Three Essays on the Economics of International Migration

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Public Policy and Economics)
in The University of Michigan
2014

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For my husband

ACKNOWLEDGEMENTS

This dissertation would not have been possible without the support of numerous people. First and foremost, I am grateful to the members of my dissertation committee - Dean Yang, Susan Dynarski, Jeff Smith, and Manuela Angelucci - for their mentorship and guidance during my time in graduate school. My growth as a researcher also benefited substantially from the advice of John Bound and Rebecca Thornton. I have learned a tremendous amount from my coauthor, David McKenzie, and he has had a substantial influence on my research. Susie Godlonton and Jessica Goldberg have served as honorary members of my dissertation committee. Jess provided constant guidance and feedback throughout my time at Michigan. Without Susie's unwavering support and mentorship, I would not have completed this Ph.D. She continued to believe in me when I did not.

Graduate school would have been dramatically different without the friendship of Kate Ambler and Morgen Miller. They provided laughter, feedback, and encouragement through all of the important moments. Nathan Seegert, Anne Fitzpatrick, Laura Zimmermann, Lasse Brune, Emily Beam, Molly Saunders-Scott, and Francie Streich also provided valuable support and feedback. I am indebted to Michael Donihue, Jessamyn Schaller, Kim Mukerjee, and Heather Ryder for their support from afar, even when I was lousy at keeping in touch.

My research would not have been possible without the support of a number of individuals in the Philippines. In particular, I am indebted to my friend, Helen Barayuga. Helen's support with gathering the data as well as her endless insti-

tutional knowledge of Filipino migration made this dissertation possible. My fellow Michigan graduate, Dalisay Maligalig, facilitated introductions to numerous agencies. I also thank Liberty Casco, Dunhill Alcantara, Nimfa de Guzman, Nerissa Jimena, Rhona Caoli-Rodriguez, Carmelita S. Dimzon, Rosanna Siray, and Lex Pineda. This dissertation would not have been possible without their diligent work and willingness to share their knowledge. Thanks to Nico Ravanilla for introducing me to his home country. Anna Yang and Ryan Yang made data collection substantially more enjoyable and were extremely welcoming during my stay in Manila.

I am also grateful to the National Science Foundation Graduate Research Fellowship and the Rackham Merit Fellowship for funding my time in graduate school.

My deepest thanks go to my parents, Jane and David Theoharides, and my husband, Joshua Hyman. Graduate school has been a difficult journey, and they have travelled with me every step of the way. Words cannot properly express my gratitude for their love and encouragement.

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ABSTRACT

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International migration is a key labor market option in many developing countries. This dissertation investigates three questions about the effects of international migration on migrant sending countries. In the first chapter, I investigate the effect of migration on investment in origin-country human capital. Using an original dataset of all new migrant departures from the Philippines between 1992 and 2009 matched to the migrants' province of origin, I examine the effect of migration demand on province-level secondary school enrollment rates. To isolate exogenous changes in demand, I create a Bartik-style instrument that exploits variation in destination-specific migrant networks across local labor markets. Analysis at the local labor market level accounts for effects of migration on both migrant and non-migrant households. I find that secondary enrollment increases by 2.1% in response to an average year-to-year percent increase in province-level migration demand. For each additional new migrant, 2.8 more children are enrolled. Private school enrollment increases by 10.1%, while the effect on public school enrollment is near zero. These effects can occur through two channels: the income channel or the wage premium channel. Exploiting variation in gender-specific migration demand, I test their relative importance and

conclude that the income channel is dominant. I provide complementary evidence of the results by analyzing a natural experiment that led to the closure of a major migration channel for Filipinos.

In the second chapter, coauthored with David McKenzie and Dean Yang and published in the *American Economic Journal : Applied Economics*, we use an original dataset of migrant departures from the Philippines to identify the responsiveness of migrant numbers and wages to GDP shocks in destination countries. We find a large, significant response of migrant numbers to GDP shocks at destination, but no significant wage response. This is consistent with binding minimum wages for migrant labor. This result implies that labor market imperfections that make international migration attractive also make migrant flows more sensitive to global business cycles. Difference-in-differences analysis of a minimum wage change for maids confirms that minimum wages bind and demand is price sensitive without these distortions.

Finally, the third chapter estimates the effects of constraining emigration flows due to destination country immigration policy. Despite the prevalence of restrictions on migration flows, the literature is largely silent on the implications of these barriers on migrant-sending countries. To estimate a causal effect of migration barriers on labor market choices of individuals in the migrant-sending country, this paper exploits a policy change that led to the halt of the largest migration channel for Filipinos. In 2005, in response to accusations from the United States of human trafficking, Japan dramatically changed the requirements for Filipinos migrating as overseas performing artists (OPAs), resulting in a decline from 71,108 to 6,696 workers. Certain areas of the Philippines historically sent a larger share of OPAs, and I employ a difference-in-differences estimation strategy that uses OPA migration in some base year to define the treatment dosage. International migration falls in response to the policy change by 1.2%. The effect on international migration is larger than the policy change itself would suggest, indicating that the importance of spillovers across migrant occupa-

tions. Domestically, more children are employed, and adults are more likely to be unemployed, looking for additional hours, or engaged in short term work. These results suggest that eliminating controversial migration channels has major repercussions for labor market choices in migrant-sending countries.

CHAPTER I

Manila to Malaysia, Quezon to Qatar: International Migration and Its Effects on Origin-Country Human Capital

1.1 Introduction

International migration is a key labor market option for many individuals from developing countries. These labor market opportunities are typically characterized by large gains in wages for both skilled and unskilled workers (Clemens, 2011; Clemens, Montenegro and Pritchett, 2008; Gibson and McKenzie, 2012). Such wage gains often result in increased income in the migrant-sending country through the receipt of remittances, which lead to substantial increases in both investment and consumption (Clemens and Tiongson, 2013; Yang, 2008). One type of investment that may respond to increased income is human capital. Unlike other investments, however, increases in migration opportunities may also affect human capital investment by changing the expected wage premium for education. Depending on the education level necessary to acquire jobs abroad, the education wage premium may either increase or decrease, and individuals will change their optimal level of educational investment accordingly. Thus, migration can affect investment in human capital in the origin country through

two main channels: the income channel and the wage premium channel.[1]

Due to data and research design limitations, most previous studies are unable to examine the net effect of migration on human capital, but rather estimate the partial effect operating either through the income channel (Ambler, Aycinena and Yang, 2013; Cox-Edwards and Ureta, 2003; Yang, 2008) or the wage premium channel (Beine, Docquier and Rapoport, 2007; Chand and Clemens, 2008; Shrestha, 2012). The handful of studies that do estimate the net effect focus exclusively on migrant households (Clemens and Tiongson, 2013; Hanson and Woodruff, 2003; Kandel and Kao, 2001; McKenzie and Rapoport, 2011). As a result, they are not able to capture the potential spillovers that occur within a local economy due to migration. For example, non-migrant households may also benefit from the receipt of remittances or their multiplier effects in the local economy as well as from changes in the expected wage premium. Therefore, estimates focusing exclusively on migrant households underestimate the effects on human capital in the economy as a whole. Furthermore, none of the aforementioned studies are able to distinguish the relative importance of the income channel versus the expected wage premium channel.

In this paper, I estimate the net causal effect of international migration on province-level secondary school enrollment rates in the Philippines. The net effect of migration on human capital at the local labor market level is a key parameter of interest for policymakers in migrant-sending countries in order to predict the level of human capital in the future labor force. My results provide the first estimates of this effect. Further, following predictions set out in a basic theoretical framework, I examine the relative importance of the income channel and the wage premium channel on secondary school enrollment decisions. This is the first paper to attempt to disentangle the effects of these two mechanisms. Identifying the dominant mechanism has the

[1] Ambler (2013) finds that information asymmetries in migrant households matter for resource allocation. Thus, migration may also affect human capital investments by geographically splitting households and changing bargaining power. However, Clemens and Tiongson (2013) find that remittances overwhelmingly dominate effects from splitting households.

potential to guide the design of policies with the goal of increasing the human capital stock.

I estimate the effect of the province-level migration rate on secondary school enrollment decisions in the province. However, the observed province-specific migration rate will confound changes in the demand and supply of migrants. To isolate exogenous changes in demand for migrants, I collected a unique, individual-level, administrative dataset on all new migrant departures from the Philippines matched to the migrant's province of origin to create a plausibly exogenous instrument for local migration demand following Bartik (1991). This Bartik-style instrument exploits variation generated by shocks to destination country-specific migration networks across local labor markets in the Philippines. Migrant networks are an important determinant of where migrants move and the occupations in which they are employed (Munshi, 2003). As a result of these networks, provinces will vary in the degree to which they are affected by changes in demand from a given destination country. The instrument predicts the number of migrants in each province-year, and is defined as the interaction of the destination-country composition of migrants in each province at baseline and destination-specific total national migration. Due to the unique nature of my micro data, this is the first instance where a Bartik-style instrument is applied to the international migration literature. In previous studies, the historic migration rate is often used to instrument for the contemporaneous migration rate (see McKenzie and Rapoport (2010); Woodruff and Zenteno (2007), among others), and the use of both the Bartik-style instrument and panel data is a substantial improvement in terms of causal identification.

To identify the relative importance of the income channel versus the expected wage premium channel, I exploit differences in gender-specific migration demand. For instance, a change in demand for female migrants should only affect the wage premium for females. Thus, female enrollment may respond to this change in demand through

the expected wage channel while male enrollment should not. The income channel, on the other hand, may or may not affect male and female students equivalently in response to a change in female migration demand. If I find that a change in female migration demand impacts male and female enrollment equally, then this suggests that the income channel is the dominant channel. If, on the other hand, I find the effects are different, then both channels may matter. To test the effects of demand by gender, I create separate Bartik-style instruments for male and female migration.[2]

I find a strong and statistically significant positive relationship between secondary school enrollment and total migration demand. Total secondary school enrollment increases by 2.1% in response to an average year-to-year percent increase in province-level migration demand. This means that for each additional migrant, there are 2.8 more students enrolled in secondary school. Private school enrollment increases by 10.1% for an average change in migration demand. While there is a near-zero effect on public school enrollment, when combined with the large effect on private school, one interpretation is that students switch from public to private school while others are induced from no school into public school. Demand for female migrants leads to similar increases in both male and female school enrollment, which leads me to conclude that the income channel is the dominant channel through which migration affects education. I also examine heterogeneity of enrollment responses by grade level to identify the location of marginal students in the education distribution. While enrollment increases for all grade levels, the largest effect is on first year enrollment, suggesting that increased migration demand induces students to enter secondary school who otherwise would not have enrolled.

I provide complementary evidence using a natural experiment. In 2005, Japan imposed barriers to hiring Filipino overseas performing artists (OPAs) in response

[2]Migrant occupations from the Philippines are highly gender-specific, as shown in Section 2.1. However, as I discuss in Section 5.3, exogeneity of the gender instruments does not require that gender composition is stable over time or that occupations must be exclusively male or female.

to allegations of human trafficking from the United States. Because OPAs are 98% female, this led to a large, exogenous decrease in demand for female Filipino migrants (Theoharides, 2014*a*). Exploiting differences in the rate of OPA migration across provinces using a continuous difference-in-differences methodology, this decline in migration opportunities caused a statistically significant decrease in public school enrollment. The effects on enrollment are similar for both male and female students, which provides further evidence in favor of the income channel.

The Philippines provides an excellent setting to address the effect of migration on education. As the first country to adopt temporary overseas contract migration on a large scale, approximately 2% of the Philippine working-age population migrates for employment each year in a wide variety of occupations and destinations. Further, substantial heterogeneity in the gender and skill composition of overseas migrants allows me to test the relative importance of changes in income versus the wage premium. From a policy perspective, the Philippines has served and continues to serve as a model for many other Asian countries such as Indonesia, Bangladesh, and Sri Lanka in the establishment of temporary contract labor programs (Asis and Agunias, 2012; Rajan and Misha, 2007; Ray, Sinha and Chaudhuri, 2007; World Bank, 2011*a*). Understanding the implications of such a program on school enrollment decisions in the migrant-sending country is thus increasingly important for policymakers in these countries as they seek to understand the future level of human capital in their domestic workforce.

The remainder of the paper is organized as follows. Section 1.2 discusses background on migration and education in the Philippines. Section 1.3 presents a basic theoretical framework relating migration to education. The data are presented in Section 1.4, followed by a discussion of the empirical strategy in Section 1.5. Section 1.6 discusses the main results, mechanisms, and magnitudes of the estimates. Section 1.7 provides complementary evidence using the natural experiment in Japan, and

Section 1.8 concludes.

1.2 Background

1.2.1 Migration from the Philippines

As the first country to adopt temporary overseas contract migration on a large scale, the Philippine government created an overseas employment program in 1974 in response to poor economic conditions in the Philippines. The program has grown dramatically; in 2011, 1.3 million Filipinos departed overseas on labor contracts (representing 2% of the working age population).[3] Approximately 517,000 of these migrants were new hires with first time labor contracts. Based on the perceived success of the migration program in the Philippines, several other countries, such as Indonesia, India, Bangladesh, Sri Lanka, and Tajikistan, have adopted or are in the process of adopting similar migration programs (Asis and Agunias, 2012; Rajan and Misha, 2007; Ray, Sinha and Chaudhuri, 2007; World Bank, 2011*a*).

Filipinos migrate to a wide range of destination countries, as shown in Table 1.1. Saudi Arabia is the largest destination country, and the majority of migration is to the Middle East or within Asia. Almost 50% of male migrants work in Saudi Arabia, whereas female migrants are split more evenly across Japan, Saudi Arabia, Taiwan, Hong Kong, and the United Arab Emirates. Filipinos also migrate in a variety of occupations. Table 1.2 shows the top 20 occupations for migrants from the Philippines. Occupations tend to be highly gendered, and occupations that are over 50% female are shaded in grey. Of the top 10 occupations, domestic helpers, performing artists, caregivers, and medical workers are all over 80% female. Plumbers, engineers, and laborers are almost exclusively male occupations while production workers, cooks and waiters, and building caretakers are much more evenly split across

[3]This figure is for land-based workers only and excludes seafarers.

genders.

Contract migration is largely temporary and legal by way of licensed recruitment agencies. There are numerous fees associated with the migration process. Legally, recruitment agencies may only charge a placement fee equivalent to one month's wages (Orbeta, Abrigo and Cabalfin, 2009). The worker satisfies this debt upon receipt of the first month's wages. However, in addition to the placement fee, a number of additional costs are incurred by potential migrants such as travel to Manila and room and board prior to overseas deployment. Migrants commonly resort to predatory lenders to cover these expenses (Barayuga, 2013). The Philippine Overseas Employment Administration (POEA) regulates recruitment and verifies work contracts prior to employment. One of the main regulatory functions of POEA is to set occupation-destination specific minimum wages for overseas contracts. McKenzie, Theoharides and Yang (2014) find that these minimum wages are binding. In the absence of a minimum wage policy, an increase in demand for migrants should lead to both an increase in the quantity and wages of these workers. However, given that these minimum wages are binding, McKenzie, Theoharides and Yang (2014) find that destination countries respond to economic shocks by changing the quantity of overseas workers rather than altering the wage.

The rate of new hire migration varies substantially across the Philippines.[4] In 2009, the average new hire migration rate across provinces for new labor contracts was 0.54% of the province population. However, this varied from a maximum of 1.3% of the population in Bataan province to just 0.07% of the population in Tawi-Tawi province. This suggests that migration is a more important labor market option in

[4]I examine how much of the movement in province-level migration rates is common across provinces versus how much is province specific. Following Blanchard and Katz (1992), I regress the log migration rate in province p on the log total migration rate separately for each province. The adjusted R^2 for each regression provides an empirical estimate for how much province-level migration rates move together from one year to the next. The average adjusted R^2 across all 83 province-level regressions is 0.22. Therefore, the majority of the movement in province-level migration rates is not explained by movement in the overall aggregate migration rate.

certain parts of the country than others. Figure 1.1 shows the new hire migration rate in 1993 in each province. While higher rates of migration are largely concentrated on the northern island of Luzon, there is substantial variation throughout the country as a whole. Even among high migration provinces, provinces specialize in certain occupations and destinations, resulting in substantial heterogeneity in the composition of migrants across the Philippines. Figure 1.2 shows province-level migration rates in 1993 for migrants to Hong Kong compared to migrants to Saudi Arabia. Migration to Hong Kong is concentrated in the northern part of Luzon, whereas migration to Saudi Arabia is more heavily concentrated around Manila and in Mindanao, the southern part of the Philippines.

I exploit this variation in the destination composition of migrants across provinces in order to identify the causal effect of migration demand on secondary school enrollment. While no legal barriers prevent workers from other provinces from acquiring these jobs, the reliance on social networks in choosing recruitment agencies and obtaining jobs abroad creates rigidities across local labor markets. In personal interviews with POEA staff, Barayuga (2013) states that migrants rely on family members and friends who have previously migrated to choose recruiting agencies and find jobs abroad.

1.2.2 Migration and Education

The effect of migration on human capital through the expected wage premium channel depends on whether jobs abroad require more or less education than jobs at home. To determine the sign of the wage premium effect in the Philippines, it is important to note the location of Filipino contract workers in the education distribution among all Filipino workers. Borjas (1987) argues that workers migrating from countries with high income inequality to countries with lower income inequality are negatively selected, and so one might expect an increase in migration demand to

reduce human capital investment due to low skill, high wage opportunities abroad. While earnings inequality in the Philippines is high, Docquier, Lohest and Marfouk (2007) suggest that emigration from the Philippines is positively selected. However, their study is limited to OECD destinations. As shown in the previous section, the majority of contract migrants work in non-OECD countries in the Middle East and Asia. To establish if this finding holds for non-OECD countries, in Figure 1.3 I follow Chiquiar and Hanson (2005) and plot the education distribution of all migrants and non-migrants in the 2000 Philippine Census.[5] Panel A shows the distributions for all migrants and non-migrants between the ages of 18 and 65. The share of migrants with less than a high school education is smaller than the share of non-migrants with less than a high school education. The opposite is true for high education levels, especially for training programs. Training programs are vocational degrees that require a high school diploma for enrollment, and in many occupations, a training program is required to be eligible for overseas contract migration. Based on Panel A, it appears that migrants from the Philippines are positively selected.

Panel B shows the same figure for individuals located in the ten provinces with the highest rates of migration.[6] Provinces that send a large number of migrants may be more educated overall, and thus the apparent positive selection in Panel A might be driven by the fact that migrants are from more educated provinces. While the degree of positive selection in Panel B is somewhat less pronounced, migrants are still more educated than non-migrants in high migration provinces. Panels C and D examine the distribution separately by gender and indicate that both male and female migrants are positively selected, though the degree of selection appears to be slightly higher for male migrants than for female migrants. One additional concern is that differences in cohort may confound the distributions. Since migrants

[5]Unlike Chiquiar and Hanson (2005), because the Philippine Census includes temporary contract migrants, I can create the education distributions based on a single data source.

[6]There are 80 provinces in the Philippines and 4 districts of Manila, which I count as provinces.

are younger than the overall population, if younger cohorts get more education than older cohorts, the apparent positive selection may simply be a result of comparing different cohorts. Panels E and F show the education distribution for workers less than 35 years of age and workers greater than 35 years of age. Both younger and older workers appear positively selected, though the degree of positive selection is somewhat less for younger workers.

While there is no overall required level of education for contract laborers mandated by either the Philippine government or employers, Figure 1.3 suggests that employers screen on education. McKenzie, Theoharides and Yang (2014) argue that there is an excess supply of Filipino workers who seek overseas employment. Given this, it is not surprising that employers can be quite selective in terms of the workers that they hire for overseas contracts. Beam (2013) collects data on job vacancies from a popular job-posting website in the Philippines and finds that potential migrants without at least a high school education are qualified for very few jobs. While certain occupations may not require the skills of a college-educated worker, when hiring workers internationally, employers may rely on education to signal that the worker is a high ability type.

1.2.3 Education in the Philippines

To understand the margin along which individuals may alter their investment in schooling, it is important to note some key features of the Philippine education system. Primary education in the Philippines consists of six years of schooling, and secondary education is four years, thus totaling ten years.[7,8] Public primary education is free and compulsory, whereas secondary education is free but not compulsory (Philippine

[7]According to the Department of Education, children must enter school by age six. However, using household survey data, Maligalig et al. (2010) find that fewer than half of six year olds are in school.

