladesh that collects detailed data on plot-level agricultural production and practices, detailed household consumption, and data to measure aspects of women's empowerment in the household.

Using the BIHS, I construct my main outcome variables at the household level as described below. The outcome variables can be divided into five main areas: labor market outcomes; household expenditure; measures of financial market access; farming and agricultural outcomes; other socio-economic outcomes.

Household labor market outcomes: The household roster contains detailed information of each member of the household including details of each employed member. Using these details, I calculate the main labor market variables: average weekly hours the average hours worked per each employed member of the household; total monthly income of the household; and, ratios of employed household members in non-farm and farm activities, respectively. I use the number of hours spent each week on work related activity to calculate the average hours worked in a week by each employed member of the household. I use the classification of the work activity to calculate the ratio of household members employed in farm and non-farm related activities. Finally, for each activity, the survey collects information on the wage or monthly salary each by each household member. I use this data to calculate the total monthly household income. All income measures are reported in nominal Bangladesh Taka values, so I adjust for inflation by calculating the real income using 2010 as the base year.

Household expenditure: The BIHS collects detailed modules to record the value of the household food consumption over a seven day period for each item consumed. The range of products include a comprehensive list of items under all the main categories of food (proteins, cereals, fruits and vegetables) whether the item was purchased, produced at home or received from other sources. I aggregate and infer the annual food consumption by the household. Similarly, the BIHS also collects the value of the household's monthly and annual expenditure on non-food items in all different categories. The variation in the recall period is based on the type of consumption. The former includes including fuel, cosmetics, washing and cleaning, transport and travel, while the latter comprises of clothing, household, medical, education amongst others. For comparability, I aggregate and extrapolate the variables at the annual level and adjust the nominal amounts in Bangladesh Taka for inflation using 2010 as the base year.

Measures of financial market access: Using the modules on access to savings and loans, I estimate an indicator for the probability of a household to save (or borrow) in the past 12 months using a binary variable that is coded as 1 if a member of the household in the sample saved (or borrowed) during the respective period. I also create a variable for the total amount saved (or borrowed) during the corresponding period by aggregating all the savings (or loans) of all household members. For all variables measured in nominal Bangladesh Taka, I adjust for inflation by calculating the real income using 2010 as the base year.

Other socio-economic indicators: In addition to the above measures of economic development; I look at a few standard measures of socio-economic development in the context of rural developing countries used in the literature. Given the importance of water and sanitation in rural Bangladesh (Benjamin-Chung et al. 2017), I look at two indicators: the first is the probability that a household uses a sanitary latrine versus using unhygienic options such as open defecation or open pit latrines; the second is the probability that the household has access to a clean water source such as tubewell, piped or bottled water versus open water bodies or rain water.

I also calculate the Household Dietary Diversity Score (HDDS) on a scale of 12, which acts as a population-level indicator of household food access. Household dietary diversity can be described as the number of food groups consumed by a household over a given reference period, and is an important indicator of food security for many reasons. A more diversified household diet is correlated with caloric and protein adequacy, percentage of protein from animal sources, and household income (Swindale et al. 2006). The HDDS indicator allows us to infer the household's ability to access food as well as its socioeconomic status based on the previous 24 hours (Kennedy, Holland, and Hwang 2011).

Finally, I calculate three indicators of women's position in the household. The first measures if a woman has been subject to domestic violence, abuse and threats. The second measures if a woman can make the decision to work on economic activities. The third measures if a woman is able to decide if they can travel outside the house by themselves. Since majority of migrants are men in migrant-prone communities, a large exodus of the men from these communities might have potentially important effects for women in both non-migrant and migrant households.

Agricultural and Farm Investments: The BIHS collects extensive information on agricultural investment and production at the plot level. In 2011, data was collected for only the largest plots of the household and consequently, this analysis is restricted to this sample. Using data on agricultural production, I calculate the use of aggregate labor hours by household and hired workers in all stages of agricultural production; the total cost of using the physical capital such as ploughs, animals and other equipment; the total cost of working capital used in the form of fertilizers; the total weight of the harvest from agricultural production. For the variables measured in nominal Bangladesh Taka, I adjust for inflation by calculating the real income using 2010 as the base year.

1.4.3 Framework

Initial exposure to migration and subsequent migration

The proposed theory characterizes the response of the rural labor markets to migration driven by variations in pre-study period migration exposure to different destinations. Migration is predicted to affect the local labor supply, which then impacts other local labor market outcome, primarily wages. The relevant local labor market is at the sub-district (*upazila*) level and there are two types of households, those with migrants and those without any migrants. As noted, in my proposed empirical design, the migration rate at the sub-district level is predicted by pre-study period intensity of migration exposure, x. Following the social capital theory in the migration literature (Aguilera and Massey 2003; Portes and Landolt 2000; Palloni et al. 2001), I predict that the degree of a region's pre-study period exposure to a destination is predicted to affect contemporaneous migration rates. This can happen since the size of a migrant network at the destination can reduce the reduce the pecuniary and non-pecuniary costs of migration at the destination for all households in that region.

A household will send a migrant abroad if the net benefits of migration are greater than the wage income from the local market, thus:

$$W_D - C_h - C_r(x) \geq W_r(x) \tag{1.3}$$

In the above equation, W_d is the wage at the destination, C_h $G(.)$ is the individual specific cost of migration, C_r is the migration cost that is common to the region and consequently impacted by the initial migration exposure, x, and W_r is the local wage that is affected by the out-migration rate, which is turn is a function of x. A full model detailing the impact of out-migration rate on local wages is based on the model developed in Dustmann et al (2013) and replicated in the Appendix. Note that given the relatively small impact of Bangladeshi migrants from each region to the respective destination countries, we can safely assume that W_d is independent of the regional migration exposure, x.

Consequently, for each household located in region, r, the probability of migration is also a function of the initial migration exposure, x, and expressed as following, which is equivalent to the regional migration rate, $M_r(x)$:

$$M_r(x) = Pr(C_h \leq W_D - C_r(x) - W_r(x)) = G(W_D - C_r(x) - W_r(x)) \tag{1.4}$$

Taking first order conditions of the above, yields the change in the migration rate as a function of the initial exposure:

$$M_r'(x) = Z(-\frac{\delta C_r}{\delta x} - \frac{\delta W_r}{\delta x}) \tag{1.5}$$

where, $Z = -\frac{\delta C_r}{\delta x}$ is a positive number. Given that the common cost of migration is a decreasing function of the exposure, that is, as the number of migrants to each destination from a region increases, the shared costs of migrating decreases with more information being available for the new out-migrants, and consequently, we have $\frac{\delta C_r}{\delta x} < 0$ and this boosts the rate of migration. The expression, $\frac{\delta W_r}{\delta x}$ indicates the change in equilibrium wages when there is a greater exposure to migration and is positive if the skills of migrants and non-migrants are comparable (Dustmann, Frattini, and Rosso 2015). Thus, the sign of $(-\frac{\delta C_r}{\delta x} - \frac{\delta W_r}{\delta x})$ depends on whether having more migrants from the region reduces the cost of migrating by more that the benefits of staying back at their origin to benefit from the higher wages.

In my paper, I can test whether the cost or the wage effect is strong by looking at the first stage of my 2SLS specification. A strong and positive first stage implies that when comparing regions with a high and low initial exposure to migration, a strong and significant coefficient for bot migrant and non-migrant households mean that $-(\frac{\delta C_r}{\delta x})$ is greater than $(\frac{\delta W_r}{\delta x})$.

Model implications and potential for spillovers

The above model proposes a mechanism by which the decision to migrate may depend on the number of migrants who are already located at different destination countries. Since migration can affect labor supply and wages, there is possibility that wage effects would act lead to a offset the the migration intensity. However, a strong, positive and significant relationship between my instrument and the predicted out-migration rate in the first stage shows that the reduction in migration costs through the social capital effect dominates.

My proposed framework, combined with the findings of the Dustmann, Frattini, and Rosso (2015) model, implies that a higher exposure to initial migration, leads to higher out-migration. Higher out-migration is associated with a rise in the labor supply of the non-migrant households when capital is immobile and the production functions remains unchanged, which are reasonable assumptions in the short to medium term. This implies an associated wage rise for the non-migrants in similar skill categories as the out-going migrants. There is an assumption here that local labor markets are relatively closed to other types of domestic migration in the short run. This is a reasonable assumption in light of the findings from Bryan, Chowdhury, and Mobarak (2014) which argue that risk aversion can act as a sufficient deterrent to internal migration and works through different exposure links than international migration.

A large out-flow of population can subsequently have multiplier or spillover effects in the local economy as a consequence of the inflow of remittances correlated with out-migration. Remittances can directly impact the expenditure of migrant households in food including diversity of food intake as well as non-food expenditure such as education, medical and household durables. Remittances can also be spent on investments such as agriculture or non-agriculture related enterprises, improvements to standards of living such as improved water and sanitation. These can have spillover effects on non-migrant households, especially if markets are not well integrated nationally.

1.5 Results and discussion

1.5.1 Impact on non-migrant households

Annual summary statistics for the BIHS panels in 2011, 2015 and 2019 are provided in Tables 1.1 to 1.3 with the characteristics of the non-migrant and migrant household samples for the key outcome variables. The summary statistics are presented for the full samples (columns 1, 4 and 7), the non-migrant household (columns 2, 5 and 8), and, migrant household samples (columns 3, 6 and 9) for each panel respectively. In columns 10 and 11, I also present the difference in means for each variable, between 2011 and 2019, for the non-migrant and migrant sample, respectively.

The 2011 sample had 475 households had migrants who were abroad for 6 months or longer since 2007 (that is the five years preceding the survey). In 2015, 138 additional households had migrants who had migrants after the follow up while in 2019, 287 households added a new migrant in their household. The fraction of male members is generally lower and women as household heads higher in household with migrants compared to those without. The number of illiterate or uneducated household members reduced over the decade. With regards to labor outcomes, the average number of hours worked per week by employed household members decreased over the decade while total monthly household income went up after accounting for inflation. All types of household expenditure went up for all groups with the exception of non-food expenditure for households with new migrants in 2019. Similarly, the increase in savings (borrowings) was lower (higher) for households with the new migrants in 2019, relative to those with no migrants. For the largest plots of the households, although labor hours increased in agriculture, the cost of capital spending and total harvest decreased over the decade. While access to sanitary latrines increased, the access to safe water deteriorated slightly while food diversity index improved for everyone.

The primary results are presented in Tables 1.4 to 1.7. For the non-migrant households, I find evidence of out-migration on labor market participation with no corresponding significant effects on household income. There is a significant increase in the ratio of hours worked in non-farm activities with a corresponding decline in the hours of farm work. The former includes various types of non-wage labor in construction, light manufacturing, self-employment in low-skill occupations. A further breakdown of the farm investment and productivity is presented in Table 1.8, using farming data for the largest plots of the households. There are no effects on spillovers on the food and non-food expenditure, financial market access or other measures of socio-economic development indicators.

Table 1.4 shows the impact of out-migration on four main variables that reflect labor market outcomes for non-migrant households in regions with high migration rates, namely, average weekly hours worked per employed member of the household; the total monthly income of the household;

and ratios of hours worked by household members in non-farm and farm activities, respectively. Column (2) shows that out-migration has a significant and positive impact on the number of average hours worked by the household members employed in non-migrant households. Specifically, an increase in out-migration rate by 10 (that is 10 migrants for every 1,000 natives of the region), will increase the average weekly hours for each employed non-migrant household member by 38 percent from the (geometric) mean of 17 hours. Columns (6) and (8) indicate, the out-migration is also associated with a significant and positive (negative) effect in the ratio of hours worked in non-farm (farm) activities, implying that the increase in labor supply was followed by a shift into non-farm (from farm) activities.

The low means in the average hours worked per week indicate underemployment in the Bangladesh rural sector and subsequently, as column (4) shows, the rise in the labor hours only leads to moderate increases in the total monthly income of the households. Specifically, an increase in out-migration rate by 10 (that is 10 out-migrants for every 1000 natives of the region), will increase the average weekly hours for each employed non-migrant household member by 25 percent from the (geometric) mean of BDT 4,125 (equivalent to about BDT 1,238 or USD 15 per month), although this is barely significant at the 10 percent level.

Table 1.5 focuses on the annual food and non-food expenditure for non-migrant households. While I find that there is no significant impact on any of these indicators, the direction of the impact is negative for non-food and positive for food related expenditure. This increase in food expenditure could indicate a change in preferences towards food-related items. However, with no change in the Food Diversity Index in Column (6) of Table 1.77, there is less support for this explanation. The more likely explanation follows from the findings of Akram, Chowdhury, and Mobarak (2017), where increased internal migration was associated with rising food prices in more migration-intensive regions as a consequence of local food markets in rural areas being imperfectly integrated with national markets. This trend has important policy implications from a food security perspective for high migrant prone regions and is discussed further in the conclusions.

Table 1.6 reports the results of the regressions on indicators of financial market access, specifically the likelihood of a household to save (and borrow) and the total amount of household savings (and loans). The general trends indicate that for non-migrant households, the savings and borrowings decreased. One hypothesis proposed with the household migration model is that with higher remittances from out-migration, migrant households can act as informal financial intermediaries for the other households in their communities. I do not find support for this hypothesis.

In Table 1.7, I report the results of the regressions on a number of other socio-economic variables as follows: probability that a household uses a sanitary latrine versus using unhygienic options such as open defecation or open pit latrines; probability that the household has access to a clean water source such tubewell, piped or bottled water versus open water bodies or rain water; Household Dietary Diversity Score (HDDS); and, three variables that measure various aspects of a women's position in the household include some abuse from other household members; freedom of mobility; and, decision power over income. These variables are chosen as they are likely to be impacted especially in households directly impacted by migration. Columns (2) and (4) show that while sanitation and water access improves, it is only significant for the latter. There are no significant changes in the food diversity or the female empowerment indicators with the estimates being tightly clustered around zero (Figure 1.4).

Given the importance of farming to the rural economy and the change in the ratio of labor hours spent in farm versus non-farm activities, I investigate the impact of out-migration on the farm investment and production. These results are reported in Table 1.8. The BIHS survey only collected data for on farming for the largest plot for each household, so the results of this table are restricted to this sample. Results indicate that for the non-migrant households, there was a significant decrease in the use working capital investments in farming including labor and fertilizer. The fall in the use of physical capital and total harvest are minimal and not significant but there is some significant increase in the labor productivity due to the reduced number of labor hours. One of the main issues for a populous country like Bangladesh with a small land area is that the agricultural sector is dominated by the presence of small farms with more workers than optimal. These results indicate that migration might be correctly these inefficiencies to some extent, although a detailed study on farm productivity is needed to establish this relationship.

In all the regressions reported above, due to the panel nature of the survey, I include households fixed effects that control for any time-invariant idiosyncratic factors allowing me to look at within-household changes in outcomes over time due to migration. I also include year fixed effects that control of any other year specific shocks during the study period. I also include household level controls for the number of male household members, the number of international and domestic migrants, land owned by the household, and, the number of household members in each age group (0-5; 6-10; 11-15; 16-20; 21-25; 26-30; 31-35; 36-40; 41-45; 46-50; 51-60; 60 and above). As expected, while standard errors increase with 2SLS over OLS estimates, the size of the estimates are larger indicating that effects on non-migrants are stronger when we account for the endogeneity of the out-migration rate between regions.

1.5.2 Indicative results on migrant households

In Appendix A, Tables A.1 to A.4, I present the results for both the non-migrant and migrant household samples, respectively. Note that the sub-sample of migrant households in the sample is relatively small, in total about 10 percent of the survey population. Migrant households are defined as those households who had someone abroad for a period of more the six months since 2007. The small sample makes the effect size and standard errors difficult to interpret. The IV analysis is also less reliable for this sample due to the low Kleibergen-Paap statistic and thus results are only presented for reference purposes only.

Table A.1 indicates that the labor outcomes for migrant and non-migrants move in the same direction. These results provide some support for the model that remaining migrant household members substitute for the loss in the income earner through migration. The results also indicate that given the low rural household incomes, any remittances sent back to the household is not sufficient to cover all household needs. Migrant households also exhibit the same pattern of movement out of farm into non-farm activities, thus showing a positive trend towards economic development.

Table A.2 shows that food and non-food expenditures for households with migrants showed mostly similar patterns as the non-migrants, no strong effects for annual expenditure in food and non-food items with positive increases in food and negative in non-food with one exception in education. This corresponds to other studies of migrant households discussed earlier especially with regards to increased expenditure on education and food consumption Furthermore, there is a significant, positive effect on the food diversity index implying the household's with migrants improve their dietary intake.

Table A.3 indicates similar savings (borrowing) trends amongst for migrant as with non-migrant households with reduced (increased) likelihood and amount saved (borrowed). These results provide some signal that migrant households in high migrant-prone areas might be crowding out the financing opportunities for the non-migrants given that they are in a position to offer better collateral due to the remittances received from their household members who are migrating. However, it is difficult to ascertain this prediction without detailed information from the credit institutions and remains to be further explored in future studies.

Finally, Table A.4 shows the indicative directions of movements on a number of other socio-economic variables. Access to safe water and food diversity increases as expected. However, the three measures of female household positions pose some causes for concern in migrant households. A large portion of women in migrant households represent the spouses left behind with in-laws. Consequently, without their partners present in the house, they may experience increased abuse, reduced mobility and decision over finances as reflected in the direction of the estimates. Given the small sample size, these estimates require further exploration and provide an important area of research in the context of migration.

1.5.3 Identifying Assumptions for IV Strategy

The empirical strategy proposed in this paper uses an instrumental variable strategy to predict the regional rate of migration by exploiting variation the in the base-period share of migrants from each region to different destination countries. The validity of this strategy relies on two fundamental assumptions of the instrument used for identification of the causal effects of migration on development. The first is that instrument has a strong first stage and second is that the exclusion principle holds. The first stage holds if these two conditions are met.

The first condition states that my instrument is a significantly strong predictor of the regional out-migration rate. In order to see whether this is true, I check if the coefficients in the first stage of all the regression are positive and significant and the size of the corresponding F-statistic to check for the strength of the instrument. In all the results tables presented, the first stage coefficient is positive and significant at the one percent level. Furthermore, all F-statistics are well over the critical value of 10. Since my standard errors I clustered at the regional level, I also report the Kleibergen-Paap (KP) statistic, which is also well above the critical value of 10 in all regression. These results provide sufficient support for a strong first stage and overall significance of the instrument in predicting the migration rate.

The second assumption relates to the exclusion principal, which states that the only effect of the instrument on the household's outcome variables is through the out-migration rate and not through any other direct means. Since my instrument aggregates a combination of past shares of a regions exposure to few different migrant destination countries interacted with national level migration growths to those respective destinations, it makes the exclusion restriction complicated to interpret. However, due to recent econometric work by Goldsmith-Pinkham, Sorkin, and Swift (2020), authors show that in this type of instrument, it is possible to first disaggregate the instruments and compute the Rotemberg weights, which identifies the main destination countries whose shares drive the identification for the instrument. My Rotemberg weights indicate that the shares of Saudi Arabia, United Arab Emirates (UAE) and Italy have positive weights and therefore drive the identification in the instrument (Table A.11). The other main destination countries, Qatar, Oman, Bahrain, and Malaysia, have small negative weights and therefore not driving the identification for the instrument.

Given that the instrument is determined by the initial 2009 shares of Saudi Arabia, UAE and Italy it is then sufficient to show that the pre-study period (that is, 2009) shares meet the exclusion criteria, meaning that the variation in the shares of migrants to these three specific destinations effect the household's change in outcomes only through migration and not other factors.

While it is not possible to directly test for the identifying assumptions, I use some of the assessments proposed by Goldsmith-Pinkham, Sorkin, and Swift (2020) to check the plausibility of the assumption. Firstly, I look at the correlates of the destination composition, that is, I estimate the correlation between the respective destination shares and the characteristics available for these regions at the base period, which in the case of this paper would be 2009. However, due to significant constraints in acquiring detailed sub-district level data for Bangladesh from that period, I use the next best alternative. The Household Income and Expenditure Survey (HIES), is a nationally representative household survey that collects detailed information on the income and consumption of households in the sample. The HIES data was collected for the year 2010, which is one year after the 2009 base year, but still prior to the start of the study period in 2011 and therefore can be used the closest proxy. Using this data, I estimate the correlations between the Saudi Arabia, UAE and Italy 2009 migrant shares, and the outcomes of household characteristic, income, consumption and education that is available in the HIES data. These results are presented in Table 1.9. All the main variables of concern including different food and non-food expenditures, household income, education, and food intake are not correlated with the industry shares. Only the total number of household members appear to be significant with a positive correlation with the UAE shares. I include baseline household controls for the household member size in my main 2SLS specifications. Furthermore, unlike in other countries, such as in the case of Mexico-US migration, where there is significant heterogeneity in the population of migrants with regards to skill and education, the majority of migration from rural Bangladesh to any of the major destinations are in unskilled or low-skilled categories (see Figure 1-4a) so the variation in exposure in unlikely to to be caused by factors apart from the migrant social network connection at the destination.

As suggested in Goldsmith-Pinkham, Sorkin, and Swift 2020, I also calculate the Bartik instrument using an alternate measure of the shock, where instead of using the interaction of the national growth in migration with the visa policy variable, I take only the national growth in migration as the shock. Using this alternate instrument, I run the main regressions (see columns 3, 6, 9, and 12 of Table A.5) and find no major differences in the size of the estimates from the original measures (see columns 2, 5, 8, and 12 of Table A.5).

Other robustness checks

In Table A.6 in the Appendix, I present the results of the main regressions with and without household controls and find that my results are stable for the non-migrant households for both types of specifications. In Table A.7, I present the results of the main regressions using inverted hyperbolic sine (IHS) transformation of the main outcome variables and find that the results are robust to this different specification.

The results presented in this paper reflect the short-term impact of migration on the labor market outcomes. However, the issue of conflating long-term and short-term impacts in immigration research is addressed in Jaeger, Ruist, and Stuhler (2018) and can be a concern. I address this using the proposed correction of using an additional lagged migration outflow predicted with an adjusted Bartik instrument using the same base period exposure shares but lagged national outflow. Results are presented in Table A.8. These results show that indeed the short term-effects can get diluted by the longer term effects captured by the lag variable, particularly for the wage effects, where the size of the positive effect on short-term wages are stronger when we adjust for the small opposing effect with some long-term adjustment. These effects are still not very significant as in the model without lags. Also as we note, the F-statistics for the regressions with lags are low indicating a (joint) weak instrument issue since the two instruments for the contemporaneous and lag periods are likely to be highly correlated. In the context of this particular study, where the period is just under a decade and combined with the results in Akram, Chowdhury, and Mobarak (2017) of relatively closed local labor markets in the Bangladeshi rural context, the risk of long term adjustments to wages and subsequent effects on migration is low. However, this indicates to the need for future studies that captures a longer time period to be studied to adequately study the long-term effects.

I also run the regressions using interactions between the migration rate, m_{rt} and a dummy for households that were identified to have an international migrant in the 2011, 2015 and 2019 BIHS surveys, Mig_{hrt}. I then run the 2SLS regressions with m_{rt} instrumented by $\tilde{z}_{rt}$ as before, and its interaction $m_{rt} * Mig_{hrt}$ is instrumented by $\tilde{z}_{rt} * Mig_{hrt}$. Consequently, all the households that had someone who migrated for 6 months or more from 2007 till 2019 are considered as migrant households for this purpose. This allows me to interpret the coefficients on the m_{rt} as the marginal effect of migration for non-migrants relative to the migrants. These results are presented in Table A.10 in the Appendix and reflect the results in the main tables. The significant coefficients on the non-migrants indicate that they experienced more positive increase in labor hours and income relative to the households with migrants, which indicate that labor market effects were stronger for this group and corresponds to prior studies.

Limitations

One important assessment for the plausibility of the identification of an IV is a pre-trends test, which is not possible in this paper since there is no defined pre-period for the visa policies that I study, since there was variation over the whole study period. An area for further improvement would be to find more detailed and sub-district level set of confounders from the 2009 period for checking can be used to check for the correlates of the 2009 industry shares. Further work can also be done to ascertain the quasi-random shock assignment using a large number of shock exposures suggested in Borusyak, Hull, and Jaravel (2018). However, given the significant dependence of Bangladesh on about a dozen significant destination countries, this approach may be somewhat more complicated to address.

An important area for future research would be to collected migration and local data for a longer time-period (such as from 2000 to 2019, which may help to address the relatively low rates of regional migration (Figure 1-3b) and better distinguish the long and short-term effects. Using an earlier base-period for the shares can allay some of the concerns for instrument validity due to correlation between industry shares and other regional characteristics.

1.6 Conclusion

Migration and development are closely linked with migration having strong first order effects on migrant incomes. Past research on migration shows variation on the estimated impact of migration and remittances on the remaining households at the origin. Income and consumption increase for migrant household conditional on the size and skill-profile of the migration programs. For example, for with variation in skill levels of migrants from Mexico or with a high proportion of migrant households in the community, there can be strong positive effects. However, when migration happens in primarily unskilled job categories and from countries with large, unskilled rural labor force such as Bangladesh, the extent of the effects and migration's contribution to rural development are less obvious.

In my paper, I use an instrumental variable strategy to causally identify the effects of migration on income, consumption and other socio-economic indicators for non-migrant households in Bangladesh. My paper indicates that in the case of Bangladesh, which has one of the largest "labor-exporting" programs and is one of the top five remittance-earning nations globally, the contemporaneous effects of migration for non-migrating rural households located in high-migrant prone regions remains limited in the context of developmental outcomes. Specifically, I find that non-migrating households significantly increase their labor supply and that the increased hours of labor are re-allocated to non-farm activities. The primary development effects manifest from increased opportunities for labor in non-farm activities, implying some structural transformation out of the rural agricultural sector. The corresponding wage effects are positive but not very significant. These results indicate that while out-migration can ease employment pressure in the local economy by creating more opportunities for work by non-migrants, the associated wage gains are limited mostly as a consequence of limitations in the rural labor market structure and labor market adjustments offset any positive gains. There are no other significant effects estimated on household expenditure, various measures of socio-economic development or access to financial access. To conclude, despite the strong correlation in out-migration and national remittances, I find limited evidence of spillovers through remittances to other socio-economic variables at the micro-level unlike in the Mexico and Nepal studies.

My paper makes an important contribution to the academic literature on migration and development by expanding the understanding about the more widespread effects of migration amongst non-migrating households living in high migrant prone areas while also offering some implications for migration policy in Bangladesh and other migrant-sending LMICs along with some key areas of future research to explore the digression in findings from the Mexico and Nepal cases.

The effects on labor supply and shift to non-farm activities without strong income effects suggest that wages are continue to remain depressed or do not rise in proportion with labor due to the structural construct of the labor market. Meanwhile, despite increased migration, the remittances are not ploughed back into the local economy in a productive way to generate economic improvements amongst non-migrants. While the NELM model predicts linkages between migration, remittances and socio-economic development for the remaining members of migrant households, exact mechanism for spillovers into non-migrating households remain under-developed. This paper highlights the need for more integrated theories of migration that can explain the empirical results for both migrants and non-migrants.

The results from my paper suggests that there is a pressing need to update the assumptions underlying the Bangladeshi government's policy to promote migration as a formal employment strategy. A number of policy implications follow from this paper. Firstly, despite the labor market opportunities created by the departing migrants, non- migrants do not experience the large wage gains predicted by the economic models possibly due to the low farm wages and under-employment. Furthermore, inefficiencies in farm production is prevalent and creating more non-farm investment opportunities along with greater financial access for non-migrants remain significant for creating local jobs along with promoting migration.

Secondly, without the remittance spillovers from the migrant households, there is a continued need for local safety nets to support these non-migrant households. Research show that safety nets such as public works programs tend to be heavily over-subscribed and households with political connections benefit more than the poor from these programs. Taking these results together, the implication is that migration alone cannot mitigate rural poverty but rather it has to be complemented with a strong social safety net programs that expand the scope of the public works program with greater transparency in job allocation amongst non-migrating households.

The lack of remittance spillovers from migrant-households into the local economy can have two implications on the nature of the remittances being sent back. The first is that the size and frequency of remittances may not be sufficient for migrants to spend on productive assets. Secondly, the costs of migration for Bangladeshis migrants are disproportionately higher relative to the wages earned as migrant workers (KNOMAD 2018). As a result, a significant share of initial remittance transfers following out-migration are spent towards loan repayments instead of household spending. Policies that address up-skilling potential migrants prior to their migration can address this issue by helping migrants to secure higher wage jobs. Tighter policies to regulate migration costs can also be effective, however with a high demand for migration with limited institutional resources for enforcement, this latter approach may be less effective.

Next, I find some evidence of increased expenditure in food items, which is not associated with improved food diversity amongst non-migrants. This indicates that food prices may be rising faster in the high-migrant prone areas due to poor integration of local food markets with national production networks (Akram, Chowdhury, and Mobarak 2017). A more extensive study on the food prices is needed to ascertain this theory and migrant-prone areas may need stronger policies that ensure equity in access to affordable food sources. However, the overall lack of significance in the expenditure corresponds to the lack of strong income effects of migration.

Finally, existing research indicate both negative and positive consequences for women in migrant households. While there are no strong spillover effects are detected amongst non-migrants, my indicative results amongst migrant household imply that increased abuse combined with economic and mobility restrictions might be prevalent amongst female spouses of migrants and this is an important area to explore in future research.

Given strong policy drive in Bangladesh as well as in other developing countries to promote temporary labor migration, the need to understand the broader effects of migration in the community, including non-migrating households are especially relevant. As I demonstrated, in addition to the academic contribution, my paper allows policy makers to have to more comprehensive understanding of the spillovers from remittances underlying the implementation of these policies. International labor migration can be incorporated and complement other development policies rather be a strategy in itself for increasing income of rural Bangladeshi workers. Finally, the empirical findings in this paper support the need for better economic models that capture the spillover effects of migration for non-migrant households.