[8]In 2011, the Philippines passed a bill to switch to a K-12 education system. The addition of grades eleven and twelve will not occur until the 2016-2017 and 2017-2018 school year and thus is not relevant for this analysis (Philippine Republic Act 10533, 2013).

Republic Act 6655, 1988). Despite the fact that secondary education is officially free, in addition to the opportunity cost of schooling, households must also cover the cost of miscellaneous fees, uniforms, school supplies, transportation, food allowances, and textbooks (World Bank, 2001).[9,10] Approximately fifteen percent of students drop out of secondary school,[11] and evidence from household survey data indicates that they do so mostly to work or because the cost of schooling is too high (Maligalig et al., 2010). Because on-time graduation occurs at age fifteen or sixteen and the minimum age to work abroad is eighteen, only domestic wages are relevant for an opportunity cost calculation.[12]

Private school education is a common alternative to public school, and eighteen percent of students enrolled in secondary school attend private school.[13] The fees for private school are substantially higher than the costs of attending public school. While Filipinos perceive the quality of private school to be higher than public school and cite sending children to private school as a major motivation for international migration (Bangko Sentral Ng Pilipinas, 2012), there is little evidence to support the perception that the quality is higher in private schools (Yamauchi, 2005).

[9]Officially, miscellaneous fees may not bar a student from public school (Philippine Republic Act 6655, 1988). However, households cite these as major barriers to public school enrollment, suggesting that this policy is not enforced (World Bank, 2001).

[10]In 2008, the Department of Education implemented a no uniform policy (Philippine Department of Education Order 45, 2008) as an attempt to reduce the barriers to poor children attending public school.

[11]This number is an underestimate of the true dropout rate as it only counts students who ever enrolled in secondary school. 8.5% of students drop out of primary school (Maligalig et al., 2010), and there are certainly some children who never enter school at all.

[12]Using household survey data from the 2006 Family Income and Expenditure Survey (FIES) and the 2007 Labor Force Survey (LFS), I calculate that direct education costs are approximately 15,000 Philippine pesos per year (USD350), and indirect costs are 35,000 pesos per year (USD810). I calculate indirect costs as the average annual wages earned by children between ages twelve and seventeen, conditional on working.

[13]These are predominantly Catholic schools.

1.3 Theoretical Underpinnings

In this section, I develop a theoretical framework that describes the secondary school enrollment decision when international contract migration is a labor market alternative. The model provides predictions to help distinguish between the income channel and the expected wage premium channel. The basic framework is similar to McKenzie and Rapoport (2011), but I extend their model so that schooling decisions are sequential due to uncertainty surrounding potential labor market outcomes and the household budget.[14,15]

1.3.1 Optimal Education Choice Without Migration

First, consider the education decision when migration is not a labor market option. At the completion of primary school, a risk neutral benevolent household dictator (the parent) chooses whether to enroll a child in high school by maximizing the discounted present value of expected lifetime earnings net of education costs. Education costs include both direct costs of schooling such as school fees or uniforms, and indirect costs such as foregone income or alternative investments. I assume there are imperfect credit markets,[16] and the parent cannot borrow against a child's future earnings. Therefore, all direct costs for a year of schooling must be paid from the household's current budget at the time of enrollment. As a result, there are two types of households: unconstrained and constrained. Unconstrained households will invest in the optimal level of schooling for children, whereas constrained households invest in education until the liquidity constraint binds.

[14]See e.g. Keane and Wolpin (1997) or Heckman, Lochner and Todd (2006) for surveys on uncertainty and the returns to education.

[15]While ideally I would use individual-level panel data to test a dynamic model of the annual enrollment decision, such education data are not available in the Philippines. However, individual-level decisions have implications for the stock of students enrolled in secondary school, so instead I use a panel of aggregate province-level data to test the response of the stock to these aggregate changes.

[16]I later relax this assumption.

A child's expected wage is conditional on educational attainment. I assume that the parent expects the child to receive this wage for his or her entire working life. For simplicity, I consider two levels of schooling, high school graduate, hs, and less than a high school education, lhs.[17] I assume the expected wage is increasing with schooling, such that $E[w_{hs}] > E[w_{lhs}]$, where $E[w_{hs}]$ is the expected wage earned by a high school graduate, and $E[w_{lhs}]$ is the expected wage earned with less than a high school education. The wage premium for a high school education is defined as:

$$Wage\ Premium = \frac{E[w_{hs}]}{E[w_{lhs}]} \tag{1.1}$$

The parent's optimal choice of schooling is based on a forecast of household income and expected returns to education when the child enters the labor market. At the start of each school year, the parent receives updated information on household liquidity and the expected returns to schooling. In response, they may revise their enrollment decision for the child. In the event that expected household income was higher than realized income, the household may not be able to enroll the child in school. Alternatively, if realized income is greater than expected household income, the parent may enroll a child who would otherwise not be enrolled. For constrained households, the constraint will either no longer bind or bind less strongly, and the child is enrolled in school. Unconstrained households may also increase enrollment in response to higher income by purchasing normal goods that complement education (e.g., electricity, books, better healthcare), such that now the investment in education is worthwhile. Changes in the wage premium may cause parents to revise their optimal level of schooling choice. If the expected returns to education have fallen, children may receive less education, whereas if the returns have increased, children may now receive more education.

[17] I discuss heterogeneity by grade-level enrollment in Appendix A.

1.3.2 Optimal Education Choice With Migration

Now suppose individuals have two potential labor market options: work at home or work overseas.[18] Introducing migration as a labor market alternative changes the expectation of wages for a given level of schooling and thus the wage premium for a high school education. Specifically, conditional on searching for an overseas job, an individual's expected wage is:

$$E[w_s] = E[w_{a,s}] * p_{a,s} + E[w_{d,s}] * (1 - p_{a,s}) \; for \; s = \{hs, lhs\} \tag{1.2}$$

where $p_{a,s}$ is the probability that an individual with schooling level s will acquire a job abroad, a. $E[w_{a,s}]$ is the expected wage overseas (net of migration fees) for schooling level s, and $E[w_{d,s}]$ is the expected wage for schooling level s domestically, d. I assume individuals are employed with probability 1.[19] I also assume that individuals can renew their overseas work contracts for as many periods as they choose, and thus may be a contract migrant for their entire working life.[20] Thus, the present discounted value of earnings is calculated assuming that a parent expects a child to earn $E[w_s]$ for his or her entire working life. I assume that 1) Migration is positively skill-biased so $p_{a,hs} > p_{a,lhs}$; 2) Expected wages, both at home and abroad, are increasing in education; and 3) For a given level of education, domestic wages are assumed to be lower than wages earned abroad, $E[w_{a,s}] > E[w_{d,s}]$.

Now consider an economic shock in a destination country that results in a change in demand for migrants. This change affects the parent's optimal choice of schooling

[18] Recall that one must be at least eighteen years of age to migrate. Since on-time graduation from high school in the Philippines is at age 15 or 16, international migration will not induce individuals to drop out in order to immediately migrate. Approximately twelve percent of eighteen year olds are currently enrolled in secondary school (2007 LFS and author's calculations).

[19] Loosening this assumption and allowing for unemployment as a third alternative with probability $p_{u,s}$ changes the value of the wage premium quantitatively but not qualitatively. I assume that $p_{u,hs} < p_{u,lhs}$ and $E[w_{u,s}] = 0$. Thus, $E[w_{hs}] > E[w_{lhs}]$ still holds, and all predictions will remain valid.

[20] Yang (2006) states that most contracts are open to renewal. Contracts are typically two years, and on average each contract is renewed for 6 years (POEA and author's calculations).

for children in the household through two channels—a change in income or a change in the expected high school wage premium—and may cause households to revise the optimal level of schooling as outlined above.[21] I will discuss each of these channels below and predict what each implies for the empirical results. Because households are unlikely to alter expectations in response to a transitory shock, I assume that the change in migration demand is perceived to be persistent.

1.3.3 Two Channels: Income and the Wage Premium

Three types of households may respond to the change in demand for migrants: 1) Households that have at least one child of secondary schooling age, but experience no change in income in response to migration demand; 2) Households that do not have children of secondary schooling age, but receive remittances or benefit from multiplier effects due to the increase in migration demand; and 3) Households that receive remittances or benefit from multiplier effects and have secondary school-aged children.[22] Parents in the first and third types of households may change their enrollment decision based on the change in the expected wage premium. The second and third types of households will experience a change in income due to the receipt of remittances or their multiplier effect. For the second type of households, this increase in income has no effect on school enrollment decisions. For the third type of household, a change in income can lead to a revision of the school enrollment decision. Thus, Type 1 households may change enrollment decisions due to the wage premium, and Type 3 households may change enrollment decisions due to both the income and

[21] Migration may also affect households by changing household structure. Cortes (2013) provides evidence that children with migrant mothers are more likely to lag behind in school than children with migrant fathers. However, Clemens and Tiongson (2013) find that the effects of migration are largely through remittances rather than changes in household structure amongst migrant households. In addition, changes in household structure are a less important channel when examining the effect of migration at the local labor market level since only a small fraction of households have an international migrant. As a result, I abstract away from household structure, but the predictions of the model for a change in household structure are qualitatively the same as a change in income.

[22] Type 3 households include both migrant households and non-migrant households that benefit from remittances.

wage premium channels.

Changes in income may affect the enrollment decisions of both unconstrained and constrained Type 3 households. For unconstrained households, enrollment may rise in response to the higher household income level through the direct purchase of more education or the purchase of normal goods that complement education.[23] Previously constrained non-migrant households can get closer to or attain the optimal level of schooling, resulting in increased school enrollment. For constrained migrant households, the effects on enrollment decisions depend on their ability to borrow to pay for migration and education. Consider the case where credit markets are imperfect for both migration and education.[24] While households may want to send a migrant overseas, they are liquidity constrained and do not have the ability to borrow. In response, parents may reallocate household resources to invest in sending a household member abroad. While the household budget could be reallocated in a number of ways, one potential option is that parents might invest in a lower level of education for children in the household. Once the migrant is earning income abroad and the household begins to receive remittances, the liquidity constraint loosens. Children may be reenrolled in school, and the negative effect on enrollment is only temporary. Thus, unconstrained and remittance-receiving non-migrant households should experience an increase in enrollment in response to higher income levels, whereas the effect on constrained migrant households is ambiguous and depends on the reallocation of household investments.

In a standard labor market setting, an increase in migration demand may affect the expected wage (and thus the expected wage premium) in two ways: 1) By changing the expected probability of migrating, $p_{a,s}$, or 2) By changing the expectation

[23]For every migrant, there are four households in the Philippines that receive remittances, suggesting that many non-migrant households benefit from changes in income as well (2006 FIES, 2007 LFS survey, and author's calculations).

[24]Alternatively, if credit markets exist, otherwise constrained households are able to borrow to finance migration and education costs. Thus, children will receive the optimal level of education.

of the overseas wage, $E[w_{a,s}]$.[25] However, due to binding minimum wages (see Section 1.2.1), $p_{a,s}$ will respond to a change in migration demand, while $w_{a,s}$ (and thus $E[w_{a,s}]$) cannot.[26] $p_{a,s}$ affects enrollment in Type 1 and 3 households in the following way: given that a household perceives the change in demand as persistent, they will update the expected probability, $p_{a,s}$, that a child will work overseas in the future for a given level of education, s. Depending on the household's initial expectation of $p_{a,s}$ and whether the change in demand for overseas labor is for high or low skilled workers, the expected wage premium could either increase or decrease.

Interpretation 1: A persistent increase in migration demand affects enrollment through both the income and wage premium channels. A positive effect could be due to increased remittances or an increase in the wage premium. A negative effect could be due to the reallocation of household resources to pay for migration costs or a decrease in the expected wage premium.

1.3.4 Gender-Specific Migration Demand

As discussed above, a change in migration demand may affect enrollment decisions through the income channel, the wage premium channel, or some combination of the two. To determine the relative importance of these two channels, I exploit the fact that occupation and destination patterns differ strongly between male and female migrants, as shown in Section 1.2.1. As a result, there may be separate shocks to migration demand for male and female migrants which has important implications for the theoretical framework outlined thus far. If there is no sex preference in terms of

[25] Because migration is positively skill biased, an increase in migration demand may result in a decrease in the supply of educated labor in the local labor market. As a result, there are fewer educated workers, and the labor supply curve for educated workers shifts back. Wages should rise domestically for educated workers, and the wage premium for a high school education increases.

[26] An increase in migration demand may also change the wage premium through $E[w_{a,s}]$ due to changes in information about wages. Several studies show that individuals underestimate wages overseas (McKenzie, Gibson and Stillman, 2013), though the expectation in the Philippines is on average fairly accurate (Beam, 2013).

the educational investment, male and female school enrollment should respond equivalently to any change in income.[27] However, it is also possible that male and female enrollment might not respond equivalently to a change in income. For instance, if households are constrained after the change in income and have children of different genders, enrollment effects may differ by gender as parents are forced to choose which child to enroll. In terms of the wage premium channel, an increase in demand for migrants in predominantly female occupations should only change the wage premium for females.[28] Thus, female enrollment should respond to increased demand, but male enrollment should not.

Interpretation 2: If male and female enrollments respond equally to gender-specific migration demand, then the income channel is dominant. If enrollment responds differentially, this could be due to the income channel, the wage premium channel, or some combination.

1.3.5 Expectations Formation

Empirical evidence suggests that individuals in the developing world form expectations using social networks, community outcomes, and neighbors' outcomes (Delavande, Gine and McKenzie, 2011). Jensen (2010) examines the labor market returns perceived by 8th grade Dominican youths and finds more than seventy percent of

[27] Cruz and Vicerra (2013) find that Filipino women do not exhibit sex preference for their children.

[28] One concern might be that domestic wages will rise for both male and female skilled workers, which would increase the wage premium for both genders. Using the 2007 Philippine Labor Force Survey (LFS), I calculate that of the top 37 domestic occupations (which represent 75% of all employment), 22 occupations are more than 75% male or female, 26 occupations are more than 70% male or female, and only 4 occupations are between 40% and 60% male or female. Appendix Table A.1 shows these occupations and the percent female. Further, using phil-jobs.net, the job posting website maintained by the Philippine government, of the 1,160 domestic job vacancies posted during the week of September 9th, 2013, over 50% explicitly specified the gender of the applicant. This evidence suggests that, like overseas employment, domestic occupations are highly gender specific, and a change in the supply of skilled female workers should increase wages for females more than for males. Even if higher domestic wages increase the wage premium for both males and females, the increased probability of finding work abroad for females means the female expected wage premium will increase by more.

students report the labor market outcomes of people in their community as their primary source of information on earnings. Thus, I assume individuals form expectations about migration demand based on the outcomes of those they observe in their local labor market, where I define the local labor market as the province.[29]

A number of papers in the U.S. examine how labor market expectations affect the decision to enroll in post-secondary education. Much of the existing literature focuses on either the effect of contemporaneous labor market conditions on college enrollment (Card and Lemieux, 2001; Dillon, 2012; Freeman, 1976)[30] or the effect of ex post earnings on enrollment (Cunha and Heckman, 2007; Willis and Rosen, 1979). A new literature examines the effects of ex ante expected returns to schooling on the school enrollment decision. Attanasio and Kaufmann (2010) find that ex ante subjective expectations matter for secondary schooling decisions for youth in Mexico. Since I do not have data on the perceived ex ante migration rate, I assume that parents form expectations of migration demand based on the observed migration rate, which I define empirically as the migration rate in the previous calendar year.[31] As mentioned above, households will only alter investment in education in response to changes in the expected wage premium if the change in migration demand is perceived as reasonably permanent. In Section 1.6.1, I use a Fourier frequency decomposition to show that changes in migration demand are overwhelmingly low frequency, implying they are both predictable and persistent. As a result, it is reasonable for parents to alter their expectations of the wage premium based on the observed migration rate in the previous year since these labor market conditions likely persist.

[29]One key reason to use the province as the local labor market is because recruitment agencies are granted the authority to recruit at the province level (Philippine Overseas Employment Administration, 2013).

[30]Survey evidence indicates that students form subjective expectations of future earnings based on contemporaneous earnings in the labor market (Dominitz and Manski, 1997; Freeman, 1976; Manski and Wise, 1983).

[31]Because the school year commences in June, the observed annual migration rate used to make enrollment decisions at time t is the migration rate at time $t-1$.

1.4 Data

1.4.1 Migration Data

I construct an original dataset of all new migrant departures from the Philippines between 1992 and 2009. The data are from the Philippine Overseas Employment Administration (POEA) and the Overseas Worker Welfare Administration (OWWA). Both under the Department of Labor and Employment (DOLE) of the Philippine government, these agencies are responsible for overseeing various aspects of the migration process. Specifically, POEA monitors recruitment and regulates the employment program. Prior to deployment, all contract migrants must visit POEA in order to have their contracts approved and receive exit clearance. As a result, POEA maintains a rich database on all new contract hires from the Philippines, encompassing 4.8 million individual-level observations of migrant departures. The database includes the individual's name, date of birth, sex, marital status, occupation, destination country, employer, recruitment agency, salary, contract duration, and date deployed.

OWWA is the agency responsible for the protection and welfare of overseas workers and their families. Upon processing overseas labor contracts at POEA, migrants are required to become members of OWWA.[32] OWWA maintains a membership database of new hires and rehires including information similar to that housed at POEA with approximately 1 million observations per year. However, while the POEA database includes information on the salary, recruitment agency, and occupation to uphold their responsibility to monitor contracts and recruitment, because OWWA is concerned with the welfare of both the migrant and his or her family, home address of the migrant is one of the key variables in the OWWA database.

OWWA membership requirements have changed substantially over the sample period. Since 2001, all contract hires are required to have active OWWA membership,

[32]Membership entitles workers to a number of services such as repatriation or evacuation. OWWA also conducts mandatory Pre-Departure Orientation Seminars as well as Reintegration Seminars.

but prior to 2001 membership was only required for new contract hires, domestic helpers, and seafarers. In order to obtain a sample of only new hires, I match the OWWA data to the data from POEA.[33] This adds home address to the POEA data, creating a unique dataset including both the origin and destination of all new contract migrants from one of the world's largest labor exporters. This paper is the first to make use of this unique data from OWWA.

To calculate province-level migration rates, I total the number of migrant workers in each province-year and divide by the working aged population in the province.[34,35] Because OWWA did not collect home address in all years of the sample, province-level migration rates can only be constructed in 1992, 1993, and 2004-2009. As a result, the sample period of analysis is from 2004-2009. Table 1.3 shows summary statistics. The average provincial-level migration rate is 0.51% and ranges from near zero to 1.59% of the population.[36] I also calculate gender-specific migration rates. Women migrate at a higher rate than men, with an average 0.28% of the female population working as overseas migrants versus 0.22% of the male population.

1.4.2 Education Data

Data on public and private high school enrollment are from the Philippine Department of Education (DepEd). To my knowledge, this paper is the first academic

[33]I match the data using first name, middle name, last name, date of birth, destination country, gender, and year of departure using fuzzy matching techniques as discussed in Winkler (2004). For the years of data used in this analysis, the match rates are approximately 90% for 1992 and 1993 and between 95% and 98% for 2004 to 2009.

[34]I define the working aged population as 18 to 60 since 18 is the minimum age at which one can migrate. The age range 18 to 60 covers 99% of all migration episodes in my sample period. All population data are from the 1990, 1995, 2000, and 2007 Philippine Censuses from the National Statistics Office, and I linearly interpolate values for years between censuses. Overseas contract workers are included in census population counts in the Philippines.

[35]The home address variable from OWWA includes only the municipality of origin, not the province or region. Out of 1630 municipalities, 332 have ambiguous names that are used in more than one province or region. Thus, to calculate the number of migrants in the province, I assign municipalities with repeated names their population share of the total number of migrants across municipalities with the same name.

[36]The 2% rate of migration stated earlier for the Philippines as a whole is based on both new hires and rehires.

research study beyond government reports to make use of these data. Public school data are from the Basic Education Information System (BEIS). Started in 2002, it includes school-level data on enrollment, number of dropouts, retention, number of teachers, number of classrooms, and a variety of other variables. I aggregate school-level data to the province level to calculate province-level public school enrollment.

Private school data are available at the division level. Divisions are a geographic unit smaller than provinces, but larger than municipalities used for the oversight of the education system. I aggregate divisions to calculate province-level private school enrollment.[37] To create province-level enrollment rates, I calculate total provincial secondary enrollment from public and private numbers and divide each enrollment count by the population in the province aged twelve to seventeen. The average province has a total secondary school enrollment rate of approximately 57%. The range is large, with the lowest rate of enrollment at 13% and the highest near 100%. Females are enrolled in secondary school at a higher rate than males, and this is true both for public and private schools. About 46% of the school-aged population is enrolled in public schools, while approximately 11% are enrolled in private schools.