1.7 Tables

Table 1.1: HH Descriptive Stats - Part 1

	(1) F11	(2) NM11	(3) M11	(4) F15	(5) NM15	(6) M15	(7) F19	(8) NM19	(9) M19	(10) Diff(8-2)		(11) Diff(9-3)	
	mean	mean	mean	mean	mean	mean	mean	mean	mean	b	p	b	p
Household Characteristics													
Male Mem	0.47	0.47	0.38	0.43	0.43	0.33	0.37	0.38	0.27	-0.09	0.00	-0.11	0.00
Fem Head	0.18	0.15	0.49	0.25	0.25	0.51	0.35	0.34	0.54	0.19	0.00	0.05	0.18
Mem<15 Yrs	0.35	0.35	0.37	0.31	0.31	0.26	0.27	0.27	0.22	-0.08	0.00	-0.15	0.00
Mem 15-40 Yrs	0.39	0.39	0.34	0.33	0.32	0.25	0.28	0.28	0.21	-0.11	0.00	-0.13	0.00
Mem>40 Yrs	0.26	0.26	0.29	0.36	0.36	0.48	0.46	0.45	0.57	0.19	0.00	0.28	0.00
Illit	0.29	0.29	0.26	0.23	0.22	0.18	0.18	0.18	0.13	-0.11	0.00	-0.13	0.00
Lit/semi-lit	0.71	0.71	0.74	0.68	0.69	0.55	0.62	0.62	0.53	-0.08	0.00	-0.22	0.00
Uneduc	0.43	0.43	0.37	0.33	0.32	0.26	0.28	0.28	0.22	-0.15	0.00	-0.15	0.00
PrimSch or Less	0.46	0.45	0.48	0.45	0.45	0.35	0.39	0.39	0.32	-0.06	0.00	-0.15	0.00
Sec/PostSec Sch	0.11	0.11	0.15	0.13	0.13	0.12	0.12	0.12	0.11	0.01	0.00	-0.04	0.00
Tertiary	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.05
Non-Earn	0.57	0.56	0.72	0.56	0.56	0.52	0.57	0.58	0.53	0.01	0.00	-0.19	0.00
Farm/Pltry	0.24	0.25	0.20	0.18	0.17	0.13	0.08	0.08	0.07	-0.17	0.00	-0.13	0.00
Wage/SelfEmp	0.16	0.17	0.07	0.15	0.15	0.07	0.12	0.13	0.05	-0.04	0.00	-0.01	0.16
Own Plot Val (BDT)	714523	667329	1313436	902542	893831	1286718	898059	880261	1197665	212932	0.00	-115771	0.41
Migrant Status	0.07			0.02			0.06						
Observations	6503	6028	475	6824	6086	138	5118	4831	287	10859		762	

Table 1.2: HH Descriptive Stats - Part 2

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		(11)	
	F11	NM11	M11	F15	NM15	M15	F19	NM19	M19	Diff(8-2)		Diff(6-3)	
	mean	mean	mean	mean	mean	mean	mean	mean	mean	b	p	b	p
Labor Outcomes													
Avg LabHrs/mem	23.55	23.90	18.05	21.47	21.54	18.15	19.77	20.06	14.57	-3.84	0.00	-3.47	0.00
Mnth HH Inc	6457	6579	4579	7310	7362	4749	8092	8202	6104	1623	0	1525	0
Rat Farm Emp	0.62	0.61	0.77	0.65	0.65	0.74	0.67	0.66	0.78	0.05	0.00	0.01	0.66
Rat NonFarm Emp	0.39	0.40	0.24	0.36	0.36	0.28	0.34	0.34	0.24	-0.06	0.00	-0.01	0.75
Household Expenditure													
Med Exp	5509	5159	9943	7205	7138	10145	8383	8167	12002	3008	0	2059	0
Educ Exp	2315	2213	3613	3448	3431	4194	3865	3818	4655	1605	0	1042	0
NonFood Exp	42831	40007	78681	54665	54268	72180	55338	54345	72051	14338	0	-6630	0
Protein Exp	11644	11011	19676	14036	15215	23069	18537	18192	24353	7181	0	4677	0
Food Exp	48748	47385	66046	88911	88384	112157	107969	106847	126853	59462	0	60807	0
Financial Market Access													
SavingsProb	0.65	0.65	0.63	0.78	0.76	0.71	0.80	0.80	0.76	0.15	0.00	0.13	0.00
SavingsFreq	0.48	0.49	0.34	0.56	0.52	0.46	0.54	0.54	0.46	0.05	0.00	0.12	0.00
TotalSavings	12223	11544	20843	15924	15690	26254	21633	21409	25413	9865	0	4570	0
BorrowProb	0.80	0.80	0.83	0.85	0.93	0.95	0.98	0.98	1.00	0.18	0.00	0.16	0.00
TotalLoans	26958	24049	63882	37432	35788	109921	45194	42278	94285	18229	0	30403	0
Migrant Status	0.07			0.02			0.06						
Observations	6503	6028	475	6824	6086	138	5118	4831	287	10859		762	

Table 1.3: HH Descriptive Stats - Part 3

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		(11)	
	F11	NM11	M11	F15	NM15	M15	F19	NM19	M19	Diff(8-2)		Diff(6-3)	
	mean	mean	mean	mean	mean	mean	mean	mean	mean	b	p	b	p
Agricultural and Farming Outcomes													
AgLabHrs	255	260	189	319	351	286	287	289	247	29	0	57	0
AgLabCost	3071	3088	2849	3906	4286	4115	3839	3841	3795	753	0	946	0
AgCapCost	1462	1453	1604	1424	1432	1099	1116	1125	961	-328	0	-643	0
AgFertCost	692	695	641	696	702	411	682	696	456	0	1	-185	0
TotalHarvest	3249	3181	4367	1768	1771	1642	1757	1768	1557	-1412	0	-2811	0
LivestockLabHrs	516	525	404	573	574	514	579	585	492	59	0	88	0
ValLivestockProd	12.62	12.47	14.59	10.75	10.72	12.14	11.16	11.14	11.46	-1.33	0.00	-3.13	0.01
Other Socio-economic Indicators													
ProbSanLat	0.28	0.27	0.43	0.44	0.44	0.56	0.49	0.48	0.64	0.21	0.00	0.22	0.00
ProbSafeWater	0.66	0.66	0.73	0.53	0.53	0.54	0.56	0.56	0.58	-0.10	0.00	-0.15	0.00
FoodDivInd	9.90	9.85	10.49	10.55	10.54	10.93	10.73	10.71	11.02	0.86	0.00	0.54	0.00
FemEmpInd	0.52	0.53	0.49	0.60	0.61	0.56	0.68	0.68	0.67	0.16	0.00	0.18	0.00
Migrant Status	0.07			0.02			0.06						
Observations	6503	6028	475	6824	6086	138	5118	4831	287	10859		762	

Table 1.4: Regressions of Out-migration Rate on Labor Outcomes for Non-Migrant HHs

Dependent variable Labor Outcome Indicators								
	AvgHrs per member		Monthly HHinc(ln)		Ratio NonFarmHrs		Ratio FarmHrs	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Out-Mig	0.014	0.038	0.006	0.025	0.007	0.011	-0.007	-0.010
	(0.007)*	(0.018)**	(0.010)	(0.019)	(0.003)***	(0.005)**	(0.003)**	(0.004)**
First Stage Instrument								
SSIV		0.31		0.31		0.31		0.31
Rob SE		0.04		0.04		0.04		0.04
F-stat 1st stage		72.2		72.5		72.2		72.2
KP stat		18.1		17.8		18.1		18.1
N	16,180	15,643	15,883	15,272	16,181	15,645	16,181	15,645
Mean Dep Var	2.86	2.86	8.36	8.36	0.37	0.37	0.64	0.64
SD Dep Var	0.73	0.73	1.43	1.43	0.33	0.33	0.33	0.33
HH controls		Yes		Yes		Yes		Yes
HH FE		Yes		Yes		Yes		Yes
Year FE		Yes		Yes		Yes		Yes

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010.

Table 1.5: Regressions of Out-migration Rate on Household Expenditure on Non-Migrant HHs

Dependent variable			**Expenditure Indicators**					
	Educ Exp (ln)		All non-food (ln)		Protein (ln)		All food (ln)	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Out-Mig	-0.032	-0.041	-0.032	-0.016	-0.022	0.017	-0.018	0.000
	(0.011)***	(0.028)	(0.006)***	(0.016)	(0.009)**	(0.020)	(0.006)***	(0.011)
First Stage Instrument								
SSIV		0.32		0.31		0.31		0.31
Rob SE		0.04		0.04		0.04		0.04
F-stat 1st stage		66.8		65.7		65.9		65.7
KP stat		17.1		19.2		18.6		19.2
N	11,637	10,363	16,940	16,591	15,533	14,798	16,939	16,587
Mean Dep Var	7.69	7.69	10.30	10.30	9.20	9.20	11.06	11.06
SD Dep Var	1.36	1.36	0.98	0.98	1.10	1.10	0.70	0.70
HH controls		Yes		Yes		Yes		Yes
HH FE		Yes		Yes		Yes		Yes
Year FE		Yes		Yes		Yes		Yes

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010.

Table 1.6: Regressions of Out-migration Rate on Indicators of Financial Market Access

Dependent variable	Expenditure									
	ProbSave		FreqSave		TotalSave		ProbBorrow		TotalLoans	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Out-Mig	0.001	0.009	0.001	-0.003	-0.041	-0.052	0.004	-0.002	-0.029	-0.003
	(0.005)	(0.009)	(0.003)	(0.008)	(0.017)**	(0.029)*	(0.003)	(0.006)	(0.009)***	(0.018)
First Stage Instrument										
SSIV		0.31		0.31		0.30		0.31		0.30
Rob SE		0.04		0.04		0.04		0.04		0.04
F-stat 1st stage		65.8		65.8		66.5		65.8		52.9
KP stat		19.2		19.2		17.3		19.2		16.7
N	16,945	16,595	16,945	16,595	10,615	8,969	16,945	16,595	11,682	10,169
Mean Dep Var	0.73	0.73	0.51	0.51	8.59	8.59	0.90	0.90	9.98	9.98
SD Dep Var	0.44	0.44	0.50	0.50	1.81	1.81	0.30	0.30	1.28	1.28
HH controls		Yes		Yes		Yes		Yes		Yes
HH FE		Yes		Yes		Yes		Yes		Yes
Year FE		Yes		Yes		Yes		Yes		Yes

Standard errors in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each

five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated

since 2010.

Table 1.7: Regressions of Out-migration Rate on socio-economic indicators

Dependent variable	**Indicators**											
	ProbSanLatrine		ProbSafeWater		FoodDivInd		FemAbuse		FemMobility		FemDecideMoney	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Out-Mig	0.023	0.020	0.002	0.030	0.000	-0.008	0.019	0.004	0.002	0.006	0.002	0.008
	(0.005)***	(0.013)	(0.005)	(0.011)***	(0.009)	(0.021)	(0.005)***	(0.013)	(0.007)	(0.016)	(0.005)	(0.012)
First Stage Instrument												
SSIV		0.31		0.31		0.31		0.31		0.31		0.31
Rob SE		0.04		0.04		0.04		0.04		0.04		0.04
F-stat 1st stage		65.8		65.8		65.7		65.7		65.5		65.7
KP stat		19.2		19.2		19.2		19.2		19.1		19.2
N	16,945	16,595	16,945	16,595	16,943	16,593	16,944	16,594	15,970	14,748	16,944	16,594
Mean Dep Var	0.39	0.39	0.58	0.58	10.34	10.34	0.36	0.36	0.56	0.56	0.75	0.75
SD Dep Var	0.49	0.49	0.49	0.49	1.34	1.34	0.48	0.48	0.50	0.50	0.43	0.43
HH controls		Yes		Yes		Yes		Yes		Yes		Yes
HH FE		Yes		Yes		Yes		Yes		Yes		Yes
Year FE		Yes		Yes		Yes		Yes		Yes		Yes

Standard errors in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010.

Table 1.8: Regressions of Out-migration Rate Farm Outcomes for Non-Migrant HHs

Dependent variable	**Farm Outcomes for Non-migrant (2SLS)**					
	FarmLabHrs	FarmLabCost	FarmFertCost	FarmCapCost	FarmHarvestKg	FarmLabProd
	(1)	(2)	(3)	(4)	(5)	(6)
Out-Mig	-0.047	-0.042	-0.105	-0.008	-0.021	0.031
	(0.022)**	(0.025)*	(0.041)***	(0.019)	(0.023)	(0.018)*
First Stage Instrument						
SSIV	0.33	0.33	0.33	0.33	0.33	0.33
Rob SE	0.04	0.04	0.04	0.04	0.04	0.04
F-stat 1st stage	84.7	77.9	80.6	83.2	84.2	84.2
KP stat	15.1	15.1	13.7	15.2	15.0	15.0
N	8,028	6,743	6,731	7,833	7,983	7,983
Mean Dep Var	5.91	8.34	6.30	7.16	7.45	1.52
SD Dep Var	0.94	1.26	1.26	1.02	1.18	0.74
HH controls	Yes	Yes	Yes	Yes	Yes	Yes
HH FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010. Sample comprises data from only the largest plots of the households in the sample.

Table 1.9: Relationship between destination shares and regional HH characteristics

Characteristics	**Shares**			**IV**
	Saudi Arabia (1)	UAE (2)	Italy (3)	Bartik-2009 shares (4)
Consumption Exp	0.202	0.203	-0.290	1.811
	(0.346)	(0.225)	(0.448)	(1.797)
Food Exp	0.636	0.008	0.471	0.277
	(0.622)	(0.347)	(0.864)	(3.228)
Educ Exp	-0.072	-0.086	0.120	-0.968
	(0.063)	(0.047)	(0.183)	(0.520)
HH income	0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Food Intake PerCap	-0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.002)
No. HH members	0.036	0.188	-0.167	2.390
	(0.119)	(0.069)**	(0.192)	(0.618)**
No. Male members	-0.310	-0.112	0.164	-2.410
	(0.179)	(0.111)	(0.273)	(1.005)*
Mean Class Passed	-0.023	0.043	0.030	0.286
	(0.037)	(0.034)	(0.086)	(0.279)
N	306	306	186	306
R2	0.07	0.16	0.08	0.13

Each column reports results of a single regression of a 2010 destination share on 2010 mean regional household characteristics obtained from the HIES 2010. The final column is the Bartik instrument constructed using the 2009 shares with growth rates for 2011 to 2019. Standard errors in parenthesis. * $p<0.05$, ** $p<0.01$. All regressions are weighted by population in 2010.

1.8 Figures

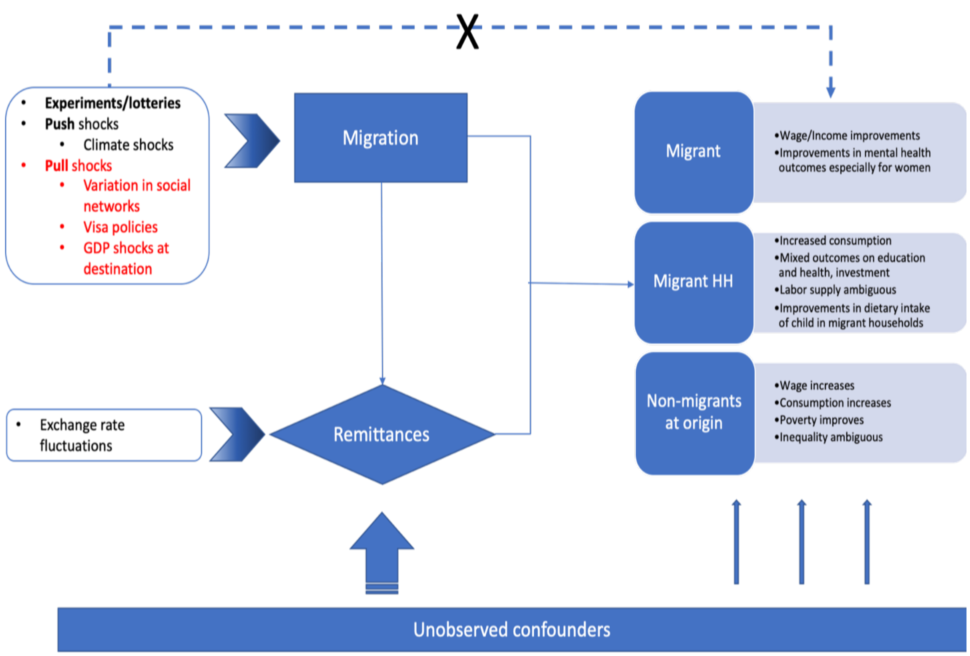
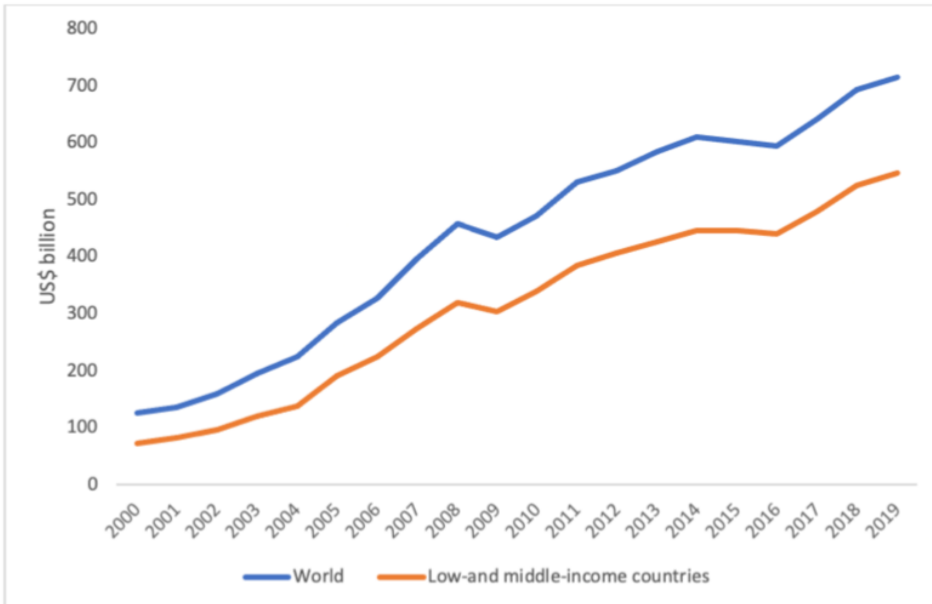
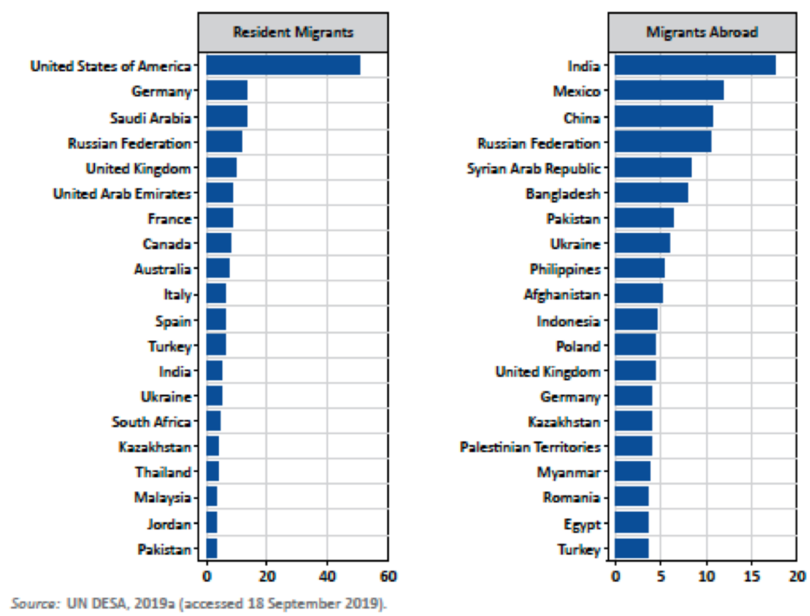


Figure 1-1: Migration and Development Link

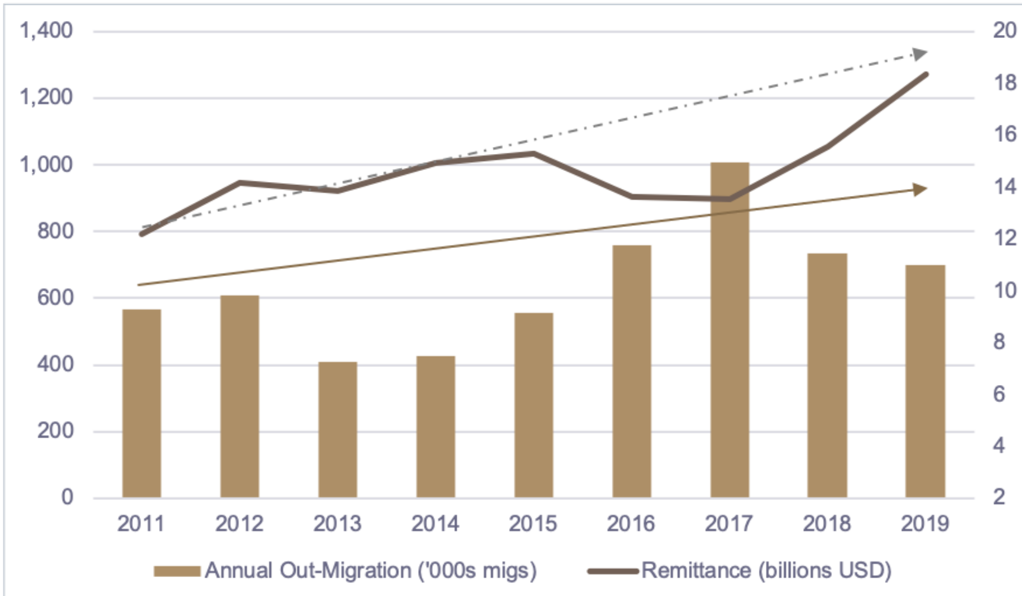


(a) Global Remittance Growth

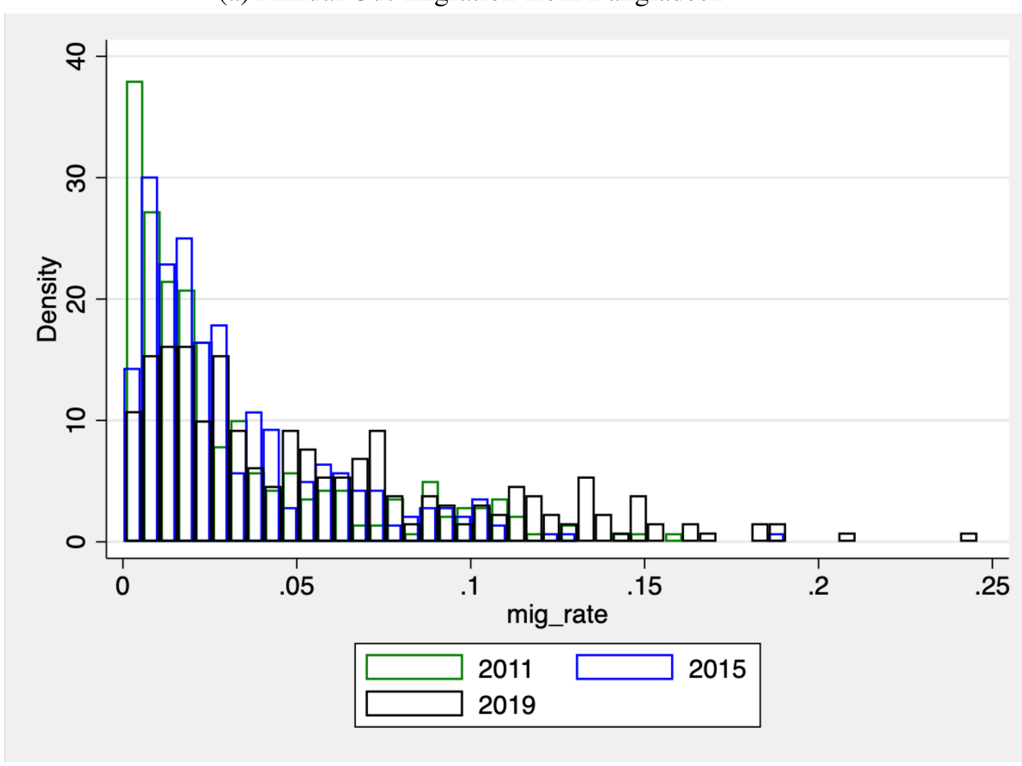


(b) Top Migration Origins and Destinations

Figure 1-2: Global Remittance and Migration Trends

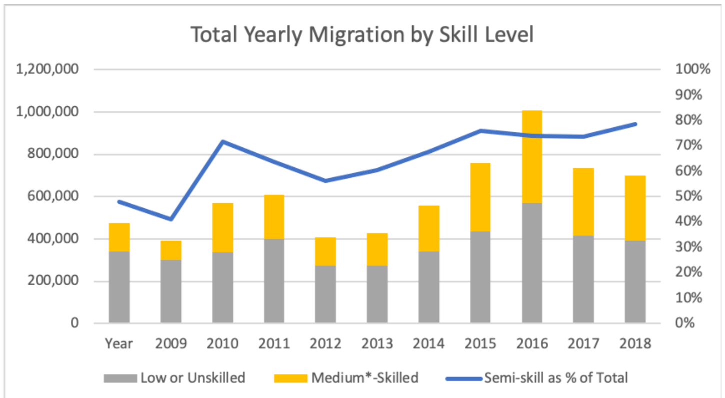


(a) Annual Out-migration from Bangladesh

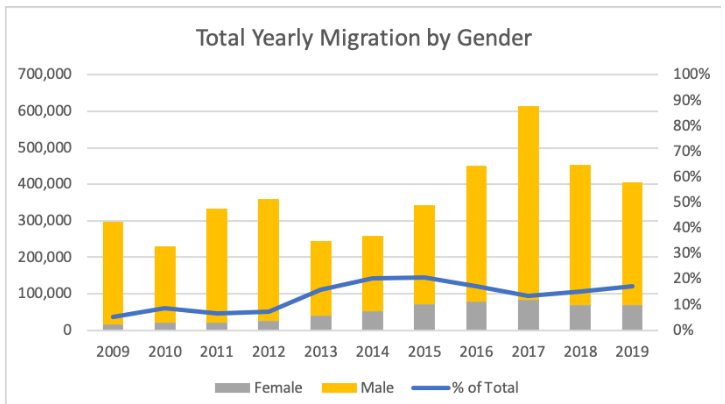


(b) Distribution of Annual Regional Out-migration Rates

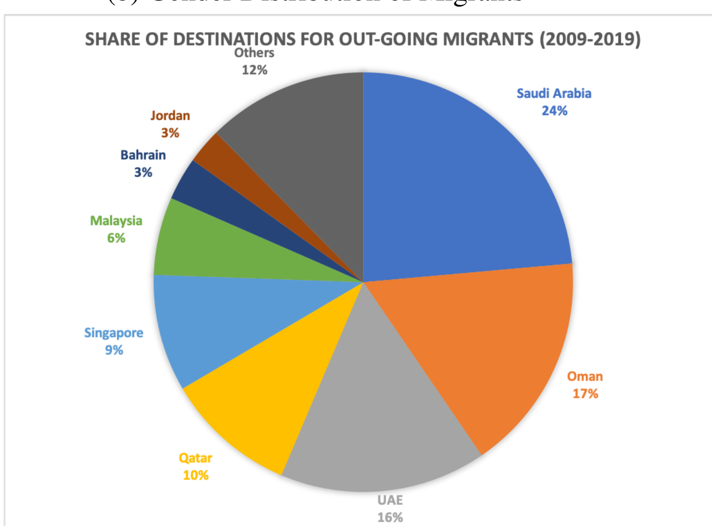
Figure 1-3: Annual Migration Trends for Bangladesh



(a) Skill Distribution of migrants

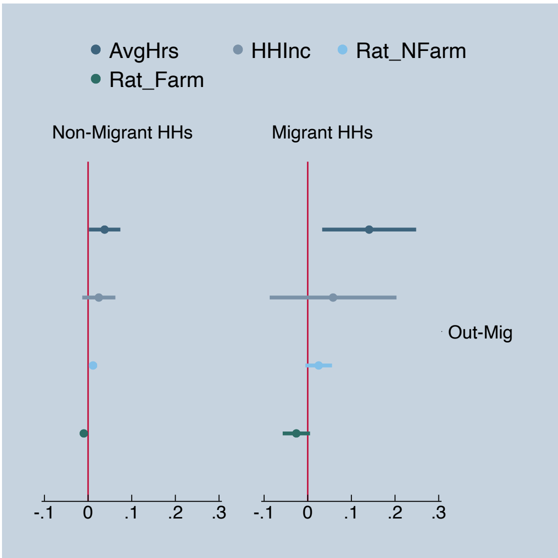


(b) Gender Distribution of Migrants

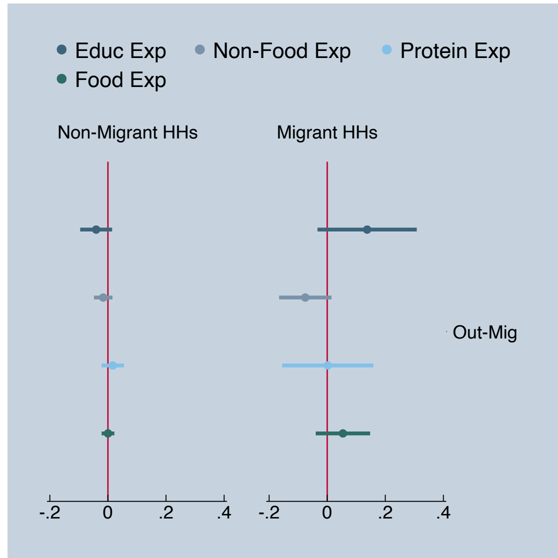


(c) Destination Distribution of Migrants

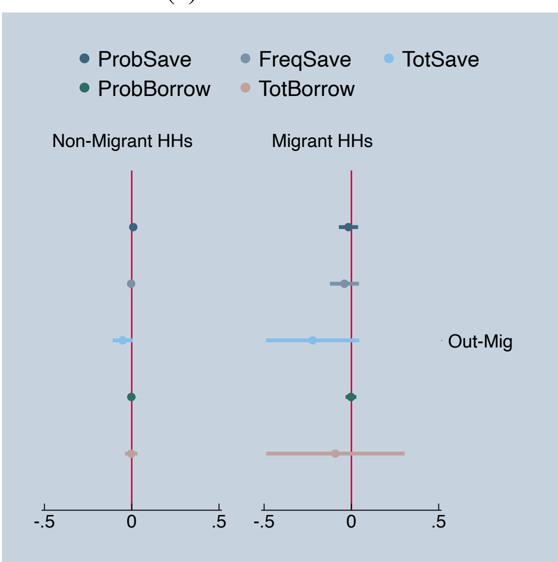
Figure 1-4: Characteristics of Bangladeshi Migrants



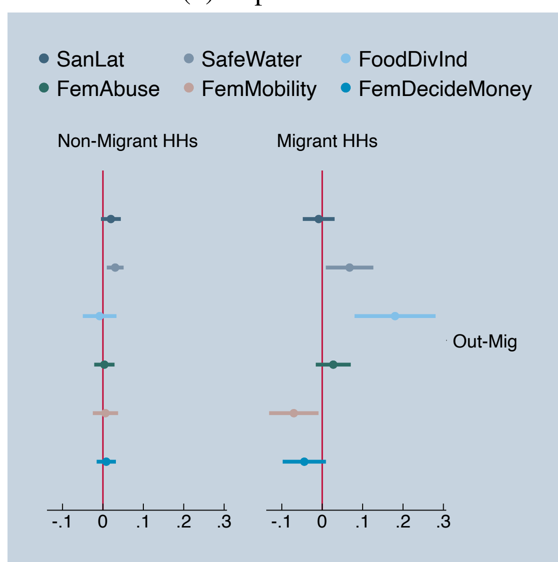
(a) Labor Outcomes



(b) Exp Outcomes

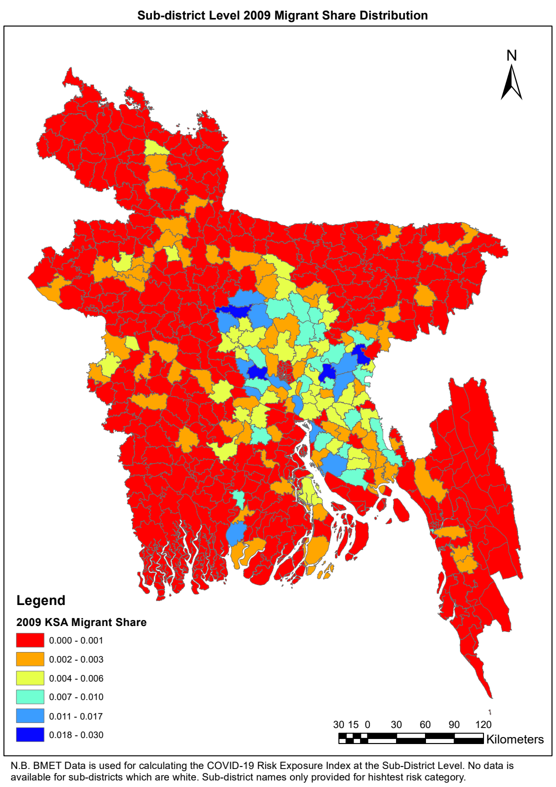


(c) Labor Outcomes

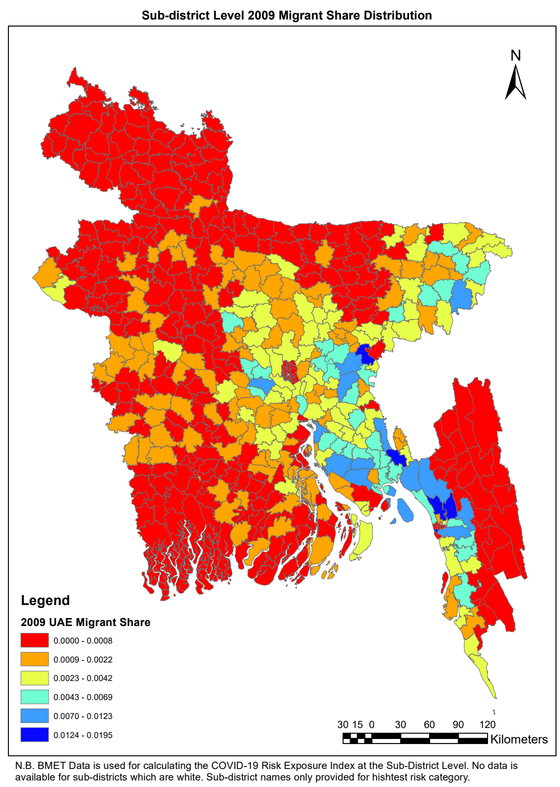


(d) Exp Outcomes

Figure 1-5: Coefficient Estimates



(a) Saudi Arabia



(b) United Arab Emirates

Figure 1-6: Sub-District-wide exposure to 2009 Migration Shares

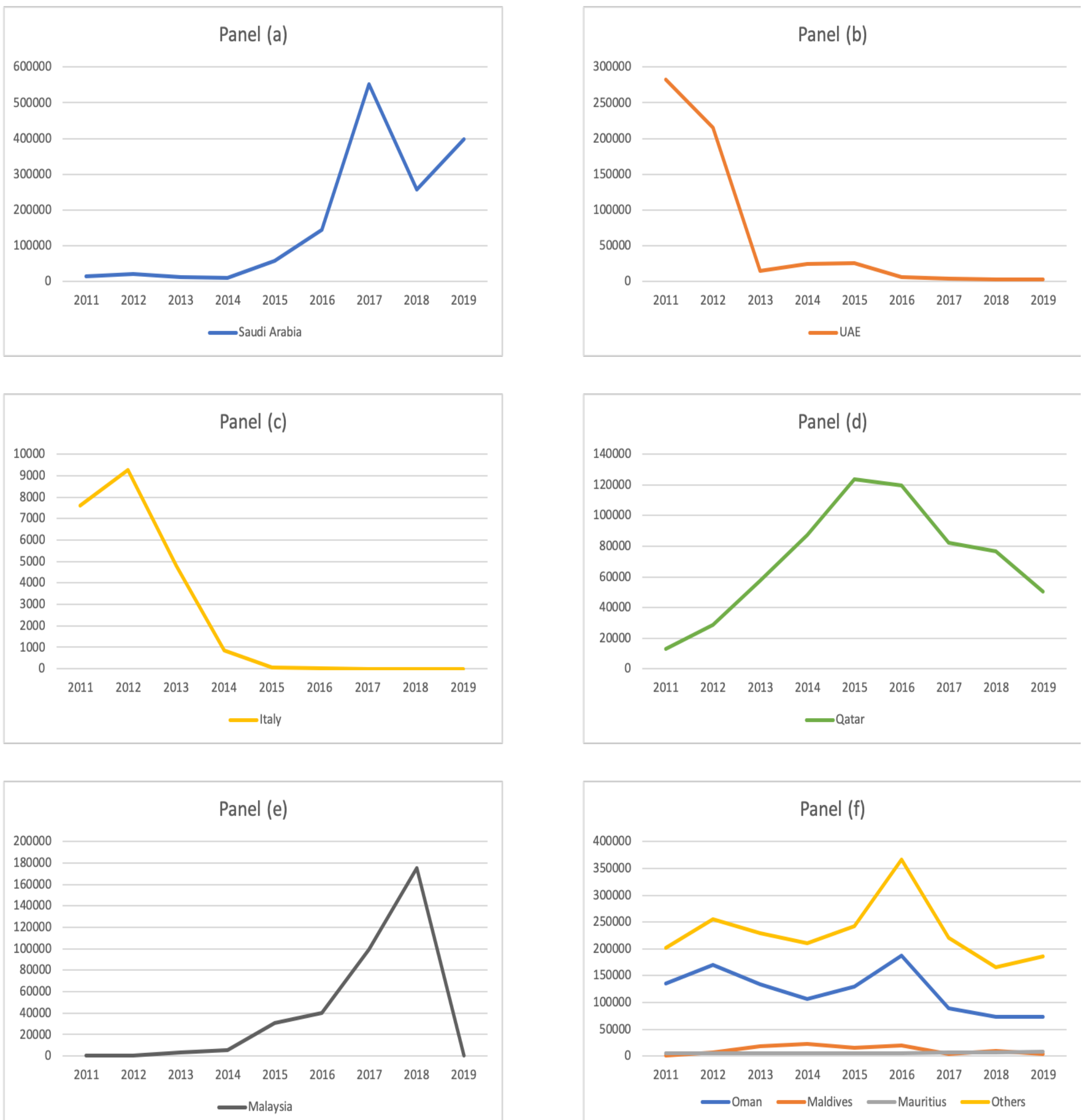


Figure 1-7: *Year-wise total out-migration trends by destination*

Chapter 2

Labor Migration and COVID-19 Risk Exposure[1]

2.1 Introduction

As of 2019, of the almost 270 million people who lived outside of their countries of birth, about two-thirds were labor migrants (ILO 2022). Majority of these migrants originate from low-and middle-income countries (LMICs) and are subject to temporary work contracts (ibid.). As a result, when the COVID-19 pandemic hit Western Europe and North America early (WHO n.d.) were many migrants are located, a large proportion of temporary migrant workers were impacted, posing potentially large threats in LMICs due to limitations in health system capacity and social safety nets (Tondl 2021; Walker et al. 2020). For example, there were fewer than 2,000 working ventilators to serve the hundreds of millions of people in Africa early in the pandemic (MacLean and Marks. 2020)[2] and there was a disturbingly large rise in food insecurity in LMICs ("Falling living standards during the COVID-19 crisis: Quantitative evidence from nine developing countries" 2021). To limit health and economic damages, it is essential for LMICs to use various tools to quickly identify disease spread at a spatially granular level and target economic and health resources efficiently.

[1] Co-authors: Reshad Ahsan (University of Melbourne); Kazi Iqbal (Bangladesh Institute of Development Studies (BIDS)); Ahmed Mushfiq Mobarak (Yale University, NBER, CEPR and Deakin University); and, Abu Shonchoy (Florida International University)

[2] Even the 170,000 ventilators in the United States has been characterized as an acute shortage (https://tinyurl.com/ram86g5).

Deficiencies in medical testing infrastructure prevents such efficient targeting from taking place, as was highlighted early in the COVID pandemic when ill-prepared governments struggled to set up comprehensive testing.

In this paper, we develop a novel method to predict the spatial distribution of the early spread of COVID-19. This approach builds on the insight that migrants were an important vector for early COVID-19 spread, and migration links with COVID-19 affected areas are informative about risk in new locations. Our methodology, which uses readily-available data, allows us to identify the variation in exposure to COVID-19 across countries and sub-national regions, which we validate using subsequent cases of COVID-19 to demonstrate its reliability. Our analytical approach can be adapted to help policy makers spatially target economic and health resources in future pandemics whenever testing data are inadequate.

Our method relies on the human-to-human transmission of viral pandemics spread to new locations: return migration has played an out-sized role in the early spread of viral pandemics across national borders and across jurisdictions within countries. Past pandemics and epidemics of infectious diseases like HIV, SARS and MERS have been similarly linked to human mobility and migration patterns (Greenaway and Gushulak 2017). In the context of COVID-19's exceptionally infectious nature, pre-existing bilateral migration links with COVID-19 affected areas are informative about disease risk in new locations.

Many countries in the Global South experienced high rates of migration in the past decade (IOM 2020b) with large emigrant populations residing in the high-income countries making them vulnerable to COVID-19 early in the pandemic. Some notable high-frequency migrant destinations like Italy and the United States were affected early by COVID-19. As a result, migrant-sending countries and regions linked to those destinations were significantly more exposed to the risk of early disease spread, since large numbers of migrants were forced to return home in the wake of the financial crises initiated by country-wide lockdowns, economic closures and uncertainties. Returning migrants thus became important vectors driving the spread of the disease in their countries of origin. For example, India with over 138,000 migrants in Italy in 2017 experienced an exponential early rise in COVID-19 cases compared to Tanzania, which had only around 1,600 migrants in Italy in the same year (WHO n.d.).

Our analysis exploits the insight that tracking both migration links and recent mobility have predictive value for early detection of pandemic risk exposure and can inform policy responses at sub- and cross-national levels. We apply this to the current COVID-19 pandemic to construct a disease risk index that predicts exposure for every country. Specifically, we combine the UN-DESA 2017 database of country-pair migration links with Johns Hopkins CSSE data on COVID outbreak intensity at each migration destination. The index value is determined not only by overall emigration rates, but each country's migration links to specific destinations that were more affected by COVID such as Italy, United States, and Spain.

We validate our migration-linked disease exposure index by comparing the predictions of the index to actual indicators of the severity of the disease, namely, the number of confirmed COVID-19 cases; a wide range of governments' response to the spread of infection (Hale et al. 2021); restrictions to citizen mobility (Google n.d.); and the number of COVID-19 deaths. We find a strong positive correlation between our index and confirmed cases – a 1 percent increase in our COVID-19 risk exposure measures is predicted to significantly increase confirmed COVID-19 cases by about 0.2 percent with a 2 week-lag from exposure at the migrants' destination countries. The strong predictive power of our index is retained even after controlling for a large set of country and week fixed effects.

We further substantiate our assumption that existing stocks of migrants predict incoming returnees during COVID-19 with a case study from Bangladesh. Bangladesh is characterized by large annual out-migrations and limited health systems. Application of our COVID-19 risk exposure is especially relevant for policy makers to take swift action to mitigate both the spread of the disease as well as the economic fallout. We show that airport arrivals in Bangladesh between December 2019 and March 2020 are significantly correlated migrant stock figures from surveys and administrative data (correlation +0.73).

We demonstrate the sub-national application of our index using Bangladeshi and Filipino administrative data to create a sub-district (*upazila*) and municipal level risk exposure index, respectively. These are useful for precise targeting of policy in the early stages of the pandemic. Our hypothesis on the COVID-19 and migration link is further substantiated by a related phone-survey of 909 households across one district in Bangladesh, which finds that respondents in communities where a migrant returned in the 2 weeks prior are 2.5 times more likely to report WHO/CDC COVID-

19 symptoms. Returnees are the single largest risk factor in a multivariate analysis (Lopez-Pena et al. 2020).

Our analytical approach would be of greatest value towards the onset of new pandemics. Heat maps based on our COVID-19 risk exposure indicate places where development indicators might be negatively impacted by exposure to COVID-19 through migration. For example, Bangladeshi districts that sent many migrants to Italy could be expected to experience larger adverse shocks to remittance income and may need greater social safety nets early in the pandemic. Overall, remittances into Bangladesh fell 34 percent (by USD 500 million) year-on-year in April 2020 (Withers, Henderson, and Shivakoti 2021 *Remittance drops 34% in April amid pandemic* 2020). Thus, even though migrants may become less predictive of COVID-19 occurrence over time as the disease-spread within LMICs switches from being externally imported to internally spread, our sub-national heat maps are still informative about the nature of economic stressors over time.

Our paper contributes to several strands of research. Firstly, we contribute to a growing literature linking the impact of COVID-19 and degree of inter-connectedness between countries due to social connections and migratory movements (Kuchler, Russel, and Stroebel 2022; Chan, Skali, and Torgler 2020; Lee et al. 2020; Milani 2021). Secondly, our paper focuses on understanding pandemic risks for a especially vulnerable population: international migrants, their households and their communities. We thus contribute to development and migration research studying the socio-economic risks posed to the migrant communities (Guadago 2020). Finally, by linking human mobility and risk of exposure to COVID-19, we contribute to the broader public health literature linking human mobility and population health (Castelli and Sulis 2017; MacPherson and Gushulak 2001; Hirsch 2014). In contrast to epidemiological studies that that predict the evolution of the number of infected individuals in a population, we focus on using bi-lateral migration channels, driven by historic economic relationships between countries, to predict disease risk exposure and the subsequent socio-economic vulnerabilities of populations in developing countries.

In the remaining paper we provide a description of the basis for measurement of our proposed pandemic risk exposure measure in the next section followed by a detailed description of the data and sample. We then provide an overview and discussion of the cross-country regression results and an application of our risk exposure at the sub-national level in Bangladesh and the Philippines. We finally conclude with some policy applications and future work.

2.2 Measure of COVID-19 Risk

Conceptually, we expect an LMIC's exposure to an infectious disease such as COVID-19 via migration channels to depend on the number of return migrants from each destination country d, A_{id}, and the probability that each returning migrant from d is infected with COVID-19, ψ_d. While we do not observe A_{id} for the countries in our sample, we can proxy it using the total stock of migrants from origin country i residing in destination d, M_{id} prior to the pandemic. The key assumption is that the number of returning migrants from d to i in 2020 is proportional to the stock of pre-COVID migrants from i that reside in d. We examine the validity of this assumption further using a case study in Bangladesh in the following section.

Next, to proxy ψ_d, we assume that the probability a returning migrant from d is infected is an increasing function of the COVID-19 infection rate in d. That is, all else equal, a returning migrant from a country with a higher infection rate is more likely to be infected themselves. Thus, we will use the number of COVID infections per capita in a destination to proxy ψ_d. With these proxies in hand, we define an LMIC's migration-based exposure to COVID as:

$$EXP_{iw} = \Sigma_{d=1}^{D} M_{id} (\frac{COV_{dw}}{POP_d}) \tag{2.1}$$

where i indexes migrant-origin LMICs and $d = 1, 2, \ldots, D$ indexes migrant-receiving destination countries. M_{id} is the total stock of migrants from source country i residing in destination d in 2017. By pre-COVID migration data, we ensure that our exposure measure is not contaminated by endogenous changes that may impact the extent of return migration. Note that M_i is not normalized by the origin country's population and should not be interpreted as a weight.

For each destination, we multiply country i's stock of out-migrants, M_{id}, with the number of COVID cases per capita in that destinations. COVID infections, COV_{dw}, is the number of confirmed cases reported by the ECDC in destination d on week w of 2020. To convert this to a per capita number, we divide by the total population in d in mid-2017, POP_d, which is also obtained from UN-DESA (2017).

Our key variable of interest, EXP_{iw}, is an increasing measure of COVID exposure since a higher value means greater COVID infections in a destination country with which country i has strong migrant links. This measure varies by origin country due to differences in pre-COVID migration patterns and by time due to the evolution of COVID cases in destination countries. In Figure 2-1, we illustrate the cross-country variation in our index in Africa and South and Southeast Asia. Among African countries where COVID-19 is not widespread yet (defined as having fewer than 2,000 cases), our index suggests that Angola, DR Congo, Ethiopia, Kenya, Ghana, Nigeria, and Zimbabwe are relatively more exposed.

2.3 Data and Methods

The data on COVID-19 cases and deaths are from the European Centre for Disease Prevention and Control (ECDC) and include the number of daily COVID-19 cases and deaths by country[3]. The data are collected from official government sources and validated prior to being added to the ECDC database. In Figure 2-2, we use the ECDC data to illustrate the cumulative cases by region during the first four months of 2020. As is clear from this figure, the heterogeneity in COVID infections across regions was evident in the early phase of the pandemic. For instance, by April 30, there were more than 125,000 cumulative cases in Latin America, South Asia, and the Middle East and North Africa respectively. In contrast, there were 25,000 or fewer cumulative cases in South-East Asia, Sub-Saharan Africa, and the Pacific.

To examine whether the differential exposure to COVID-19 can be explained by migration patterns, we combine the COVID data with migration data from the United Nations (U.N.). For all years between 1990 and 2017, the U.N. data report the total stock of migrants from an origin country to a destination one (UN-DESA 2017). These data are constructed using population censuses, population registers, and nationally representative surveys in the destination countries. Migrants are defined as foreign-born residents in the first instance. Where such data are unavailable, migrants are defined as foreign citizens instead[4]. For our analysis, we use these data to calculate the stock of migrants from each origin-country to all possible destination countries. We create this measure using 2017 data as this is the last pre-COVID year in which such data are available.

[3] As of July, 2021, the ECDC data can be accessed here: https://www.ecdc.europa.eu/en/publications-data/data-daily-new-cases-covid-19-eueea-country.

[4] In developing countries where refugees were not included in population censuses, data on the number of refugees from the Office of the United Nations High Commissioner for Refugees (UNHCR) and the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNWRA) were added to construct the total stock of migrants. As of July, 2021, the migrant-stock data can be accessed here: https://www.un.org/en/development/desa/population/migration/data/estimates2/estimates17.asp

To construct our final working sample, we restrict the data to low-and-middle income migrant origin countries, as our focus is on whether return migration was a vector of transmission to LMICs. Collectively, these countries accounted for 78.70 percent of all out-migrants in 2017. Note that we do not restrict the set of destination countries, so that our out-migration data capture all possible destinations.

We supplement these data with population data from UN-DESA (2017); measures of lockdowns and other restrictions from Hale et al. (2021) and Google (n.d.).

Sample Period Selection

We argue that international migrants, by travelling from the destination to home countries, carry the disease physically and spread it in the home countries. However, this does not take place instantaneously. The incubation period of COVID-19 is not negligible. The median incubation period of COVID-19 is approximately five days with 97 percent will show symptoms in about 11 days, and 99 percent will do so within 14 days of exposure (Lauer et al. 2020).

We follow a data-driven approach to select the sample period for regression analysis. To this end, we rely on the information on international travel ban. The idea is that our hypothesis of the international migration channel of COVID-19 spread holds when the international borders are open. That is, we consider the period when the international migrants were allowed to travel to their home countries before the ban was imposed. This is the period when the link between infected migrants and community transmission is more direct and traceable.

We use data from Hale et al. (2021) for international travel control. The variable has four values 0 - no restrictions, 1 - screening arrivals, 2 - quarantine arrivals from some or all regions, 3 - ban arrivals from some regions, 4 - ban on all regions or total border closure. We only consider the most stringent one, that is, 4. We plot the cumulative distribution of the non-high-income countries which include low income, lower middle income and higher middle income countries as classified by the World Bank in 2019 (Figure 2-2).

The World Health Organization (WHO) declared COVID-19 a pandemic on March 11, 2020. Data from Hale et al. (2021) show that full border closures in developing countries started on March 12. Now we add a two-week incubation period and this suggests that March 24, 2020 is a reasonable end date of our sample. Hence our default sample period is 10 weeks from January15, 2020 to March 24, 2020.

Sample Country Selection

We restrict our sample only to non-high-income countries. That is, we exclude high income countries and include low income countries, lower middle income countries and higher middle income countries as classified by the World Bank in 2019. The reason for including only the non-high-income countries is the following. According to International Organization of Migration (IOM 2020b), about two-thirds of international migrants resided in high-income countries in 2019. Hence, the international migrants traveling from high-income countries to their home countries are more likely to spread the disease than the migrants from non-high-income countries to high income countries. Note that more than 40 percent of international migrants originated from Asia in 2019, India being the largest sender of migrants, followed by China, Bangladesh and Pakistan (IOM 2020b) among the Asian countries[5]. Hence, we consider only non-developed countries for our analysis.

Econometric Specification

Our benchmark econometric specification takes the following form:

$$ln(COV_{iw}) = \alpha + \beta EXP_{iw} + \theta_i + \theta_w + \varepsilon_{iw} \tag{2.2}$$

where COV_{iw} is the number of confirmed COVID cases per million people in country i during week w[6]. To address concerns about measurement error, we also use alternate dependent variables such as lockdown intensity and deaths per capita. EXP_{iw} is country i's exposure to COVID-19 via return migration and is as defined in Equation (2.1). The coefficient of interest is β, which we expect to be positive if return migration was a vector of transmission to LMICs during the initial phase of the pandemic.

[5]Top 10 migrant sending countries in 2019 were: India, Mexico, China, Russia, Syria, Bangladesh, Pakistan, Ukraine, Philippines, and Afghanistan (IOM 2020b).

[6]To account for the large number of zeroes in the COVID infection data, we add one to COV_{iw} prior to taking logs. We also show that our key result is robust to using an inverse hyperbolic sine transformation instead.

A concern with our empirical approach is that the number of COVID cases in i is likely to be driven by country-level characteristics such as its health infrastructure, demographic profile, population density, and rate of urbanization. If these characteristics are also correlated with the stock of out-migrants from i, then β will not be identified. We address this concern in two ways. First, we include origin-country fixed effects, θ_i, in all regressions. To the extent that these alternate characteristics are time invariant, θ_i will sweep out their confounding effects.

Finally, θ_w are week fixed effects, which we include in all regressions while ε_{iw} is an error term. All standard errors are clustered at the country level.

2.4 Results and Discussion

Baseline Results and Selection of the Lag Length

The baseline results are reported in Table 2.1 based on the specification in Equation (2.2) and show that our index is significantly and positively correlated with the subsequent COVID-19 cases observed in our sample. A one percent increase in exposure measure results in about 0.12 percentage increase in contemporaneous COVID-19 cases. The coefficient is significant at 5 percent level[7]. All units are country-week and in all specifications, we control for country and week fixed effects.

Next, we regress confirmed cases on the exposure measures on a five-week lags of the cases in columns (2) to (6). The effect on the coefficient increases for the first three lags but tapers off afterwards. Finally, in a horse race with all three lags in column (7), only second lag of the exposure measure remains positive and significant at 5 percent level.

Table 2.1 highlights two points. First, the stock of international migrants is a good predictor of the spread of COVID-19. Second, the significant impact occurs with two lags. That is, when an international migrant carrying the disease reaches her home country, it is likely to have an impact on the local transmission after two weeks. Hence, we use this second lag as our default lag for the rest of our analysis.

[7]Summary statistics of the regression sample is provide in Table B-1 in Appendix B.

Alternative Proxies for Infections

We use two sets of alternative proxies for infections based on government's responses and community mobility. The governments of the countries across the globe put forwarded a wide range of non-pharmaceutical public health measures to contain the spread of diseases. Cross country results show that cancellation of public events, restriction on private gathering and closing of schools and workplaces had significant impact on reducing COVID-19 infections (Askitas, Tatsiramos, and Verheyden 2021). In other words, changes in these non-pharmaceutical measures are good proxies for the changes in infection rates. Since we use country fixed effects, within country changes in these measures indicate the changes in infections. For example, if the rate of infection increases in a country, the government may impose stricter measures to arrest the spread of the disease. The opposite is also true – a country may relax the measures if the COVID-19 situation gets better.

In the first four columns of Table 2.2, we use four indices from Hale et al. (2021). These are stringency index, government response index, containment and health index, and economic support index. The description of these measures are given in Figure B-1 of Appendix B. We control for week and country fixed effects in all specifications and standard errors are clustered around the country level. The indices are not expressed in logarithm. Higher values of these indices imply stricter measures.

First, we regress the stringency index on the second lag (default lag) the exposure measure and report the results in column (1). The results show that a one percent change in the exposure measure leads about 8.94 point increase in the stringency index. The coefficient is significant at the one percent level. The column (2) reports results for government response index. In this case, a one percent increase in the exposure measures results in about 6.34 point increase in the index and the coefficient is significant at the one percent level. Now we regress containment and health index and report results in column 3. In this case, a 1 percent increase in the exposure value increases the index by about 6.76 points. The coefficient is also significant at the one percent level. The results for economic support index is reported in column 4. In this case also the coefficient for exposure measure is positive and significant at the one percent level.

Lastly, we use log of death per capita as the dependent variable in column (5). The coefficient of the exposure measure is also positive and significant at 10 percent level. In this case, a 1 percent increase in the exposure measure leads to about 0.008 percent. The size of the elasticity coefficient of deaths per capita is much smaller than that of cases per capita, which is a plausible result.

In Table 2.3 we use five variables that capture that the extent of community mobility of the citizens. Note that all these variables are expressed in percentage changes in mobility compared to some baseline values . These variables are taken from Google's Community Mobility Report and are described in Figure B-1 of Appendix B. All specifications are subject to country and week fixed effects and standard errors are clustered at country level.

We regress the changes in mobility for retail and recreation on the exposure measure and report results in column 1. We find that a one percent increase in the exposure measure leads to about 7.1 percentage point decrease in mobility for retail and recreation. The coefficient is significant at the one percent level. Column (2) reports results for the changes in mobility for grocery. The coefficient for the exposure measure is -4.38 which is also significant at one percent level. This implies that a the one percent increase in the exposure measure reduces public movement for the purpose of groceries by 4.38 percentage points. Next, we regress the percentage change in mobility related to visiting parks on the exposure measure. We find that a one percent increase in the exposure measure results in the drop of parks related mobility by about 6.84 percentage points. The coefficient is significant at one percent level. In the case of transit related mobility, the results show that a one percent increase in the exposure measures reduces mobility by 6.7 percentage points in column (4). We also find significant reduction of workplace related mobility due to the exposure measure in column (5).

Heterogeneous Effects

We examine how the impact varies with a number of key variables which have strong bearing on the confirmed cases in the host countries. We interact five variables with the exposure measure separately in our baseline specification and report the results in Table 2-4. These variables are share of health expenditure in GDP, share of working age population, share of population over 65, population density and share of urban population. In all specification we control for country and month fixed effects, and standard errors are clustered at the country level.

Column (1) of Table 2.4 shows that coefficient of the interaction term between the exposure measure and the share of health expenditure in GDP is positive but insignificant. The interaction of the exposure measure with the share of working age population in column (2) is negative and statistically significant at 1 percent level. This implies that impact of the exposure measure on the confirmed cases decreases as the share of working age population increases. The interaction between the exposure measure and the share of population above 65 is positive and significant at the one percent level in column (3) indicating that the impact of the exposure measure on the confirmed case increases with the share of old population. We find that the impact decreases with the population density and weakly significant at 10 percent level in column (4). The impact of the exposure measure on the confirmed cases is found to increase with higher urban population in column (5).

Robustness Checks

Our first robustness check controls for country specific confounding variables. As in Table 2.4, we control for the interaction terms between month FEs and percentage of health expenditure in GDP, share of working age population, share of population over 65, population density and share of urban population separately. We use the baseline specification and control for these interaction terms. The results are reported in Table 2.5. These interaction terms allow us to control for these country specific characteristics which are constant over a year. We also control country and month fixed effects for all specifications. Standard errors are clustered at the country level.

First we control for the interaction term between the month fixed effect and share of health expenditure in GDP and the results are reported in column 1. The coefficient of the exposure measure is positive and statistically significant at the one percent level. Note that the size of the elasticity of the confirmed case with respect to the exposure measure is larger when we control for share of heath expenditure. Column (2) reports the results when we control the month fixed effect interacted with the share of working age population. In this case also the coefficient is positive and significant at the one percent level. In the next three columns (3) to (5), we control month fixed effect interacted with the share of population over 65, population density and the share of urban population respectively. All the coefficients are positive and significant at one percent level. The size of these elasticities are also large than the baseline value.

Table 2.6 reports robustness checks of our baseline results using different sample periods, expressing variables in inverse hyperbolic sine, and using only high income countries. First we use three different sample periods – we increase the end date of the sample by two weeks in column (1), by four weeks in column 2 and by five weeks in column (3). Our experiment with augmenting the sample period ends on April 28, 2020. The international travel restriction data Hale et al. 2021 show that the maximum number of non-high-income countries with international travel ban occurred on April 22, 2020. On this date, 93 countries had international travel ban. Hence, we extend our sample period up to April 28, 2020 to include this date in the third column.

The first column of Table 2.6 uses sample period from June 15, 2020 to April 7, 2020, extending sample period by two weeks from the baseline period. The coefficient of the exposure measure is positive and significant at one percent level. A one percent increase in the exposure measure leads to about 0.47 percent increase in the confirmed case. In column 2, we extend the sample period further by two weeks. In this case the coefficient of the exposure measure is positive and significant at 5 percent level. We increase the sample period by one more week in column (3) and the coefficient is also positive and significant at 5 percent level.

In addition to above robustness checks with sample periods, we also check if our results are robust to alternate specification. Instead of using logarithm, we use Inverse Hyperbolic Sine (IHS) transformation to both dependent and independent variables. An advantage of using IHS is that it can transform zeros, unlike logarithm function. We rerun the baseline regression using HIS transformation and the results are reported in column (4) of Table 2.6. We find similar results as in the baseline specification – a one percent increase in the exposure measure results in about 0.15 percent increase in the confirmed cases.