[37]The private school data from 2002 to 2004 are the official figures from DepEd. Unlike public school, private schools are not required to submit enrollment counts to DepEd. Thus, for 2005 to 2010, I adjust division-level enrollment to account for non-submission. I calculate the submission rate by dividing the number of schools that submitted by the total number of private schools in the division. The median submission rate is 1, and the 5th percentile is 0.5, suggesting that compliance is generally high. However, 47% of divisions do not have 100% compliance, suggesting that adjustment is important. To adjust for compliance, I assume that complying and non-complying schools are the same size. I then inflate enrollment by one divided by the submission rate. Further, there are 120 observations (10%) between 2005 and 2010 that are missing or have unavailable compliance rates. For these observations, I replace enrollment with the average enrollment for the years before and after. The results are robust to excluding missing values or non-compliers. Neither official figures nor compliance rates are available for 2011 so I drop it from my analysis.

1.5 Empirical Strategy

The basic specification for identifying the impact of migration demand on school enrollment is as follows:

$$EnrollRate_{pt} = \beta_0 + \beta_1 MigRate_{pt-1} + \alpha_p + \gamma_t + \epsilon_{pt} \tag{1.3}$$

where $EnrollRate_{pt}$ is the secondary school enrollment rate, defined as the percent of students enrolled in high school out of the total number of children aged twelve to seventeen in province p, year t.[38] $MigRate_{pt-1}$ is the province-specific migration rate in year $t-1$, defined as the outflow of new migrants. I define it as the percent of migrants in province p, year $t-1$ out of the total working age population in province p, year $t-1$. Province fixed effects, α_p, remove province-specific effects, and year fixed effects, γ_t, remove time-specific unobservables.[39] ϵ_{pt} is the error term and is clustered by province. There are 80 provinces in the Philippines and 4 districts of Manila, resulting in p equal to 84.

The inclusion of province and year fixed effects resolves some concerns of omitted variables bias. However, a number of threats to the validity of the identification strategy remain. First, province-year specific omitted variables can lead to bias. For instance, if a province had a large factory close in a given year, this could lead to both an increase in the province-specific rate of migration abroad due to limited job opportunities at home and to an increase in the high school enrollment rate as individuals stay in school longer due to a lower opportunity cost. As a result, β_1, the coefficient on $MigRate_{pt-1}$, would be biased upward. In addition to possible omitted variables, reverse causation could also lead to upwardly biased point estimates. Specifically,

[38] The results are robust to other definitions of the school-aged population. I follow the Department of Education's definitions and Maligalig et al. (2010) in my choice. I also examine the enrollment rates by gender and in public and private schools.

[39] I prefer the fixed effects estimator to the first difference estimator since a fixed effects estimator is more likely to identify long-run effects whereas a first difference estimator tends to only estimate short-run effects. See Baker, Benjamin and Stanger (1999) for a thorough and technical discussion.

high enrollment rates in a given province may cause migration rates to increase.[40]

1.5.1 Migration Demand Index

To address these threats to causal identification and isolate changes in migration demand from changes in migration supply, I instrument for the migration rate using a migration demand index. Specifically, I create a Bartik-style instrument (Bartik, 1991; Blanchard and Katz, 1992; Bound and Holzer, 2000; Katz and Murphy, 1992) by exploiting destination country-specific historic migrant networks across provinces. However, rather than predicting employment growth as is standard in this literature, I create an index of the predicted number of migrants in each province-year. To predict the number of migrants, I weight the total number of migrants nationally to 32 distinct destinations by the province share of the national total to that destination in a base period. I then sum over all 32 destinations to predict the total number of migrants in each province-year.[41] Specifically, I define the migration demand index as follows:

$$D_{pt} = \sum_{i} M_{it} \frac{M_{pi0}}{M_{i0}} \tag{1.4}$$

where D_{pt} is the predicted number of migrants in province p, year t, M_{it} is the number of migrants to destination i, year t in the Philippines as a whole, and $\frac{M_{pi0}}{M_{i0}}$ is the share of migrants at baseline in province p, destination i, out of the total number of migrants nationally at baseline in destination i. I define baseline as 1993, but the results are robust to the choice of other base years.[42] By using these baseline shares,

[40] This seems less likely to be a concern given that the migration rate is lagged.

[41] As a robustness check, I also create two analogous indices that exploit occupation-specific historic migration networks and occupation x destination country-specific historic migration networks rather than destination-specific shares. For the occupation-based index, I use 38 occupations categories, and for the destination x occupation-based index, I use 32 destination cells times 38 occupation cells. The results are robust to the choice of index, and the main results are shown in Appendix Table A.2.

[42] The results are robust to using 1992 or an average of 1992, 1993, and 1994 as the base year instead. I use 1993 as the base year for the majority of my analyses for two reasons: 1) 1993 has the fewest missing values for municipality and thus provides the most accurate counts of migrants at the province level and 2) One large occupation, caregivers, only commenced as a migration opportunity

I am implicitly assuming that the distribution of migrants to a given destination is stable across the Philippines over time, or at least a reasonable predictor of future distributions of migrants (Munshi, 2003; Woodruff and Zenteno, 2007). If this is not the case, the instrument will be a poor predictor of the province-specific migration rate. I then divide the index by the working population in the base year in order to obtain a predicted migration rate.

Panel B of Table 1.3 shows summary statistics for the Bartik-style instrument. The constructed total migration demand index exhibits similar patterns as the actual migration rate. The main difference between the actual rate and the demand index is the maximum values. The Bartik-style instrument has a much larger maximum value. This is because at baseline (1993) the four districts of metro Manila composed a much larger share of total migration than in later periods, since migration has spread more evenly across the Philippines over time.

I then estimate Equation (3) using the migration demand index to instrument for the actual province-level migration rate.[43] This is an improvement on the OLS fixed effects estimation strategy for a number of reasons. First, it isolates the effects of changes in migration demand, rather than confounding changes in demand with changes in supply. Returning to the example of the factory closure, now if a factory closes in province p, year t, it will not affect the predicted migration rate as long as the factory closure does not affect the total demand for overseas migrants. I argue in Section 1.5.2 that demand is determined by destination countries. Thus, while this factory closure may result in a shift in the allocation of migrants across provinces,

in 1993. Thus, to accurately assign networks, I use the base year once it was established as a common occupation.

[43]In a previous version of this paper, I also instrumented for the actual migration rate with a weighted measure of destination country GDP and destination country sectoral GDP, where the weights are based on the province-specific destination shares at baseline. However, my preferred specification includes province-specific linear time trends, and when these are included, the weighted GDP instrument is weak. Results are robust without the province-specific linear time trends and are available upon request.

it will not affect total overseas migration.[44] Further, it seems highly unlikely that a factory closure today affects shares at baseline. The index alleviates concerns from any province-year specific omitted variables since they no longer affect the constructed migration rate. It should be noted that this approach differs substantially from the use of the historic migration rate as an instrument for current migration (see McKenzie and Rapoport (2010); Woodruff and Zenteno (2007), among others). These studies use cross sectional data, which leads to concern about the endogeneity of the historic migration rate. Due to the panel nature of my data and the inclusion of province fixed effects, province-specific omitted variables at baseline are not a relevant concern in this paper for reasons I discuss below. Finally, reverse causation is also no longer a concern unless the high school enrollment rate in a province drives destination country demand at the national level. Given that migrants are spread across the Philippines and that demand is from outside the country, this seems doubtful.

1.5.2 Identifying Assumptions

For this analysis to provide a causal estimate of the effect of migration demand on secondary school enrollment, a number of identifying assumptions must hold.[45] First, to satisfy the relevance condition, there must be variation in the province-specific destination shares at baseline. If, for instance, each province sends an equal share of migrants to Saudi Arabia in the base period, then the instrument would explain little of the variation in province-level migration rates. In Appendix Table A.3, I show the quartiles, standard deviation, minimum and maximum of the base shares for each of the 32 destination countries. There is substantial variation in the size of the shares

[44] This potential shift in the allocation of migrants across provinces is one reason why simple OLS may be biased despite the fact that migration demand is determined outside the Philippines.

[45] Blanchard and Katz (1992) discuss two identifying assumptions for the standard Bartik-style instrument. Goldsmith-Pinkham, Sorkin and Swift (2013) formalize their assumptions and assert that two additional assumptions must hold in the standard case for the instrument to be valid. Since the construction of my instrument is slightly different, the identifying assumptions are modified accordingly.

that each province comprises of total migration to a given destination country, thus satisfying this condition.

The second assumption, which is necessary for the exogeneity of the instrument, states that the number of migrants departing from the Philippines annually is determined by host country demand. I argue that there is a large potential supply of Filipinos who want to migrate, and the number hired is determined by demand from overseas employers. McKenzie, Theoharides and Yang (2014) suggest, based on evidence from 2010 Gallup World Poll, that there may be as many as 26 million Filipinos who would like to migrate if given the opportunity, compared to only 2 million who currently work abroad each year. Further, they report from qualitative interviews with recruiting agencies that there is an excess supply of Filipinos who want to work abroad and that the overseas contract labor market is a buyer's market.

If demand is determined outside the Philippines, then the actual number of migrants in each year should not be influenced by economic conditions in the Philippines, but rather by the economic conditions in the destination countries. McKenzie, Theoharides and Yang (2014) show that there is a causal link between migrant numbers and GDP shocks in the destination country. To further show that economic conditions in the Philippines do not influence the number of migrants, I regress the log number of migrants in each of the 32 destination countries on log Philippine GDP, controlling for log GDP in the top ten destinations for Filipinos. If economic conditions in the Philippines do not affect the number of overseas workers, then Philippine GDP should not have an effect on migrant outflows. Appendix Table A.4 shows the results of this analysis. Out of the 32 destinations, Philippine GDP only has a statistically significant effect in 2 cases, roughly what would be expected due to chance. While the coefficients are not precisely estimated zeros, they are smaller and less precisely estimated than the point estimates on log GDP in the top ten destinations.

The final identifying assumption is that baseline shares are not correlated with

trends in variables related to the outcome variable.[46] One way to test the validity of this exogeneity assumption is to compare provinces with low destination-specific baseline migration rates to those with high rates and compare their trends in variables related to education. If, for example, provinces with high baseline rates have higher growth in enrollment than provinces with low baseline rates, I would incorrectly estimate that an increase in demand has a positive effect on enrollment, when in actuality the increase in enrollment was at least partly due to differing trends due, presumably, to other factors.[47]

Ideally I would compare trends in education outcomes prior to the start of the overseas migration program in areas that have high or low destination-specific migration rates at baseline. However, the overseas migration program for the Philippines commenced in 1974, long before data on education outcomes in the Philippines were available. In Figure 1.4, I plot the migration outflows for the 9 destinations with the highest variation over the sample period. It seems demand for at least some of the occupations remained relatively flat between 1993 and 2000. This suggests that the importance of shocks to migration demand was much larger during the later years of the sample. Thus, in provinces with high and low destination-specific migration rates, I examine trends in the high school enrollment rate in the period from 1993 to 2000.[48]

In Figure 1.5, I plot the average province-level high school enrollment rates for high and low migration provinces for each of the 9 destinations with the highest variation in migrant counts.[49] This allows for a visual evaluation of the parallel trends assumption: in the absence of the change in migration demand, enrollment should

[46]Because I am using panel data, province fixed effects absorb differences in the levels of any such omitted variables.

[47]This is conceptually similar to testing for pre-trends in a difference-in-differences methodology.

[48]I use destination-specific rates of migration at baseline to measure the level of treatment. The baseline shares used in the construction of the index do not take into account the population of the province, thus they are not measuring the density of migration experienced by the province.

[49]Since DepEd did not release enrollment data prior to 2002, I use the NSO's quarterly Labor Force Survey to calculate province-level high school enrollment rates.

have remained parallel. In the pre-period, the trends in enrollment appear quite parallel. This suggests, for example, that recruiters did not choose to locate in areas where education was increasing at a higher rate. In the post period, enrollment in the low migration provinces appears to be catching up, perhaps due to poverty reduction policies or policies geared at increasing educational attainment specifically.[50] While this is concerning for the parallel trends assumption, it will lead to downward bias of the estimates of the effect of migration demand on enrollment. Since I hypothesize that migration demand increases enrollment, increases in education for low migration areas compared to high migration areas will bias the estimates against finding an effect from increased migration demand.

To more rigorously examine if there are differential trends in enrollment, I estimate the following equation separately for each destination country in the pre period, post period, and full sample:

$$\Delta EnrollRate_{pt} = \beta_0 + \beta_1 MigRate_{p0} + \gamma_t + \epsilon_{pt} \tag{1.5}$$

where $\Delta EnrollRate_{pt}$ is the percent change in the province-level high school enrollment rate from time $t-1$ to time t, $MigRate_{p0}$ is the province migration rate at baseline, γ_t are year fixed effects, and ϵ_{pt} is the error term. t is equal to 1993 to 2000 for the pre period and 2006 to 2011 for the post period. A non-zero value for β_1 would lead to concern that the enrollment rate is trending differentially for different levels of the migration rate. Appendix Table A.5 shows the results. While the point estimates are not precise, there is substantial variation in the magnitudes of the coefficients. However, many of the destinations with large point estimates are small and account for little of the variation in migrant demand over the sample period. I highlight the 9 highest variation destination countries in grey. Other than Lebanon and Singapore, the coefficients in the pre-period for these highest variance

[50] Total high school enrollment data are not available from the LFS in 2001 to 2005.

destinations are close to zero. Given that most of the identifying variation will come from changes in demand in these destinations, this reduces concerns about differential trending driving the results. The inclusion of province-specific linear time trends in all preferred specifications further alleviates this concern.

1.5.3 Gender-Specific Demand Indices

In order to identify the mechanism through which migration affects human capital, I examine the enrollment response to gender-specific demand for migrants as discussed in Section 1.3.4. Estimating equation (3) with the province-level gender-specific migration rate as the key explanatory variable will suffer from the same threats to identification as outlined for the overall migration rate. Thus, I create gender-specific Bartik-style instruments:

$$D_{gpt} = \sum_{i} M_{git} \frac{M_{gpi0}}{M_{gi0}} \tag{1.6}$$

where D_{gpt} is the predicted number of migrants of gender g in province p, year t, M_{git} is the number of migrants of gender g to destination i, year t in the Philippines as a whole, and $\frac{M_{gpi0}}{M_{gi0}}$ is the share of migrants at baseline of gender g in province p, destination i, out of the total number of migrants nationally at baseline of gender g to destination i. While occupations are highly gendered in the Philippines as shown in Section 1.2.1, the creation of this index does not assume that the gender composition is stable over time. Rather, it simply assumes that, given a certain number of female migrants hired for a certain destination, the share coming from each province is relatively stable over time. The identifying assumptions are the same as discussed in Section 1.5.2.

1.6 Results

1.6.1 Identifying Variation

One critique of Bartik-style instruments is that the source of underlying variation is often unclear (Goldsmith-Pinkham, Sorkin and Swift, 2013). To address this, in Figure 1.4 I start by plotting total migration over time in each of the 9 destinations with the highest variances over the sample period in order to explicitly explore the identifying variation.[51] Migrant outflows change substantially over the sample period. Despite fluctuations in certain destination-years, in general these plots of destination-specific migration demand suggest that migration demand increased over time and that the variation in most destinations is fairly low frequency.

To formally test whether the variation in migrant demand is high or low frequency, I filter the migration demand index into high and low frequency components following Baker, Benjamin and Stanger (1999) and Bound and Turner (2006). Low frequency variation suggests that changes in migration demand are persistent over time, whereas high frequency variation would imply that changes in migration demand are quite transitory. If demand is high frequency, it seems unlikely that individuals will change their expectations of the wage premium in response to changes in migration demand. If demand is instead low frequency, such labor market conditions are likely to persist and thus may cause individuals to revise expectations of the wage premium. First, I employ a basic decomposition following Baker, Benjamin and Stanger (1999), which filters the migration demand index into a high frequency component and a low frequency component:

$$D_{pt} = \frac{1}{2}(D_{pt} - D_{pt-1}) + \frac{1}{2}(D_{pt} + D_{pt-1}) \tag{1.7}$$

[51] Incidentally, these are also 7 of the top 10 largest destinations. Figures for all 32 destinations are available upon request.

The first component, $\frac{1}{2}(D_{pt} - D_{pt-1})$, is the first difference and encompasses high frequency changes in the migration demand index. The second component, $\frac{1}{2}(D_{pt} + D_{pt-1})$ or the moving average, represents low frequency changes in the index. Because I have data on the national number of migrants by destination in all years of the sample period, the migration demand index can be constructed from 1993 to 2009. Thus, I conduct the decomposition over the entire sample period.[52] Eighty-two percent of the variance in the migration demand index is explained by the low frequency component, and when province-specific linear time trends are included, 88% of the variance is explained by the low frequency component. This suggests that long-run, persistent changes in migration demand will drive the results.

I next use a Fourier decomposition following Baker, Benjamin and Stanger (1999) and Bound and Turner (2006) to divide the migration rate into orthogonal components at varying frequencies, which more precisely determines the nature of the variation. Using seventeen years of data from 1993 to 2009, I split the migration demand index into nine orthogonal components of different frequencies using:

$$D_{pt} = \sum_{k=0}^{8} \left(\xi_k cos \left(2\pi \frac{k(t-1)}{17} \right) \right) + \left(\gamma_k sin \left(2\pi \frac{k(t-1)}{17} \right) \right) \tag{1.8}$$

To estimate ξ_k and γ_k, I follow Bound and Turner (2006) and run separate regressions for each province (84 regressions in total). I then use these parameter estimates of ξ_k and γ_k to calculate the nine Fourier components for each province-year. Each component is simply the term under the summation for k equals 0 to 8. Over 87% of the variance in the migration demand index is explained by the two lowest frequency components regardless of the inclusion of province-specific linear time trends. The results of both the basic and Fourier decompositions indicate that changes in province-specific migration demand are overwhelmingly low frequency and thus are

[52] While the IV results cannot be estimated over this sample period, the reduced form and IV results are qualitatively similar. Further, it seems reasonable that households will make educational investment decisions based on long-run variation from before my main sample period.

stable and predictable. As a result, when individuals in the Philippines observe an increase in demand for migrants, it is reasonable for them to infer that such a change is permanent and to change their expectations about future labor market opportunities in response.

To further explore the determinants of demand, I uncover a number of institutional factors that drive the identifying variation for the 9 highest variance destinations shown in Figure 1.4. Panel A shows total migration to Saudi Arabia from 1992 to 2009. During the early part of the sample period, migration fell due to the Gulf War (United Nations, 2006). From 2003 onward, migration to Saudi Arabia grew substantially as oil prices increased, and the hire of engineers, building caretakers, domestic helpers, laborers, and medical workers increased substantially. The dip at the end of the sample is due to a change in the minimum wage for domestic helpers imposed by the Philippines in 2007 (McKenzie, Theoharides and Yang, 2014). With a minimum wage that was double the previous rate ($400 per month from $200 per month), the number of domestic helpers fell from 12,550 in 2006 to 3,870 in 2007, though the hire of domestic helpers recovered by 2009.

Migrants to Japan are almost exclusively employed as Overseas Performing Artists (OPAs). In Panel B, the large drop in the number of migrants to Japan in 2005 is due to barriers imposed on migration of OPAs in response to pressure from the United States (Theoharides, 2014*a*). The dip in deployment of migrants to Japan between 1994 and 1995 was due to more stringent requirements for OPAs imposed by the Philippine Labor Secretary in response to exploitation of Filipinas (Philippine General Rule 120095, 1996).

Panels C, D, and F show steady increases in the number of Filipino migrants to the Middle East from 2003 onward. This coincides with the rise in oil prices, and the number of migrants employed as building caretakers, cooks, domestic helpers, engineers, plumbers, salesmen, and other service workers increases substantially in

these destinations during this period. Similar to Saudi Arabia, the dip in the number of migrants in 2007 is due to the increase in minimum wage for domestic helpers.

In Taiwan (Panel E), about 50% of migrants work in the production sector, which is largely composed of factory workers. Growth in the hire of these workers over the sample period was substantial due to growth in cell phones, computers, and other electronics during the 1990s, and this growth remained steady through the 2000s. The other major occupations migrating to Taiwan are caregivers and domestic helpers, though this declined substantially in 2006 for caregivers and in 1997 for domestic helpers, likely due to the increased hire of these migrants from Indonesia. The large drop in the number of workers to Taiwan in 2000 was due to a hiring ban on Filipino workers imposed by Taiwan in June, 2000 due to deteriorating relations between Taiwan and the Philippines (Migration News, 2000).