In section 2.3 we noted the exclusion of high-income countries because we posit that most of the international migrants originate from non-high-income countries. We test this hypothesis by limiting our analysis to the sample of high-income countries and find no significant impact for these countries thus confirming our assumption. The results are reported in column (5) of Table 2.6.

2.5 Sub-National Applications of COVID-19 Risk Exposure

We apply our methodology to estimate pandemic risk via exposure to international migration in constructing corresponding sub-national indices for Bangladesh and the Philippines. These applications demonstrate a practical use of our index to predict exposure to COVID-19 for developing countries with large exposure to international migration. We use this replication to illustrate how such risk exposure indices can be calculated in other countries, where similar datasets are available. We validate each sub-national index with public health data on COVID-19 cases, quarantines, and distress calls to a Bangladesh government COVID-19 hot-line at the respective sub-national levels.

2.5.1 Bangladesh

Correlation between Migrant Stock and Return Migration

In order to validate the ability of migrant stock data to predict return migration, we conducted a correlation analysis between different estimates of migrant stock data from administrative and survey data with details of return migration in Bangladesh.

Migration Stock Data

The Bureau of Manpower, Employment and Training (BMET), a department under the Bangladesh Government's Ministry of Expatriates' Welfare and Overseas Employment is the administrative body in charge of registering all outgoing migrant workers from Bangladesh. Consequently, their database contains information on every migrant that has registered to legally go abroad for employment purposes. They provide their address at the time of registration as well as their destination and expected departure date. Using this data we were able to calculate the stock of migrants that travelled to each destination at the district and sub-district level in 2018 and 2019 respectively. The Household Income and Expenditure Survey (HIES) is a comprehensive nationally representative survey used to measure monetary poverty in Bangladesh. The HIES 2016/17 is the fourth round in the series of HIES conducted by the Bangladesh Bureau of Statistics (BBS) in 2000, 2005, and 2010. The HIES 2016 contains a module on migration, which provides the number and destination of migrants at the household level. Data from this module were used to compute the estimated on the number of migrants for a given destination at the district level using the appropriate household weights.

Returnee Migrant Data

The Civil Aviation Authority of Bangladesh (CAAB) records data on incoming travelers to Bangladesh, which include the address of the traveler in Bangladesh and their exit port (country where the passenger started their journey). We were able to get the data for the set of people who entered Bangladesh between December 17, 2019 and March 18, 2020 , a period during which COVID-19 cases exploded in countries labelled as Level 3 by the United States Center for Disease Control. There was also an influx of returnee migrants from these countries to Bangladesh noted in the media. Using this data we were able to calculate the number of returnees from each destination at the district level during the period stated above. The CAAB records the originating country for each incoming traveler as well as the returnee's home address in Bangladesh. We use this information to assign each returnee to a district within Bangladesh. Since the CAAB data tracks actual returns, it provides the most reliable signal of virus transmission among all the sources of migration data we use.

Correlation Analysis

We show how well the BMET administrative and HIES 2016 survey datasets compare to the CAAB data in predicting the number of returnees. These results are presented at the district, destination and district-destination levels in panels (1) to (9) of Table 2.7. The results of the individual regression model are presented in first two panels of each section, while the multiple regressions are presented in final panel. Results show that district origins of airport returnees from CAAB data are strongly correlated with the number of migration permits issued in that district by BMET in the previous 5 years (correlation of +0.73, p-value < 0.001). This broadens the scope and applicability of our analytical approach, because while airport returnee data may not be quickly accessible in every LMIC, administrative data on migration permits data exist for many others.

The HIES survey data is better able to reflect the migrant stock while BMET, being an administrative registration of outgoing migrants, reveals the flow of migrants to a specific destination from a district in a given year, thus an average from 2015 to 2019 corrects for this partially. The BMET offers one key benefit as an administrative dataset by providing finer granularity of the data at the sub-district-destination level, which is not available in the HIES. These databases also typically provide more fine-grained addresses and family contact information for contact tracing purposes.

Sub-national Level Exposure to Pandemic Risk

We calculate a district-level risk exposure index using CAAB disembarkation card data collected from travellers who returned to Bangladesh from December 2019 and March 2020 at the district level and at the sub-district (*upazila*) using BMET administrative data on migration permits, which are often more readily accessible for many countries (Figures 2-3a and 2-3b, respectively). For example, the Overseas Employment Development Board (OEDB) in the Philippines and the Ministry of Manpower in Indonesia maintain analogous databases. The heat maps below show the sub-national exposure to global COVID-19 risk, in that the index value rises if the locality has strong migration links to destinations such as Italy, Singapore or the United States, where the disease was already more prevalent.

We validate the exposure index[8] by first comparing it to the number of people quarantined[9]. The index value for a district is a strong predictor of subsequent quarantines in that district (correlation of +0.52, p-value < 0.001; Figure 2-4a).

We work with multiple sources of data in Bangladesh because our goal is to establish a "proof of concept" of an approach that can be applied to many other LMICs to make sub-national predictions. The comparison of different measures also provides some insight on the relative advantages of - and proper use of - different data sources. For example, many LMIC governments are collaborating with mobile service providers to collect information on call patterns (such as distress calls) to do contact tracing[10]. The starting point of such datasets are decisions by individuals to make a call, which is very different from random sampling.

Since quarantine decisions may be partly driven by migrant returnee presence in that district, we validate using data on the number of distress calls placed to a national hot-line set up by the government of Bangladesh. The data tracked the location of the origins for the calls placed on the hot-line between March 22 and April 12, 2020. The district-level correlation between our CAAB

[8] We simply replace the country indicator in equation (1) with the analogous sub-national indicator. Our within-country exposure measure is the product of district j's stock of out-migrants and the outbreak intensity in the respective destination, d. Thus, it is a proxy for the expected number of returning migrants from d to j who have been infected by COVID-19.

[9] Quarantine data comes from the Government of Bangladesh data published on the following site: https://corona.gov.bd/. Accessed on April 16, 2020.

[10] China has been using contact tracing applications since February while India launched the Aarogya Setu on April 2, 2020. Meanwhile, Ghana has also developed a COVID-19 tracker app to help trace people infected with the virus amongst other LMICs. A full list of countries using different private and public sector launched apps including their coverage can be found here: https://www.top10vpn.com/news/surveillance/covid-19-digital-rights-tracker/

returnee exposure index and distress calls is +0.77, (p-value<0.001; Figure 2-4b). These positive correlations with quarantines and distress calls remain significant after we control for district level measures of medical facilities' preparedness for COVID-19[11], medical staff availability[12], and other logistical preparation[13]. Our analysis shows that these data are less correlated with data on migrants, airport returnees and quarantines, but have improved predictive power when we analyze within-region correlations.

Use of district level exposure variation by policy makers to implement localized lockdowns or other targeted policies is constrained by the size of the area and the population exposed at this level. The top ten high risk districts identified by our district-level index have an average population of 4.6 million[14]. For relief or public health targeting, it would be more useful to construct the index at the sub-district level. Figure 2-3b maps the variation in such an index across the 544 Bangladeshi upazilas, constructed using BMET data. The average population of the top ten most risky sub-districts is 542,000. This index is strongly correlated with the number of distress calls originating in that sub-district (pair-wise correlation of +0.47; p-value < 0.001; Figure 2-5).

Validation using Survey Data

Phone surveys of a representative sample of households in one district in Bangladesh were conducted in a related research (Lopez-Pena et al. 2020) to assess the drivers and impacts of COVID-19[15]. The survey contained a module on symptoms developed by the Yale Institute of Global Health, designed to indirectly identify the likelihood of COVID-19. Consistent with the logic of our risk

[11]Controls for COVID-19 preparedness measures at health facilities include: (a) number of functioning hospital beds, (b) presence of isolation unit, (c) separate outpatient department for respiratory tract infection, (d) full medical team in place, and, (e) presence of control room.

[12]Controls for medical staff availability include aggregated numbers of: (a) physicians, (b) nurses, (c) support staff, (d) technicians, and, (e) other field staff.

[13]Control for logistical preparation at health facilities include: (a) appropriate biohazard disposal system, (b) availability of personal protective equipment (gloves, gowns, masks (N95 and surgical), overalls, shoes covers, etc.) (c) respiratory equipment (oxygen tanks, tubes, etc.), (d) disposal services for biohazard materials, (e) availability of adequate disinfecting products, (f) ventilator equipment and accessories, (g) thermometers, and, (h) various informative leaflets and instruction pamphlets.

[14]Source: Bangladesh Bureau of Statistics (BBS) projected estimates for 2016 using 2011 census data.

[15]The sampling frame for this phone survey was the Cox's Bazar Panel Survey (CBPS), a longitudinal study tracking 5,020 refugee and host community households in Cox's bazar district of Bangladesh, living near and far from Rohingya refugee camps. The CBPS was designed to be representative of all three sub-populations, and the sample for the phone-based study was selected to maintain that representativeness. We successfully contacted 909 of 1,255 households in April 2020, and 99 percent of contacted households consented to participate in the survey.

exposure index, human movement is the strongest predictor of COVID-19 symptoms in this survey. Respondents in communities where at least one migrant returned in the 2 weeks prior to the survey are significantly more likely to report COVID-19 symptoms (odd ratio 2.57, CI: 1.34-4.96). Spending at least one day away from home in the same period was also strongly positively correlated with showing symptoms (odds ratio 2.20, CI: 1.28-3.79). Both factors are statistically significant with 99 percent confidence. This supports the insight underlying our approach: human mobility is critical to the geographic spread of COVID-19.

2.5.2 Philippines

We apply the same method to the Philippines and create province and municipality level risk exposure index using administrative data on international migrants from the Overseas Worker Welfare Administration (OWWA)[16]. We validate using COVID-19 cases reported by the Filipino government[17]. Figures 2-6a and 2-6b show the heat maps for risk exposure at the province and municipality levels, respectively. While the average population for the top ten most exposed provinces is 3.2 million[18], it is only a third of that (about 1.1 million) at the municipality level. Thus, the municipality level analysis offers a greater detail of specificity in identifying areas at highest risk of exposure to COVID-19, which can be of greater utility for targeting policy in the crisis.

As in the prior analysis, we use actual case data to validate the migration-based risk exposure index in Figure 2-7. The index significantly predicts COVID-19 cases confirmed by the Filipino government at the province level (correlation +0.71, p-level < 0.001) as well as the municipality-level (correlation +0.64, p-level < 0.001).

[16] We thank Dean Yang and Caroline Theoharides, who have worked extensively on Filipino migration, for these data.

[17] Actual case data comes from the Philippines Department of Health Covid-19 Data Drop. These data were accessed on April 21, 2020 and are available for download from the following link: https://drive.google.com/drive/folders/10VkiUA8x7TS2jkibhSZK1gmWxFM-EoZP. We thank Peter Srouji and Nassreena Sampaco-Baddiri at Innovations for Poverty Action (IPA) Philippines Country Office for guiding us to this resource.

[18] Estimates based on population data are from the 2015 Philippines Census.

2.6 Conclusion

In our paper we provide a method for estimating a country's or a region's risk of infectious disease vulnerability based on its exposure to international migration with a specific application to the COVID-19 pandemic. Using this measure can enable policy makers in LMICs to spatially target their responses swifly to areas especially vulnerable to risk exposure as predicted by our measure.

LMICs need geographically disaggregated information to determine how to spatially target resources within each country. Given that widespread, nation-wide lockdowns are either too costly or infeasible in poorer countries (Barnett-Howell and Mobarak, 2020 Barnett-Howell and Mobarak 2020), accurate, sub-regional targeting during pandemics is crucial approach for policy makers. Furthermore, data deficiencies hamper resource allocation not only at the sub-national level, but also globally. International bodies such as the World Health Organization need analogous comparative information across countries to spatially target resources and support to LMICs at greater risk. Again, the lack of uniformity in testing frequency and protocols across countries makes it difficult to identify relative disease risk and target support. There is large variation in testing even within sub-continents[19]. Consequently, whether it's targeting financial support, public health measures, or lockdowns and quarantines - international bodies need to identify countries while national- and regional-level decision makers need to prioritize specific locations that require a rapid response in terms of enhancing hospital and screening capacity, flow of medical resources, or imposing more stringent social distancing and lockdown measures that are spatially targeted. Vulnerable areas may also need immediate social protection support and targeted relief for those at greatest risk of food insecurity. Due to limitations in the health sector and public resources in LMICs, timely detection of cases and accurate data on the spread of highly infectious diseases such as COIVID-19 can be challenging. Our method and validation checks provide a credible way for decision makers operating in these constrained environments constrained an alternate way to think of pandemic risk.

The methods we developed can be applied to create heat maps in other developing countries and future pandemics where decision makers are constrained by inadequate testing capacity. Our migration-based exposure index can also be combined with epidemiological modeling to improve

[19]Testing per capita was three times as high in Pakistan compared to Bangladesh, four times as high in Romania compared to Ukraine, seven times as high in El Salvador compared to Guatemala, and ten times as high in Uruguay compared to Bolivia from Worldometers.info.

predictions on the specific spatial patterns of disease spread within countries. The same exposure concept underlying our index can also be applied to data on internal-migration links to model the community spread of disease over time. Other research papers have also documented how various forms of social and economic connectedness is predictive of the spread of COVID-19 (Kuchler, Russel, and Stroebel 2022; Chan, Skali, and Torgler 2020; Lee et al. 2020).

Furthermore, our paper contributes to a growing literature studying the links between infectious diseases like COVID-19 and socio-economic outcomes by focusing on the international migration links. With increasing risks of future viral outbreaks and the prominence of international migrants globally, this paper makes an important contribution by quantifying the risk of a country or region to disease outbreak based on its stock of international migrants.

2.7 Tables

Table 2.1: Contemporaneous and lag effect of exposure measure on confirmed cases

VARIABLES	(1) contemporaneous	(2) one week lag	(3) two week lag	(4) three week lag	(5) four week lag	(6) five week lag	(7) all lags
L0. Exposure	0.00115**						0.00059
	(0.00044)						(0.00060)
L1. Exposure		0.00147***					-0.00000
		(0.00052)					(0.00057)
L2. Exposure			0.00188***				0.00207**
			(0.00071)				(0.00097)
L3. Exposure				0.00193*			-0.00134
				(0.00110)			(0.00099)
L4. Exposure					0.00135		
					(0.00158)		
L5. Exposure						0.00282	
						(0.00336)	
Constant	-0.00000	0.00000	-0.00000	0.00000	-0.00000	0.00000	-0.00012
	(0.00025)	(0.00028)	(0.00031)	(0.00036)	(0.00041)	(0.00049)	(0.00040)
Observations	1,230	1,107	984	861	738	615	861
R-squared	0.15797	0.16184	0.16082	0.14947	0.14389	0.15083	0.16941
Number of countries	123	123	123	123	123	123	123

Note: The column heads are the dependent variables. First four dependent variables the indices which capture governments' response to the spread of infection. These variables are taken from Hale et al. 2021. In the fifth column, we use confirmed death per capita as the dependent variable. Our default lag is lag 2. Hence, our variable of interest is the second lag of the exposure measure which is in logarithm. Exposure measure is defined in section 2. We control for country and week fixed effects for all specifications. The sample period is 10 weeks from January15, 2020 to March 24, 2020. Robust standard errors clustered at the country level are reported in parentheses. The sample includes low income countries, lower middle income countries and higher middle income countries as classified by the World Bank in 2019. *** p<0.01, ** p<0.05, * p<0.1.

Table 2.2: Effect of exposure measure: Alternative proxies for infections I

Indices	(1) Stringency	(2) Govt. response	(3) Containment and health	(4) Economic support index	(5) Death per cap
L2.Exposure	8.93692***	6.34373***	6.76205***	3.83235***	0.00008*
	(1.68699)	(1.23732)	(1.35301)	(1.43460)	(0.00004)
Constant	5.16151***	4.31986***	5.04051***	-0.00808	-0.00000
	(0.61072)	(0.45707)	(0.52818)	(0.39349)	(0.00002)
Observations	888	888	888	888	984
R-squared	0.78606	0.80017	0.79674	0.22258	0.03201
Number of countries	111	111	111	111	123

Note: The column heads are the dependent variables. First four dependent variables the indices which capture governments' response to the spread of infection. These variables are taken from Hale et al. (2020) Hale et al. 2021. In the fifth column, we use confirmed death per capita as the dependent variable. Our default lag is lag 2. Hence, our variable of interest is the second lag of the exposure measure which is in logarithm. Exposure measure is defined in section 2. We control for country and week fixed effects for all specifications. The sample period is 10 weeks from January15, 2020 to March 24, 2020. Robust standard errors clustered at the country level are reported in parentheses. The sample includes low income countries, lower middle income countries and higher middle income countries as classified by the World Bank in 2019. *** p<0.01, ** p<0.05, * p<0.1.

Table 2.3: Effect of exposure measure: Alternative proxies for infections II

Outcomes	(1) Retail and Rec	(2) Grocery	(3) Parks	(4) Transit	(5) Workplace
L2.Exposure	-7.09948***	-4.38482***	-6.83858***	-6.70105***	-6.19694***
	(1.98809)	(1.28309)	(2.16345)	(1.74441)	(1.46435)
Constant	4.80704***	3.90984***	6.70147***	3.87158***	7.54245***
	(0.72871)	(0.49350)	(1.01285)	(0.78534)	(0.51690)
Observations	468	468	467	462	468
R-squared	0.61395	0.25615	0.38911	0.58716	0.58731
Number of countries	78	78	78	77	78

Note: The column heads are the dependent variables. The dependent variables capture the extent of community mobility of the citizens which are taken from the Google LLC, undated. Our default lag is lag 2. Hence, our variable of interest is the second lag of the exposure measure which is in logarithm. We control for country and week fixed effects for all specifications. The sample period is 10 weeks from January15, 2020 to March 24, 2020. Robust standard errors clustered at the country level are reported in parentheses. The sample includes low income countries, lower middle income countries and higher middle income countries as classified by the World Bank in 2019. *** p<0.01, ** p<0.05, * p<0.1.

Table 2.4: Impact of exposure measure: Heterogeneity

	(1)	(2)	(3)	(4)	(5)
L2.Exposure	-0.00029	0.00963***	0.00006	0.00312***	-0.00122
	(0.00204)	(0.00241)	(0.00092)	(0.00075)	(0.00122)
L2.Exposure* Health expenditure/GDP	0.00049				
	(0.00041)				
L2.Exposure* Share of working age population		-0.00012***			
		(0.00003)			
L2.Exposure* Share of population over 65			0.00034***		
			(0.00012)		
L2.Exposure* Population density				-0.00000*	
				(0.00000)	
L2.Exposure* Share of urban population					0.00007***
					(0.00002)
Constant	-0.00049	-0.00028	-0.00046	-0.00042	-0.00031
	(0.00084)	(0.00077)	(0.00082)	(0.00080)	(0.00078)
Observations	936	960	960	984	976
R-squared	0.18009	0.19775	0.18369	0.15456	0.17696
Number of countries	117	120	120	123	122

Note: The dependent variable is the log of confirmed COVID-19 cases per person. Exposure is the exposure measures defined in section 2. The exposure measures are also in logarithm. In each column, we interact the second lag of the exposure measure with percentage of health expenditure in GDP, share of working age population, share of population over 65, population density and share of urban population. We control for country and month fixed effects for all specifications. The sample period is 10 weeks from January15, 2020 to March 24, 2020. Robust standard errors clustered at the country level are reported in parentheses. The sample includes low income countries, lower middle income countries and higher middle income countries as classified by the World Bank in 2019. *** p<0.01, ** p<0.05, * p<0.1.

Table 2.5: Impact of exposure measure: Robustness check I

	(1)	(2)	(3)	(4)	(5)
L2.Exposure	0.00278***	0.00239***	0.00246***	0.00272***	0.00253***
	(0.00063)	(0.00054)	(0.00058)	(0.00060)	(0.00056)
Constant	-0.00039	-0.00044	-0.00054	-0.00036	-0.00041
	(0.00079)	(0.00081)	(0.00087)	(0.00078)	(0.00079)
Observations	936	960	960	984	976
R-squared	0.17391	0.17982	0.16676	0.14977	0.16833
Number of countries	117	120	120	123	122

Note: Dependent variable is in log(confirmed COVID-19 cases/ person). Exposure is defined in sec. 2 and in log. In col (1) we control interactions between month f.e. and share of health exp. in GDP, in col (2) we control month f.e. interacted with share of working age population. In col (3) we control month f.e. interacted with the share of population>65. In col (4), we control month f.e. interacted with population density and in col (5) we control interactions between the month f.e. and share of urban population. We control country and month f.e. for all specifications. The sample period is 10 weeks from Jan15, 2020 to March 24, 2020. Robust s.e. clustered at the country level are reported in parentheses. The sample includes low income, lower middle income and higher middle income countries as classified by the World Bank in 2019. *** p<0.01, ** p<0.05, * p<0.1.

Table 2.6: Effect of exposure measure on confirmed cases: Robustness check II

	(1)	(2)	(3)	(4)	(5)
	Sample period [15 Jan 20- 7 April 20]	Sample period [15 Jan 20- 21 April 20]	Sample period [15 Jan 20- 28 April 20]	IHS	High income countries
L2.Exposure	0.00468***	0.00582**	0.00607**	0.00150***	-0.00090
	(0.00155)	(0.00243)	(0.00265)	(0.00056)	(0.01846)
Constant	-0.00000	-0.00000	-0.00000	0.00000	0.00000
	(0.00067)	(0.00119)	(0.00150)	(0.00026)	(0.00532)
Observations	1,476	1,722	1,845	1,230	760
R-squared	0.23116	0.19847	0.18365	0.15299	0.25969
Number of countries	123	123	123	123	76

Note:

The dependent variable is the log of confirmed COVID-19 cases per person. Exposure is the exposure measures defined in section 2. The exposure measures are also in logarithm. In column (1) we extend the sample period by two weeks. In this case the sample period is 15 January 2020- 7 April 2020. In column (2), we extend the sample period further by two weeks. In this case the sample period is 15 January 2020- 7 April 2020. In column (3), we again extend by one week to 28 April 2020. The reason for extending sample period by one week is that this period includes the date when the highest number of countries implemented international travel ban (22nd April). In column (4), both dependent and independent (exposure measure) are expressed in inverse hyperbolic sine. In column (5), we use sample of high income countries. In columns (1)-(4), sample includes low income countries, lower middle income countries and higher middle income countries as classified by the World Bank in 2019. We also control for country and week fixed effects for all specifications. *** p<0.01, ** p<0.05, * p<0.1.

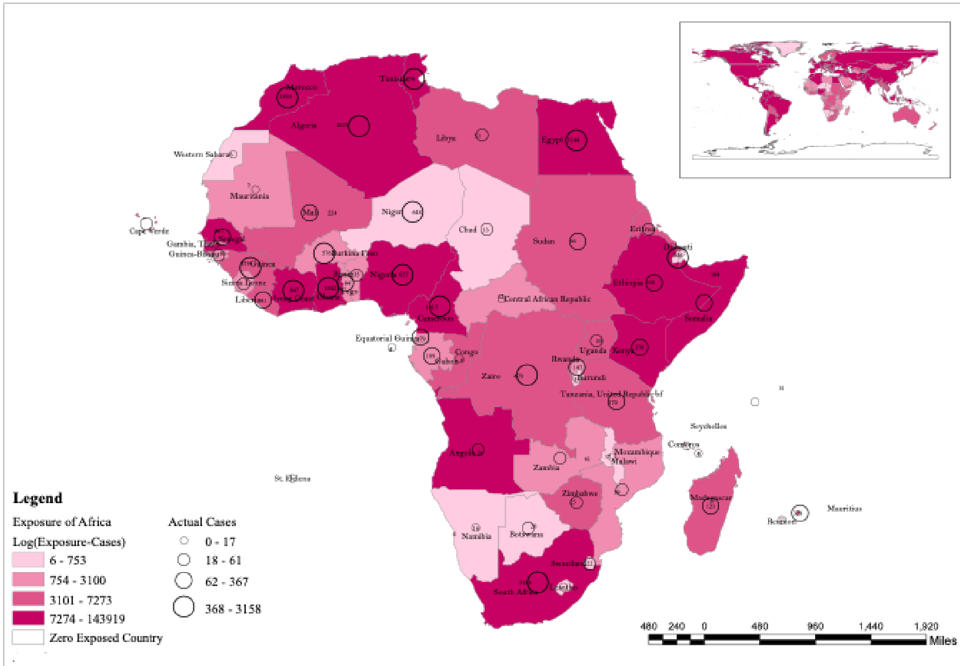
Table 2.7: Correlation between migrant stock and returnee data in Bangladesh

	(Log) Number of Arrivals from CAAB Data (at the District Level)								
	District Level			Destination Level			District-Deestination Level		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(Log) Migrants (HIES 2016)	0.464***		-0.0113	0.702***		0.818**	0.999***		0.788***
	-6.54		(-0.09)	-4.27		-3.31	-23.16		-16.4
(Log) Migrants (BMET - 2015-2019 Avg)		0.731***	0.744***		0.535***	-0.0932		0.525***	0.195***
		-8.81	-4.51		-7.13	(-0.63)		-31.93	-6.66
Constant	4.698***	3.030***	3.031***	1.558	3.128***	0.981	-2.439***	1.617***	-1.720***
	-6.39	-4.13	-4.09	-0.89	-8.99	-0.49	(-7.06)	-26.82	(-5.11)
N	64	64	64	23	141	23	493	2294	454
R-squared	0.408	0.556	0.556	0.464	0.268	0.475	0.522	0.308	0.56

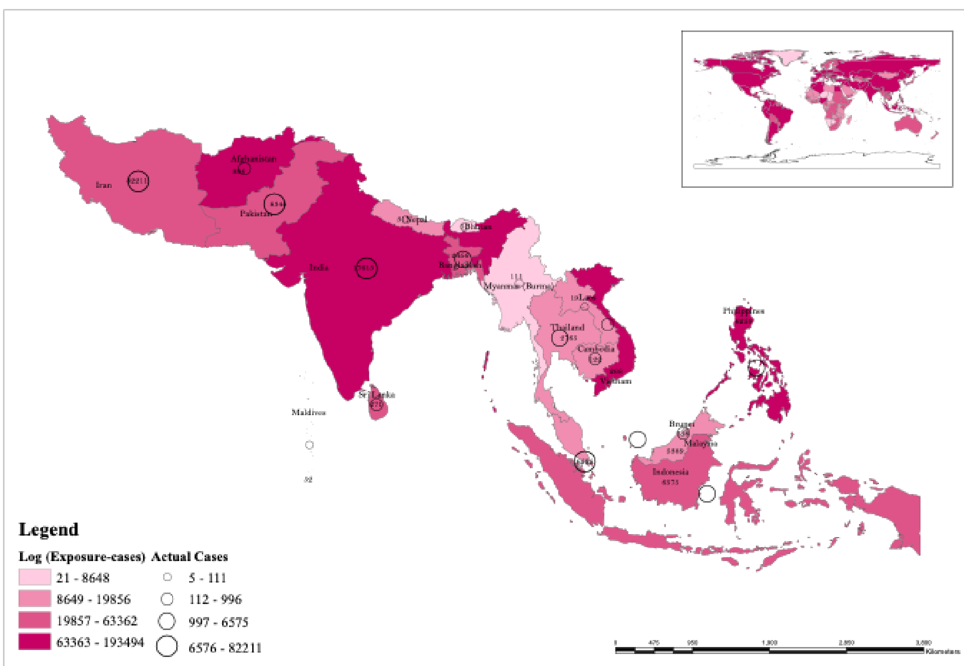
Note: Number of observations at the district level is 64 for all datasets, thus corresponding with the total number of districts in Bangladesh. Number of observations at the destination and district-destination level varies depending on the dataset

used. *** p<0.01, ** p<0.05, * p<0.1.

2.8 Figures



(a) Exposure risk in Africa



(b) Exposure risk in south and south-east Asia

Figure 2-1: *COVID-19 exposure by region*

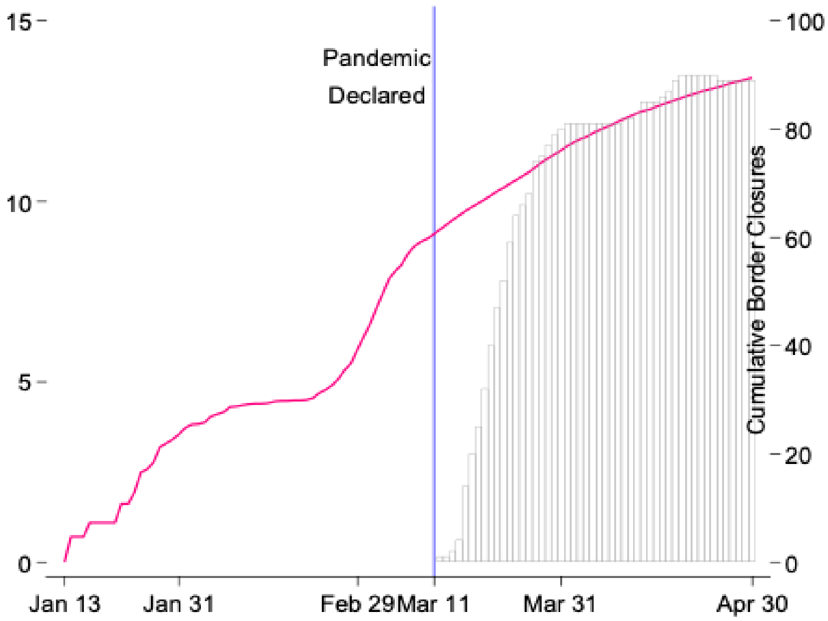
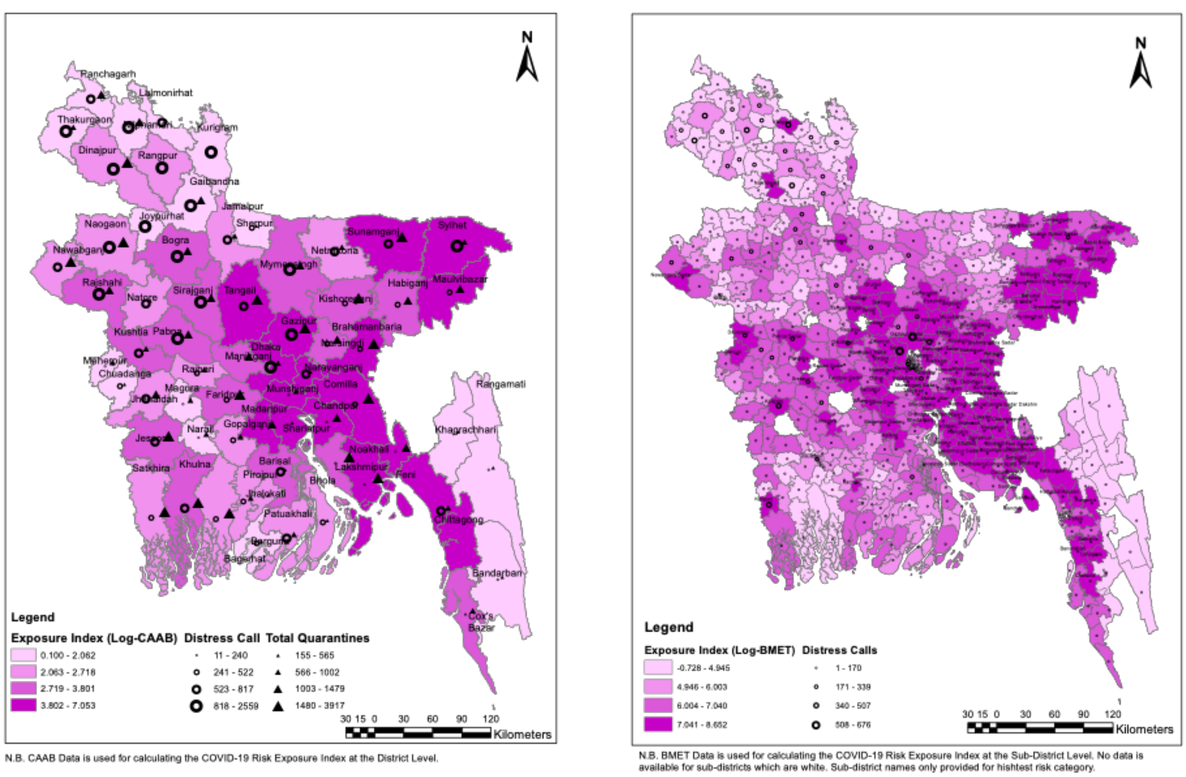


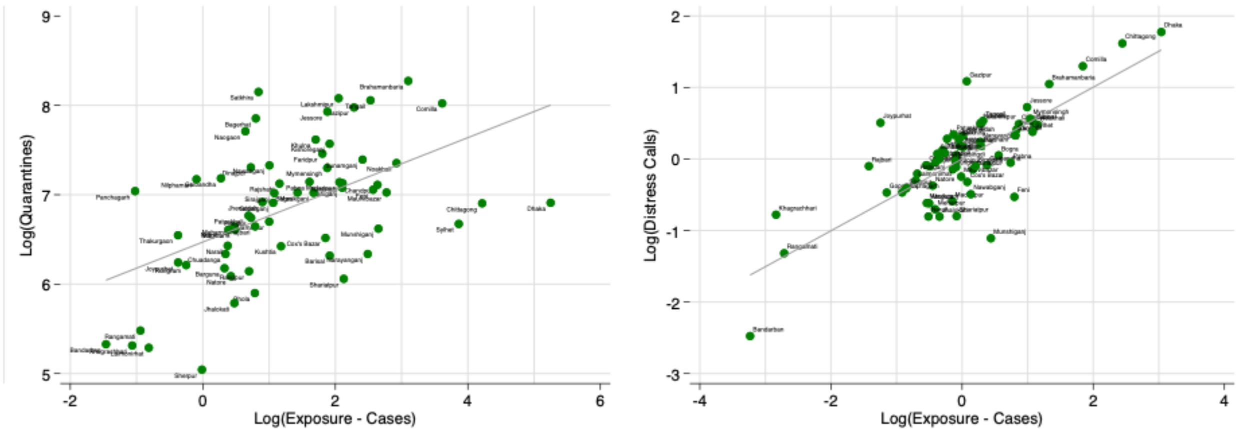
Figure 2-2: *Cumulative number of countries with border closure*



(a) District level exposure

(b) Sub-district level exposure

Figure 2-3: *COVID-19 risk exposure in Bangladesh*



(a) Validation Using Quarantine Data

(b) Validation Using Distress Call Data

Figure 2-4: *Validation of CAAB data*

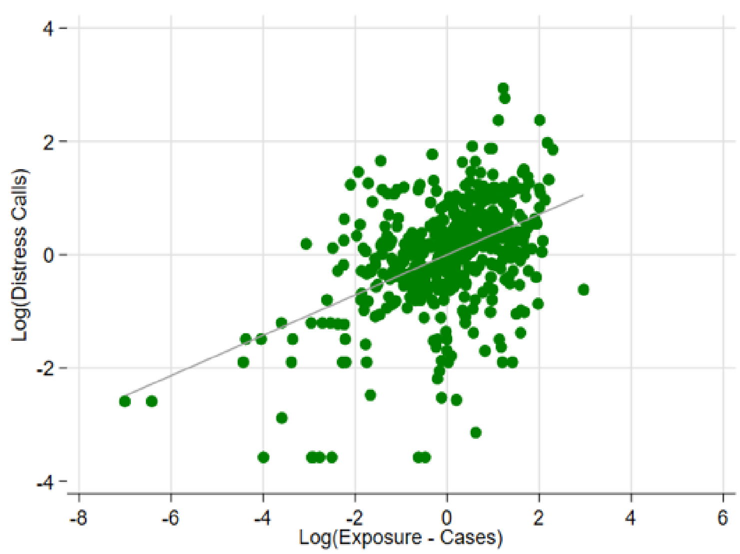
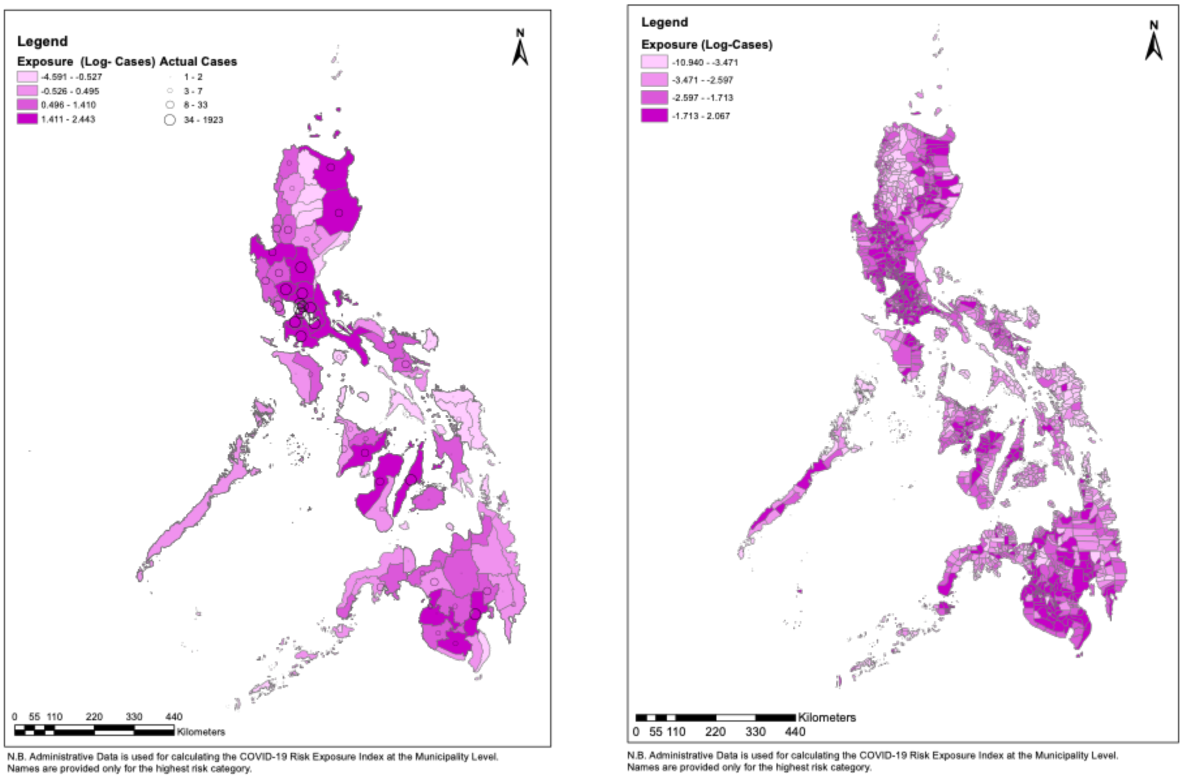


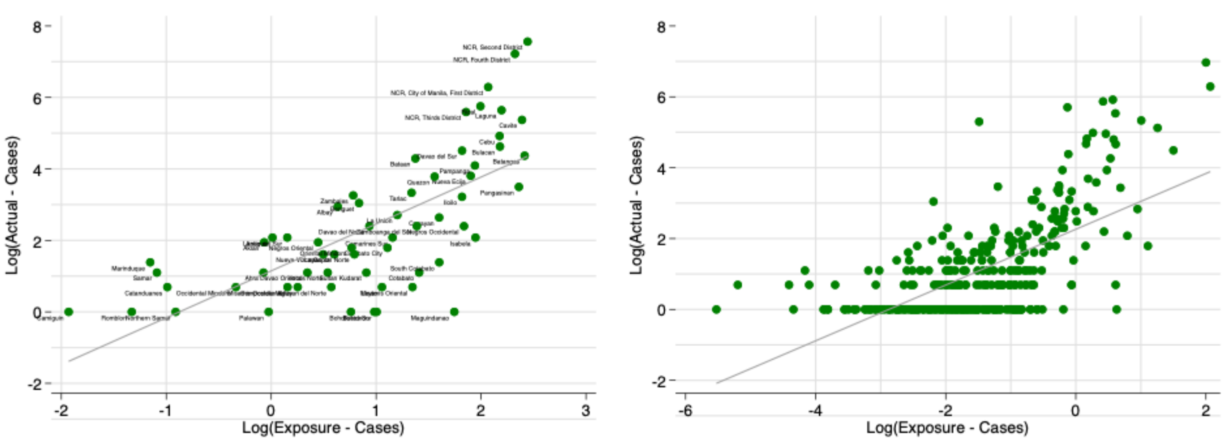
Figure 2-5: *Validation of BMET Sub-District-Level Exposure*



(a) Province level exposure

(b) Municipality level exposure

Figure 2-6: *COVID-19 risk exposure in the Philippines*



(a) Province level

(b) Municipality level

Figure 2-7: *Validation of Filipino Index at the Province and Municipality Levels*

Chapter 3

Worker Voice and Labor Standards: Study of Participation Committees in Supply Chains

3.1 Introduction

Globalization, referring to an expansion of the product and capital markets across national boundaries, is cited as one of the leading causes of the transforming nature of employment relations in industrialized and emerging economies (Chaykowski and Giles 1998). The phenomenon of "fissurization" (Weil 2014), which has led to the growth of precarious forms of work in the advanced economies is mirrored in global supply chains. These issues become magnified in the context of the low-cost production sites located in developing countries that are also associated with the worst forms of labor violations (Kucera and Sari 2019) and weak institutional histories.

Consequently, there have been a growing number of private transnational initiatives, often motivated by catastrophic disasters, activism and consumer pressure (Seidman 2007), that aim to mitigate these violations and ensure safe working conditions. While these initiatives have focused on enforcement and efficacy with regards to compliance with factory codes of conduct, they have often minimized the role of worker voice in their implementation given the buyer driven approach of these initiatives. The International Labour Organization's (ILO) Better Work program (BWP), as an example of a transnational initiative, is distinguished by having mandated worker-management committees as a tool of facilitating worker-management dialogue in the factories where they operate. The BWP also bases their evaluations of non-compliance on international labor standards and national law rather than setting their own code of conduct. This creates a unique opportunity to study the role of facilitating voice in creating enabling conditions for raising issues of violations with codes in apparel supplier factories in the developing country context. With the establishment of the Alliance and Accord initiatives following the collapse of Rana Plaza in 2013 in Bangladesh, these committees are becoming increasingly common in the design of transnational initiatives (Bair, Anner, and Blasi 2020).

The literature in the field of industrial relations suggests that voice plays an important role in determining workers' welfare (Kochan 1980). Worker voice in an organization can lead to improvements in decision-making, dispute resolution (Budd and Colvin 2008), and productivity (Morrison 2014). Voice can also create enabling conditions for raising issues of compliance in the context of factories in globally dispersed supply chains (Pike and Godfrey 2015). However, despite the importance of voice in the industrial relations scholarship, the processes of globalization, financialization, and technological change have contributed in weakening the mechanisms for providing worker voice in many contexts (Locke, Kochan, and Piore 1995; Chaykowski and Giles 1998; Kochan et al. 2019a). Traditional forms of worker voice, such as unions, have declined in the US (Western and Rosenfeld 2011; Katz, Kochan, and Colvin 2015) and other industrialized countries (Ebbinghaus and Visser 1999). Similarly, unionization and collective bargaining mechanisms have historically been limited in scale in the context of developing industrial nations (Freeman 2010) with significant resistance to freedom of association from employers and state institutions in most cases.

A large part of research on collective employee voice facilitated by labor unions (Freeman and Medoff 1984) focused on outcomes specific to compensation, benefits, and productivity (Bennett and Kaufman 2004). Empirical studies show that employee-focused management strategy can be an important moderator in driving the positive relationship between unionization and productivity (Pohler and Luchak 2015; Black and Lynch 2001). Non-union forms of employee representation where voice is the implicit mechanism in empowering workers have received some recent attention in the context of developed countries (Kochan et al. 2019b). However, these non-union voice channels still remain largely unexplored especially in developing country contexts. Also, past research provides limited empirical evidence in establishing the link between enabling voice in firms through worker engagement and subsequent links with violations of factory codes of conduct.

As a way to bridge the empirical gap in the literature, I study the effects of establishing joint management-employee representation bodies that can facilitate worker voice in factory settings under the auspices of ILO's BWP. The entities in question are called Performance Improvement Consultative Committees (PICCs), which are joint management worker committees, modelled after the European Works Councils (*Better Work Report* 2013) set up in BWP factories in Vietnam, Jordan and Indonesia specifically. PICCs are designed to provide a platform that enable workers and management to come together to discuss a range of workers' rights, that is, violations of the local labor law and/or ILO Conventions, thus serving as means of facilitating forums for worker-management discussion that can lead to greater worker voice.[1]

The creation and subsequent meetings of the PICCs are initiated and often mediated by the BWP enterprise advisors (EA) with the ultimate goal to make the PICCs self-sustaining institutional entities. However, there is broad mistrust of such platforms in providing adequate voice to workers due to the misalignment of power between workers and management and the risk of worker representatives acting as double agents (Charlwood and Pollert 2014; Bryson 2004; Freeman and Medoff 1984). Recent research on Vietnam's wildcat strikes in the apparel sector indicated that PICCs characterized by certain institutional features could potentially contribute to lowering strikes by mitigating the risk of management capture (Anner 2017). I hypothesize that the effectiveness of PICCs as institutional tools for creating credible worker voice is contingent on its ability to demonstrate features that indicate independence from management while also having support from management for their existence and functioning. The details of these characteristics are yet to be explored extensively in existing literature.

In my paper, I build on this line of research by studying the institutional characteristics of PICCs in further detail and how specific characteristics are associated with changes in reported and resolution of violations with compliance standards. I use detailed quantitative datasets, collected by BWP EAs to analyze the association of PICC characteristics with reported violations in factory standards over time. I find that representation of unions and fair electoral process in PICC selection

[1] A more detailed table distinguishing between PICCs and traditional trade unions is provided in *Figure 3-2*.

contribute significantly in reporting or resolving non-compliance issues. Gender representation and management support for PICC operations are important for specific subsets of violations. Country-specific institutional contexts affect how PICC effectively PICCS engage with worker voice and impacts the characteristics that are more significant for activating worker voice. In Jordan, where the state has historically limited the role of unions in the production process, PICCs were not found to be effective at changing non-compliance issues regardless of its characteristics. However, in Indonesia and Vietnam, where the history unionization is stronger, PICCs have a stronger influence both the increasing the reported number of non-compliance issues as well as their resolution. These findings confirm prior literature on the limiting role of the state's institutional context on the operation of transnational initiatives (Locke 2013; Distelhorst, Hainmueller, and Locke 2017). The findings also support the role of unions in supplementing mandated committees and reinforces the need to include unions as part of remediation processes at the factory level, an issue that has been particularly relevant following the 2013 Rana Plaza crises in Bangladesh and the distinction between the operations of the Bangladesh Accord and Alliance (see Donaghey and Reinecke 2018 for a full discussion).

This is a significant finding in the literature for multiple reasons. Firstly, the continued challenge of unions to be established globally have spurred a debate in whether other forms of worker representation at factories can serve as alternative forms of worker voice in the employment relationship. My results suggest that while PICCs can be such an option, the effectiveness of PICCs in addressing issues of violations through meaningful worker engagement is contingent on the characteristics of the PICC and the institutional context of the country in which they operate. Secondly, given the limited empirical work exploring the link between worker engagement and working conditions in developing countries, these results add to our understanding of factories in the literature on global supply chains. The cross-country findings support the consensus in the industrial relations (IR) literature that institutional context matters for worker organizations to be successful (Weil 1996; Kochan, Dyer, and Lipsky 1977; Amengual and Chirot 2016). Future work can explore how management and firm behaviour can mitigate the limiting role of the state, especially in these emerging countries, where there continues to be significant challenges to creating legitimate organizations to respsent worker rights.

I proceed with the paper as follows. The next section provides a deeper exploration of the three strands of literature with which this paper engages. I then provide a background of the ILO Better Work Program along with a brief overview of the three country contexts. In the following section, I describe the data and the methodology used to answer the question and in particular how I use two sources of factory data to link PICC characteristics with reported non-compliance with factory codes of conduct. I subsequently provide an overview of the results along with a discussion on the finding before concluding.

3.2 Theoretical Motivation and Theory of Change

The overarching goal of this study is to estimate the effectiveness of PICCs in engaging worker voice as evidenced by a change in the aggregated measure of non-compliance with factory codes of conduct, where an increase in the aggregated measure reflects an increasing in the net reported issues of non-compliance while a decrease in the aggregated measure reflects a net increase in the resolution of non-compliance issues. I look towards contributing to three strands of literature, which form the basis for the following research questions:

- *Within factories, is there an association between PICCs and changes in the aggregated non-compliance index?*
- *How are specific institutional characteristics of PICC associated with changes in non-compliance?*
- *What is the role of country-specific institutional contexts on the association between PICCs and non-compliance?*

In studying the BWP, an initiative primarily situated in the context of regulation of codes of conduct in global supply chains, I first look to the relevant research that studies this phenomenon, which use qualitative and quantitative methodologies to study enforcement of codes of conduct by firms sourcing from developing countries. This literature offers examples of how to operationalize health, safety and other workplace conditions using findings from factory audits. However, this research has been limited in investigating worker voice mechanisms since the buyer-driven nature of most initiatives tend to minimize the role of the workers. Consequently, I present Industrial Relations (IR) theory, which posits the importance of voice in the context of the employment relationship. In doing so, I present some relevant findings in IR research that focus on unions and works councils as the primary means of worker voice in developed industrialized nations.

Finally, I also contribute to a specific subset of the supply chain literature that focuses on the International Labor Organization's (ILO) multi-country initiative on improving working condition in factories, the Better Work Program (BWP). The latter serves an important basis for presenting the program outcomes while highlighting the gaps from the perspective of worker voice outcomes while also describing the scope conditions for the findings.

3.2.1 Global Value Chains, Enforcement and Worker Engagement

The tripartite model of IR relies on the state as a force for mediating the inherent conflict in the relationship between employers and workers (Kochan, Katz, and McKersie 1994). However, this structure breaks down in the context of global supply chains as a result of the state being unable or unwilling to legislate and enforce standards. The issue of worker welfare and worker voice is particularly germane in the context of labor intensive buyer-driven commodity chains prevalent in industries like low-end electronics, footwear and apparel industries where the suppliers tend to be located in the Global South. In light of this restricted state capacity, the past decades have seen an increase in the number of multi-stakeholder governance initiatives (including companies, NGOs, unions, industry bodies and/or international organizations) to regulate workplace standards (Risse-Kappen 1995; Bartley 2007). However, while private compliance mechanisms are theoretically ideal for ensuring improved working conditions and safe supply chains, in reality they are limited by the lack an external enforcement mechanism (Budd 2004; Locke 2013; Locke, Amengual, and Mangla 2009) and the local institutional context (Distelhorst, Hainmueller, and Locke 2017).

A number of scholars have studied the efficacy of various private transnational regulatory initiatives and the conditions that have contributed to their respective successes or failures. Outcomes have largely focused on improvements in working conditions with respect to a set of relevant corporate codes of conduct and a focus on firm performance. There has been limited attention on the extent of worker engagement as part of these initiatives and consequently in the subsequent analyses. This is often a consequence of the design of the initiatives themselves, which being buyer driven, rely less on worker engagement as a mechanism for driving change in the compliance with codes of conduct. There are some exceptions and ILO's BWP and the Bangladesh Accord for Fire and Building Safety[2] are examples of the such initiatives. Furthermore, the countries themselves often have weak institutional histories of worker engagement and competing for contracts on price with other low-cost producers under non-trivial power asymmetries in favor of the lead firm (Locke 2013).

While some research in the field highlights the importance of incorporating worker participation as an important dimension for implementing OSH regulation in firms (Tucker 2013; Weil 1996), most have shown significant skepticism on the efficacy of voice generating mechanisms in the context of the global South. Bryson (2004) expresses concern that non-union representative voice may not be *"genuinely representative of employees and independent of management"* (ibid.: 230) while Yu (2008) in a case study of a Reebok factory in China found the "employee-elected trade union installed through codes implementation operated more like a *"company union rather than an autonomous workers' organization representing worker interests"* (ibid.:513). Still others find that workers using non-union voice mechanisms may not be protected against management retaliation (Kidger 1992); that workers engaged in cooperative approaches lack power to bring about more than very modest changes (Lund-Thomsen and Lindgreen 2014; Terry 1999); or, that workplace voice mechanisms are only effective with "less serious problems" rather than for more serious infringement of workers' rights (Charlwood and Pollert 2014). The studies suggest that management-initiated voice mechanisms in factories can be limited in their ability to adequately empower workers to affect working conditions and a deep dive of the institutional features may serve to enrich the findings.

A set of studies by Locke and coauthors explore the complementarities between state and private regulation. The papers have studied initiatives led by buyers based in developed countries to bring about enforcement with codes of conduct in factories in their supply chain. Links between factory conditions and labor relations have been highlighted by Distelhorst, Hainmueller, and Locke (2017) in the study of Nike's lean intervention in apparel supplier firms in 11 countries. A study of the

[2]As noted in the Accord website, ahead of the expiration of the 2018 Bangladesh Transition Accord on 31 May 2021, UNI Global Union, IndustriALL Global Union, and a negotiating committee representing leading fashion brands reached a tentative agreement to extend the current commitments of the 2018 Accord for three months as negotiations continue for long-term plans.

BWP in Indonesia by Amengual and Chirot (2016) further highlights the importance of institutional complementarities for worker-based outcomes by showing that BWP can reinforce the state when unions are mobilized.

While the papers mentioned provide us with the context of the origins of private regulation and their limitations as regulatory bodies to ensure compliance with factory standards, this literature largely overlooks the issue of worker engagement as part of these initiatives.

3.2.2 Relevant Studies on Voice in Industrial Relations (IR) Theory

The concept of voice has multiple interpretations depending on the discipline and one that has been extensively explored in the context of the theoretical and empirical work in IR. Seminal work by Budd (2004) presents voice as "the opportunity to have meaningful input into decisions" (ibid.: 23). He places equity, efficiency and voice as the three vertices of the triangular employment relationship (ibid.: 30), where they act as potentially competing but equally important objectives of the employment relationship. Consequently, according to Budd (2004), the society should care about employee voice not as a means for achieving productive efficiency - in fact, the enabling of voice for ensuring industrial democracy and the autonomy of human dignity as well as efficiency objectives.

Democratizing the workplace can enable workers to influence the employment relationship and impact important workplace conditions such as compensation and benefits (Freeman and Medoff 1984:19-20), and, occupational health and safety amongst others (Weil 1996). However, from the employers perspective the impact of providing workers greater voice may come as a double-edged sword with improvements in productivity accompanied by reduced profits and lower returns to capital (ibid.:19-20). These trade-offs are well theorized in the neoclassical models and studied empirically in the context of the industrialized nations. The following section reviews some of these studies that operationalize voice using different institutional settings and establish its importance in affecting firm outcomes, thus highlighting the gap in the literature.

Unions, works councils and health safety management committees are some of the modes of worker voice studied in the IR literature. The relevance of the specific institutional form depends often on economic and political policies in the respective countries. Unions have dominated the

US as the primary means for worker voice while works councils have been more prevalent in complementing the union activities in the European context.

Prior research in the field of IR has focused on studying efficacy of unions on firm and worker outcomes. In the seminal work of Freeman and Medoff (1984), entitled *"What do unions do?"*, the authors describe in detail how unions bargain and the effect they have on wages, productivity and profits. Broadly speaking, unions help improve wages and productivity but maybe costly to employers with regards to profits and capital returns. Bennett and Kaufman (2004), in a review and update on the state and function of unions explore the crucial question of how unions affect wages, productivity, efficiency and welfare in the context of the firm. Similarly, the majority of research on unions focused on firm-based outcomes since the question of trade-offs between voice and productive efficiency has long been in the public debate. For example, Cooke (1992) investigated the effectiveness of an employee participation program on product quality in only management and joint union-management settings. His findings make a clear case for worker representation in the form of joint worker-management settings on the selected outcome measures.

In European countries, and in particular in Germany, a model of works councils have long been established as part of society as a means of resolving conflict in the employment relationship (Frege 2002). Consequently, there is a rich literature looking into the co-determination model of the German works councils. Frege (2002) provides a detailed review of the theoretical and empirical work with a focus on firm outcomes. Enabling worker voice in the co-determination model is theorized to improve the nature of employment relations at the firm-level (Freeman and Lazear 1994; Rogers and Streeck 1994) and the functioning of internal labor markets (Aoki 1994; Freeman and Medoff 1984). This is in contrast to the neoclassical theories that predict firm inefficiencies resulting from increased worker participation in management.

The empirical findings are inconclusive in establishing the impact on firm outcomes. Studies by Addison, Kraft, and Wagner (1993) find that works councils are negatively associated with gross firm investments with ambiguous effects on remuneration while Backes-Gellner, Frick, and Sadowski (1997) show that works councils benefit both workers and firms. Similarly, qualitative studies find that the results are affected by the strength of work councils, where more participative firms with egalitarian control can improve the effective of the works councils (Bartölke et al. 1982). Some research also has shown complementarities between unions and works councils in enabling enforcement of better working conditions (Müller-Jentsch 1995; Behrens 2009; Pfeifer 2014). The link between works councils, worker voice and violations with workplace standards remain to be shown in systematic quantitative empirical studies.

The decline in unionization witnessed in developed industrialized nations has been accompanied by a slow take-up of collective bargaining mechanisms in the employment relations construct in developing countries. While this phenomenon maybe partly a result of the knock-on effects of the developed counterparts, the outcome is more often a result of weak institutional environment in these contexts. Thus, enforcement of standards has been privatized from the buyers' side, largely in response to consumer advocacy (Bartley 2007) and activism (Seidman 2007).

Recent attention has been diverted to alternative worker-management constructs with a call to develop middle-range theories incorporating alternative new forms of worker voice into traditional models of IR (Tapia, Ibsen, and Kochan 2015; Kochan et al. 2019b) with implications for industrial relations contexts globally. By studying worker voice facilitation in the context on developing countries, which continues to be understudied in the traditional industrial relations literature, the findings of the paper can significantly contribute to the understanding of these contexts.

3.2.3 ILO's Better Work Program Related Studies

In this section, I focus specifically on studies that analyze the impact of ILO's Better Work Program (BWP), the empirical setting of my study. BWP operates in eight countries, most of which have significant limitations on freedom of association. This is further exacerbated by the power dynamics favoring the large multi-nationals that source from the smaller suppliers as a consequence of their economic power. Consequently, workers in these populous countries, operating in an industry that require relatively low skill levels find themselves at a disadvantageous position with limited means to voice their rights. Tri-partite initiatives like the Better Work try to re-balance the power in favor of the workers with varying levels of success and the first two papers address the role of BWP in affecting worker voice in factories.

In a study situated in BWP Lesotho, Pike and Godfrey (2015) uses findings from focus group discussions to understand PICCs and how they affect worker related outcomes. Their results show that while the PICCs appear to make impact at the onset, the effect tapers off with time. PICCs are positively associated with improvement in worker-management communications relations and increased reporting on violations against discrimination and freedom of association. However, PICCs are also associated with deterioration in attention with regards various training programs focusing on issues like HIV/AIDS and OSH. They find increased interference in union activities. The results maybe summarized in saying that the efficacy of PICCs deteriorates over time; factories divert resources from other training purposes, although this may taper off over time, and reports on certain types of violations may increase at the onset. This ambiguity in the PICC effects indicate a need for further exploration of PICCs in other BWP countries.

While Pike and Godfrey (2015) studies worker-based outcomes of PICCs, questions remain as to how much of the Lesotho results are relevant in other country contexts and how the PICCs vary with regards to its characteristics. The latter is analyzed in greater detail by Anner (2017) and Anner (2018), which investigate the role of the PICCs in mediating wildcat strikes in Vietnam. His findings indicate that *"well-functioning"* PICCs could contribute to lower strike rates under specific conditions that relate to the formation and governing of PICCs. Anner (ibid.) identifies four criteria for a *"well-functioning"* PICC: fair electoral process of PICC members; appropriate representation of workers in the PICC; protection of members from management retaliation; and, empowerment of workers to address serious non-compliance issues.

My paper sheds light on the specific characteristics of PICCs that can enable them to be effective at raising and addressing issues in BWP factories specifically with regards to violations in working standards. These results are not only in line with the study by Bartölke et al. (1982) on German works councils but they also show that PICCs exhibiting characteristics of fair union and gender representation, fair electoral process and management support for their activites can be more effective in raising and addressing issues at the workplace. The paper makes the case that PICCs may matter for worker-based outcomes conditional on the institutional features that signify their independence.

In order to highlight the importance of BWP as a global initiative and situate the importance of studying factories that subscribe to this initiative, it is also important to bring to light the firm-based impact of the program. BWP is largely a voluntary program that has been marketed to supplier factories based in developing countries in order to help them secure relationships with reputation conscious buyers (Oka 2016; Robertson et al. 2011) in ways similar to other transnational initiatives

(Distelhorst et al. 2017). Despite fears of increased inefficiency and fear of firm closure, Brown, Dehejia, and Raymond (2016) show the contrary: their results suggest that improvements in factory standards increase the probability of plant survival along with improved productivity outcomes and work effort. Furthermore, the BWP interventions may induce factories to experiment in human resource management innovations that are both more humane and more efficient, which may also be implicitly driven by improved worker-management relations (Robertson et al. 2011).