Almost all migrants to Hong Kong (Panel G) are employed as domestic helpers. While there are fluctuations in demand for these workers over the sample period, the general trajectory is upward. Indeed, the number of domestic helpers increased from about 13,500 in 1992 to 25,000 in 2009. Migrants to Lebanon (Panel I) are also almost exclusively domestic helpers. The hire of domestic helpers grew substantially starting in 1998 and by 2005, over 11,000 domestic helpers were employed. However, in 2007, the Philippines imposed a two year ban on the deployment of Filipinos due to fighting between Israel and Hezbollah (GMA News, 2011). Finally, migration to Singapore (Panel H) is mainly for domestic helpers, engineers, and medical workers. The growth at the end of the sample period was due to a doubling of the hire of medical workers between 2007 and 2008.

To summarize, the majority of the variation in the migration demand index is relatively low frequency, indicating that changes in migration demand are persistent. Policy changes by destination countries and the Philippines, the price of oil, and growth in the electronics field seem to be the drivers behind changes in the number

of Filipinos migrating abroad each year overall as well as to specific destinations.

1.6.2 The Effect of Migration Demand on Enrollment

In Table 1.4, Panel A, Column 1, I report the first stage results of the effect of the total migration demand index on the total migration rate. The index has a positive and statistically significant relationship with the endogenous variable, but the F-statistic is less than 10, indicating that weak instruments are an issue (Stock and Yogo, 2002).[53] In column 2, I add province-specific linear time trends to alleviate concerns about differential trending in omitted variables across provinces at baseline as outlined in Section 1.5.2. The F-statistic increases to greater than 10, and the relationship between the endogenous variable and the instrument is larger in magnitude. In Column 3, my preferred specification, I weight by the population in order to obtain nationally representative results. The first stage results are much stronger with an F-statistic of 46. Finally, in Column 4, I test if the highest migration province, the second district of Manila, is driving the results. The first stage results appear robust. Therefore, I proceed with Column 3 as my preferred specification, though I show the robustness of the results to other specifications throughout.

Table 1.5, Panel A shows that total migration demand is positively related to secondary school enrollment decisions. To interpret the point estimate in Panel A, Column 3, my preferred specification, for a 1-percentage point increase in total migration demand, school enrollment increases by 10.3 percentage points. However, it is important to note that, given average migration rates of 0.51% of the total province working population, a 1-percentage point increase in the province-level migration rate is unrealistic. Instead, I calculate the average year-to-year percentage point change in migration demand over my sample period to be 0.12 percentage points. For an average change in migration demand of 0.12 percentage points, enrollment increases

[53]When using robust standard errors, the Cragg-Donald Wald statistic is not valid. Instead, I report the Kleibergen-Paap statistic (Kleibergen and Paap, 2006).

by 10.3*0.12=1.2 percentage points. This results in a 2.1% increase in enrollment, off a sample mean of 56.8% enrolled. The results without the population weights (Column 2) are qualitatively similar, but larger in magnitude. This indicates that the enrollment response to education is different across small and large provinces in the Philippines. Namely provinces with smaller populations have a larger education response to migration. In Column 4, I drop the second district of Manila. The results are robust to this change in sample. The effects on female and male enrollment Panels B and C are qualitatively similar to the overall results. Male and female enrollment increase by 2.0% and 2.2% respectively, and I cannot reject that the coefficients are the same.

In addition to the effect of migration demand on total secondary school enrollment, another key consideration is whether households choose to send their children to public or private school. One of the major motivations for international migration from the Philippines is the desire to enroll children in private school (Asis, 2013). As income increases, parents may now choose to switch to a type of schooling that they perceive as higher quality. The effect of the expected wage premium on public and private enrollments remains an empirical question, and I will test the channels affecting school choice below using gender-specific migration demand. In Table 1.6, I examine the response of public and private secondary school enrollment to changes in total migration demand. The effects on public school enrollment are small and imprecisely estimated. However, they suggest that increases in migration demand lead to slightly greater public school enrollment. Private school enrollment, on the other hand, increases statistically significantly in response to migration demand. Looking at Panel B, Column 3, an average year-to-year increase of 0.12 percentage points yields a 10.1% increase in private secondary school enrollment off a sample mean of 11.4%. If I assume that most individuals who enroll in private school in response to an increase in migration demand were previously enrolled in public school, these

results suggest that for every student switching to private school, there is another previously unenrolled child who enrolls in public school.

1.6.3 Mechanisms

The results thus far provide evidence that total and private secondary school enrollment increase in response to increases in total migration demand, while there is suggestive evidence of slight increases in public school enrollment. In order to determine the mechanisms through which these effects may occur, I examine the effect of gender-specific migration demand on school enrollment. As discussed in Section 1.3.4, if the effects on male and female enrollment are equal in response to an increase in, for instance, female migration demand, the income channel is dominant. If the effects are not equal, either income, the wage premium, or some combination of the two could be the dominant channel. Panels B and C in Table 1.4 show the first stage results for the male- and female-specific migration demand indices. Both indices have a positive and statistically significant relationship with the gender-specific migration rates. However, the male migration demand index has an F-statistic below the critical value of 10, and thus weak instruments are a problem. The higher standard errors in the male regressions compared to the female regressions suggest that there is less variation in the male migration rate over the sample period. As a result of the weak first stage for male migration, I focus the gender-specific analysis on the effect of female migration demand.

While the same identifying assumptions must hold for the gender-specific demand indices as for the total migration demand index, by splitting demand by gender, I introduce the potential for an additional omitted variable. Consider the effect of female migration demand. If the provinces that are more affected by changes in the national number of female migrants (ie., higher base share provinces) also experience an increase in the male migration rate, and male migration also has an effect on

school enrollment, then the results will be biased. To test for this, I first examine the relationship between the male migration rate and the female demand index as well as the relationship between the female migration rate and the male demand index by regressing the gender-specific migration demand index on the migration rate for the opposite gender. A positive relationship would suggest that the effect of gender-specific migration demand on enrollment may be biased upward. The results are shown in Columns 1 and 2 of Appendix Table A.6. For the female demand index, the male migration rate appears to have little effect. As such, omitted variables bias due to the male migration rate is likely not a concern.[54] I also control for the male migration rate in the regressions that follow.

Table 1.7 reports the effect of female migration demand on total, female, and male enrollment. Looking at my preferred specification in Panel A, Column 3, a change in female migration demand has a positive but statistically imprecise effect on total secondary school enrollment. In Column 5, I add a control for the male migration rate, and the results are robust to the addition of this control. Turning to Panel B, Column 3, female migration demand has a positive and significant effect on female secondary school enrollment. Specifically, an average year-to-year percentage point increase in female migration demand of 0.05 percentage points leads to a 7.3*0.05=0.36 percentage point increase in female secondary school enrollment. This is a 0.6% increase in enrollment off a sample mean of 60.0%. In Panel C, Column 3, the effects of female migration demand on male enrollment are smaller than the effects on female enrollment, though I cannot reject that they are the same. If I examine the estimates without population weights shown in Column 2, the coefficients on male and female enrollment are quite similar. This leads me to conclude that changes

[54]On the other hand, the female migration rate and the male demand index have an inverse and statistically significant relationship. Thus, if female migration has a positive effect on school enrollment, estimates of the effect of the male migration demand index on enrollment will be biased downward. Thus, in addition to concerns about the weak first stage for men, I proceed in my analysis using the female migration demand index due to concerns about omitted variables bias with the male index.

in income, rather than changes in the expected wage premium, are the dominant channel through which migration affects school enrollment. The slight differences in point estimates suggest that the expected wage premium may matter as well. The differential effects could be due to either changes in the female-specific wage premium or households preferring to invest in girls' education when income increases. Because the coefficient on male enrollment is non-zero, this indicates that the entire effect could not be from the wage premium, and enrollment changes at least partially in response to the income channel.

In Table 1.8, I examine the response of public and private enrollment to a change in female migration demand. Comparing Column 1 to Column 2 in Panel A, the public school enrollment results are not particularly robust to the population weights. This suggests that while lower population provinces in the Philippines respond positively to increases in female migration demand in terms of public school enrollment, this is not true in Manila or other high population areas. This may be indicative of lower income levels of migrant households outside Manila, such that the marginal student is induced into public school, whereas in Manila a higher initial portion of children in migrant households are enrolled. In Panel B, Column 2, private school enrollment increases by 2.5% in response to an average year-to-year change. The results are of a similar magnitude when both unweighted and weighted. The estimates without weights on both public and private school enrollment are nearly identical for men and women and slightly larger for women than for men when weights are included, though I cannot reject that they are the same. This again suggests that the dominant channel through which migration affects secondary school enrollment is through an income channel, rather than through changes in the expected wage premium.

1.6.4 Effect of Migration Demand on Enrollment by Grade

Secondary school enrollment increases in response to increased migration demand, primarily due to changes in income rather than changes in the wage premium. However, given that the enrollment choice is sequential, aggregate enrollment results may miss potentially interesting dynamics regarding the marginal student affected by changes in migration demand. To examine these dynamics, I look at the effect of both total and female migration demand on grade-level enrollment rates for each grade of high school. The results are shown in Table 1.9.

Panel A shows the effects of total migration demand by grade level. An increase in migration demand causes an increase in enrollment across all grades, indicating marginal students are induced into enrollment at all grade levels. However, first year enrollment increases by more than fourth year enrollment (3.2% compared to 2.4%), likely due to the bunching of dropouts prior to the first year of high school. This could be a result of limited benefits to partial completion of high school or because this is when compulsory schooling concludes, among other reasons. Thus, while there are marginal students in all grades, this suggests a large number of students never enroll in high school either because of liquidity constraints or the returns on the education investment are too low.

Panel B shows the enrollment response to female migration demand. The effects are positive and quite similar across grade levels, though imprecisely estimated. Turning to Panels C and D, while there are equivalent effects on male and female aggregate enrollment in response to a change in female migration demand, I find substantial heterogeneity when comparing the male and female enrollment responses. Specifically, for year one, I can reject that female migration demand has equal effects on male and female enrollment, while in later years I cannot reject that the effects are the same, though the male point estimates are consistently smaller than the female estimates. This differential response to gender-specific demand in the first year

suggests that while the aggregate results imply that income is the dominant channel, first year enrollment may respond to some combination of both channels.

1.6.5 Interpreting Effect Sizes

The results suggest that an average year-to-year increase in total migration demand leads to a 2.1% increase in total secondary school enrollment. Given that the average province sends 2,550 migrants and has 79,081 students enrolled in secondary school, my main point estimate Table 1.5, Panel A, Column 3) suggests that a 1 percentage point increase in migration demand off a mean migration rate of 0.51% would lead to a 196% increase in migration. Thus, given that the average province sends 2,550 migrants, this results in 4,998 new migrants. A 10.3 percentage point increase in total secondary school enrollment off a sample mean of 57.21% enrolled is an 18% increase in enrollment. This results in 14,234 new students enrolled for every 4,498 new migrants. Every additional migrant causes 2.8 more children to enroll in secondary school.

How does this effect size compare to previous estimates? Yang (2008) estimates the effect of differences in exchange rate shocks faced by Filipino migrant households in light of the Asian financial crisis on school enrollment. A 10% improvement in the exchange rate experienced by migrant households leads to a 6% increase in remittances and a 1% increase in total school enrollment. A 6% increase in remittances is 2,160 pesos in Yang's sample. Thus, for every 216,000 additional pesos remitted, one additional child will be enrolled in school. Using data from the 2006 Family Income and Expenditure Survey, I determine that the average remittance receiving household receives 76,273 pesos of remittances each year. Further, for every one migrant in a province, four households receive remittances. Thus, a rough back-of-the-envelope calculation suggests that each additional migrant results in 305,092 pesos of remit-

tances.[55] So, by Yang's estimate, each additional migrant in my sample should cause 1.4 additional children to be enrolled in school.[56]

It is important to note that Yang's paper examines the effects of an increase in remittances on households that already have a migrant abroad (and thus are likely already receiving remittances). For households sending a new migrant abroad, the increase in income and the relaxation of the liquidity constraint from the initial receipt of remittances is likely more pronounced than for households that have received remittances for some time. Further, Yang only estimates the effect of remittances on migrant households, thus missing spillovers to non-migrant households. While it is not possible to determine if the difference in estimates is due to a larger effect from first time migrants or from spillovers, my results suggest that spillovers matter.

Turning to a similar calculation for private school enrollment, there are 17,465 students enrolled in private school in the average province. Following the same calculations as above, this suggests that for each additional migrant, 2.9 additional students enroll in private school. I turn to Clemens and Tiongson (2013) to contextualize these results. Using a regression discontinuity design, they compare the households of individuals just above and below the cutoff on a Korea proficiency exam required for migration to Korea. They find that for each additional migrant, there are 0.41 more children enrolled in private school. To compare this to my results, it is important to remember that this estimate assumes that there are no effects of migration on

[55] Recall that the sum of direct and indirect education costs is approximately 50,000 pesos.

[56] One important consideration is that I only estimate the effect of new hire migration on secondary school enrollment. If rehires are positively correlated with both new hire migration and secondary school enrollment, I will overstate the results. McKenzie, Theoharides and Yang (2014) find that a 1% increase in GDP leads to a 2.6% increase in new hires and a 1.9% increase in rehires. Based on their respective sample means, a 1% increase in GDP results in 121 new hires and 148 rehires. Thus, for every 1 additional new hire as a result of a change in GDP, there are approximately 1.2 additional rehires. I hesitate to simply split my effect size linearly as there are likely heterogeneous effects on education depending on if a migrant is a new hire or rehire. For instance, liquidity constrained households may find the liquidity constraint loosened enough to increase education in response to new migration, and thus when the migrant is rehired, there is no enrollment response. Unfortunately, I cannot test this empirically, but it is an important consideration when interpreting the magnitude of the results.

non-migrant households. Given the fact that each migrant on average sends remittances to four households, if the effects of a given peso of remittances are equal across migrant and non-migrant households, then each migrant would induce 4*0.41=1.64 additional students to enroll in school. The difference of 1.3 students between my estimate and Clemens and Tiongson's estimate is likely due to two factors. First, these estimates again miss potential spillovers to non-remittance receiving households. Second, Clemens and Tiongson acknowledge that their sample is not representative of the Philippines as a whole. Their sample is both richer and better educated than the overall population. Thus, both migrant and non-migrant households in my sample are likely more responsive to the loosening of liquidity constraints than households in their sample.

While my results are large, they are comparable with results found in these previous studies in the Philippines, especially given the differences in sample and research design. These comparisons emphasize the importance of spillovers to non-migrant households from migration.

1.7 Analysis of Japanese Policy Change for Overseas Performing Artists

I next use a natural experiment to provide evidence that complements my main results. In 2005, Japan dramatically reduced the hire of overseas performing artists (OPAs) in response to allegations of human trafficking from the United States. This led to the closure of a major migration channel for Filipino women, resulting in a fall in annual OPA migration from 71,108 to 6,696 between 2004 and 2006. This drop can be observed in Figure 1.4, Panel B. This exogenous change in demand provides an opportunity to conduct a complementary analysis of the results found in Section 1.6, since this policy change caused a sudden decrease in demand for exclusively female

migrants that is likely perceived as permanent.

To test the effect of this sudden reduction in overseas migration, I conduct a difference-in-differences analysis with a continuous treatment variable.[57] Treatment is defined as the share of OPAs out of the population in the base year (1993) and expressed as a percentage. I estimate the following equation:

$$EnrollRate_{pt} = \beta_0 + \beta_1 Post + \beta_2 Post * ShareOPA_{p0} + \alpha_p + \gamma_t + \epsilon_{pt} \tag{1.9}$$

where $ShareOPA_{p0}$ is the number of OPAs in province p at time 0 divided by the total population in the base period. There are 77 provinces used in the analysis. β_2 estimates the effect of the OPA ban on the province-level high school enrollment rate. For the identification to be valid, in the absence of the policy change the high school enrollment rate in high and low OPA share provinces must be moving in parallel during this period. Figure 1.6 plots the public high school enrollment rate for the highest and lowest quartiles of the OPA shares.[58] The trends in the pre-period appear to be parallel.[59]

The results of this analysis are shown in Table 1.10. Though imprecisely estimated, there is a negative effect of the policy on total enrollment. The total effect is driven by a statistically significant decrease in public school enrollment in response to the reduction in demand. Specifically, when moving from the 25th percentile of the OPA share to the 75th percentile, this leads to a 0.8% decline in the total public school enrollment rate. Recall from Table 1.8 that if we assume the increase in private school

[57] In another paper (Theoharides, 2013), I exploit this policy change with a similar methodology to investigate the effects of migration barriers on international migrant flows, domestic labor market outcomes, and overall welfare.

[58] I show public school trends since this is where I find effects.

[59] Appendix Table A.7 checks that the enrollment rate is not decreasing at a faster rate in the pre-period in higher OPA share provinces. The OPA share does not have a statistically significant effect on the change in the enrollment rate in the pre period for either total or male public school enrollment. While the effect is statistically significant for females, it is much smaller than the effect found as a result of the policy.

enrollment is due to switching from public to private, then there is also a similarly sized increase in public school enrollment in response to increases in female migration demand. OPA migrants tend to be from the poorest migrant-sending households in the Philippines (Theoharides, 2014*a*). This suggests that they are more likely to be initially constrained in their schooling choice and thus switch from no enrollment to public school as opposed to from public to private. The responses to this seemingly permanent decline in demand for female migrants are similar for male and female enrollment. This corroborates that the income channel is the dominant mechanism through which migration affects human capital in the Philippines.

1.8 Conclusion

As international migration continues to gain prominence as a labor market outcome, understanding the impacts of migration on migrant-sending economies can have important implications for development. One way in which migration can affect the home economy is by altering the human capital stock. In this paper, I estimate the effect of migration on secondary school enrollment in the Philippines. I conduct my analysis at the province level in order to account for spillover effects from migration on non-migrant households. To do this, I use two large administrative datasets to create an original dataset of all new migrant departures from the Philippines linked to the migrant's province of origin and calculate province-level migration rates. Simply estimating the effect of the province-level migration rate on secondary school enrollment is likely to suffer from a number of biases and confound changes in migrant demand with changes in migrant supply. To isolate exogenous changes in demand for migrants, I create an instrument following Bartik (1991) that exploits variation generated by shocks to destination-specific migrant networks across local labor markets in the Philippines. As a result of these networks, provinces will vary in the degree to which they are affected by changes in demand for migrants from certain destination

countries.

I conclude that an average sized increase in migration demand leads to an overall increase in high school enrollment of 2.1%. Effects are larger for private school: in response to an average-sized increase in female migration demand, private school enrollment increases by 10.1%. Effects on public school enrollment are small and imprecise. Assuming most children who enroll in private school in response to increased migration demand were previously enrolled in public school, this suggests an equal number of children switch from no schooling to public school. While my results are larger than previous estimates of the effect of migration on human capital in the Philippines, they underscore the importance of spillovers from migration to non-migrant households. As policy makers in migrant-sending countries seek to understand the human capital stock in the domestic economy, omitting non-migrant households will lead to an underestimate of the true level.

The previous literature suggests that migration may affect investment in human capital through two key channels: the income channel and the expected wage premium channel. I empirically test predictions laid out in a basic theoretical framework in order to examine the relative importance of these two channels. Specifically, I test the response of male and female enrollment to changes in female migration demand. If the effects on male and female enrollment are equal, this suggests the income channel is dominant, whereas if the effects are different, the channel is ambiguous. I find that while the effects on female enrollment are slightly larger, they are not statistically distinguishable from the effects on male enrollment. Thus, I conclude that changes in income due to the receipt of remittances is the dominant channel through which migration affects education. For policymakers, this suggests that there are a large number of students who would enter school if liquidity constraints were loosened.

I also examine heterogeneity in enrollment responses by grade level. While enrollment increases for all grade levels, the largest response is on year one of secondary

school enrollment. This indicates that there are a substantial number of marginal students who never even enter high school due to the income and liquidity constraints in their households. The effects on female first year enrollment in response to female migration demand are larger than the effects on male enrollment. Thus, while the aggregate specifications and the natural experiment lead to the conclusion that the income channel dominates, the effects on first year enrollment suggest that a combination of the two channels may matter.