Overall, the Better Work studies, which form a subset of the studies in the previous section on Global Supply Chains, provide evidence that indicate that Better Work can lead to some improvements in factory compliance and productivity. Reputation conscious buyers play a significant role in determining the outcomes and even suppliers at the lower end of the supply chains can see some shift upwards in the baseline of their standards. The quantitative empirical evidence in favor of improved worker outcomes are limited especially with regards to worker engagement. My paper fills this gap by analyzing data that connects PICC characteristics to different types of reported violations of factory standards, thus improving BWP's understanding of the workings of the PICCs in different institutional contexts of the countries in which they operate.

3.2.4 Theory of Change

Budd's triangular formulation of the employment relationship has an equity vertex that relates to outcomes observed while the voice vertex relates to the participatory process for the workers (Budd and Colvin 2008). I look at the interaction of these two dimensions - that is, does enabling the voice process lead to more equitable outcomes from the employee perspective in the context of the ILO BWP.

I use *Figure 3-1* to illustrate the predictions between voice and reported violations of factory standards following from the prior scholarship in these areas. I describe this framework moving from left to right. In my research, I look into the PICCs, which operationalize voice in the context of BWP factories. The PICCs are tools for facilitating worker voice, which forms the vertex of the triangular relationship with equity and efficiency. The PICCs have the potential to facilitate workers' voice and impact their ability to confront and resolve issues relating to various aspects of working conditions with management. These factors together comprise the aggregated index of non-compliance with factory standards. When worker voice is significantly activated as a consequence of the PICC characteristics described in the maroon arrow in the middle, reported levels of violations can increase or decrease. The yellow boxes break up the sub-clusters of the violations index.

While past studies have focused on industrial settings in the Western world where the institutional setting offers greater support on enforcement of local labor laws, there is ambiguity on how bi-partite worker management committees perform in the context with weaker institutions prevalent in the countries in my study. My paper fills that gap by offering some magnitude of the degree of association between PICC characteristics and violations with factory standards and shedding light on the PICC features that are most influential. This can help in better designing how standards are implemented in similar contexts and the role of workers in establishing sustained changes in factory behavior.

3.3 Institutional Context

3.3.1 Background on Better Work Program and the formation of PICCs

The Better Work Program (BWP) is form of private transnational regulatory initiative with the goal to assist supplier firms in global value chains to improve practices based on core ILO labor standards and national labor law. Unlike most such private initiatives, BWP is implemented with a strong emphasis on social dialogue to improve worker-management cooperation and raise and resolve non-compliance with factory codes of conduct. Additionally, BWP bases their evaluations of non-compliance on international labor standards and national law rather than setting their own code of conduct as is the case in most private initiatives. This is a consequence of its tripartite nature - BWP is a partnership between the International Labour Organization (ILO) and International Finance Corporation (IFC) as well as the government in the respective countries. Although it is primarily a voluntary program [3], where supplier firms pay for BWP advisory services, in practice, they are often steered by the buyers in advanced industrialized countries to join the program.

BWP was launched in August 2001 in Cambodia, scaled up as a global program and has since then been working in nine countries: Bangladesh, Cambodia, Egypt, Ethiopia, Haiti, Indonesia,

[3] As noted in the BWP website, it works as a mandatory program (required/driven by the government) in which all apparel factories are covered in Cambodia, Haiti and Jordan while it is voluntary in all other countries of operation.

Jordan, Nicaragua and Vietnam. It motivates supplier firms to participate in the program by helping them to meet the international labor standards and national law thus helping them achieve social compliance demands of global buyers by improving conditions for workers, and helping firms become more competitive. BWP focuses on labor intensive industries having large numbers of vulnerable workers in developing countries - primarily the apparel sector. The project includes advisory visits focusing on training and capacity building as well as audit assessments of factory's compliance with safety and labor standards.

The Performance Improvement Consultative Committees (PICCs) - a joint management worker committee are mandated as part of all BWP globally. Consequently, they were set up in factories in Vietnam, Jordan and Indonesia under the auspices of the International Labour Organisation's (ILO) Better Work Program (BWP). The committees are a form of activating worker-management dialogue in factories covered by the program and as such, where unions are present in factories, they are required to be represented in the PICCs. The goal of the PICCs is to create a platform that enables dialogue between workers and managers so they interact under full bipartite representation. The Better Work (BW) factories generally experienced five to six assessment cycles in each country of operation. The PICCs are generally created during the second assessment of the factories by the BW enterprise advisors. Once formed, the quality of the PICCs may vary across the factories across a range of variables including: appropriate and adequate union representation in PICCs; freedom of the PICCs in the candidate selection and electoral process; representation of women in the PICCs in proportion to the gender ratio of the employees in the factory; ability of the PICCs to meet independently in the absence of the Better Work Enterprise Advisors; and, factory management's decision to incorporate the deliberations of the PICCs as part of their decision-making. There has been some prior research assessing the impact of Better Work on various firm-based outcome measures, which have been detailed in the earlier section.

Better Work believes that good PICCs, modeled after the European Works Councils, create an atmosphere of dialogue that spills over to other areas (*Better Work Report* 2013). Consequently, and in line with the predictions of the Weil (2014) analogy of the "Fixing Broken Windows" concept, when workers and managers start to bring up non-compliance issues through PICCs, they simultaneously develop tools and power to resolve conflict. Thus, there is an assumption that PICCs have spillover effects in creating a culture of participation (Anner 2018).

While the broader objectives and goals of BWO remain consistent across the country programs, every country has its own employment relations history and institutional framework, which creates some variation in the specific details of implementation. A high-level overview of the industrial relations and some key BWP features are provided below for each of the three countries covered in the study.[4]

3.3.2 Country Profiles

Jordan

Despite lacking some of the typical comparative advantages of other garment producing countries such as populous work force, low minimum wage and indigenous experience in textile production, Jordan's garment manufacturing sector flourished as a consequence of the establishment of qualifying industrial zones (QIZ) in 1997 and a preferential trade arrangement implemented by the United States that gave Jordanian products manufactured in the QIZ significant tariff advantages.

With the rapid expansion of Jordan's garment industry and accompanying low participation rate of local workers, migrant workers from the surrounding countries were brought in to fill the gap under the *kafala* system. Migrant workers now comprise about 75 percent of the industry workforce. Under the *kafala* system of employment sponsorship, rights are severely restricted with the sponsoring employer holding significant power over the workers by controlling their legal status in the country and discretion over the payment of compensation.

The significant proportion of migrant workers posed challenges for Jordan's employment relations dynamic. At the national level, the General Federation of Jordanian Trade Unions, established in 1954 and constituted by 17 unions, is in charge of advocating on behalf of workers. However, its impact and influence is limited because of limitations on the unions' independence and power under Jordanian law. Furthermore, Jordan has not ratified ILO Convention 87 on the Right to Freedom of Association, and there are several legal limitations on unions freedom to organize and self-govern. More importantly the laws on unions discriminate between workers of Jordanian and foreign origins. It was only in 2010 that migrant workers were granted the right to be members of

[4] Note that each country has detailed reviews of the specific details of each country program, which are available for further reference on the Better Work website: https://betterwork.org/.

the union, although they still do not have the right to form their own unions or to vote or have a say in union governance or run for office.

A 2005 AFL-CIO report and a labor expose led by an American labor rights organization in 2006 combined with a large decline in exports during the Great Recession forced Jordan to address its challenges in employment relations. BWP started their activities in Jordan in 2008, in the wake of Jordan's employment relations crises. BWP in Jordan operates primarily in the garment industry with a goal to establishing decent work conditions in the sector and address the pervasive violations in worker rights that plagued the industry.

While BWP is voluntary in Vietnam and Indonesia, enrolment is mandatory in Jordan.[5] While there has been some initial tension between existing unions, employees and BW officers and distrust over PICCs, the establishment of the collective bargaining agreement (CBA) in 2013 resolved some of the tension. The CBA requires all factory workers to be union members, which potentially poses some unintended consequences such as decreases the incentives and motivation for unions to organize and ensure that their members are active and engaged, which are reflected in the country specific results for Jordan detailed in the later sections. A full detailed version of the summary of the Jordanian industrial relations as it pertains to the garments sector and the development of BWP in Jordan can be found in (Kolben 2019).

Indonesia

The industrial relations dynamics in Indonesia went through three major phases, Old Order (1945-65); the New Order (1965-98) and the post-New Order (1998-present), that are briefly summarized here. A full detailed analysis is provided in Rupidara and McGraw (2010). Although union activity flourished due to the freedom given by the Old Order to the labor movement, the era of Suharto regime saw a dramatic shift towards a more centralized control and restriction on labor activity. The state sponsored Federation of All Indonesia Workers' Unions enjoyed monopoly status by aggregating all former unions under its umbrella and in control of the ruling party thus serving as an advocate the government's rather that the workers' voice. Industrial relations was placed under the tight control of the central government: strikes were banned in vital industries and military

[5] According to BWP website, it is mandatory for garment factories and subcontractors exporting to the US and Israel, and for eligible manufacturing enterprises in the chemicals, plastics and engineering sectors. Garment factories exporting to the EU market under the relaxed rules of origin (RoO) are also enrolled with Better Work Jordan.

interventions used in coercive measures to control union activities and ensure industrial peace. Furthermore, the regime legitimized their approach by combining their restraining labor approach with the broader national rhetoric of Pancasila, calling it Pancasila Industrial Relations (Hubungan Industrial Pancasila, HIP) which further perpetuated state control in the country's populace.

Fortunately, despite the states measure to control the labor movement, grass-roots organizations led by students, labor-NGOs and alternative unions, continued to thrive and came to fruition with the Asian financial crises of 1997 that culminated in the fall on the Suharto regime. In line with the democratization of the state at the national level, the IR system underwent significant reforms with the ratification of eight ILO core conventions of which Convention No.87, 1948 on Freedom of Association and Protection of the Right to Organize was the key one that resulted in the rise of labor activism and the rapid growth of trade unions including the re-emergence of multiple labor unions and the emergence of independent federations and confederations.

With reduced restrictions to entry, unions flourished and there are over 100 unions formally in existence at national level[6]. Despite the dramatic increase in numbers, increasing membership remains a challenge for the unions and reports of declining union density were reported in recent years exposing thee challenges for unions to remain effective in promoting true worker voice at the workplace.

The BWP in Indonesian factories is an opt -in regulatory program to introduced in 2011. Since its introduction, the program has enrolled over 130 garment factories that employ approximately 200,000 workers (one-third of all garment workers). The program is nationally embedded through its Project Advisory committee (PAc), which includes representatives from the Ministry of Manpower and Transmigration (MOMT), employers, and unions. While unions representation is mandatory in the PICCs, there is variation as to how early in the BWP cycle they were incorporated in the PICC structure.

Vietnam

The Vietnam industrial relations dynamic is significantly influenced by the political regime of the socialist, one-party system under the rule of the Vietnamese Communist Party. Although Vietnam

[6]According to the ILO, based on the trade union verification in 2016 published by the Government, there were 14 Confederations and 115 Federations at the national level, while the number of unions at the enterprise level were 7,294 and the total union membership 2,717,961.

underwent transition from its centralized economic planning system towards a global market economy after the mid-1980s it remains a socialist-oriented market economic system, with the state still largely in control over the management of the economy. The political backdrop plays a significant role in shaping Vietnam's IR system as detailed in (Collins et al. 2011) and summarized below.

Vietnam's acceptance into the WTO in 2006 saw a growth in foreign owned enterprises combined with privatization and disaggregation of monopolistic state-owned enterprises. This led to growing tensions amongst the workers. Since the pre-reform era IR system was theoretically consistent with the socialist ideology of collectivism, Vietnam's IR system lacked mechanisms for bargaining. During this period, a single national union – the Northern Confederation Red Union– colluded with the government to represent these 'common' worker-management interests.

Eventually, a new Charter on the role of unions (1989), and a Labor Code (1994) which established worker rights and minimum working conditions, and allowed unions to engage in bargaining and negotiations with management were issued. This formalization of the role of unions led to a growth in the number of unions in Vietnam. One of most important legal implications of this code is that it provides a formal system for the resolution of individual and collective labor disputes through conciliation and arbitration, and gives employees the right to strike on paper at least in the case of a collective labor dispute. The role of unions in Vietnam has thus shifted. It is now more clearly identified as working in the interests of the workers, at least on paper.

However, their influence has been relatively limited as the government has sought to protect the traditional (or socialist) ideology, because they have no coherent organizational base. The new values have since then shaped the country's approaches to labor relations and to the organization of labor management relationships. Despite its membership of the ILO, the state is yet to ratify Conventions 87 on freedom of association and right to organize. Convention 98 on the right to organize and collective bargaining was only ratified in 2019 and remained un-ratified for the period of the study.

Better Work started operations in Vietnam in 2009 as an opt-in program, and provided supports more than 400 export-oriented factories employing over half a million workers – some 21 percent of the industry's workforce, mainly in the Ho Chi Minh area. Since March 2012, union representatives on the Better Work Vietnam PICCs have been directly elected from the factory floor. As with the case of Indonesia, there is variation as to how early in the BWP cycle they were incorporated in the PICC structure. Due to the nationally

3.4 Data and Methodology

3.4.1 Data

I use two distinct datasets that contain observations at the factory level for the three countries that are a part of the Better Work Program: Jordan, Indonesia, and Vietnam. While the program operates in eight countries, I focus on analyzing the programs in these three countries due to availability on PICC quality data.

Dataset on PICC Characteristics

The first dataset, which I will refer to as the PICC dataset, comprises of factory level observations for each assessment cycle of the Better Work Program (BWP). The data is coded from the detailed assessment reports that are conducted by the BWP enterprise advisors in first three rounds of the program cycle, where each cycle corresponds roughly to one calendar year. The information from the reports were coded into binary data to indicate in which round of the report a PICC was created and whether it conformed with the PICC quality characteristics. Thus, each line of observation represents the PICC characteristics recorded for each factory in each report of the cycle. A total of fourteen variables are used to describe the characteristics of the PICC. The most basic variable indicates if a PICC exists, while the remaining thirteen are various indicators of PICC quality.

The BW team has identified a total of eight criteria for determining the quality of the PICCs, which include: i) adequate union representation; ii) democratic process in election of PICC worker's representatives; iii) fair representation of female workers in proportion to factory's female workforce; iv) management support for PICC activities (includes regularity of meetings, ability to convene in the absence of BWP representatives, relaying PICC's deliberations to workers, adequate training for PICC members, and consideration of PICC deliberations in management decision making). Thirteen variables were used to measure these eight criteria. So, for example, if *Factory X* had a PICC that was created in the second cycle of the intervention then it would be coded as 1 in that period and stay as 1 for any subsequent reports in later cycles. Similarly, each of the remaining thirteen characteristics would be coded ad 0 or 1 depending on whether the respective PICC met with each of the quality dimensions.

An important point to note here is that for the period covered in the analysis of the paper, all the PICC characteristics described above were assumed to remain the same. While these characteristics could potentially change over time, for the period for which the reports were available, there was negligible variation in the measures of PICC quality observed, thus validating the assumption of non-variability. However, a longer term analysis of this data in the future can change this assumption to include a more dynamic measure of PICC quality. For this current study, I draw conclusions based on the PICC characteristics at the onset of the program and subsequent effects on reported violations.

I draw aparallel between the PICC characteristics to the four criteria for determining PICC quality in Anner (2017), namely, fair election of PICCs, adequate representation; protection from management retaliation; and, sufficient empowerment. I aggregate the thirteen variables in my dataset to create a single index of PICC quality. The index is created as a sum of the variables that represent the following characteristics and act as indicators of PICC quality: appropriate and adequate union representation in PICCs; fair process in PICC elections; representation of women in the PICCs in proportion to the gender ratio of the employees in the factory; and, management supports the operation of the PICCs. I check for internal consistency for the selected factors using the Cronbach's Alpha measure to test if the chosen characteristics are a reliable measure for the respective quality. The table of the alpha score is provided as *Figure 3-3* as an indication of the internal consistency of the variables chosen to be summed together as an index. I note that this measure is adequate at approximately 0.76 and greater that the acceptable level of 0.6.

Dataset on Violations

The second dataset is also at the factory level and contains findings from compliance audit assessments carried out by BWP enterprise officers. I refer to this as the "violations" dataset. The data collection period spans from 2009 to 2015 depending on the country. There is on average ten to thirteen months between the assessments, so on average there is an assessment for each cycle of the program. Since the start time for the factories are staggered, I refer to the first year of intervention and data collection as cycle 1 and so forth. The responses are coded as binary with 1 being an indicator of non-compliance. I first create a full index of reported violations by aggregating all the measures of violations that incorporate all different aspects of the audits including compensation, health and safety, working hours/time, child and forced labor, freedom of association and collective bargaining, discrimination, disciplinary practices, and other worker protection/environment. I also take a subset of the violations measures for which there are sufficient observations across the observation cycles and create a set of indices in the following categories: health and safety; unions and bargaining; work time; and, other worker protection. These sub-categories are constructed based on internal consistency using a Cronbach-Alpha greater than 0.7. The indices are created by summing the indicators in each of the sub-clusters. The details of the components of these sub-clusters are as follows:

- The indicator for health and safety includes: Violations with regards to chemicals substances, emergency preparedness, hazardous work, health services and first aid and OSH management systems.
- The indicator of collective bargaining includes: violations against union operations, collective bargaining and dialogue against discipline and disputes.
- The indicator for violations of work time includes: violations against the following variables: leave, paid leave, overtime and regular hours.
- The indicator for worker protection includes: welfare facilities, working environment and worker protection.

Figure 3-4 provides the summary characteristics for the main PICC variables I construct for the three countries. PICCs exist in the majority of factories in each country. Once created, which generally happens within the first 2 cycles, they continue to exist over time. The PICC quality is assumed to remain the same over time.

In all cases, an increase in the index indicates a worsening of the violations and a deterioration in the compliance conditions. *Figure 3-5* shows the distributions in the sub-clusters of the violation index for each country. The extent of violations recorded in all of the sub-clusters are low reflecting some of the limitation of this form of data collection. The violations are recorded by BWP enterprise officers during compliance visits and there is often a tendency for under-reporting violations. For example, if we look at the measures relating to unions and bargaining, we know based on research (Anner 2017, Amengual and Chirot 2016) and widespread media reports, that violations against freedom of association are common in the case of Vietnam and Indonesia. However, the BoxPlots in *Figure 3-5* show very low medians and small distributions reflecting the issue of under-reporting. Consequently any significant changes that are found in the analysis are likely to be lower-bounds. Health and safety related measures tend to have higher reported violations given many of the measures can be directly observed by the surveyor. Work hours may suffer from under-reporting as well due to lack of record keeping while workplace conditions may not always be directly measured or maybe temporarily manipulated prior to inspections (such as cleaning bathrooms). Jordan has lowest reports of violations in sub-clusters while Indonesia has the highest reports of violations.

While there maybe a general under-reporting seen in these and other compliance reports, these exist in all three contexts and thus the effect of union representation on reported violations is of special relevance in this study. Furthermore, an indication of worker voice in this context can be seen through an increase rather than a decrease in the number of reported violations.

The alpha score table for the full violations index is provided in *Figure 3-6*. Once again, the alpha score is approximately 0.8 and greater that the acceptable level of 0.6, indicating internal consistency for the index.

Merged Data Descriptions

The final dataset is created by merging the PICC and violations datasets described above. I use BoxPlots in *Figure 3-7* to compare the distribution patterns in the PICC quality and the violations indices for each country respectively to get an understanding of how the averages of the two main indices compare across the three countries - indices were normalized for ease of comparison. Overall, the median level of violations recorded is relatively low - below 0.5 for all three countries. However, in cross country comparisons we find that Jordan has the lowest level of violations while Indonesia has the highest. These patterns are in line with the context of the respective countries. Jordan, as a whole, has fewer factories with fewer workers, which focus on more high-end products relative to the other two countries. Indonesia, with a more populous labor force, has greater number of factories that are larger and focus on a broader range of products (*Better Work Report* 2015). The plot of the PICC quality index paints a slightly different picture. The highest quality PICCs seem to be in Vietnam, while those in Jordan and Indonesia are roughly comparable with Jordanian PICCs faring slightly better than Indonesia, although with much greater variance.

I also look at the trends in the mean PICC quality and violations indices over time in each of the countries using BoxPlots in the next three figures *Figure 3-8* to *Figure 3-10*. In Jordan, the median violations fall over the first five cycles but picks up slightly afterwards, while PICC quality seems to generally improve over time but dips off in the last cycle. Similarly, in Vietnam, the violations fall over time but show an increase in the last cycle while the median PICC quality seems to vary little over time. In Indonesia, the violations fall over all the cycles and the trend is stronger than in the previous two. The PICC quality shows some improvement over time although the trend is less dramatic.

In *Figure 3-11*, I plot the factory means in the violations index versus the PICC quality for each country respectively to get an understanding of the variation and the broad correlation patterns in the reduced form results. The figures show that while there is some negative correlation between the two variables in all the three countries, that is, higher PICC quality is negatively associated with lower levels of violations, the association is fairly weak in all three cases. Jordan has a tight distribution in the coefficients, with the the null effects being precisely estimated. In Vietnam, all factories have PICCs and are in the middle to top end of the PICC quality distribution. Given the small sample size in Vietnam, these results are mainly indicative given the large size of the standard errors.

While these illustrations give us some idea of the changes in violations over time, they suggest small if any association between PICCs and violations. Consequently, the the regression analysis with fixed effects described below provide a more detailed understanding of the link between PICC characteristics and sub-clusters of violations.

3.4.2 Methodology

I use the merged datasets for Jordan, Indonesia, and Vietnam to understand the association between PICCs and non-compliance with labor and health and safety standards in factories. In particular, I answer the following questions:

- *Within factories, is there an association between PICCs and changes in the aggregated non-compliance index?*
- *How are specific institutional characteristics of PICC associated with changes in non-compliance?*
- *What is the role of country-specific institutional contexts on the association between PICCs and non-compliance?*

I use the following regression estimation with two-way fixed effects to answer the first question:

$$Y_{it} = \alpha + \beta_1 PICC_{it} + \beta_2 PICCQualInd_{it} * PICC_{it} + \gamma_t + \eta_i + ctry_k + \varepsilon_{it} \tag{3.1}$$

where, the left hand side is a the standardized measure of the (full and subset of) reported violations index for factory i at time t; the first term on the right hand side is the constant; the second term is a binary indicator of whether a PICC is present or not in the factory i at time t; the third term is the main independent variable which is the index of PICC quality interacted with the presence of the PICC; the fourth term captures the time fixed effects; the fifth term captures factory fixed effects; and, finally the error term.

$$\begin{aligned} Y_{it} = \alpha + \beta_1 PICC_{it} + \beta_{2,j=1} PICCQualInd_{j=1,it} * PICC_{it} + \ldots \\ + \beta_{2,j=X} PICCSubInd_{j=X,it} * PICC_{it} + \gamma_t + \eta_i + ctry_k + \varepsilon_{it} \end{aligned} \tag{3.2}$$

In *Equation 2*, I replace the main independent variable, the PICC quality index, with a subset of PICC characteristics, which are measures of the PICC's institutional features to answer the second question. The PICC characteristics that I study are as follows:

- UnionsRep: Aggregates indicators, which shows if a union is present in the factory and it is represented amongst the PICC members;
- ElectionsFair: Aggregates indicators, which denote if the PICC elections were held without interference from management, multiple candidates were present and the workers had free choice in candidate selection;

- GenderRep: Indicates if the female ratio in the PICC is presentative of the female ratio in the factory;

- ManagementSupport: Aggregates indicators, which tell us how much the factory management supports the PICC processes and includes measures that show: if PICC members receive training on how to implement the PICC; workers are released from duty to attend PICC meetings; PICC meetings take place regularly and even if no BW officers are present; both workers and management take turns to chair meetings; and, management incorporate PICC deliberations in their decision making.

An estimation of *Equations 1 & 2*, for both pooled and separate country samples, enables me to makes predictions on the following questions within BWP factories, over time, within countries:

- Are PICCs – on their own - associated with changes in the aggregated measure of non-compliance within factories over time? On average, does variation in the quality of the PICC change the reported and resolved non-compliance issues?

- How are different PICC characteristics related to the sub-clusters of violations and how do these results vary between the three countries?

In addition to the regression analysis mentioned above, I complement my results with some descriptive analysis some of the cases based on written factory reports from Indonesia and Jordan to enable readers to get a more in-depth understanding of the some of the results of the analysis, which are presented in the Appendix.

3.5 Results and Discussion

3.5.1 Results

The results of the regressions from the specifications in *Equations 1 & 2* are presented in Table 2.1 to 3.3 for the pooled country sample, and Table 3.4 to 3.6 for the country specific samples. In Table 3.1, I present the results from Equation 3.1, the regression of the violation index on the PICC quality index. In *Column 1*, I only keep the binary variable that a PICC exists as the independent variable for comparison purposes. The results indicate that having a PICC is associated with no significant effect on violations within factories. In *Column 2*, I include the aggregated index for PICC quality and its inclusion of leads to some negative effects on the aggregated violations, although the results are weak and not significant. [7] While this result gives us some indication that PICCs that are of high quality, as captured by the PICC quality index, may move the needle on violations, the effects are not significant on the aggregated levels.

In Table 3.2, I report the results of the regression from Equation 3.2. The analysis breaks down the main components of the PICC index in order to disentangle the effects of specific PICC characteristics on reported violations of factory standards. The objective is to see if the lack of significant results as seen above are consistent for all aspects of the PICC or if certain characteristics of PICCs are actually effective in changing reported violations. Furthermore, I am able to quantitatively test the validity of the PICC features presented in Anner (2017).

In all three columns of Table 3.2 the dependent variable remain the same, that is, the natural log of the full violations index. In *Columns 1-4*, I specifically look at the independent contributions of each aspect of PICC feature on the aggregated violations index and find that only PICCs elected through fair elections impact violations. However, in *Column (5)*, when I include all the four different features of PICC quality, both union representation in the PICCs and PICCs elected through fair electoral process effect violations index albeit in opposite direction. Given that all indices are standardized, the results can be interpreted as follows: a one standard deviation increase in the union representation in PICCs is associated with a 0.132 standard deviation increase in the violations index on average while for a similar change in the fair elections index, there is a 0.171 standard deviation decrease in the violations index on average.

In Table 3.3, I present the results from the regression in *Equation 2*, where the main independent variables remains as the four components of PICC quality for all the regressions in *Columns 1 to 5*. The dependent variable changes in each column. The first column takes the full index for the violations variables as the dependent variable and results correspond to *Column 5* in Table 3.2. The subsequent models in *Columns 2 to 5* then in turn take each of the sub-clusters of the violations separately as the dependent variable, namely: health and safety (H&S); collective bargaining issues

[7] Note that indices are created by aggregating binary variables that record violations against the Better Work compliance criteria. Consequently, a more negative value of the index indicates net resolution in compliance issues (or a fall in violations) while a higher value indicates a net increase in the number of reported non-compliance issues.

(Bargain); measures for protecting workers such as welfare facilities (Protection); and, violations in working hours (Work Hours). As before, I take the standardized indices to enable me to interpret the results as one standard deviation changes for comparability of results.

In the case of the *H&S* sub-cluster, the PICCs featuring fair electoral processes for PICCs and gender representation are most effective in reducing reported violations. In case of collective bargaining issues, management support for PICC operations are significant for reducing violations. Conversely, for violations relating to worker protection and work hours, union presence in PICCs is significant and is associated with a rise in the reported number of violations. Work hour violations are reduced by fair electoral process of PICCs.

The breakdown of the analysis by the PICC components provides a more detailed illustration of the PICCs effects on various types of violations. Union presence and fair election of PICCs being the most relevant and drive the total reported violations in opposing directions. To summarize, fair electoral process of PICCs are most relevant for resolving health and safety and work hours violations; gender matters for improving health and safety while management support for collective bargaining bargaining. Finally, union presence in PICCs increase the reported number of violations for work hours and worker protection. The opposing effects of PICC characteristics on reported violations is significant since they can account for the null effects of the aggregated PICC quality index while also revealing areas for further investigation of the PICC functioning process.

The cross-country results are largely reflected in the factories in Indonesia Table 3.4, which account for more that half the factories in the pooled sample. For the full index on violations, union representation and fair electoral process are the two most relevant PICC features. Union presence in PICCs increase the reported number of violations for work hours and worker protection, and gender effects violations reported in all categories to some degree, either by increasing or decreasing the reported violations. Fair electoral process of PICCs are somewhat significant for resolving health and safety and work hours violations. Note that given the local institutional context of the state, Indonesia had a relatively strong cultural of unionization that persisted until the Suharto regime, when there was some weakening of the strength of the unions.

For factories in Vietnam that account for about one-sixth of the sample, Table 3.5, union and gender representation are the two most relevant PICC features that increase reported index of aggregated violations significantly. Health and safety; work hours and worker protection related violations are impacted by union and gender representation and fair electoral processes of PICCs while collective bargaining issues are not impacted by any measures of PICC characteristics in the context of Vietnam. Note however that given the small size of observations, the estimates are quite noisy with regards to standard errors and should be used for indicative purposes only. Vietname, given its socialist background, has the richest history of labor organization, and consequently it reflects in the significance of the PICCs association in raising issues of non-compliance across most sub-clusters.

Finally, for factories in Jordan, Table 3.6, adequate gender representation and management support for PICC activities are significant in reducing reported violations for health and safety and collective bargaining issues, respectively. No significant effects are found on any aggregated measures of violations.Jordan had the weakest industrial relations system with a history of state opposition to union formation.

3.5.2 Discussion

Past studies indicate that bi-partite institutional set-ups as embodied by the PICCs are ineffective without adequate institutional support from management (Weil 1996, Kochan, Dyer, and Lipsky 1977). Simple presence of a PICC (as in Column 1 of Table 3.1 is not sufficient in order to be associated with an improvement in the compliance. This trend in the results are in line with the findings in Anner (2017) in PICCs in BWP factories in Vietnam, which indicate PICCs on their own accord make little (if any) difference in driving change in workplace behavior of workers (eliminating the risk of strikes in particular). According to Anner (2017), efficacy of the PICCs is characterized by the presence of four key factors: fair electoral process of PICC members; appropriate representation of workers in the PICC; protection of members from management retaliation; and, empowerment of workers to address serious non-compliance issues. These components roughly map to my quantitative characterisation of the PICC as discussed above, allowing my paper to show some of the positive and negative effects of these features on reported violations, both at the aggregate level and in sub-clusters.

My results show that: i) PICCs can have opposing effects on the reported violations; ii) specific features of PICCs can drive the reports of violations in different directions with union representation unilaterally increasing the number of reported violations in all sub-clusters of violations; and iii) institutional context of the country matters for which features of PICCs are most relevant in impacting reported violations. The latter points are further illustrated using two case studies, in Indonesia and Jordan, which are presented in the Appendix C.