While it appears that the stock of human capital increases as a result of migration, one concern is that these students may eventually migrate away from the Philippines, leading to brain drain. Recall that for each new migrant, there are 2.8 additional children enrolled in school. For all of these additional students to acquire work abroad, demand for Filipino migrants would need to increase by unprecedented proportions. This implies that migration causes a substantial increase in the stock of high school educated labor in the Philippines. Such increases, however, have important policy implications and highlight the vulnerability of education levels in the Philippines to changes in migration demand. As a result, policymakers in the Philippines and other migrant-sending countries may want to devote some portion of their limited resources to provide a social safety net that helps smooth educational investment in times of reduced migration demand.

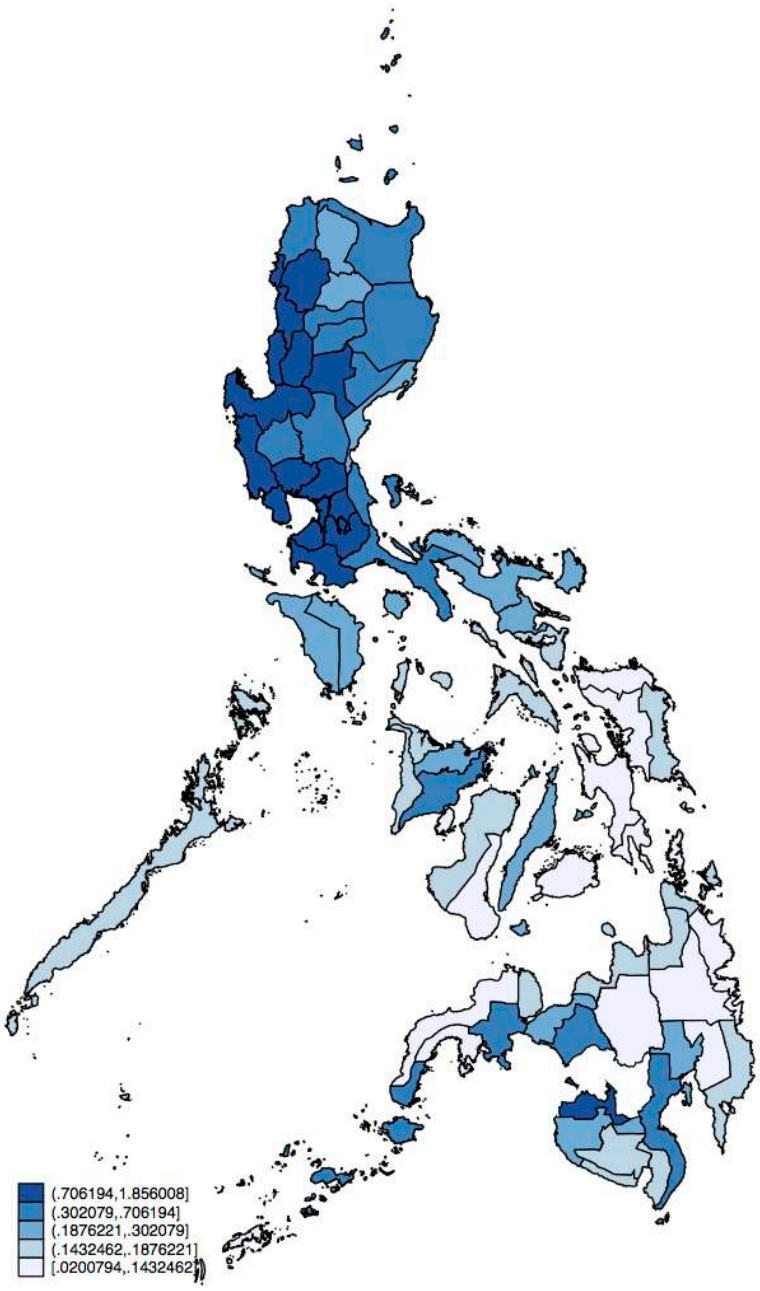


Figure 1.1: 1993 Migration Rates by Province

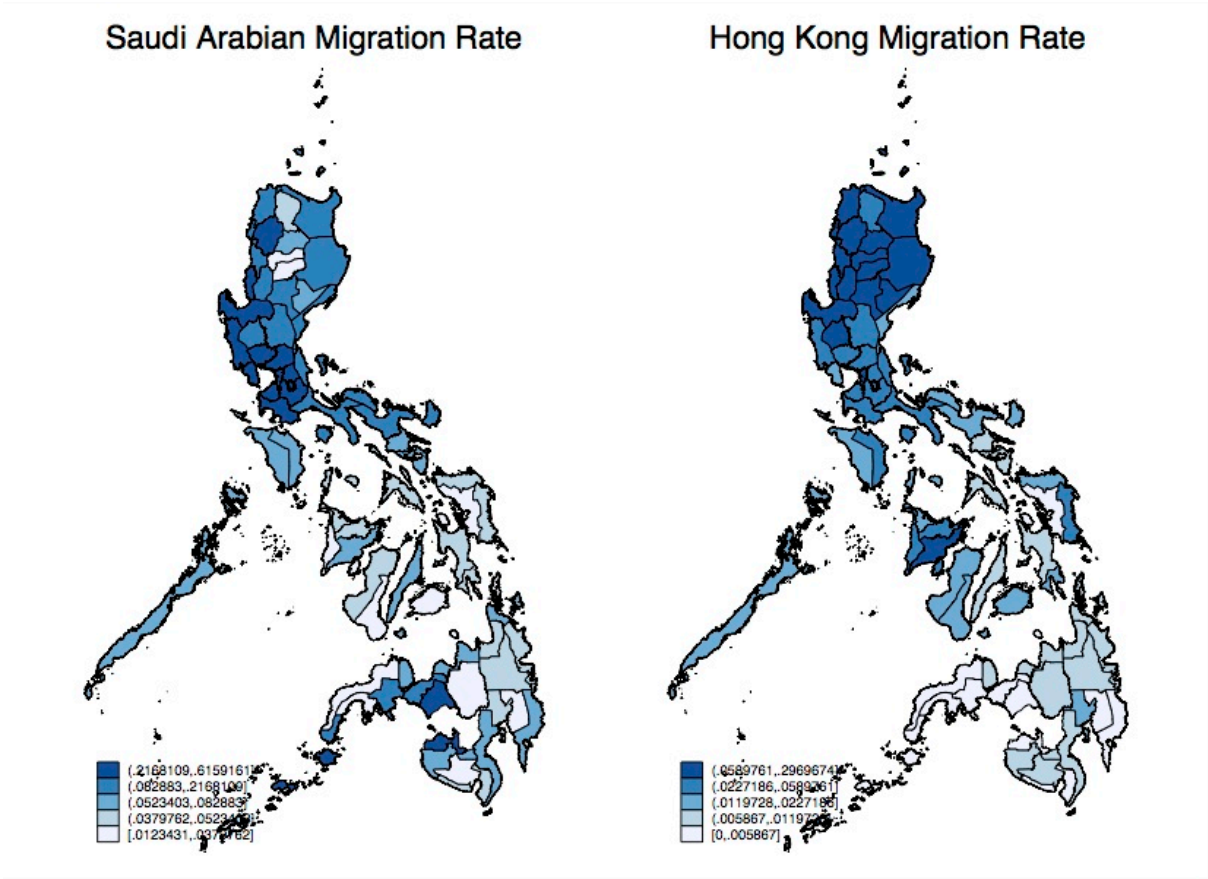
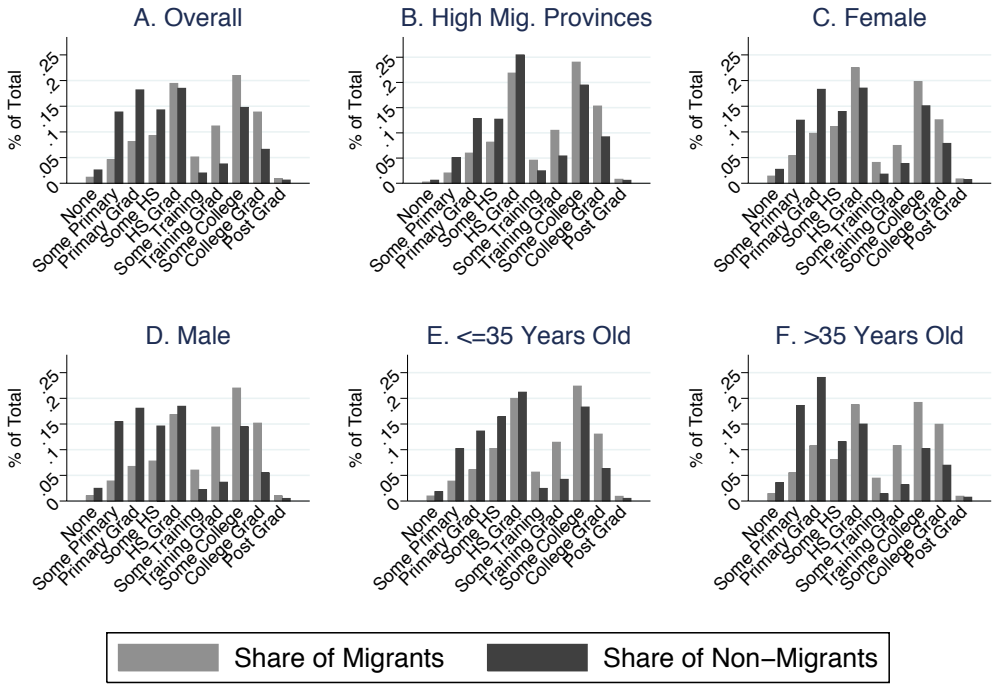


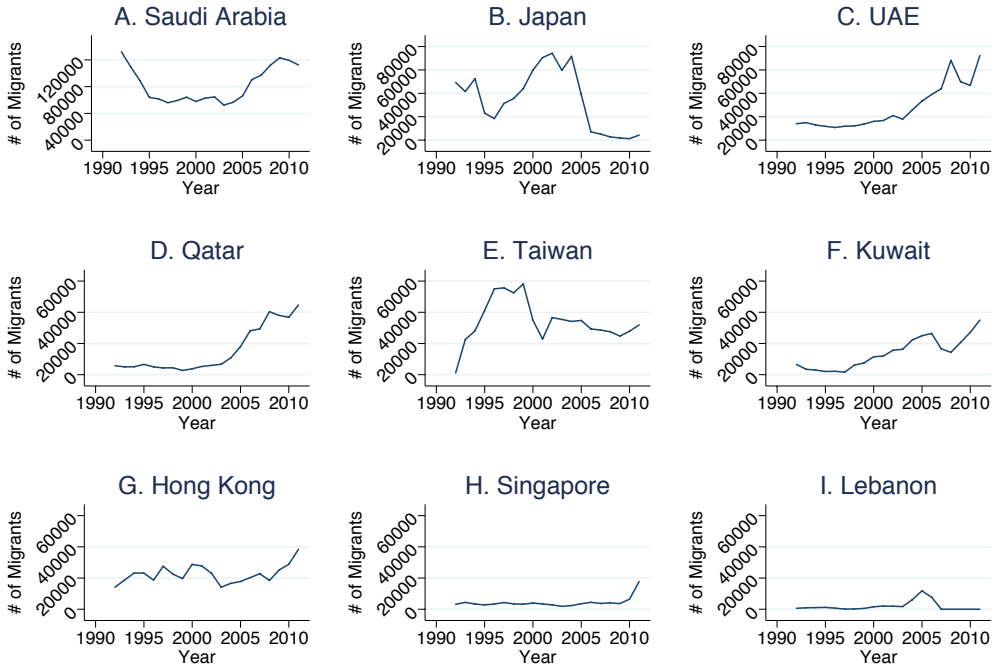
Figure 1.2: 1993 Destination-Specific Migration Rates by Province

Figure 1.3: Distribution of Education



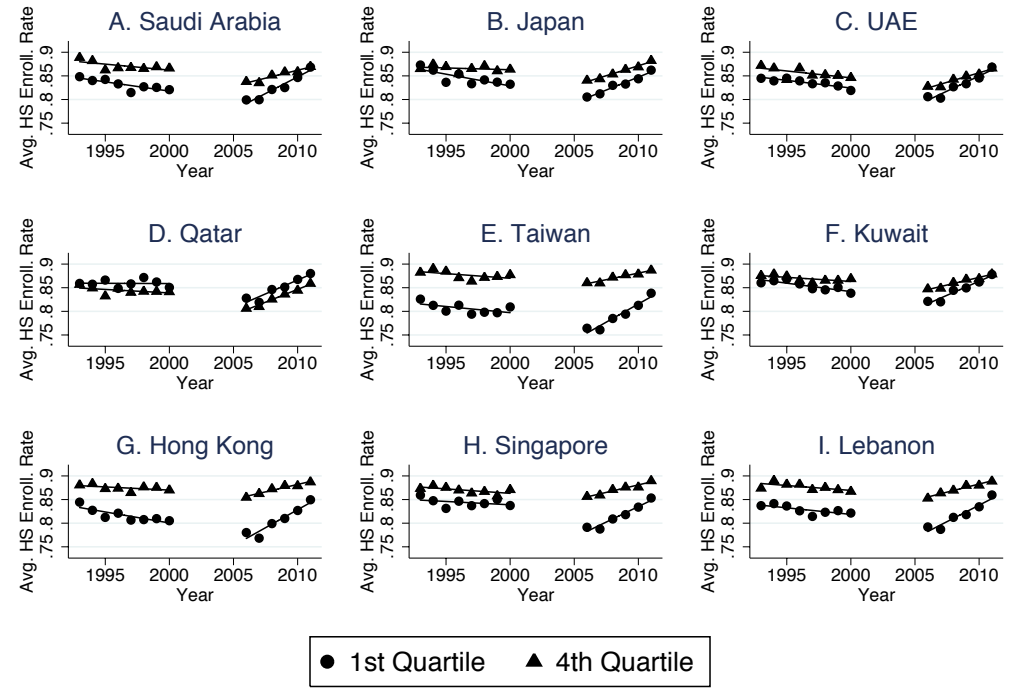
Source: 2000 Philippine Census

Figure 1.4: Total Migrants in Highest Variance Destinations



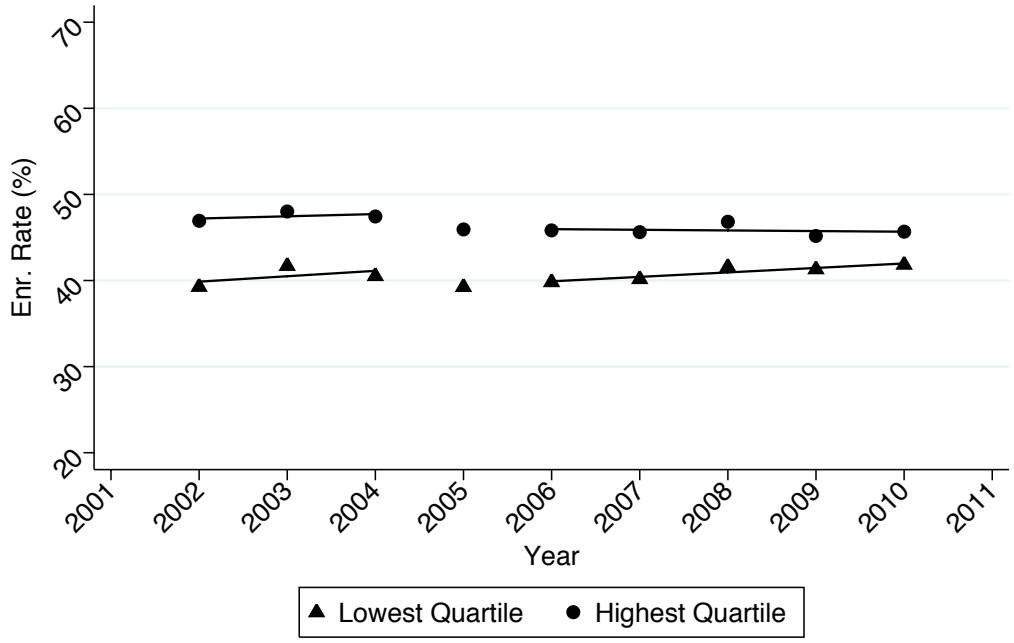
Source: POEA.

Figure 1.5: Parallel Trends Test Across High and Low Baseline Migration Provinces



Source: POEA, OWWA, LFS.

Figure 1.6: Natural Experiment: Parallel Trends Check



Notes: The enrollment rate is the total public enrollment rate and is calculated as the average province–level rate for each quartile.
Source: DepEd, POEA, OWWA.

Table 1.1: Top 10 Destination Countries

	Overall			Female		Male	
	Destination	Percent	Avg. New Contracts per Year	Destination	Percent	Destination	Percent
1.	Saudi Arabia	33.10	78,860	Japan	22.64	Saudi Arabia	49.19
2.	Japan	16.04	38,205	Saudi Arabia	16.81	Taiwan	11.40
3.	Taiwan	14.53	34,621	Taiwan	14.06	UAE	7.60
4.	UAE	10.12	24,121	Hong Kong	12.82	Qatar	7.49
5.	Hong Kong	8.92	21,247	UAE	10.01	South Korea	2.43
6.	Kuwait	4.97	11,848	Kuwait	5.78	Kuwait	2.42
7.	Singapore	1.44	3,438	Qatar	2.88	Japan	1.69
8.	South Korea	1.44	3,435	Malaysia	1.57	Libya	1.47
9.	Malaysia	1.38	3,298	Singapore	1.47	Brunei	1.17
10.	Bahrain	1.34	3,190	Lebanon	1.38	Singapore	1.02

Notes: The sample period is from 1992 to 2009.
Source: POEA and author's calculations.

Occupation		Total	% of Total	% Female
1.	Domestic Helpers	1,139,053	23.97	97.46
2.	Performing Artists	696,504	14.66	95.14
3.	Production	328,486	6.91	43.99
4.	Caregivers	238,408	5.02	96.07
5.	Laborers	237,064	4.99	11.88
6.	Medical Workers	214,832	4.52	81.25
7.	Plumbers	197,508	4.16	0.35
8.	Engineers	191,816	4.04	3.48
9.	Cooks and Waiters	163,382	3.44	53.24
10.	Building Caretakers	140,199	2.95	72.15
11.	Electrical Workers	137,306	2.89	19.97
12.	Carpenters	131,314	2.76	0.41
13.	Machine Fitters	92,946	1.96	2.69
14.	Tailors and Sewers	87,185	1.83	83.16
15.	Other Service Workers	80,832	1.70	54.61
16.	Freight Handlers	74,995	1.58	3.62
17.	Clerical Workers	63,516	1.34	51.32
18.	Transport Equipment Operators	52,664	1.11	5.39
19.	Production Supervisors	43,434	0.91	5.14
20.	Machine-Tool Operators	39,609	0.83	5.87
Total		**4,751,936**		**60.66**

Notes: The sample period is from 1992 to 2009. Occupations that are shaded light grey are over 50% female.
Source: POEA and author's calcuations.

Table 1.2: Top 20 Occupations for Overseas Contract Workers

	Mean	SD	Min	Max
Panel A. Actual Migration Rate (%)				
Total Migration Rate	0.51	0.23	0.04	1.59
Female Migration Rate	0.28	0.17	0.03	1.29
Male Migration Rate	0.22	0.18	0.01	1.39
Panel B. Migration Demand Index (%)				
Total Migration Rate	0.64	0.64	0.01	3.62
Female Migration Rate	0.41	0.39	0.02	2.68
Male Migration Rate	0.22	0.33	0.00	1.99
Panel C. School Enrollment Rates (%)				
Total	57.21	10.39	13.47	96.66
Total Female	60.30	10.28	14.39	100.00
Total Male	54.28	10.76	12.50	93.32
Total Public	45.96	8.47	12.30	79.61
Female Public	48.58	8.70	12.30	78.29
Male Public	43.51	8.59	11.34	80.81
Total Private	11.25	6.57	0.00	47.95
Female Private	11.74	6.80	0.00	52.05
Male Private	10.77	6.38	0.00	47.99

Notes: The unit of observation is the province-year, and the sample period is from 2004 to 2009. All values are expressed as percentages. The enrollment rates are calculated using the population aged 12 and 17 as the denominator.
Sources: Department of Education, POEA, OWWA, and author's calculations.