In all cases where the representation of unions in PICCs are significant, there is a rise in the number of reported violations and reinforces the case for ensuring union representation in PICCs to ensure that voice is adequately activated to raise issues in factories. Furthermore, unions are particularly relevant for violations with regards to health and safety, worker protection and working hours. These results reflect the findings of the IR research such as Weil (1999) on the role of unions in mandated health and safety committees in the US factories showing that unions tend to increase reports of job dissatisfaction as well as Pike and Godfrey (2015) results, which indicate that reports of certain types of violations may increase when unions are represented in the factories and in the PICCs. Interestingly enough, having union presence was not associated with raising issues of collective bargaining. While this current methodology does not enable me to directly disentangle the reasons for this, one major reason for this could be the reliability of reports of such violations from the audits in many contexts or determined more nationally as in the case of Vietnam thus showing limited variability in outcomes. Reports on the other sub-clusters of violations can be measured more objectively by the auditors thus mitigating the reporting issues.

PICCs elected through fair election process, gender representation and management support are associated with both negative and positive impact on reported violations depending on the country and sub-cluster of violations. For example, having PICCs elected fairly in Indonesia is associated with reduction in reported violations while in Vietnam it is the opposite. In Indonesia, gender representation increases violations on work hours and collective bargaining while reducing violations on health and safety and worker protection. These results add further nuance to the gross associations that are noted in *Figure 3-7* to *Figure 3-10* , which show trends in gradual improvement in compliance over time, that eventually tapers off for the three countries.

Finally, I cluster standard errors at the factory level corrects for correlation in unobserved errors at the factory level and ensures the robustness of the significance of the coefficients. With respect to identification, factory fixed effects help in mitigating endogeneity concerns to a great degree since the results give us a within-factory impact on reported violations associated with measures of PICC characteristic. One of the major constraints in the data arise for the non-dynamic measure of PICC characteristic. These results are based on the initial characteristics of the PICCs. Future work can build on this by coding a dynamic time-varying measure of PICC characteristic to see if the effects of PICC characteristics on reported violations change over time.

3.6 Conclusion

Prior studies on the efficacy of private enforcement of work standards in global supply chains indicate that there are strong limitations and sustained noncompliance (Barrientos and Smith 2007; Egels-Zandén 2007; Locke, Qin, and Brause 2007). A few studies have highlighted some important aspects that can play a mediating role such as anti-sweatshop campaigns on improved wages (Harrison and Scorse 2010) and lean production methods on wage and work hour (Distelhorst et al. 2017).

The effect of local institutional context and influence of civil society on compliance with labor and OSH standards continue to be relevant in the literature (Distelhorst et al. 2017; Toffel, Short, and Ouellet 2015). Furthermore, the empirical research, often as a consequence of the nature of the initiatives, have neglected the role of worker engagement in initiating and sustaining social compliance by raising and resolving violations with standards. My study aims at filling this gap by studying the worker management participation committees (PICCs), that are formed as part of the ILO's BWP, an example of a private transnational regulatory initiative.

The results of this paper indicate that within factories, there is some association between PICCs that are of higher quality and the level of violations, although these results are not significant. More importantly, this paper highlights that certain PICC characteristics are especially relevant for affecting the reported violations and specific sub-clusters of violations when the local institutional contexts are enabling for the creation of worker voice. Union representation is the most important of these characteristics as well as fair electoral process in selecting PICC members. While union representation in PICCs is associated with higher reported violations, fair election process in PICC selection is associated with lower reports of violations. Both these results are in line with prior research on worker engagement in the context of advanced industrialized countries, where unions can help in identification and reporting of violations can explain the increased reports of violations while a well-represented PICC can help in implementing remediation of problems identified in audits. Additionally, results in both characteristics imply an activation of voice in the PICCs with unions enabling more issues to be raised while a well-balanced independent PICC can address in resolving the issues.

Further analysis is needed to understand the specific mechanisms by which the changes take place, especially in moving the violation reports in opposing directions. There maybe two alternative explanations as to what is driving change in the context of the BWP. The first relates to the theory of change in the BWP model, reminding readers of the *"Fixing Broken Window"* analogy in Weil (2014): PICCs create a platform that empowers workers by enabling voice and as a result they are better able to identify problems that increase the reported number of violations and also enforce compliance, which reduce violations with standards. The alternative is a signaling effect: by ensuring that effective PICCs operate in the factory, management is able to signal to BW and their clients that they are committed members of the BWP in order to sustain their relationship. While in both cases, voice is activated for workers, due to limitation in data it is difficult to address this and remains in the agenda for future research. Primary data collected from detailed interviews with management and workers can help distinguish between these mechanisms.

My sample is limited to factories that are under the BWP umbrella, where participation is largely voluntary [8] thus meaning that these results can be generalized to only comparable regulatory regimes. The results are still relevant to the broader universe of regulatory regimes for two reasons. One, the BWP program has devoted significant resources to their programs and has a wide reach in the global south in countries that are major exporters of apparel. The establishment of the PICCs is one of the focal components of the program and therefore getting a more nuanced understanding of PICC characteristics in this setting is significant in and of itself. Understanding how specific characteristics can affect specific sub-clusters of violations can be helpful to BWP EAs as they work with factories on strengthening PICC structures. Furthermore, the factories self-select to be in the BWP in most countries and maybe argued to be at the top end of the employers. However, even in my sample there is some variation in both PICC quality and violations and these significant changes in the results imply that there is further room for improvement in non-BWP factories in these countries conditional on changing management attitude. Even if we take this out of the context

[8] Some exceptions exist such as in the case of Jordan described above where it is mandatory.

of the developing world to that of the developed countries, we need to better understand how worker management setups can affect worker voice and in particular how to ensure union representation as part of mandated committees.

3.7 Tables

Table 3.1: Basic Regressions - Effect of PICCs on Violations

	(1)	(2)
PICC	-0.195	
	(0.170)	
PICC*Agg PICC Qual Ind		-0.101
		(0.068)
Constant	0.462	0.368
	(0.351)	(0.353)
R-squared	0.227	0.229
Year and Cycle FE	X	X
Factory FE	X	X
Country FE	X	X
Constant	0.494***	0.421***
	(0.140)	(0.063)
R-squared	0.161	0.163
N	591	591

+ p<0.10, * p<0.05, ** p<0.025, *** p<0.001

Table 3.2: Main Results - Effect of Specific PICC Characteristics on Violations

	(1)	(2)	(3)	(4)	(5)
PICC*Union Rep	0.096				0.132*
	(0.065)				(0.064)
PICC*Fair Elections		-0.160**			-0.171**
		(0.054)			(0.057)
PICC*Gender Rep			-0.038		-0.036
			(0.052)		(0.051)
PICC*Management Support				-0.086	-0.037
				(0.060)	(0.059)
Constant	0.409	0.298	0.410	0.378	0.294
	(0.343)	(0.352)	(0.350)	(0.353)	(0.345)
Year and Cycle FE	X	X	X	X	X
Factory FE	X	X	X	X	X
Country FE	X	X	X	X	X
R-squared	0.229	0.243	0.225	0.228	0.251
N	591	591	591	591	591

+ p<0.10, * p<0.05, ** p<0.025, *** p<0.001

Table 3.3: Effects of PICCs characteristics on Violations sub-components

	(1)	(2)	(3)	(4)	(5)
Standardized	All	H&S	Bargain	Protection	WorkHrs
PICC*Union Rep	0.132*	0.034	0.030	0.189*	0.181***
	(0.064)	(0.062)	(0.068)	(0.087)	(0.050)
PICC*Fair Elections	-0.171**	-0.160**	-0.050	-0.118	-0.132*
	(0.057)	(0.058)	(0.063)	(0.082)	(0.056)
PICC*Gender Rep	-0.036	-0.138**	0.060	-0.036	0.045
	(0.051)	(0.051)	(0.053)	(0.063)	(0.052)
PICC*Management Support	-0.037	0.078	-0.242**	0.000	0.007
	(0.059)	(0.067)	(0.075)	(0.074)	(0.056)
Constant	0.294	-0.248	0.466	0.931*	0.131
	(0.345)	(0.373)	(0.459)	(0.414)	(0.478)
Time and Cycle FE	X	X	X	X	X
Factory FE	X	X	X	X	X
Country FE	X	X	X	X	X
R-squared	0.251	0.253	0.071	0.217	0.111
N	591	591	591	591	591

+ p<0.10, * p<0.05, ** p<0.025, *** p<0.001

Table 3.4: Effects of PICCs characteristics on Violations sub-components - Indonesia

	(1)	(2)	(3)	(4)	(5)
Standardized	All	H&S	Bargain	Protection	WorkHrs
PICC*Union Rep	0.409**	0.020	0.065	0.770**	0.312*
	(0.124)	(0.097)	(0.171)	(0.284)	(0.133)
PICC*Fair Elections	-0.328*	-0.191+	-0.159	-0.346	-0.174+
	(0.161)	(0.104)	(0.251)	(0.332)	(0.101)
PICC*Gender Rep	-0.033	-0.214*	0.373**	-0.305*	0.283*
	(0.129)	(0.105)	(0.130)	(0.132)	(0.126)
PICC*Management Support	0.120	0.438***	-0.003	0.190	-0.047
	(0.124)	(0.120)	(0.210)	(0.235)	(0.148)
Constant	0.098	0.026	-0.241	1.108**	-0.167
	(0.205)	(0.154)	(0.359)	(0.377)	(0.247)
Time and Cycle FE	X	X	X	X	X
Factory FE	X	X	X	X	X
R-squared	0.429	0.438	0.075	0.342	0.194
N	252	252	252	252	252

+ p<0.10, * p<0.05, ** p<0.025, *** p<0.001

Table 3.5: Effects of PICCs characteristics on Violations sub-components - Vietnam

	(1)	(2)	(3)	(4)	(5)
Standardized	All	H&S	Bargain	Protection	WorkHrs
PICC*Union Rep	13.360***	12.319***	-3.251	11.570***	5.985***
	(2.764)	(1.756)	(4.537)	(1.427)	(1.695)
PICC*Fair Elections	4.411***	4.345***	-1.270	3.526***	2.421***
	(1.021)	(0.534)	(1.621)	(0.425)	(0.552)
PICC*Gender Rep	3.880***	3.883***	-1.023	3.169***	1.689***
	(0.801)	(0.419)	(1.272)	(0.333)	(0.433)
PICC*Management Support	-15.779***	-15.407***	4.627	-12.420***	-7.953***
	(3.563)	(2.140)	(5.797)	(1.706)	(2.111)
Constant	-8.443***	-7.543***	3.187	-7.123***	-4.146***
	(1.987)	(1.032)	(3.156)	(0.818)	(1.044)
Time and Cycle FE	X	X	X	X	X
Factory FE	X	X	X	X	X
R-squared	0.827	0.804	0.776	0.753	0.585
N	105	105	105	105	105

+ p<0.10, * p<0.05, ** p<0.025, *** p<0.001

Table 3.6: Effects of PICCs characteristics on Violations sub-components - Jordan

	(1)	(2)	(3)	(4)	(5)
Standardized	All	H&S	Bargain	Protection	WorkHrs
PICC*Union Rep	-0.053	-0.042	-0.090	-0.006	0.058
	(0.052)	(0.072)	(0.073)	(0.063)	(0.052)
PICC*Fair Elections	-0.044	-0.030	0.068	-0.066	-0.066
	(0.049)	(0.067)	(0.073)	(0.062)	(0.071)
PICC*Gender Rep	-0.018	-0.101*	0.013	0.033	0.004
	(0.044)	(0.045)	(0.052)	(0.052)	(0.056)
PICC*Management Support	-0.010	0.106	-0.202*	-0.077	0.039
	(0.055)	(0.064)	(0.088)	(0.064)	(0.054)
Constant	-0.494	-0.420	0.593	-0.155	-1.056*
	(0.319)	(0.332)	(0.393)	(0.421)	(0.494)
Time and Cycle FE	X	X	X	X	X
Factory FE	X	X	X	X	X
R-squared	0.183	0.217	0.129	0.131	0.067
N	234	234	234	234	234

+ p<0.10, * p<0.05, ** p<0.025, *** p<0.001

3.8 Figures

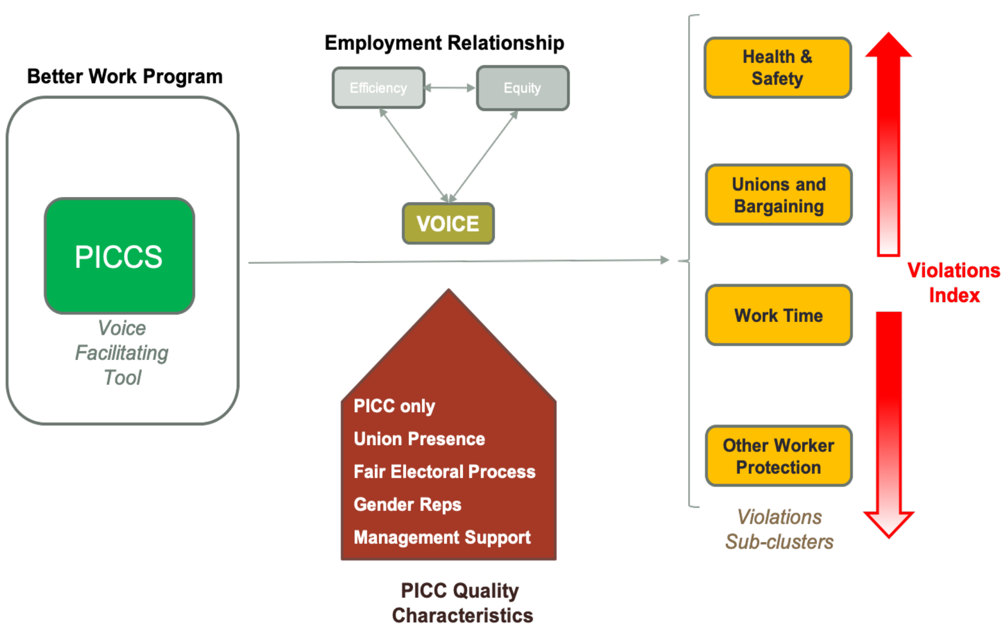


Figure 3-1: *How PICCs Affect Violations*

Differences between PICCs and Trade Unions

Categories	**PICC**	**Trade Union**
Purpose	Foster Labor-Management Cooperation	Represent workers as equal partner with management in industrial relations matters.
Role in Worker Empowerment	Empower workers to have a voice in labor management issues and to have a voice as equals with management.	Empower workers to hold employer accountable for protection of workers' rights and interests.
Mandate	Facilitate the collective contribution of workers to factory improvements on non compliance findings.	Negotiate with management over terms and conditions of work.
Role of Representatives	Worker Representatives elected by fellow workers to contribute to decision making processes related to factory improvements.	Shop stewards elected by fellow workers and accountable to trade union members.
Role in Industrial Relations	Promote a culture of dialogue and prevent industrial disputes	Carry out all representative duties of workers, including grievance handling, dispute resolution, and negotiating collective agreements with management.
Legal Status	Temporary committee, consultative in nature, no permanent status.	Registered organization with legal personality, recognized legal counterpart with management in negotiations over terms and conditions of work.
Legal Protection of Representatives	No official legal protection of PICC Worker representatives, unless they are also trade union representatives.	Legal status as trade union representative, protected under ILO Conventions 87 and 98 against union-based discrimination.
Communication with workers	Responsible for bringing workers' views to PICC committee, and to communicating back PICC solutions to workers.	Responsible to ensure regular communication with members of bargaining unit, through general assembly meetings.
Affiliation with outside organizations	No legal basis for affiliation to outside organization, but if union present in factory, union should have communication link with PICC.	Able to join sectoral or federation level unions of its own choosing.
Resource base	No basis for maintaining resources, but activities should not be paid for management, to avoid perceptions of interference.	Membership organization able to collect dues from members, for purposes of carrying out representative functions and delivering services to members.
Role in Industrial Action	No recognized role under many national labor law to engage in strikes, but dismissal of worker reps for participation in a strike may be classified as arbitrary dismissal under ILO Core Labor standards.	Recognized role to mobilize members to take collective action, including withdrawal of labor, i.e. strike action.

Figure 3-2: *How PICCs Differ from Trade Unions*

Item	Obs	Sign	item-test corr.	item-rest corr.	avg. int. covariance	alpha
Union present	562	+	0.57	0.46	0.04	0.73
Union member incl	562	+	0.53	0.40	0.04	0.74
Worker Reps Freely Chosen	562	+	0.68	0.57	0.03	0.72
No Interference in Elections	562	+	0.61	0.50	0.04	0.73
Multiple Candidates Present	562	+	0.63	0.52	0.04	0.73
Members Receive training	562	+	0.51	0.37	0.04	0.74
Reps Released from Duty	562	+	0.14	0.10	0.04	0.76
Meet Regularly	562	+	0.61	0.50	0.04	0.73
Bipartite meeting chairing	562	+	0.53	0.40	0.04	0.74
Meeting Minutes Recorded	562	+	0.18	0.04	0.04	0.77
Female Ratio Represented	591	+	0.49	0.32	0.04	0.75
Meets Independently	562	+	0.32	0.21	0.04	0.76
Management Incorporate Decisions	562	+	0.57	0.43	0.04	0.74
Test scale					0.04	0.76

Figure 3-3: *This figure shows alpha scores for the PICC index.*

Variable	Obs	Mean	Std. Dev.	Min	Max
INDONESIA					
PICC Exists	252	0.9	0.2	0.0	1.0
Agg PICC Quality Index	252	0.3	0.2	0.0	0.8
Union Present	252	0.6	0.4	0.0	1.0
Fair Elections	252	0.2	0.2	0.0	1.0
Gender Rep	252	0.2	0.4	0.0	1.0
Management Support	252	0.3	0.2	0.0	0.9
JORDAN					
PICC Exists	234	0.8	0.4	0.0	1.0
Agg PICC Quality Index	234	0.4	0.2	0.0	1.0
Union Present	234	0.5	0.4	0.0	1.0
Fair Elections	234	0.4	0.4	0.0	1.0
Gender Rep	234	0.5	0.5	0.0	1.0
Management Support	234	0.3	0.2	0.0	1.0
VIETNAM					
PICC Exists	105	0.9	0.3	0.0	1.0
Agg PICC Quality Index	105	0.6	0.2	0.0	0.8
Union Present	105	0.9	0.3	0.0	1.0
Fair Elections	105	0.8	0.4	0.0	1.0
Gender Rep	105	0.4	0.5	0.0	1.0
Management Support	105	0.4	0.2	0.0	0.7

Figure 3-4: *Description of PICC Variables by Country*

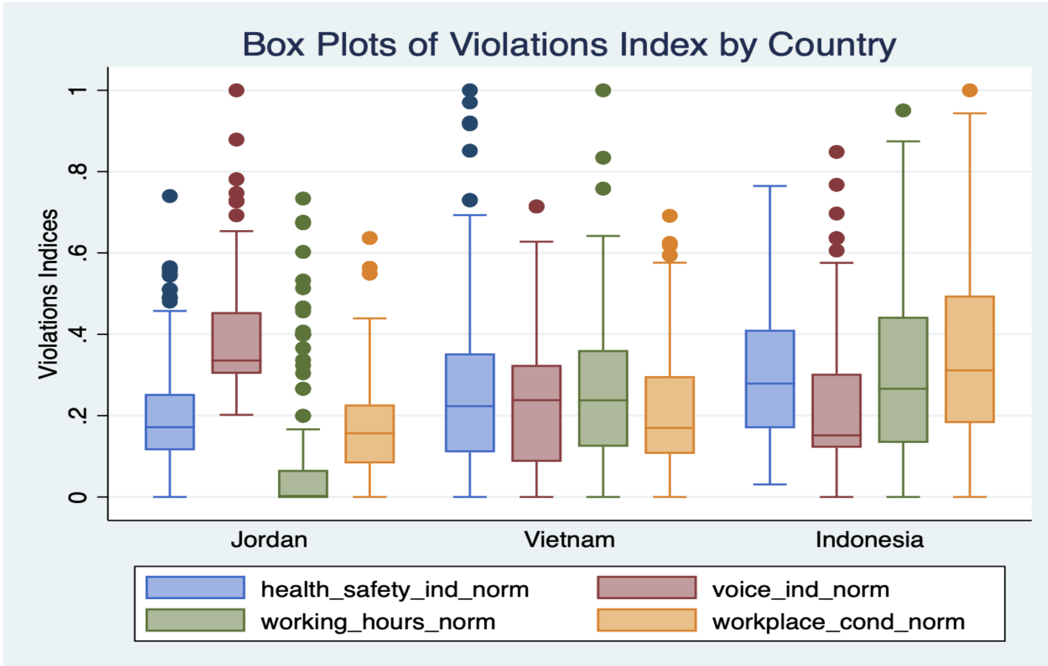


Figure 3-5: *How Violations Index Varies by Country*

Item	Obs	Sign	item-test corr.	item-rest corr.	avg. int. covariance	alpha
Union Operatons	591	-	0.52	0.43	0.01	0.82
Collective Bargaining	591	+	0.27	0.20	0.01	0.83
Dialogue, discipline & Disputes	591	+	0.64	0.57	0.01	0.81
Chemicals	339	+	0.61	0.51	0.01	0.82
Emergency Preparedness	591	+	0.61	0.54	0.01	0.82
Hazardous Materials	591	+	0.29	0.22	0.01	0.83
Health Safety/First Aid	591	+	0.62	0.55	0.01	0.81
OSH Management	591	+	0.65	0.56	0.01	0.81
Bonded_Lab~r	591	-	0.13	0.11	0.01	0.83
Coercion	591	-	0.16	0.14	0.01	0.83
Leave	591	+	0.56	0.51	0.01	0.82
Paid Leave	591	+	0.38	0.34	0.01	0.83
Overtime	591	+	0.61	0.51	0.01	0.82
Regular Hours	591	+	0.60	0.50	0.01	0.82
Welfare	591	+	0.59	0.50	0.01	0.82
Worker Protection	591	+	0.62	0.56	0.01	0.82
Working	591	+	0.47	0.39	0.01	0.82
Gender	591	-	0.12	0.10	0.01	0.83
SOCBenefits	591	+	0.50	0.40	0.01	0.82
Forced Labor	591	+	0.16	0.13	0.01	0.83
Minimum Wage	591	+	0.46	0.42	0.01	0.82
Overtime Wages	591	+	0.50	0.34	0.01	0.83
Test scale					0.01	0.83