Table 1.3: Summary Statistics

Table 1.4: First Stage Analysis: Effect of Instruments on Migration Demand

	Lag 1 Migration Demand Index	Plus Province-Specific Time Trends	Plus Weights	Plus Weights & Without 2nd District
	(1)	(2)	(3)	(4)
Panel A. Lag 1 Total Migration Rate	0.276**	0.444***	0.654***	0.674***
	(0.123)	(0.125)	(0.096)	(0.110)
N	502	502	502	496
R^2	0.876	0.954	0.956	0.958
F-Statistic	5.04	12.57	46.12	37.39
Panel B. Lag 1 Female Migration Rate	0.435***	0.504***	0.487***	0.512***
	(0.072)	(0.080)	(0.057)	(0.064)
N	502	502	502	496
R^2	0.905	0.947	0.951	0.952
F-Statistic	36.54	39.71	73.64	64.38
Panel C. Lag 1 Male Migration Rate	0.327**	0.337	0.136	0.218
	(0.133)	(0.205)	(0.137)	(0.174)
N	502	502	502	496
R^2	0.888	0.963	0.965	0.968
F-Statistic	6.07	2.69	0.99	1.58

Notes: The sample period is from 2005 to 2010 (N=502) with 1993 used as the base year in the construction of the instrument. All regressions include province and year fixed effects. Robust standard errors clustered at the province level are in parentheses. The unit of observation is the province-year. Since the standard errors are clustered, the reported F-statistic is the Kleibergen-Papp statistic. The female and male migration rates are instrumented for with the gender-specific versions of the indices. In Column 4, I drop the Second District of Manila, which is the province with the highest migration rate. The migration rate and the migration demand index are lagged by 1 year. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.
Sources: POEA, OWWA, and author's calculations.

	Total Demand Index			
	(1)	(2)	(3)	(4)
Panel A. Effect on Total Enrollment	6.091	16.976***	10.324***	12.789***
	(5.988)	(5.826)	(3.578)	(3.354)
R^2	0.912	0.947	0.927	0.920
Mean Dependent Variable	56.8	56.8	56.8	56.7
Panel B. Effect on Female Enrollment	10.579	16.492***	10.995***	13.192***
	(7.546)	(5.359)	(3.528)	(3.393)
R^2	0.892	0.945	0.912	0.907
Mean Dependent Variable	60.0	60.0	60.0	59.9
Panel C. Effect on Male Enrollment	-0.381	15.488***	9.178**	11.739***
	(4.713)	(5.724)	(3.585)	(3.275)
R^2	0.932	0.954	0.943	0.936
Mean Dependent Variable	53.8	53.8	53.8	53.6
N	502	502	502	496
F-Statistic	5.04	12.57	46.12	37.39
Province-Specific Linear Time Trends	No	Yes	Yes	Yes
Population Weights	No	No	Yes	Yes
Drop Largest Province	No	No	No	Yes
Mean Change in Demand	0.12	0.12	0.12	0.12

Notes: The sample period is from 2005 to 2010 with 1993 used as the base year in the construction of the instrument. All regressions include province and year fixed effects. Robust standard errors clustered at the province level are in parentheses. The unit of observation is the province-year. The mean change in migration demand is measured in percentage points and is the average annual province-level change in migration demand. The migration rate and the migration demand index are lagged by 1 year. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.
Sources: POEA, OWWA, DepEd, and author's calculations.

Table 1.5: Effect of Total Migration Demand on Total School Enrollment

	Total Demand Index			
	(1)	(2)	(3)	(4)
Panel A. Effect on Total Public Enrollment	1.078	5.629*	0.723	1.637
	(2.938)	(3.167)	(1.226)	(1.110)
R^2	0.970	0.991	0.984	0.981
Mean Dependent Variable	45.7	45.7	45.7	45.7
Panel B. Effect on Total Private Enrollment	5.013	11.347***	9.600***	11.152***
	(4.962)	(3.815)	(3.160)	(3.293)
R^2	0.853	0.921	0.905	0.895
Mean Dependent Variable	11.4	11.4	11.4	11.4
N	502	502	502	496
F-Statistic	5.04	12.57	46.12	37.39
Province-Specific Linear Time Trends	No	Yes	Yes	Yes
Population Weights	No	No	Yes	Yes
Drop Largest Province	No	No	No	Yes
Mean Change in Demand	0.12	0.12	0.12	0.12

Notes: The sample period is from 2005 to 2010 with 1993 used as the base year in the construction of the instrument. All regressions include province and year fixed effects. Robust standard errors clustered at the province level are in parentheses. The unit of observation is the province-year. The mean change in migration demand is measured in percentage points and is the average annual province-level change in migration demand. The migration rate and the migration demand index are lagged by 1 year. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.

Sources: POEA, OWWA, DepEd, and author's calculations.

Table 1.6: Effect of Total Migration Demand on Public & Private Secondary School

	Female Migration Demand Index				
	(1)	(2)	(3)	(4)	(5)
Panel A. Effect on Total Enrollment	0.842	10.043**	5.452	7.726*	6.408
	(4.768)	(4.416)	(3.644)	(4.466)	(3.945)
R^2	0.919	0.954	0.931	0.926	0.931
Mean Dependent Variable	56.8	56.8	56.8	56.7	56.8
Panel B. Effect on Female Enrollment	2.277	10.699**	7.291**	9.180**	8.431**
	(5.330)	(4.236)	(3.502)	(4.371)	(3.811)
R^2	0.909	0.952	0.917	0.914	0.917
Mean Dependent Variable	60.0	60.0	60.0	59.9	60.0
Panel C. Effect on Male Enrollment	-1.347	8.516*	3.458	6.029	4.235
	(4.140)	(4.378)	(3.804)	(4.536)	(4.102)
R^2	0.931	0.960	0.945	0.940	0.945
Mean Dependent Variable	53.8	53.8	53.8	53.6	53.8
N	502	502	502	496	502
F-Statistic	36.54	39.71	73.64	64.38	70.02
Province-Specific Linear Time Trends	No	Yes	Yes	Yes	Yes
Population Weights	No	No	Yes	Yes	Yes
Drop Largest Province	No	No	No	Yes	No
Control for Male Mig. Rate	No	No	No	No	Yes
Mean Change in Demand	0.05	0.05	0.05	0.05	0.05

Notes: The sample period is from 2005 to 2010 with 1993 used as the base year in the construction of the instrument. All regressions include province and year fixed effects. Robust standard errors clustered at the province level are in parentheses. The unit of observation is the province-year. The mean change in migration demand is measured in percentage points and is the average annual province-level change in migration demand. The migration rate and the migration demand index are lagged by 1 year. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.
Sources: POEA, OWWA, DepEd, and author's calculations.

Table 1.7: Effect of Female Migration on Total School Enrollment by Gender

	Female Migration Demand Index	
	(1)	(2)
Panel A. Total Public Enrollment	2.937*	-0.378
	(1.549)	(1.240)
R^2	0.989	0.981
Mean Dependent Variable	45.7	45.7
Panel B. Total Private Enrollment	7.106**	5.830*
	(3.590)	(3.194)
R^2	0.928	0.911
Mean Dependent Variable	11.4	11.4
Panel C. Female Public Enrollment	2.907*	0.012
	(1.501)	(1.197)
R^2	0.989	0.982
Mean Dependent Variable	48.5	48.5
Panel D. Male Public Enrollment	2.959*	-0.762
	(1.653)	(1.370)
R^2	0.989	0.982
Mean Dependent Variable	43.2	43.2
Panel E. Female Private Enrollment	7.792**	7.279**
	(3.518)	(3.147)
R^2	0.929	0.906
Mean Dependent Variable	11.6	11.6
Panel F. Male Private Enrollment	5.557	4.219
	(3.479)	(3.244)
R^2	0.929	0.916
Mean Dependent Variable	10.7	10.7
N	502	502
F-Statistic	44.56	71.28
Population Weights	No	Yes
Mean Change in Demand	0.05	0.05

Notes: The sample period is from 2005 to 2010 with 1993 used as the base year in the construction of the instrument. All regressions include province and year fixed effects and province-specific linear time trends. Robust standard errors clustered at the province level are in parentheses. The unit of observation is the province-year. The mean change in migration demand is measured in percentage points and is the average annual province-level change in migration demand. The migration rate and the migration demand index are lagged by 1 year. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.
Sources: POEA, OWWA, DepEd, and author's calculations.

Table 1.8: Effect of Female Migration on Public and Private School Enrollment

	Year 1	Year 2	Year 3	Year 4
	(1)	(2)	(3)	(4)
Panel A. Total Demand on Total Enrollment	24.569***	10.654	9.990*	14.413**
	(7.922)	(6.852)	(5.722)	(5.858)
R^2	0.911	0.904	0.919	0.927
Mean Dependent Variable	91.4	88.2	80.1	72.4
N	502	502	502	502
F-Statistic	46.12	46.12	46.12	46.12
Mean Change in Demand	0.12	0.12	0.12	0.12
Panel B. Female Demand on Total Enrollment	8.339	10.906*	8.173	4.356
	(5.655)	(6.193)	(6.523)	(6.475)
R^2	0.919	0.905	0.921	0.930
Mean Dependent Variable	91.8	88.2	80.1	72.4
Panel C. Female Demand on Female Enrollment	12.479**	14.311**	10.312	5.606
	(5.035)	(6.215)	(6.848)	(7.104)
R^2	0.899	0.877	0.901	0.916
Mean Dependent Variable	100.0	94.3	81.0	78.6
Panel D. Female Demand on Male Enrollment	3.230	7.075	5.980	3.207
	(6.548)	(6.592)	(6.311)	(5.984)
R^2	0.937	0.926	0.936	0.941
Mean Dependent Variable	97.4	86.2	75.5	64.9
N	502	502	502	502
F-Statistic	73.64	73.64	73.64	73.64
Mean Change in Demand	0.05	0.05	0.05	0.05

Notes: The sample period is from 2005 to 2010 with 1993 used as the base year in the construction of the instrument. All regressions are population weighted and include province and year fixed effects and province-specific linear time trends. Robust standard errors clustered at the province level are in parentheses. The unit of observation is the province-year. The mean change in migration demand is measured in percentage points and is the average annual province-level change in migration demand. Grade level enrollment rates are calculated by dividing the total number enrolled in a given grade by 1/7th of the age 12-17 population. Rates are higher than total secondary enrollment rates because while on time enrollment would suggest that 12 year olds are enrolled in year 1, a number of individuals older or younger than 12 are also included. As a result, rates may be greater than 100. See Maligalig et al., (2010) for a more detailed description of enrollment rate calculations in the Philippines. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.
Sources: POEA, OWWA, DepEd, and author's calculations.

Table 1.9: Effect of Migration Demand on School Enrollment, by Grade Level

	All Enrollment	All Female Enr.	All Male Enr.	Total Public	Female Public	Male Public	Total Private	Female Private	Male Private
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post*OPA Share	-3.154	-4.201	-2.420	-6.206***	-5.826***	-6.663***	2.420	1.234	3.588
	(5.365)	(5.099)	(5.515)	(1.977)	(2.090)	(1.995)	(4.486)	(4.501)	(4.551)
N	616	616	616	693	693	693	616	616	616
R^2	0.878	0.869	0.891	0.943	0.937	0.945	0.790	0.785	0.794
Sample Mean	57.21	60.30	54.28	45.96	48.58	43.51	11.25	11.74	10.77
Interquartile Range of Share OPA	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06

Notes: The pre-period is from 2002 to 2004, and the post period is from 2006 to 2010. The OPA share is the percent of the province population migrating as OPAs in 1993, the base year. All regressions include province and year fixed effects. Robust standard errors are clustered at the province level. The unit of observation is the province-year. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.
Source: DepEd, POEA, OWWA, and author's calculations.

Table 1.10: Effect of OPA Ban on Enrollment Rate

CHAPTER II

Distortions in the International Migrant Labor Market: Evidence from Filipino Migration and Wage Responses to Destination Country Economic Shocks

2.1 Introduction

The global market for labor has some of the largest distortions of any factor market (Clemens, 2011). The same worker can earn very different wages depending on in which country they work (Clemens, Montenegro and Pritchett, 2008; McKenzie, Gibson and Stillman, 2013). As a result, moving from a poor country to a rich country to work is perhaps the single act most likely to succeed in dramatically increasing an individuals income, as well as that of remaining family members (Cox-Edwards and Ureta, 2003; Yang, 2008; Gibson, McKenzie and Stillman, 2012). In recognition of this fact, a number of developing countries have put in place policy measures to help their citizens work abroad. The government of the Philippines has been on the forefront of promoting overseas temporary contract work and making emigration part of its national development strategy, and many other developing countries are now seeking to emulate the Philippines in this regard.

However, the recent global financial crisis has highlighted the potential vulnerability of migrant jobs to economic conditions in destination countries. Emigration to Ireland from the new European Union states fell 60 percent from 2008 to 2009, while overall European Union flows to Spain fell by two-thirds. Inflows to the United States fell in almost all legal temporary work categories, including a 50 percent decline in visas issued to low-skilled seasonal workers (Papademetriou, Sumption and Terrazas, 2010). Net migrant outflow from Mexico to the U.S. was only 0.09 percent of the Mexican population in 2010-11, compared to 0.53 percent in 2006-7 (Rodriguez, 2011). Moreover, despite these responses at the extensive margin (the number of migrants), immigrant employment rates among those who do migrate or remain abroad are more sensitive to the business cycle than the employment rates of natives (Orrenius and Zavodny, 2009). A key contribution of this paper is to show that the high vulnerability of migrant jobs to economic shocks is intimately tied to the large gains in wages that migration offers. The extent to which migration flows respond to shocks at destination depends on the output elasticity of demand for migrant labor and on the extent to which wage adjustment can occur through movements along the migrant labor supply curve. However, estimating this responsiveness in the context of bilateral migration flows is complicated by concerns that economic shocks also affect the migrant origin country, thereby also shifting the labor supply curve and preventing identification of the labor demand impact. In addition, reliable microeconomic data on migrant flows and the wages these migrants earn are extremely rare. We overcome both issues by using a unique database which has information on all new work contracts issued to Filipino workers over the 1992 to 2009 period, including information on the destination country and contracted wage.

The Philippines provides an excellent setting to examine how migration responds to shocks at destination. It was the first country to implement temporary overseas contract work on a wide scale, and Filipinos now migrate in large numbers to a

very diverse set of countries, which have experienced substantial heterogeneity in macroeconomic conditions over the period of our data. In 2007, 1.7 million Filipinos were working outside of the Philippines in 181 countries, with overseas contract work the primary channel of emigration.

Using these data, we estimate how the number of contract workers and the wages they are paid respond to economic shocks in destination countries. We find a strong and significant positive relationship between migrant numbers and GDP fluctuations at destination, with the point estimate suggesting migrant quantities respond more than one-for-one to proportional GDP changes. In contrast, we find that the wages migrants are paid has no large or statistically significant relationship with GDP changes at destination. This pattern is consistent with the existence of binding minimum wages that lead to migrant labor supply exceeding labor demand at the contracted wages. This occurs for both low- and high-skilled workers, suggesting the distortion comes not just from national minimum wages in destination countries, but also from restrictions on the wages that migrants of higher skill levels can be paid. For example, the United States H1B program that many IT professionals and foreign professors use to work in the United States requires that employers pay the "prevailing wage" obtained from a salary survey, as do a number of other immigration categories in the U.S.; Australia requires employers to pay their overseas workers the market salary rate and on top of this, specifies a threshold (currently A$49,330) that skilled migrants must make;[1] and the Philippines bilateral labor contracts require workers to be paid the prevailing wage for their positions in the destination countries. As a result, the same market imperfection that is one reason that workers can so dramatically increase their incomes by working abroad shifts all the burden of adjustment to demand shocks onto quantities rather than wages.

As supporting evidence that minimum wages bind and to help rule out alterna-

[1]See http://www.immi.gov.au/skilled/temporary-skilled-migration-threshold.htm (Australian Government Department of Immigration and Citizenship, 2010).

tive explanations, we also consider the impact of a 2006 law change that raised the mandated minimum wage for overseas Filipinos working as domestic helpers (maids). We use difference-in-difference analysis to show that this change led to a decline in the number of Filipinos going as domestic helpers to low wage destinations, relative to those going as domestic helpers in higher wage countries and to those going to low wage destinations in other worker categories. In addition, we show that this increase in the minimum wage for domestic helpers lead to increases in contracted wages for such workers. This evidence from the single largest occupational category supports the claim that minimum wages bind, and helps rule out concerns that workers and employers might be able to circumvent any regulations by writing a contract for one wage and in practice working for a different wage. The result of such a minimum wage increase is to increase even further the gap between supply and demand for migrant labor, thereby ensuring migrant numbers will remain vulnerable to economic shocks at destination.

The remainder of the paper is structured as follows: Section 2.2 describes the institutional setting and labor market for Filipino overseas workers, and its implications for modeling labor adjustment to GDP shocks at destination. Section 2.3 describes our new database. Section 2.4 provides the main results, highlighting the response of migrant numbers and wages to GDP shocks, and examining heterogeneity in these responses. Section 2.5 carries out difference-in-difference analysis of a change in the minimum wage for domestic helpers to bolster our case for a binding minimum wage, by showing that quantities fall and wages rise when this minimum wage is increased. Section 2.6 concludes and discusses implications for migration as a development strategy.

2.2 Institutional Setting and Labor Market for Filipino Overseas Foreign Workers

2.2.1 Institutional Setting

As the first country to implement temporary overseas contract work on a wide scale, the Philippines provides a particularly relevant setting for testing the sensitivity of migration to global economic shocks. In 1974, the Philippine government began the Overseas Employment Program to aid Filipinos in finding work overseas due to poor economic conditions in the Philippines. Since the programs inception, Filipino migration has increased dramatically, and Filipinos now migrate in large numbers to an extraordinarily diverse range of destination countries. The top ten destinations account for approximately 86 percent of all new overseas Filipino worker (OFW) hires (see Table 2.1). Countries such as Saudi Arabia, the U.A.E., and Kuwait, in the Middle East, and Japan, Hong Kong, Taiwan, and Singapore in East Asia are the most common destinations, but Italy, the U.K., Canada and the U.S. are also among the top fifteen destinations. By comparison, 98 percent of Mexican migrants are in the United States (World Bank, 2011*b*). Migration from the Philippines is largely temporary and legal, and occurs through licensed private recruitment agencies. Overseas temporary contract work is the primary channel through which Filipinos migrate, and in order to be cleared to leave the Philippines, an OFW must have a job contract in hand. Between 1992 and 2000, 83 percent of Filipinos abroad were engaged in contract work,[2] with most of the rest being non-temporary workers migrating through family reunification policies or other permanent migration channels. This form of legal temporary work is likely to become more common in future years as countries like Bangladesh, Indonesia, Nepal, Sri Lanka and India seek to follow the Philippine model, and destination countries consider how to balance demands for labor with

[2]Authors calculation from the Survey of Overseas Filipinos (SOF), an offshoot of the Labor Force Survey in the Philippines.

public concerns about migrant settlement.

2.2.2 Large Potential Supply

Data from the 2010 Gallup World Poll suggest that there are many individuals in the Philippines who would like to work abroad but who are not currently doing so. This poll asked a representative sample of 1000 adults in the Philippines the question "Ideally, if you had the opportunity, would you like to go to another country for temporary work, or not?" Overall, 51.1 percent of adults aged 15 and over said they would like to work abroad in temporary work (and 18.6 percent said they would like to migrate permanently abroad). Desire to migrate temporarily abroad is highest for individuals in the 15-34 age range, for individuals in urban areas, and for more educated individuals. The voting age population (18+) in the Philippines is approximately 52 million, so taking 51 percent of this gives approximately 26 million people who say they would like to migrate temporarily. This is ten times the magnitude of the 2.0 million who actually did work abroad as overseas foreign workers in 2010.[3] Even allowing for the likelihood that many more people express an interest in migrating abroad than would actually migrate if given the opportunity, these numbers still suggest large interest in migration.

Our qualitative interviews with employment agencies in the Philippines also support the notion of excess supply; it is common to hear reports that the market for overseas contract labor "is a buyers market." In particular, they note that the emergence of Bangladesh, India, Indonesia, Sri Lanka, and Pakistan as competing labor-sending countries has made it more difficult for them to find jobs for Filipinos.

[3]See http://www.census.gov.ph/data/pressrelease/2011/of10tx.html (National Statistics Office, 2011).

2.2.3 Wage Setting and Minimum Wages

The Philippine Overseas Employment Administration (POEA) regulates the recruitment and employment of Filipinos for work abroad. Their rules and regulations dictate that there be "guaranteed wages for regular work hours and overtime pay, which shall not be lower than the prescribed minimum wage in the host country or not lower than the appropriate minimum wage standards set forth in a bilateral agreement or international convention, if applicable, or not lower than the minimum wage in the country [the Philippines], whichever is highest."[4] This rule effectively sets a minimum wage for legal overseas work, since the Philippines Government will not process work contracts which have wages set at a level below that set out in this law. Such minimum wage setting for overseas migration is a direct result of the 1974 Philippine Labor Code and was instated for the primary purpose of ensuring that overseas workers are not exploited or discriminated against (Philippine Labor Code, 1974).[5]

In practice only some of the host countries for Filipino workers have their own minimum wages that apply to foreign labor. Thus, for example, Filipino workers in the United States, Canada and Korea are covered by minimum wage laws in those countries, whereas other destinations like Saudi Arabia, the United Arab Emirates, Qatar, Bahrain, Oman, and Malaysia do not have minimum wage laws. Yet, as will be discussed below, although they do not have minimum wage laws, the immigration laws of most of these countries require migrants to be paid wages no less than those offered to nationals, effectively imposing a minimum wage for migrants. Furthermore, for a number of destination countries, the Philippine Government negotiates bilateral agreements, which in some cases set additional minimum wage requirements.

[4]See http://www.poea.gov.ph/rules/POEA%20Rules.pdf [accessed July 19, 2011] (Philippine Overseas Employment Administration, 2002).

[5]OFWs are often quite vulnerable. For instance, in 2011, welfare assistance, such as psychological counseling, legal assistance, and conciliation, was provided to 268,026 overseas workers (Overseas Worker Welfare Administration, 2011).

As stipulated in POEAs Rules and Regulations, prior to deployment of an OFW, work contracts must be verified by the Philippine Overseas Labor Offices (POLOs) to ensure that the contract conforms both with the minimum standards set forth by POEA and the labor laws and legislation of the host country. For each occupation, POLOs determine the prevailing market wages in the host country and will not approve contracts that set wages below these levels.[6] Thus even more skilled occupations, whose incomes are above the Philippine minimum wage and above the overseas minimum wage for low-skilled occupations, still have limits on how low their contracted wages can be. In addition to these steps, in 2006 the Philippine government enacted the Household Service Workers Reform, which set a universal minimum of US$400 for overseas work in the domestic service sector. We examine the impact of this reform in Section 2.5 below.

A natural question is then whether these minimum wages set by the Philippines are enforced. It appears that for the most part they are. Since the establishment of the POEA in 1982, there has been some system for employees to file complaints if contracted wages are not received. This system of complaints was formally written into law with the passage of the Migrant Workers and Overseas Filipinos Act of 1995 (RA 8042) by the Congress of the Philippines. It was amended in 2010 (Migrant Workers and Overseas Filipinos Act of 1995 amended , RA 10022) and maintains regulations for enforcement of wages.

In the event that an OFW does not receive his or her contracted wages, he or she can file a complaint against the employer and the recruiting agency. The POLO initially tries to settle the dispute directly between the employer and worker. If this is unsuccessful, there is a dispute settlement in the labor courts of the host country. Should this procedure fail, POEA tries to resolve the dispute with the recruiting

[6]To determine prevailing market rates, POLO officers use available information from both the government and private sector in the host country as a reference. They also refer to rates previously approved by POEA for the destination country and occupation (Casco, 2013).

agency through internal conciliation services. As a last resort, the worker can file a claim against the recruiting agency in the Philippine labor courts. In addition to monetary punishment including the payment of contracted wages as well as fines, recruitment agencies with labor contracts found to be in violation may face other sanctions such as having their operating licenses suspended or cancelled.

OFWs are widely aware of the procedures surrounding contract disputes. As part of their mandatory Pre-Departure Orientation Seminar (PDOS), OFWs receive information about their rights and responsibilities within their employment contract and what to do in the case of contract violations. In addition to a large Legal Assistance Fund for migrant workers, the president of the Philippines appoints a Legal Assistant for Migrant Workers to assist with these contract violations. Additionally, Philippine embassies and POLOs in common destination countries have 24-hour resource centers providing legal services.

2.2.4 Quotas, wages, and migration policies around the world

Although there is no global database of migration policies which details which countries impose migration quotas or minimum wage restrictions on migrants, there have been a couple of attempts by international organizations to examine these issues. A review by the OECD (2006) found that "migration quotas per se tend to be the exception in OECD countries" (p. 113) but that in contrast "in many OECD countries, work permits for potential cross-border recruits are subject to an employment test" (p. 114). For example, Japan, Canada, Australia, Greece, Belgium, Finland, and France were some of the OECD countries with no quotas during the period of our study, relying on labor market tests and/or points systems. These employment tests typically require employers to show that there is no qualified candidate available to fill the job, and can require advertising the job first to natives at the prevailing wage.

A more systematic and comprehensive effort occurred via an ILO (2004) survey

which surveyed migration policies at that time, getting replies from 93 member states. While one-third of countries replied that they had specific quotas for migrant workers admitted for certain reasons, these were almost always partial in nature, applying only to certain sectors or types of firms, such as quotas for seasonal workers or, in some countries, restrictions at an enterprise level on a maximum ratio of foreign to local workers. The only country in our sample that had a national level quota is Switzerland, which has quotas on the number of non-EU nationals entering. Moreover, quotas were not always binding. For example, the United States has no quotas, only a labor market test, for seasonal agricultural workers coming under the H2A policy; has a quota of 66,000 seasonal non-agricultural workers coming in under the H2B policy which has not been met in many years; and a quota for high-skilled temporary workers coming under the H1B policy which was not filled between its establishment in 1990 and 1997, or between 1999 and 2002, but has been filled since then (OECD, 1998; NFAP, 2010).

In contrast, the vast majority of countries use a labor market test requiring employers to show that there is a lack of qualified applicants and/or requiring that migrant workers be offered a wage no less than the prevailing wage offered to nationals in that occupation. In the ILO survey, 84 percent of countries reported such a requirement, and the only countries in our studys sample that didnt report having that requirement were Saudi Arabia and Singapore. However, Singapore does charge employers of low and medium-skilled workers a monthly levy for each foreign worker employed, with this levy ranging from US$123 to US$362 per month (Yeoh and Lin, 2012), which acts to increase the effective wage paid by employers of foreign workers. These labor market tests and requirements that migrant workers be offered a wage no less than that of nationals often occur alongside any partial quotas countries may have, and can be a reason quotas do not bind.

As a result of these policies, there is effectively a minimum wage that needs to

be paid to be able to bring a migrant worker into most countries, with the labor market test requirement meaning this minimum wage varies with occupation and skill level. Thus when we refer to minimum wages, we are referring to a more general phenomenon than is typically considered in the labor literature, which focuses on a single minimum wage that is the least every worker must be paid. In the Philippines migration context, minimum wages can vary by destination country, skill level, and occupation.

2.2.5 Model of the Labor Market and Response to GDP Shocks Abroad

Clemens, Montenegro and Pritchett (2008) estimate that a low-skilled Filipino worker would earn 3.5 to 3.8 times as much working in the U.S. as they do in the Philippines, even after accounting for differences in costs of living. However, the wages Filipino workers are paid for the same occupation differ a great deal across destination countries. For example, in 2005, domestic helpers earned a median monthly wage of $1,527 in Australia versus $200 in Malaysia. Similarly, production workers in the United Kingdom in 2005 earned $1,742 per month, whereas in the United Arab Emirates, the corresponding figure was only $275. A model of the migrant labor market should explain why (a) there is variation across destinations in the wages migrants earn; and (b) more people dont migrate despite the much higher wages to be earned abroad. We consider three potential models of the labor market that might explain these facts, and consider the implications of each for the response to a GDP shock in the destination country. Market clearing model

The most basic model is one in which the labor market clears in each destination country, and the higher wages earned abroad are just enough to offset workers disutility of leaving their home country and spending time away from family, with this disutility varying across destination countries. In such a model, a positive output shock in the destination country will shift out the labor demand curve, leading to an

increase in wages and an increase in the quantity of migrants. However, this model is not realistic for several reasons. First, it does not accord with the evidence for excess supply of migrants and institutional rules on wages detailed above. Second, it would require that migrants experience much less disutility going to Saudi Arabia (which has relatively low wages) than Canada (which has relatively high wages), which does not accord with the preferences migrants give when asked about destinations. This is particularly the case for destinations in the Middle East, in which mostly Christian Filipino workers often experience difficulties in practicing their religion. The same critique would apply for explanations based on a flat (perfectly elastic) labor supply curve: it would require migrants to prefer low-wage destinations in the Middle East to Canada, Europe, and the U.S., requiring an offsetting higher wage premium to overcome the disutility of going to these locations.

A more likely model therefore includes distortions which prevent the migrant labor market from clearing, and which lead to wages above the level which would equate supply and demand for migrant labor. The two most probable sources of distortions are minimum wage requirements and quotas. We discuss each in turn.

Binding minimum wages

The discussion above of how wages are set through bilateral agreements and destination country laws suggests that an appropriate model of the international migration, for a particular overseas labor market, could be that set out in Figure 2.1. There is a binding minimum wage, Wm, and the willing supply of Filipino workers at this wage greatly exceeds market demand. Market demand is given by the market demand curve, LD(GDP1, X), where demand depends on the level of GDP in the destination country economy, and on characteristics, X, of the occupation and destination country. The result is then that the number of individuals who get to migrate, M1, is purely determined by labor demand. Variation in wages across destinations then arises from variation in these minimum wages.

Consider then the impact of a positive shock to GDP in the destination country, which increases GDP from GDP1 to GDP2. If the minimum wage still continues to bind, all adjustment will be through migration quantities the number of migrants will increase to M2, while wages will remain at the minimum wage, Wm. This leads to the following hypothesis:

Hypothesis 1 : If binding minimum wages are the main distortion, international migration flows will be positively correlated with changes in GDP in destination countries, while wages will not be.

This analysis assumes that the minimum wage itself does not change with the business cycle. This seems a plausible assumption in the case where wage contracts are negotiated for several years or where the Philippines itself has set the minimum wage. However, if minimum wages (or the minimum allowed in work contracts) are determined with reference to prevailing market wages, the minimum wage may increase at the same time as labor demand, thereby increasing wages and reducing the extent to which the increase in labor demand increases employment. This seems more likely in skilled occupations, suggesting we may see heterogeneity in the response to GDP shocks by skill.

Dube, Naidu and Reich (2010) note that this prediction that a rise in minimum wages will reduce employment need not hold in the standard competitive labor model if product demand is not price elastic and input substitution possibilities are not present. Adjustment then occurs through goods prices. In our setting it seems likely that on average products being produced by migrants have some price elasticity, and, furthermore, that employers have some scope for substituting Filipino workers for other inputs (including workers from other migrant nations, a topic we return to in Section 2.5), so that higher minimum wages would lower migrant employment.

However, a rise in minimum wages need not reduce employment under some non-competitive labor market models. For example, under dynamic monopsony models,

labor market frictions from matching and hiring workers result in an equilibrium with positive unemployment and positive quit rates (Manning, 2004). A rise in the minimum wage can then result in reductions in quitting and/or vacancy rates, which can potentially increase net employment while reducing the flow into and out of employment. The standard contract length terms of Filipino workers may make this model less relevant in our setting, but to check this we will examine how contract duration and rehires of migrants change.

Binding Migration Quotas

An alternative form of distortions could arise from binding migration quotas. A binding quota restricts labor demand to a maximum of the quota amount MQ, leading to a wage W1 above the market clearing level (Figure 2.2). Countries with more binding quotas will then pay higher wages. In such a model, the prediction is an increase in output in the destination country will cause firms to compete harder for the same number of quota spaces, leading to an increase in wages, and no adjustment in the quantity of migrants.

Of course the quota itself might be endogenous to economic conditions at destination, with quotas increasing during economic expansions and being reduced in recessions. This would lead to some procyclicality in both quantities and wages, since it seems unlikely that quotas would be adjusted frequently and finely enough to keep wages fixed.

Whilst plausible in some contexts, we believe it unlikely that binding quotas is the main distortion in the global market for Filipino migrant labor given the evidence discussed above which shows that the majority of countries do not have quotas, and those that do typically only have them for some categories of migrants. Nevertheless, it remains an empirical question as to whether wages or quantities see the majority of the adjustment to GDP shocks, shedding light on which distortion is more likely to be underlying the high wage gains to be had through migration. Since the above

theory suggests responses are likely to vary with migration policy, we will also examine heterogeneity in responses to whether or not destination countries use some form of a migration quota. Matching models

In matching models of the labor market (e.g., the canonical Mortensen and Pissarides (1994) model), equilibrium unemployment can occur without minimum wage laws or quotas. It is common for theoretical macroeconomic models to assume some form of wage rigidity (Hall, 2005; Shimer, 2005), so as to replicate the empirical variability in unemployment. But the empirical evidence (in particular Solon, Barsky and Parker (1994) and Martins, Solon and Thomas (2012)) actually reveals substantial wage responses to macro fluctuations,[7] and in particular this is true for hiring (starting) wages. Taking the observed business-cycle procyclicality of hiring wages as a departure point, the model of Pissarides (2009) matches the empirical variability in unemployment by modifying the specification of matching costs, while allowing flexibility in hiring wages. Such a model predicts, in accord with the empirical facts, procyclicality in both new hires and hiring wages. This prediction will be directly tested in our empirical analysis, which will examine new hires and hiring wages in the international migrant labor market.

2.3 Data

2.3.1 POEA Micro Data

The data are from the Philippine Overseas Employment Administrations (POEA) database of departing OFWs. Created in 1982, POEA is a Philippine government agency within the Department of Labor and Employment. POEA has a multifaceted agenda: it monitors recruitment agencies, monitors worker protection, and conducts a variety of other tasks relating to the oversight of the overseas worker program.

[7]See also Bils (1985); Shin (1994); Devereux and Hart (2006); Martins (2007); Carneiro, Guimaraes and Portugal (2012).

Further, as a final step prior to departure, all OFWs are required to receive POEA clearance. Since all OFWs are required to pass through POEA, the agency has a rich dataset composed of all migrant departures from the Philippines. This is the first paper to utilize this rich data resource.

Since all OFWs must pass through POEA, the dataset contains data on departures for all land-based new hires leaving the Philippines between 1992 and 2009 for temporary contract work. New hires are defined as OFWs who are starting a contract with a new employer. These migrants may have previously worked overseas, but the contract that they are presently departing on is new, rather than renewed. For each OFW departure from the Philippines, the database includes name, birthdate, gender, civil status, destination, employer, recruitment agency, contract duration, occupation, date deployed, and salary. Typical contracts are of one or two year durations, with an average duration of 17.7 months over our sample period. Female workers account for 60.6 percent of new hires during this period. The most common occupations are in production (e.g., laborers, plumbers), services (domestic helpers, cooks) and professional occupations (nurses, engineers, entertainers).

To study the flows of migrants in response to fluctuations in GDP, individual migration records are grouped by year and destination country and combined to create a count of the number of migrants to each destination country annually between 1992 and 2009. Table 2.1 displays the top twenty OFW destinations averaged over the sample period, along with their average annual flow. Saudi Arabia is the most common destination, accounting for 33% of new hires. It also shows the average monthly wage in US dollars by destination, showing wide differences in the wages Filipinos earn in different locations. Since the micro data contain a few outliers on wages, we trim at the 1st and 99th percentiles before taking means.

Since the micro data from POEA does not include skill levels, we calculate average education levels by occupation using the 1992-2003 Survey of Overseas Filipinos

(SOF),[8] and assign each occupation the average education level. We use this to then construct skill quartiles of aggregated occupational cells in our data. The average years of education for occupations in the first quartile is 11.6 years, 12.8 years for the second quartile, 13.8 years for the third quartile, and 15.1 years of education for the fourth quartile. One sees notable differences in the wages that a worker of a given skill level can earn across destination countries. For instance, OFWs in the first skill quartile in Saudi Arabia receive an average wage of $336 per month, whereas OFWs of the same skill level in Japan earn an average monthly wage of $1,505. This large variation across destination countries holds for the more skilled quartiles as well. The highest skilled workers in Saudi Arabia earn $553 per month, whereas in Japan these OFWs earn $1,661 on average each month.

2.3.2 Macro Data

Data on annual real GDP (constant 2000 US$) over the sample period were obtained from the World Development Indicators database and the World Factbook (Central Intelligence Agency, 2008-2009). These data are then matched to the POEA data based on destination country and year of departure. Over the sample period, destination countries in our sample experience vastly different rates of GDP growth as well as varied fluctuations in growth. For instance, during the Asian Financial Crisis, Asian countries such as Japan or South Korea faced dramatic reductions in GDP growth, whereas Middle Eastern destinations such as Bahrain or Kuwait maintained fairly stable growth. Online appendix Figure 1 plots real GDP growth in the top 10 destinations for OFWs. In addition to the differences in growth rates in 1997 during the Asian Financial Crisis, another period of high volatility was during the Global Financial Crisis, which by 2009 had affected some destinations more than others.

[8]The Philippine Labor Force Survey is administered annually to a nationally-representative sample of households. The SOF is administered as a rider to the LFS if the household reports having any members working overseas, and contains information on migrant demographics, overseas occupation and location, and remittances (all reported by the household remaining behind in the Philippines).

2.3.3 Sample Restrictions

The sample is restricted to include only countries with a positive number of OFWs in every year and to countries with GDP data available in each year, in order to create a balanced panel. These sample restrictions result in 54 destinations included in the analysis. Online appendix Table 1 presents a list of all included destination countries.

2.4 Results

2.4.1 Aggregate Impacts

In order to measure the impact of fluctuations in GDP at destination on the flows of Filipino migrants and the wages paid, we estimate the following equation for destinations j=1, 2, . . . , 54 and time periods t=1992, . . . , 2009:

$$log(M_{jt}) = \beta_0 + \beta_1 log(GDP_{jt}) + \alpha_j + \gamma_t + \epsilon_{jt} \tag{2.1}$$

where M_{jt} is the number of Filipino migrants leaving on new contracts to country j in year t; GDP_{jt} is the level of real GDP in country j in year t; α_j are destination country fixed effects; γ_t are time period fixed effects; and ϵ_{jt} is the error term for country j in year t. Standard errors are clustered at the level of the destination country. M_{jt} is replaced with mean or median wages in order to test the response of wages earned by these migrants to GDP. We estimate equation (1) for all migrants, and then separately by gender.

Time fixed effects control for any aggregate changes occurring in the world economy, as well as for any Philippines-specific changes that are affecting the overall supply of migrants.[9] Country fixed effects remove time-invariant effects in destina-

[9]Note this also controls for any overall devaluation or appreciation in the Philippines exchange rate as well.

tion countries, such as their overall policies towards migrant labor. The resulting identifying variation then comes from differences across destination countries in how GDP fluctuates over time. Since Filipino labor supply is small relative to the total labor forces of destination countries and we are looking at new contract labor movements, it seems reasonable to assume there is no reverse causation whereby changes in Filipino migrant numbers are driving GDP changes at destination. Online appendix Figures 2 and 3 provide scatterplots of the underlying data.

We use these data to estimate equation (1), which differs from the scatterplots in also including year fixed effects in the regression. The results are shown in Table 2.2. Column 1, Panel A shows the impact of GDP in a destination country on the total quantity of migrants going to that destination. For Filipino migrants as a whole this coefficient is 1.5 and significant at the 1 percent level. This elasticity suggests that if a destination country has 1 percent higher growth in output than other destination countries, 1.5 percent more Filipinos migrate on new contracts to this destination than migrate to other destinations. We can also not reject unit elasticity, whereby migrant numbers increase proportionately with GDP. Panels B and C then examine this elasticity separately by gender. The point estimates suggest slightly higher elasticity of migrant flows for females than males, but we cannot reject equality of the two.

By way of comparison, Kapsos (2005) estimates the aggregate national employment elasticities of growth in different regions around the world. He finds globally employment has an elasticity of between 0.3 and 0.4 with GDP, but is higher in services (0.6), and in the Middle East (1.1), with the elasticity for women in the Middle East being 2.2. Since migrant labor is likely to be easier for firms to adjust than native labor, it seems reasonable that our estimates are more on average higher than those of natives, and more similar to the Middle East estimates (where much of the labor force is foreign workers). In contrast, columns 3 and 5 of Table 2.2 show no sig-

nificant response of migrant wages at destination to changes in GDP at destination. The coefficients are all close to zero, and in five out of six cases, slightly negative.

Taken together, our results suggest all adjustment to GDP shocks occurs through quantities and not wages, which is consistent with hypothesis 1 and the binding minimum wages model. This pattern is not consistent with the aggregate volatility of employment and hiring wages in developed countries, because both employment and hiring wages are procyclical to a similar degree. Therefore matching models of the macroeconomy that incorporate such procyclicality (e.g., Pissarides 2009) cannot account for the patterns in our data.