Figure 3-6: *This figure shows alpha scores for the violations index.*

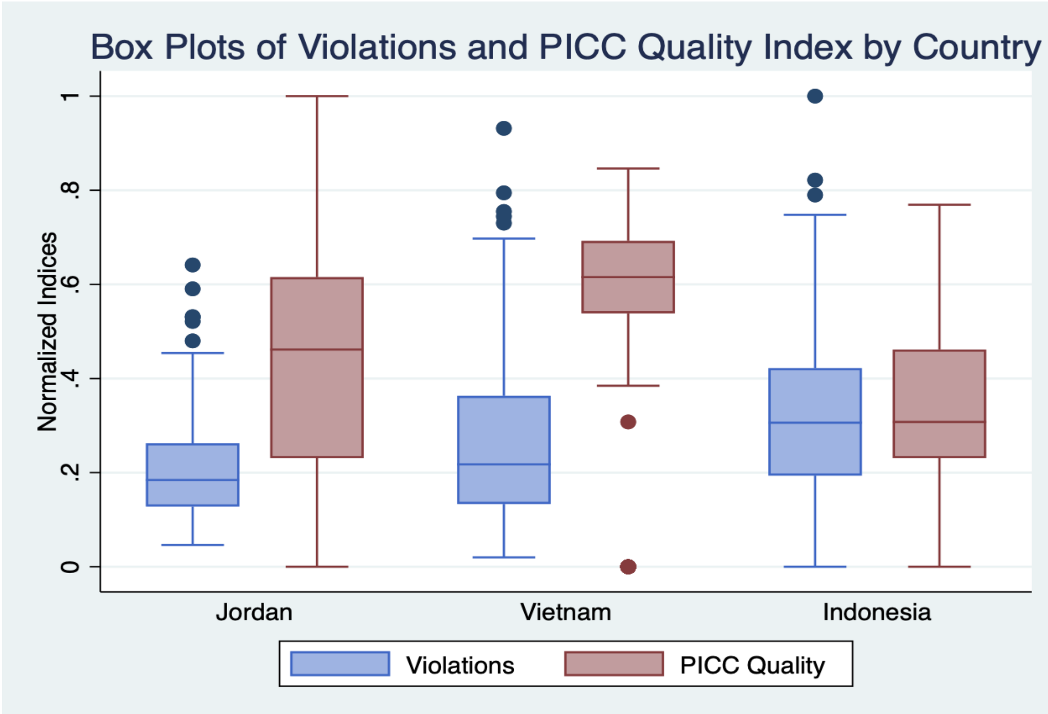


Figure 3-7: *How Violations and PICC Quality Varies by Country*

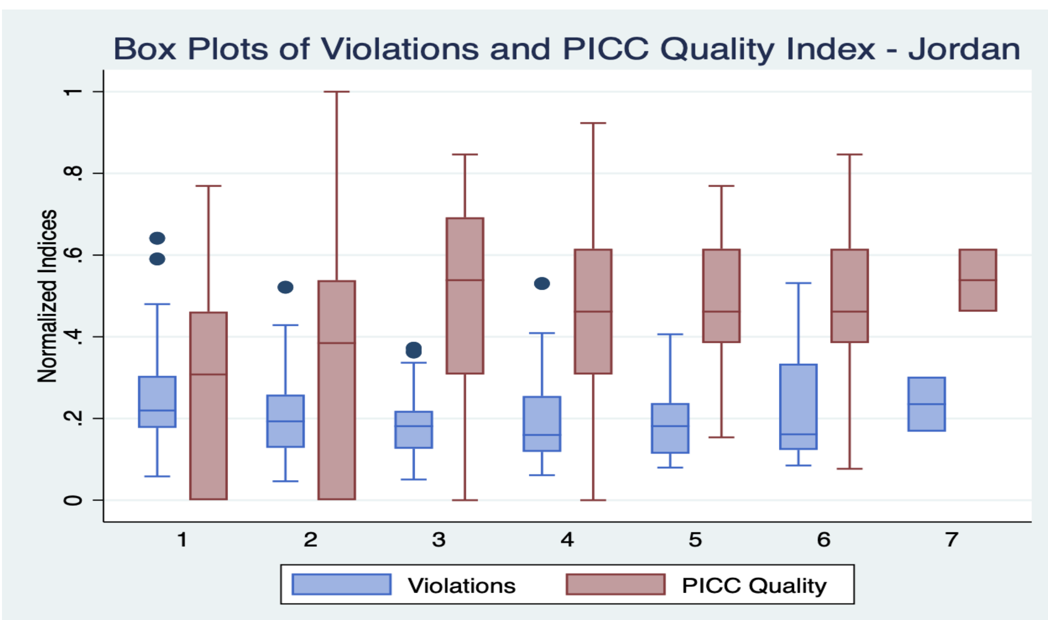


Figure 3-8: *How Violations and PICC Quality Varies for Jordan*

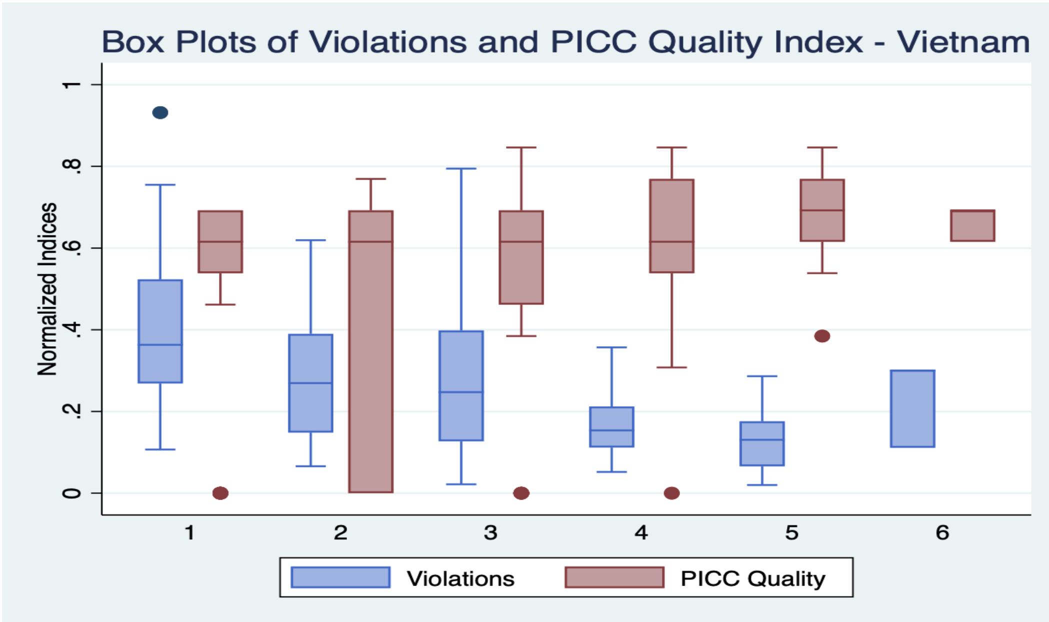


Figure 3-9: *How Violations and PICC Quality Varies for Vietnam*

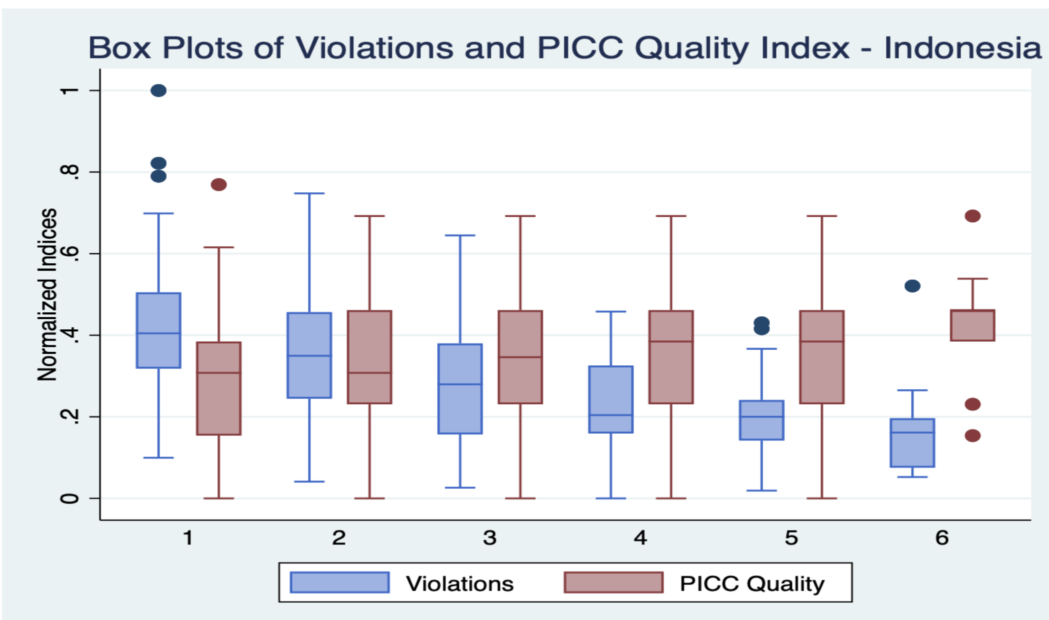


Figure 3-10: *How Violations and PICC Quality Varies for Indonesia*

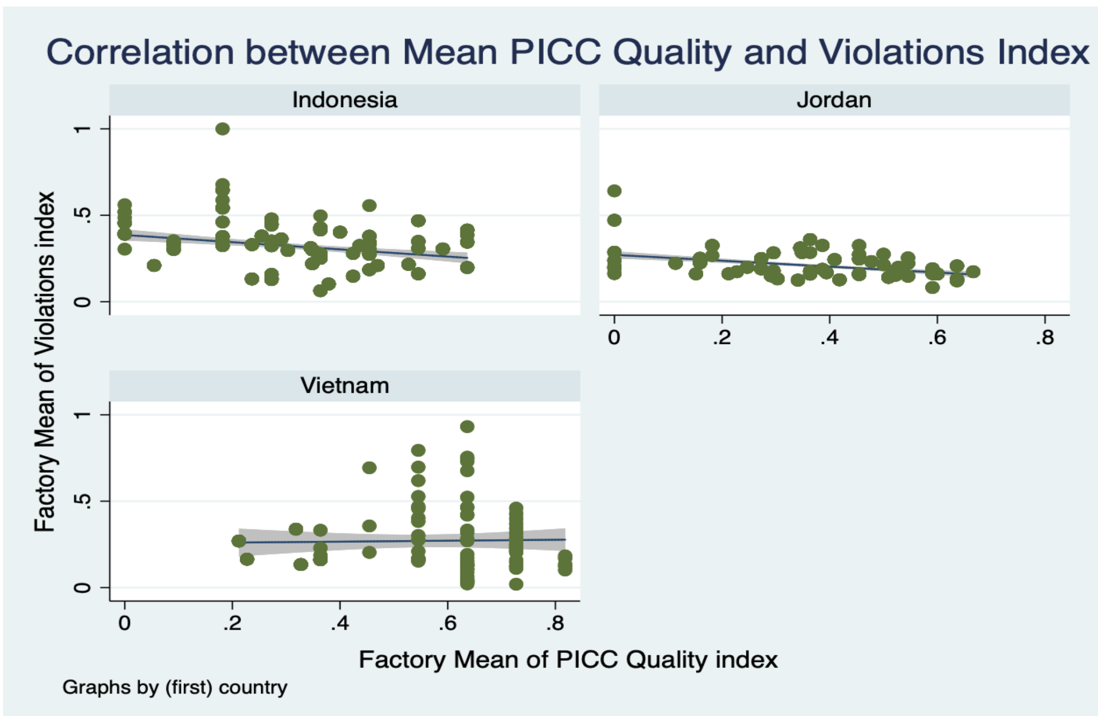


Figure 3-11: *How PICC Index Varies with Violations by Country*

Appendix A

Chapter 1: Additional Materials

A.1 Comparison of Migrant and Non-migrant Households

Table A.1: Regressions of Out-migration Rate on Labor Outcomes

Dependent variable	**Labor Outcomes**											
	AvgHrs per member			Monthly HHinc(ln)			Ratio NonFarmHrs			Ratio FarmHrs		
	Non-Mig HH		Mig HH	Non-Mig HH		Mig HH	Non-Mig HH		Mig HH	Non-Mig HH		Mig HH
	OLS	2SLS	2SLS	OLS	2SLS	2SLS	OLS	2SLS	2SLS	OLS	2SLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Out-Mig	0.014	0.038	0.141	0.006	0.025	0.058	0.007	0.011	0.025	-0.007	-0.010	-0.026
	(0.007)*	(0.018)**	(0.055)**	(0.010)	(0.019)	(0.074)	(0.003)***	(0.005)**	(0.016)	(0.003)**	(0.004)**	(0.016)
First Stage Instrument												
SSIV		0.31	0.46		0.31	0.46		0.31	0.46		0.31	0.46
Rob SE		0.04	0.07		0.04	0.07		0.04	0.07		0.04	0.07
F-stat 1st stage		72.2	48.9		72.5	48.5		72.2	48.9		72.2	48.9
KP stat		18.1	6.4		17.8	6.7		18.1	6.4		18.1	6.4
N	16,180	15,643	162	15,883	15,272	148	16,181	15,645	162	16,181	15,645	162
Mean Dep Var	2.86	2.86	2.45	8.36	8.36	7.50	0.37	0.37	0.25	0.64	0.64	0.77
SD Dep Var	0.73	0.73	0.92	1.43	1.43	1.99	0.33	0.33	0.33	0.33	0.33	0.33
HH controls		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
HH FE		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Year FE		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes

Standard errors in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010.

Table A.2: Regressions of Out-migration Rate on Household Expenditure

Dependent variable			**Expenditure**									
	Educ Exp (ln)			All non-food (ln)			Protein (ln)			All food (ln)		
	Non-Mig HH		Mig HH	Non-Mig HH		Mig HH	Non-Mig HH		Mig HH	Non-Mig HH		Mig HH
	OLS	2SLS	2SLS	OLS	2SLS	2SLS	OLS	2SLS	2SLS	OLS	2SLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Out-Mig	-0.032	-0.041	0.137	-0.032	-0.016	-0.075	-0.022	0.017	0.002	-0.018	0.000	0.054
	(0.011)***	(0.028)	(0.087)	(0.006)***	(0.016)	(0.046)	(0.009)**	(0.020)	(0.080)	(0.006)***	(0.011)	(0.048)
First Stage Instrument												
SSIV		0.32	0.44		0.31	0.42		0.31	0.43		0.31	0.42
Rob SE		0.04	0.06		0.04	0.08		0.04	0.08		0.04	0.08
F-stat 1st stage		66.8	50.5		65.7	29.6		65.9	29.4		65.7	29.6
KP stat		17.1	5.3		19.2	6.8		18.6	6.8		19.2	6.8
N	11,637	10,363	136	16,940	16,591	213	15,533	14,798	211	16,939	16,587	213
Mean Dep Var	7.69	7.69	8.10	10.30	10.30	10.79	9.20	9.20	9.56	11.06	11.06	11.22
SD Dep Var	1.36	1.36	1.25	0.98	0.98	0.87	1.10	1.10	1.06	0.70	0.70	0.69
HH controls		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
HH FE		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Year FE		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01. All standard errors are clustered at the sub-district level. A migrant household had at least one- household member who migrated since 2010.

Table A.3: Regressions of Out-migration Rate on financial market access

Dependent variable			**Expenditure**							
	ProbSave		FreqSave		TotalSave		ProbBorrow		TotalLoans	
	Non-Mig HH	Mig HH	Non-Mig HH	Mig HH	Non-Mig HH	Mig HH	Non-Mig HH	Mig HH		
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Out-Mig	0.009	-0.017	-0.003	-0.040	-0.052	-0.222	-0.002	-0.002	-0.003	-0.092
	(0.009)	(0.028)	(0.008)	(0.042)	(0.029)*	(0.137)	(0.006)	(0.016)	(0.018)	(0.202)
First Stage Instrument										
SSIV	0.31	0.42	0.31	0.42	0.30	0.32	0.31	0.42	0.30	0.36
Rob SE	0.04	0.08	0.04	0.08	0.04	0.07	0.04	0.08	0.04	0.11
F-stat 1st stage	65.8	29.6	65.8	29.6	66.5	21.5	65.8	29.6	52.9	10.7
KP stat	19.2	6.8	19.2	6.8	17.3	7.5	19.2	6.8	16.7	5.0
N	16,595	213	16,595	213	8,969	86	16,595	213	10,169	105
Mean Dep Var	0.73	0.68	0.51	0.40	8.59	9.24	0.90	0.90	9.98	11.04
SD Dep Var	0.44	0.46	0.50	0.49	1.81	1.78	0.30	0.30	1.28	1.34
HH controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HH FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010.

Table A.4: Regressions of Out-migration Rate on socio-economic indicators

Dependent variable	**Indicators**											
	ProbSanLatrine		ProbSafeWater		FoodDivInd		FemAbuse		FemMobility		FemDecideMoney	
	Non-Mig HH	Mig HH	Non-Mig HH	Mig HH	Non-Mig HH	Mig HH	Non-Mig HH	Mig HH				
	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Out-Mig	0.020	-0.009	0.030	0.068	-0.008	0.180	0.004	0.027	0.006	-0.070	0.008	-0.044
	(0.013)	(0.020)	(0.011)***	(0.030)**	(0.021)	(0.051)***	(0.013)	(0.022)	(0.016)	(0.031)**	(0.012)	(0.027)
First Stage Instrument												
SSIV	0.31	0.42	0.31	0.42	0.31	0.42	0.31	0.42	0.31	0.42	0.31	0.42
Rob SE	0.04	0.08	0.04	0.08	0.04	0.08	0.04	0.08	0.04	0.08	0.04	0.08
F-stat 1st stage	65.8	29.6	65.8	29.6	65.7	29.6	65.7	29.6	65.5	29.6	65.7	29.6
KP stat	19.2	6.8	19.2	6.8	19.2	6.8	19.2	6.8	19.1	6.8	19.2	6.8
N	16,595	213	16,595	213	16,593	213	16,594	213	14,748	213	16,594	213
Mean Dep Var	0.39	0.52	0.58	0.65	10.34	10.73	0.36	0.22	0.56	0.41	0.75	0.77
SD Dep Var	0.49	0.50	0.49	0.48	1.34	1.23	0.48	0.42	0.50	0.49	0.43	0.42
HH controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HH FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010.

Table A.5: Regressions of Out-migration Rate on Farm Outcomes

Dependent variable	**Farm Outcomes**											
	FarmLabHrs		FarmLabCost		FarmFertCost		FarmCapCost		FarmHarvestKg		FarmLabProd	
	Non-Mig HH	Mig HH	Non-Mig HH	Mig HH	Non-Mig HH	Mig HH	Non-Mig HH	Mig HH				
	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Out-Mig	-0.047	-0.208	-0.042	-0.206	-0.105	-0.193	-0.008	-0.055	-0.021	-0.129	0.031	0.079
	(0.022)**	(0.034)***	(0.025)*	(0.044)***	(0.041)***	(0.062)***	(0.019)	(0.076)	(0.023)	(0.061)**	(0.018)*	(0.047)*
First Stage Instrument												
SSIV	0.33	0.38	0.33	0.34	0.33	0.35	0.33	0.34	0.33	0.38	0.33	0.38
Rob SE	0.04	0.05	0.04	0.06	0.04	0.06	0.04	0.06	0.04	0.05	0.04	0.05
F-stat 1st stage	84.7	55.0	77.9	31.0	80.6	39.1	83.2	31.1	84.2	55.0	84.2	55.0
KP stat	15.1	3.3	15.1	4.2	13.7	4.3	15.2	4.2	15.0	3.3	15.0	3.3
N	8,028	63	6,743	61	6,731	49	7,833	61	7,983	63	7,983	63
Mean Dep Var	5.91	5.91	8.34	8.57	6.30	6.20	7.16	7.16	7.45	7.60	1.52	1.68
SD Dep Var	0.94	0.88	1.26	1.06	1.26	1.16	1.02	0.98	1.18	1.17	0.74	0.79
HH controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HH FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010. Sample comprises data from only the largest plots for the households.

A.2 Robustness checks

Table A.6: Regressions of Out-migration Rate on Labor Outcomes - Effect of Alternate Measures of Shocks

Dependent variable	**Labor Outcomes**											
	AvgHrs per mem			(ln)Monthly HH Inc			Ratio Non-Farm Hrs			Ratio Farm Hrs		
	OLS	2SLS		OLS	2SLS		OLS	2SLS		OLS	2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Out-Mig	0.014	0.044	0.041	0.006	0.039	0.032	0.007	0.016	0.015	-0.007	-0.015	-0.014
	(0.007)*	(0.018)**	(0.017)**	(0.010)	(0.021)*	(0.018)*	(0.003)***	(0.006)***	(0.005)***	(0.003)**	(0.005)***	(0.005)***
First Stage Instrument												
SSIV		0.28	0.28		0.28	0.28		0.28	0.28		0.28	0.28
Rob SE		0.04	0.04		0.04	0.04		0.04	0.04		0.04	0.04
F-stat 1st stage		55.0	55.1		55.1	55.3		55.0	55.1		55.0	55.1
KP stat		19.1	19.1		18.7	18.8		19.1	19.1		19.1	19.1
N	16,180	15,643	15,643	15,883	15,272	15,272	16,181	15,645	15,645	16,181	15,645	15,645
Mean Dep Var	2.86	2.86	2.86	8.36	8.36	8.36	0.37	0.37	0.37	0.64	0.64	0.64
SD Dep Var	0.73	0.73	0.73	1.43	1.43	1.43	0.33	0.33	0.33	0.33	0.33	0.33
HH controls		No	Yes		No	Yes		No	Yes		No	Yes
HH FE		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Year FE		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes

Standard errors in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010.

Table A.7: Regressions of Out-migration Rate on Labor Outcomes - Effect of Controls

Dependent variable	**Labor Outcomes**											
	AvgHrs per mem			(ln)Monthly HH Inc			Ratio Non-Farm Hrs			Ratio Farm Hrs		
	OLS	2SLS		OLS	2SLS		OLS	2SLS		OLS	2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Out-Mig	0.014	0.038	0.038	0.006	0.024	0.025	0.007	0.011	0.011	-0.007	-0.010	-0.010
	(0.007)*	(0.018)**	(0.018)**	(0.010)	(0.023)	(0.019)	(0.003)***	(0.005)**	(0.005)**	(0.003)**	(0.005)**	(0.004)**
First Stage Instrument												
SSIV		0.31	0.31		0.31	0.31		0.31	0.31		0.31	0.31
Rob SE		0.04	0.04		0.04	0.04		0.04	0.04		0.04	0.04
F-stat 1st stage		72.1	72.2		72.3	72.5		72.1	72.2		72.1	72.2
KP stat		18.0	18.1		17.8	17.8		18.0	18.1		18.0	18.1
N	16,180	15,643	15,643	15,883	15,272	15,272	16,181	15,645	15,645	16,181	15,645	15,645
Mean Dep Var	2.86	2.86	2.86	8.36	8.36	8.36	0.37	0.37	0.37	0.64	0.64	0.64
SD Dep Var	0.73	0.73	0.73	1.43	1.43	1.43	0.33	0.33	0.33	0.33	0.33	0.33
HH controls		No	Yes		No	Yes		No	Yes		No	Yes
HH FE		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Year FE		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes

Standard errors in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010.

Table A.8: Regressions of Out-migration Rate on Labor Outcomes - Effect of IHS Specifications

Dependent variable	**Labor Outcomes**			
	(ln)AvgHrs per mem	(ihs)AvgHrs per mem	(ln)Monthly HH Inc	(ihs)Monthly HH Inc
	2SLS			
	(1)	(2)	(3)	(4)
Out-Mig	0.038	0.038	0.025	0.038
	(0.018)**	(0.018)**	(0.019)	(0.027)
First Stage Instrument				
SSIV	0.31	0.31	0.31	0.31
Rob SE	0.04	0.04	0.04	0.04
F-stat 1st stage	72.2	72.2	72.5	71.1
KP stat	18.1	18.1	17.8	18.2
N	15,643	15,645	15,272	15,702
Mean Dep Var	2.86	3.55	8.36	8.86
SD Dep Var	0.73	0.72	1.43	1.93
HH controls	Yes	Yes	Yes	Yes
HH FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010.

Table A.9: 2SLS Regressions of Out-migration Rate on Labor Outcomes for Non-Migrant HHs with 1-Lag

Dependent variable **Labor Outcome Indicators**								
	AvgHrs per member(ln)		Monthly HHinc(ln)		Ratio NonFarmHrs		Ratio FarmHrs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Out-Mig	0.038	0.054	0.025	0.117	0.011	0.046	-0.010	-0.050
	(0.018)**	(0.053)	(0.019)	(0.075)	(0.005)**	(0.028)	(0.004)**	(0.028)*
Out-Mig(Lag 1)		-0.015		-0.091		-0.034		0.040
		(0.065)		(0.086)		(0.030)		(0.030)
First Stage Instrument								
SSIV	0.31	0.06	0.31	0.05	0.31	0.06	0.31	0.06
Rob SE	0.04	0.02	0.04	0.02	0.04	0.02	0.04	0.02
F-stat 1st stage	72.2	8.4	72.5	8.0	72.2	8.4	72.2	8.4
KP stat	18.1	7.5	17.8	7.5	18.1	7.6	18.1	7.6
N	15,643	15,561	15,272	15,192	15,645	15,563	15,645	15,563
Mean Dep Var	2.86	2.86	8.36	8.37	0.37	0.37	0.64	0.64
SD Dep Var	0.73	0.72	1.43	1.42	0.33	0.33	0.33	0.33
HH controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HH FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. All standard errors are clustered at the sub-district level. Controls include: numbers of household members in each five-year age group; household assets; number of international and domestic migrants; regional population. A migrant household had at least one- household member who migrated since 2010.

Table A.10: Regressions of Out-migration Rate on Labor Outcomes - Interaction Effects

Dependent variable	**Labor Outcomes**							
	AvgHrs PC		Monthly HHinc		Ratio FarmHrs		Ratio NonFarmHrs	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Out-Mig	0.015	0.040	0.012	0.030	-0.006	-0.009	0.006	0.012
	(0.008)**	(0.018)**	(0.010)	(0.018)*	(0.002)**	(0.004)**	(0.002)***	(0.004)***
Out-Mig*Mig HH	-0.008	-0.008	-0.031	-0.034	-0.001	0.001	0.001	0.000
	(0.008)	(0.010)	(0.014)**	(0.016)**	(0.003)	(0.003)	(0.003)	(0.003)
First Stage Instrument								
SSIV		0.31		0.31		0.31		0.31
Rob SE		0.04		0.04		0.04		0.04
F-stat 1st stage		73.0		72.8		73.0		73.0
KP stat		17.9		17.6		17.9		17.9
N	16,927	16,550	16,569	16,104	16,928	16,552	16,928	16,552
Mean Dep Var	2.84	2.84	8.32	8.32	0.65	0.65	0.37	0.37
SD Dep Var	0.74	0.74	1.46	1.46	0.33	0.33	0.33	0.33
HH controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HH FE		Yes		Yes		Yes		Yes
Year FE		Yes		Yes		Yes		Yes

Standard errors in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. All standard errors are clustered at the sub-district level. A migrant household had at least one- household member who migrated since 2010.

A.3 Bartik Share Decomposition

Table A.11: Analysis of Rotemberg Weights

Panel A: Negative and positive weights					
	Sum	Mean	Share		
Negative	-0.426	-0.142	0.230		
Positive	1.426	0.713	0.770		
Panel B: Correlations of Industry Aggregates					
	α_k	g_k	β_k	F_k	Var(z_k)
α_k	1				
g_k	0.691	1			
β_k	0.521	0.489	1		
F_k	0.823	0.577	0.756	1	
Var(z_k)	0.159	0.296	0.673	0.259	1
Panel C: Variation across years in α_k					
	Sum	Mean			
2011	0.177	0.035			
2015	0.044	0.009			
2019	0.866	0.173			
Panel D: Top 3 Rotemberg weight industries					
	$\hat{\alpha}_k$	g_k	$\hat{\beta}_k$	95 % CI	Ind Share
Saudi Arabia	1.263	1468.65	0.012	(0.00,0.00)	.524
United Arab Emirates	0.124	931.47	0.010	(0.00,0.00)	.786
Italy	0.067	24.67	-0.001	[-0.313,0.123]	.028

A.4 Migration-Wage Model

This model replicates the model used in Dustman et al (2015) to interpret the connection between out-migration and wages. Assume that we an in a rural economy where there is one agricultural output y is produced by labor, l. The economy is described by a nested CES production function, which produces out y by combining labor, L and capital, K. Labor is of L types and H is the labor composite.

$$y = [\gamma H^s + (1-\gamma)K^s]^{\frac{1}{s}}, \tag{A.1}$$

In the above equation, H is a CES aggregate of the different labor types, l_i, with $H = (\sum_i \alpha_i l_i^\sigma)^{\frac{1}{\sigma}}$. Here, $\sigma \leq 1$ defines the elasticity of substitution between the labor types, γ defines the relative productivity of labor and capital and $s \leq 1$ defines the elasticity of substitution between labor and capital.

The out-migrating and non-migrant labor are assumed to be perfect substitutes when they are of the same type. For each labor type i, the non-migrant labor is $l_i = l_i^0 - l_i^1$, that is the difference between labor before and the emigrant labor. When there is market clearing, $l_i = n_i$ for all i and n_i is the total labor supply is a particular group and $N = \sum_i n_i^0$ is the total pre-migration labor supply. Then, we can define the pre-migration fraction labor of type, i as $\pi_i^0 = \frac{n_i^0}{N}$. Then, post-migration fraction labor of type, i is $\pi_i^1 = \frac{n_i^1}{N}$, and the fraction of out-migrants to the total labor force is, $m = \sum_j \frac{n_j^1}{N}$

$$\begin{aligned}
l_i &= n_i \\
&= n_i^0 - n_i^1 \\
&= (N\pi_i^0) - (\pi_i^1 \Sigma_j n_j^1) \\
&= (N\pi_i^0) - (\pi_i^1 N m) \\
&= N(\pi_i^0) - \pi_i^1 m)s
\end{aligned} \tag{A.2}$$

In this set up, Dustman et al (2015) show that the equilibrium change in the non-migrant's log wages in response to a change in the ratio of emigrants to the total population is given by the following:

$$\left.\frac{\mathrm{d}lnw_i}{\mathrm{d}m}\right|_{m=0} = (1-\sigma)\left(\frac{\pi_i^1}{\pi_i^0} - \phi\sum\omega_j\frac{\pi_j^1}{\pi_j^0}\right) \quad \text{(A.3)}$$

Here, ω_i is the contribution of the i the type the the labor ageggrate, H with $\sum_i \omega_i = 1$ and $\phi \leq 1$ is a parameter that depends on the capital mobility, capital to labor substitutability and the labor share; $\frac{\pi_i^1}{\pi_i^0}$ is the relative density of emigrants for all skill types, and $\Sigma\omega_i\frac{\pi_i^1}{\pi_i^0}$ is the weighted counterpart. When capital is perfect mobile, $\phi = 1$, while when capital is immobile, $\phi \leq 1$.

Since $\sigma \leq 1$, an increase in the number of out-migrants will increase the wages for all skill types if and only if the expression in the parentheses is greater than zero, which happens when the intensity of out-migration in the respective skill group is greater that the weighted average of the emigration across all skill types. Note the following implications:

- When the skill profile of the emigrants match that of the emigrants (that is, $\pi_i^1 = \pi_i^0$), the effect of wages everywhere is zero.
- When capital is imperfectly mobile, the effect of wages are positive, even if the above condition is true since: $\frac{\pi_i^1}{\pi_i^0} > \phi\sum\omega_j\frac{\pi_j^1}{\pi_j^0}$

The effect of out-migration on mean wages of those who do not migrate is:

$$\frac{d\Sigma_i w_i \pi_i^0}{dm} = (\sigma-1)(1-\phi)\bar{w}^0\sum_i\omega_i\frac{\pi_i^1}{\pi_i^0} \geq 0 \quad \text{(A.4)}$$

where, $\bar{w}^0$ are pre-migration wages. Note the following implications:

- When capital is perfectly mobile, out-migration has no effect on non-migrant wages.
- When capital is imperfectly mobile, the effect of wages are positive.

Appendix B

Chapter 2: Additional Materials

Table B.1: Effects of exposure measure on confirmed cases

	(1)	(2)	(3)	(4)	(5)
Variables	No.obs	Mean	SD	Min	Max
Log of confirmed cases per capita	1,230	0.001	0.006	0.000	0.095
Log of confirmed deaths per capita	1,230	0.000	0.000	0.000	0.012
Log of exposure measure	1,230	0.927	1.531	0.000	7.435
Stringency index	1,110	15.831	23.176	0.000	100.000
Government response index	1,110	12.864	17.768	0.000	84.520
Containment health index	1,110	14.747	20.178	0.000	88.890
Economics support index	1,110	1.565	8.047	0.000	75.000
Percentage changes in movement compared to baseline regarding:					
Retail and recreation	468	-0.25	14.516	-80	28
Grocery	468	5.181	9.731	-60	34
Parks	467	3.809	16.285	-73	86
Transit	462	-0.772	14.863	-84	27
Workplace	468	4.805	12.051	-59	26
Share of health expenditure in GDP (%)	1,170	5.949	2.511	2.271	16.620
Share of working age population (%)	1,200	63.970	17.621	31.880	111.343
Share of population above 65 (%)	1,200	5.874	3.837	1.920	20.758
Population density (person per sq. km.)	1,230	134.370	215.207	2.000	1,654.673
Share of urban population (%)	1,220	51.395	20.450	12.706	91.749

No.	Name of the variable	Description of the variable
1	Stringency index	The index records the strictness of 'lockdown style' policies that primarily restrict people's behavior. It is calculated using all ordinal containment and closure policy indicators, plus an indicator recording public information campaigns
2	Government response index	The index records how the response of governments has varied over all indicators in the database, becoming stronger or weaker over the course of the outbreak. It is calculated using all ordinal indicators.
3	Containment health index	The index combines 'lockdown' restrictions and closures with measures such as testing policy and contact tracing, short term investment in healthcare, as well investments in vaccines. It is calculated using all ordinal containment and closure policy indicators and health system policy indicators.
4	Economics support index	The index records measures such as income support and debt relief. It is calculated using all ordinal economic policies indicators.
5	Retail and recreation	Percentage change in the mobility related to retail and recreation compared to a baseline value. Places include restaurants, cafés, shopping centers, theme parks, museums, libraries and cinemas.
6	Grocery	Percentage change in the mobility related grocery compared to a baseline value. Places include supermarkets, food warehouses, farmers markets, specialty food shops and pharmacies.
7	Parks	Percentage change in the mobility related to visiting parks compared to a baseline value. Places include national parks, public beaches, marinas, dog parks, plazas and public gardens.
8	Transit	Percentage change in the mobility related to transit compared to a baseline value. This includes the mobility in public transport hubs, such as underground, bus and train stations.
9	Workplace	Percentage change in the mobility related to work compared to a baseline value.

Figure B-1: *Data Description*

Appendix C

Chapter 3: Additional Materials

I present a description of two short case studies below, which try to highlight some of the statistical findings above. The studies are chosen from two different country contexts and are of different sizes. The first case, of a factory in Indonesia, is large, and ranked to be only of moderate success. There is union representation in the PICC, which has some impact on reports of violations and the dynamics of implementing the remediation of violations. The second one in Jordan is a case where the PICC is reflected as taking into account gender representation, is largely effective in reducing violations and the factory is overall on track toward remediation, especially in health and safety issues.

Case Study 1: Factory report from Indonesia

In the context of the sample of factories in Indonesia, union presence in PICCs increased reported violations while fair electoral process reduced violations. Factory *XYZ* is part of Indonesia's BWP and has a total of 2,485 workers of which 1,849 are women. The factory was enlisted into the program in 2014 and was still in the second year of the program when the report was completed later in the year. Overall the BW officer's rated *XYZ* as being moderate with regards to its progress on violations. This factory has union workers, who are represented in the PICCs - although both gender and non-union workers were not well-represented.

A total of 62 violations were recorded in the visits, which were concentrated in areas of worker protection (e.g. overtime wage payments and contract renewals) and health and safety clusters such as inadequate use of PPE or safety training. While some of the violations were in progress under the improvement plan recommended by the BWP EAs. EAs recommended the inclusion of non-unionized workers as PICC members to reduce conflict and re-balancing the focus of the PICCs to solving issues more cooperatively with management. The union representatives bring up many issues as well as using the PICC as means for negotiating and bargaining on the union specific issues and dissatisfaction rather than working through the remediation plan. BWP EA noted that some members could not attend the meetings as they were not released from production activities. The PICC needed to also meet more regularly in the absence of the BWP advisors and establish task-teams to ensure that each member can focus and prioritize certain issues instead of having all members taking responsibility for all issues.

These recommendations indicate that while the factory did have a PICC in place, it operated less than optimally in ensuring sufficient voice to workers at the factory and also without sufficient support from the management. While union participation in the PICC helped to raise issues on violations with various sub-clusters, the lack of fair representation of workers in the PICCs could mean that many issues remained unresolved without reducing thee violations.

This case highlights an area where this is scope for improvement in the functioning of the PICC by ensuring better representation in the PICC structure that could help the PICC to be more goal oriented in resolving issues along with raising issues of violations.

Case Study 2: Factory report from Jordan

The analysis of Jordanian factories in the sample showed that while no specific PICC characteristic mattered for thee aggregated violations, adequate gender representation helped to resolve violations in thee health and safety sub-cluster. Jordan's Factory *ABC* has a total of 885 workers of which just over half of them are women. Workers are mainly migrants from India, Sri Lanka and Bangladesh. Women are well-represented in the PICC structure. The factory was registered in the BWP-Jordan in 2009 and was in the fourth cycle of the program at the time of the 2013 report. Overall the BWP officer's rated *ABC* as being *Good/Satisfactory* with regards to its overall compliance. About a dozen major violations were identified at the onset and their progress tracked over time. The main aspects of its violations related to issues on health and safety. The PICC was selected through representative worker elections and the officers (with the guidance of the BW advisors) helped to set up detailed improvement plan for the factory with regards to the violations in conjunction with the management. By the time of the fourth cycle, majority of the violations were deemed to have been remedied. The BWP guidance advised the factory to allocate more resources to the remediation of the remaining violations and workers to work with management in ameliorating the conditions.

PICC was established at *ABC* in cycle 2 of the program and was appointed by selection of the managed and comprised eight workers - equally distributed between men and women with representatives from the migrant workers. On the management side, there was representation from top levels. Although the PICC met regularly, it was met with the guidance of BWP officers. The comments in the report indicated that the PICC discussed various OSH related issues, discussed plans for safety training, worker recruitment plans and *"emphasized the importance of conducting PICC meetings on a regular basis, discussed issues raised by workers, such as food quality for migrants"*.

The report shows that PICC played a role in setting up a remediation plan. The committee was established through fair processes and had a fair representation of women and workers and showed management engagement. The PICC shows promise of continued progress even in the absence of BWP.

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