The results above show a strong elasticity of migrant numbers to GDP, with no responsiveness of migrant wages. In columns 2, 4, and 6 of Table 2.2, we check whether our results are being driven by the occupational mix of workers changing with the business cycle at destination. To do this, we control for the share of Filipino migrants that are in each of the 10 most common occupations plus the residual share for each country-year. We see that the point estimates and their significance are very similar to the baseline results, so that we still obtain the same results even holding occupation fixed.

We consider several additional checks on the robustness of these results, which are reported in detail in the online appendix. In particular, we show that quantity elasticities look similar if we use total hires or rehires instead of just new contracts; that contract length does not vary with GDP at destination; that the results are robust to using up to 5 lags of log GDP; that impacts are not different in recessions; and that the results are robust to a number of alternative criteria for which countries we include in the regressions. In addition, we show in US Census data that Filipino workers in the US typically earn at least as much as native-born workers in the top Filipino migrant occupations, consistent with our claim that migrants face binding minimum wages in destination labor markets.

2.4.2 Heterogeneity of Impacts by Skill Level

Legally specified minimum wages in destination countries provide a reason why the market for legal low-skilled migrant labor does not clear, and for the large wage gains for low-skilled migrants documented in Clemens, Montenegro and Pritchett (2008). However, the absolute income gains from emigration are even larger for high-skilled workers, with Gibson and McKenzie (2011) showing that very high-skilled workers from four developing countries increased their annual incomes by US$40,000-75,000 by emigrating. Together with the institutional practices of restricting high-skilled immigrants to earn the prevailing wage, this suggests that the labor market for high-skilled workers also faces binding minimum wages, and that we may therefore also see most of the adjustment to output shocks at destination occurring via quantities rather than wages even for high-skilled workers.

We investigate this in Table 2.3, which estimates equation (1) separately by skill quartile. The lowest skill quartile includes occupations like construction work, farming, and welding; the second includes occupations like domestic helpers (maids), shop assistants, and cooks; the third occupations like supervisors, caregivers, and electricians; and the highest skill quartile includes occupations like engineers, teachers and accountants. Panel A shows that the quantity of all four skill groups has a positive relationship with GDP, with no monotonic relationship in the point estimates across skill levels, and we cannot reject equality of impacts across the four skill groups. Low, medium, and high skilled workers therefore all seem to experience a reduction in migrant numbers when GDP falls and increase when it rises.

Panels B and C of Table 2.3 examine the responsiveness of median and mean wages respectively to GDP by skill quartile. Again we cannot reject equality of coefficients across the four skill categories at conventional skill levels and find point estimates which are mostly small in magnitude and statistically insignificant. An exception is the second quartile, in which we see a significant negative coefficient on

median wages of -0.31, and a similar-sized, but statistically insignificant coefficient on mean wages. This suggests wages for individuals in this skill range may actually fall when economic conditions at destination improve, although if we control for multiple hypothesis testing by multiplying the p-values by the number of separate outcome-group results being tested here for wages, then this result also would not be significant.

2.4.3 Does who migrates change over the business cycle?

An alternative explanation for our results could be that the selection of who migrates is changing over the business cycle. In particular, in a market-clearing model with wages falling in a recession, we could observe in our data a reduction in the quantity of individuals migrating with no change in mean wage paid to migrants if low-skilled, lesser-paid, individuals experience more of a reduction in migrant numbers than higher skilled individuals do during recessions. Indeed Solon, Barsky and Parker (1994) show that such a change in composition leads aggregate wages in the U.S. to be less procyclical than indicated by longitudinal microdata.

We have shown above that our results are robust to controlling for occupational categories, and that we cannot reject that the elasticity of migrant quantities to GDP changes at destination is constant across skill quantiles. Nevertheless, as a further check, we use the Survey of Overseas Filipinos to directly examine whether the observable characteristics of who is migrating varies over the destination business cycle.

The Survey of Overseas Filipinos is an annual survey which asks a nationally-representative sample of households in the Philippines about members of the household who left for overseas in the past five years (see Yang (2008)). Since it is remaining members of the household who are reporting on the absent migrants, only basic details of the characteristics of these migrants are available. However, it is the most comprehensive source available on the characteristics of new Filipino migrants, and

importantly, does contain information on the destination country and whether this is the first time an individual is migrating or not for contract work. We use data from the 1992-2003 surveys.

In Table 2.4 we use this data to test whether the age, sex, marital status, place of origin in the Philippines, and education of new migrants going to a particular destination varies with GDP shocks at destination. To do this, we estimate equation (1) with these characteristics as the dependent variables. We find no statistically significant relationships between GDP changes at destination and the characteristics of the migrants going to that destination. The dependent variables are in levels, and GDP is in logs, so to interpret the magnitude of the coefficients, we divide them by 100 to get the impact of 1 percent change in GDP at destination. Thus not only are the coefficients not statistically significant, but we also see they are very small in magnitude. For example, 1 percent higher GDP at destination is associated with a decrease of 0.049 years in the mean age of migrants going to that destination and an increase of 0.024 years in the mean education of migrants going to that destination.

Thus we find no evidence of large selectivity in which individuals migrate over the business cycle, at least in terms of these observable characteristics. We speculate that this composition effect is much less important for the type of migrant labor examined here than it is for examining the procyclicality to domestic business cycles of native wages because of the much greater distortions in global labor markets.

2.5 Analysis of a Change in the Minimum Wage for Domestic Helpers

The results presented thus far are consistent with the case of binding minimum wages presented in Section **??** above. To bolster this interpretation of the results, we provide direct evidence (via a natural experiment) that minimum wages bind for an

important subset of overseas jobs, domestic helpers (maids). In addition, this analysis will also rule out the possibility that true wages paid to OFWs are in fact changing in response to GDP shocks, but overseas employers are simply misreporting (failing to report changes in wages).

On December 16, 2006, the Philippine government implemented the Household Service Workers Reform, aimed at improving working conditions for Filipino migrants working as domestic helpers (maids).[10] New policies associated with the reform included worker skill assessments, country-specific language and culture training, and the elimination of placement fees. One of the main components of the policy change was an increase in the minimum wage to $400 per month for domestic helpers. This doubled the prevailing wage rate of $200, especially in Middle Eastern countries. All employers hiring domestic helpers with visas issued after December 16, 2006 were required to pay a minimum wage of $400 per month.[11]

Ezquerra (2008) describes the political economy of this reform, noting that it was sparked by the Israeli-Lebanon war of 2006, in which the Philippines government acted to repatriate quickly its migrant workers, including a large number of domestic workers. This brought attention to the exploitative conditions that some of these workers experienced, with media accounts of a worker saying the war gave her the chance to escape a master who repeatedly raped her; a worker dying when trying to escape from her employer who wouldnt let her leave by tying together bedsheets and attempting to escape from a fourth floor balcony; and other returnees telling how they were made to sleep in little rooms with dogs, eat leftovers, and work until midnight.

However, the increase in minimum wages proposed under the reform also met

[10] In the context of overseas Filipino work, individuals employed by a private household overseas for childcare and/or general household work are typically referred to as "domestic workers," "maids," "domestic helpers," or "household service workers."

[11] see *www.poea.gov.ph/hsw/hsw_advisory1.html* for details about all new regulations [accessed July 19, 2011].

strong resistance from recruitment agencies, arguing that this would have strong negative impacts on migrant numbers. Ezquerra (2009, p.148) describes how "Recruiting agencies and aspiring domestic workers held rallies in Metro Manila, in which the latter protested the upcoming reforms and expressed their willingness to work for less than $400." In response to this pressure the government dropped a plan to raise the minimum age for recruitment as a domestic employee to 25, and delayed the implementation of the reform until March 2007, but the reform was still implemented.

For a number of countries, this policy change thus led to an exogenous and large increase in wages for domestic helpers. Many destinations, such as Canada and Italy, already paid domestic helpers wages above $400 per month, and the reform had no effect on the wages paid in these locations. Similarly, even in countries facing a binding minimum wage for domestic helpers due to the policy change, this wage increase did not have a binding effect on the minimum wage paid to Filipino workers in other industries. Thus, using either countries or industries not subject to the minimum wage change as a control group, we can conduct a difference-in-difference analysis to test the effect of the increase in the minimum wage on the quantity of OFWs and on OFW wages.

2.5.1 Estimation Strategy

The treatment group in this analysis is composed of domestic helpers in 18 destination countries that faced a new binding minimum wage after the policy change.[12] We create two comparison groups for the difference-in-difference analysis. First, we use domestic helpers in countries where the median wage prior to 2007 was greater than $400 (i.e., countries not affected by the policy change). 21 countries are included

[12]Countries included in the treatment group are Bahrain, Brunei Darussalam, China, Cuba, Cyprus, India, Jordan, Kuwait, Malaysia, Oman, Pakistan, Palau, Saudi Arabia, Singapore, South Africa, Syrian Arab Republic, United Arab Emirates, and Republic of Yemen.

in this comparison group.[13] Alternatively, we restrict the sample to include only the 18 destinations in which domestic helpers faced a higher minimum wage as a result of the policy change. We then create a comparison group of the other occupations in these countries.[14] Our difference-in-difference analysis compares the treatment and control groups before and after the policy change in 2007.

When other countries not facing a binding minimum wage change are the comparison group, we measure the effect of the minimum wage change by estimating the following equation for destinations j=1, 2, . . . , 39 and time periods t=2001, . . . , 2009:

$$M_{jt} = \beta_0 + \beta_1 * BindingMinimumWageChange_{jt} + \alpha_j + \gamma_t + \epsilon_{jt} \tag{2.2}$$

where M_{jt} is the number of Filipino domestic helper migrants leaving on new contracts to country j in year t; $BindingMinimumWageChange_{jt}$ is an indicator equal to 1 if the country j is one of the 18 countries facing a binding change in the minimum wage for domestic helpers, and t is 2007, 2008, or 2009 (after the introduction of the wage increase). α_j are destination country fixed effects; γ_t are year fixed effects; and ϵ_{jt} is the error term for country j in year t. Standard errors are clustered at the destination country level. The sample is restricted to the period 2001 to 2009.

When the comparison group is other occupations in these same low-wage countries, we estimate the following equation for destination$j$=1, 2, . . . , 18, occupation s=1,2,. . . ,17 and time periods t=2001, . . . , 2009:

[13]Countries included in this comparison group are Australia, Austria, Belgium, Canada, Finland, France, Germany, Greece, Hong Kong, Israel, Italy, Japan, South Korea, New Zealand, Russia, Spain, Sweden, Switzerland, Taiwan, United Kingdom, and United States. Of the 22,380 domestic helpers in the comparison group in 2006, only 7 workers have wages less than $400.

[14]There are 17 main occupations that encompass 88.7 percent of OFWs. We compare domestic helpers to these OFWs in the other 16 occupation groups.

$$M_{sjt} = \gamma_0 + \gamma_1 DomesticHelper_s + \gamma_2 BindingMinimumWageChange_{sjt} + \alpha_j + \delta_{sjt} + \epsilon_{jt} \tag{2.3}$$

Where $BindingMinimumWageChange_{sjt}$ takes value 1 for the domestic helper occupation after the domestic helper wage increase (years 2007-2009) and zero otherwise. $DomesticHelper_s$ is a binary variable equal to 1 for domestic helpers and 0 for all other occupations. α_j are destination country fixed effects; δ_t are year fixed effects; and ϵ_{jt} is the error term for country j in year t. Standard errors are clustered at the destination country level.

2.5.2 Results

Prior to estimating equations (2) and (3), we first confirm that our previous empirical results from estimation of equation (1) for all jobs in aggregate also holds for domestic helpers. Re-estimating equation (1) for only domestic helper jobs, we find that the coefficient on log GDP in the regression for log counts, 1.138, is very similar to the corresponding coefficient in Table 2.2 and statistically significant at the 10 percent level. By contrast, the coefficient on log GDP in the wage regression is small in magnitude (-0.079) and not statistically significantly different from zero at conventional significance levels. This also corresponds to the wage result in Table 2.2 for all jobs in aggregate.

We then turn to estimation of equations (2) and (3); results are in Table 2.5. Column 1 shows the results for the full sample, including destination and year fixed effects. The coefficient on the indicator for a binding increase in the minimum wage is the causal impact of the minimum wage change on the quantity of migrants. When the comparison group is countries with a non-binding minimum wage for domestic helpers (Panel A), the impact of the minimum wage change is a reduction in em-

ployment of Filipino domestic helpers by 54.6% (exp(-0.605)). When the comparison group is occupations other than domestic helpers (Panel B), the impact is a 56.8% (exp(-0.565)) reduction in employment of Filipino domestic helpers compared to other unaffected occupations.

Column 2 shows that this reduction in employment was accompanied by an increase in wages, both relative to the wages of domestic workers in countries which werent affected by the new law, and relative to the wages of Filipino migrant workers in other occupations in the same destination country who were not affected by the new law. The increase in wages is estimated to be between 27 and 46 percent, depending on which comparison group is used. To test the robustness of our results, in the last two columns we restrict the sample to only destination countries that hire domestic helpers in every year of the sample period (2001-2009). These results are similar to the full sample results: an increase in the minimum wage led to a decrease in the quantity of domestic helpers in countries where the minimum wage was binding and an increase in the wage paid to these workers.

If employers and workers were able to evade these regulations by reporting different wages on their official contracts to those paid in practice, then we would expect to see only a change in the stated wage, with no reduction in employment. The fact that we find a reduction in employment therefore provides clear support that the minimum wage binds in practice as well as in theory, and that setting high minimum wages increases the wages migrants earn at a cost of a reduction in the number of jobs available to them.

2.5.3 Substitutability of Filipino workers with other nationalities

The large quantity response to a change in minimum wages here is in contrast to many studies in the labor literature which have found zero or relatively limited employment responses to changes in the minimum wages (e.g. Card and Krueger

(2000); Neumark and Wascher (2000); Dube, Lester and Reich (2010)). There are two possible reasons for this difference. First, the change we are examining is a much larger change, doubling the wage; by contrast, other studies have examined more marginal changes in minimum wages. If there are some fixed costs to firing workers, we might expect quantity responses to be more than proportionately larger for large changes in minimum wages. Secondly, and likely more important, ours is a context in which only some workers (Filipinos) are subject to the minimum wage change.

If Filipino workers were perfect substitutes for either native workers of the destination country, or for immigrant workers from other countries, then we would expect to see no Filipinos hired at all if minimum wage requirements imposed by the government of the Philippines were binding. However, there are reasons to think that Filipino workers are not perfect substitutes for either natives or migrants from other countries, so that the Philippine government is effectively engaging in monopolistic competition, and can charge a higher wage for its workers without losing all demand for these workers.

Policies that require employers of migrants to show that there is a lack of qualified local applicants at the prevailing wage are one reason that migrant workers are not perfect substitutes for local workers in the types of jobs for which migrant workers get hired. Indeed imperfect substitution between native workers and immigrants has been found in several recent empirical studies, and has been used to help explain the relatively limited impacts of immigration on the wages of native workers (Ottaviano and Peri, 2012; Manacorda, Manning and Wadsworth, 2012). As such, we should not expect Filipino workers to be completely replaced by native workers if the Philippine government increases the wages its migrants must be paid.

It seems more likely that Filipino workers will be substitutable with immigrant workers from other countries than with native workers. We are unaware of any data comparable to the Philippine data we have which would enable us to look at how

migrant numbers from competitor countries like Indonesia or Bangladesh reacted to the change made in Philippine policy. However, it does appear that the drop in Filipino numbers was at least in part made up by recruitment from other countries, with newspaper reports from countries like Qatar and the U.A.E. discussing recruitment efforts to bring in workers from non-traditional source countries like Bosnia, Morocco, and Sudan.[15]

Nonetheless, statements by recruiters and foreign government officials suggest that Filipino workers are seen to have certain desirable attributes which make them less than perfect substitutes with immigrant workers from other countries. First, Filipinos have English language proficiency, so that, for example, Hong Kong employers of housemaids are said to prefer Filipino workers over Malaysian and Indonesian workers (GMA News, 2009). Second, worker training in the Philippines is often done with an overseas market in mind, so Filipino workers skills are often more easily adapted to overseas markets (Visa Workforce, n.d.). Third, Filipino workers are often touted as having better work ethics, being more sociable, and being better able to adapt to working abroad than nationals of many other countries (Karim, 2008). As a result, we might not expect all Filipino workers to be replaced by workers from other countries when their relative wages rise, but still expect the quantity response to be larger than would be the case when the minimum wage change applied to all workers.

2.6 Conclusions

The view that very large distortions exist in the global market for migrant labor is widespread among economists (Clemens, 2011; Rodrik, 2011). However, empirical work that identifies the specific nature of the distortions is scarce, in part due to severe data limitations. This papers main contribution is to shed light on key distortions in

[15]E.g. http://dohanews.co/post/15124268586/qatar-to-cast-wider-net-for-domestic-workers [accessed February 5, 2013] (Khatri, 2012).

the international market for migrant labor via analysis of migrant flows and contracted wages in a unique data resource: the Philippine governments database of contracted migrant worker jobs.

We estimate the impact of economic shocks in Filipino migrant destination countries on migrant flows to and the wages that migrants are paid in those destinations, from 1992-2009. We find that percent changes in destination country GDP have a large (roughly one-to-one) impact on percent changes in Filipino migrant flows, but, by contrast, essentially zero impact on migrant wages. This pattern is consistent with the existence of a particular type of distortion in the market for international migrant labor: binding minimum wages. This pattern would not be predicted by market-clearing models of the labor market or binding immigration quotas.[16]

These minimum wages appear to be occupation-specific; we cannot reject that the effect of GDP fluctuations is similar across higher- and lower-skilled migrant occupational categories. We also provide direct evidence of the existence and impact of binding minimum wages for an important occupational category (domestic helpers), via analysis of a natural experiment that raised the mandated minimum wage for Filipino domestic helpers. This minimum wage increase led to increases in wages and reductions in migrant flows in this occupational category.

Direct evidence on the nature of distortions in the market for international migrant labor is important, because it clarifies the nature and interconnectedness of the welfare gains and losses associated with international migration. Wage floors for international migrant work mean that the wage gains for migrants that are able to secure work overseas are magnified. But at the same time, the total quantity of migrant labor is smaller than the market-clearing level. Furthermore, these same wage floors also lead migrant flows to be more sensitive to economic shocks in destination countries

[16]The pattern is also contrary to the empirical procyclicality of both employment and hiring wages observed in a variety of developed economies (the destinations for many migrant workers), indicating that models of the macroeconomy that properly incorporate such procyclicality also cannot explain our results.

than they would be if markets cleared, since they lead all labor market adjustment to occur via quantities rather than wages.

Second, our evidence reveals important welfare consequences of policies instituted by destination countries as well as by the migrant-source countries that set wage floors for international migrant work. On the destination country side, the policies in question include the U.S. federally-mandated minimum wage as well as H1-B rules requiring immigrant workers be paid the prevailing wage for the workers occupation. On the migrant-source country side, the key policy relevant for our analysis is the Philippine governments regulation of labor contracts to ensure wages paid are above occupation-specific minimums. Our results reveal that these policies lead to higher wages for workers able to secure jobs, but reduce the number of jobs available and lead the burden of adjustment to destination-country economic shocks to fall entirely on the employment rather than the wage margin. Migrant-source countries such as the Philippines are for the most part powerless to change regulations setting minimum wages for migrants in destination countries, but they clearly can change their own regulatory practices related to migrant labor. Our results underline the negative economic consequences of source-country government efforts to impose wage floors for migrant workers.[17]

Our results are most directly relevant for international migrant labor from a particular source country, the Philippines. That said, the Philippines is one of the most important global sources of workers for the international contract labor market, and several other countries such as India, Bangladesh, and Sri Lanka are seeking to emulate Philippine government policies regulating and promoting international migrant work (Ray, Sinha and Chaudhuri, 2007). Our results documenting the negative

[17]That said, another rationale given for imposition of wage floors for occupational categories such as domestic helpers is that they lead lower-quality employers to exit the market, resulting in less physical, sexual, or mental abuse of workers. Our results cannot directly speak to such potential benefits of minimum wages in this context, and thus we cannot say whether this reform increased or reduced welfare.

economic consequences of minimum-wage regulations on the part of migrant source countries should be an important input in these countries policy-setting process.

Figure 2.1: Response of Demand for Filipino Workers to GDP Shock with Binding Minimum Wages

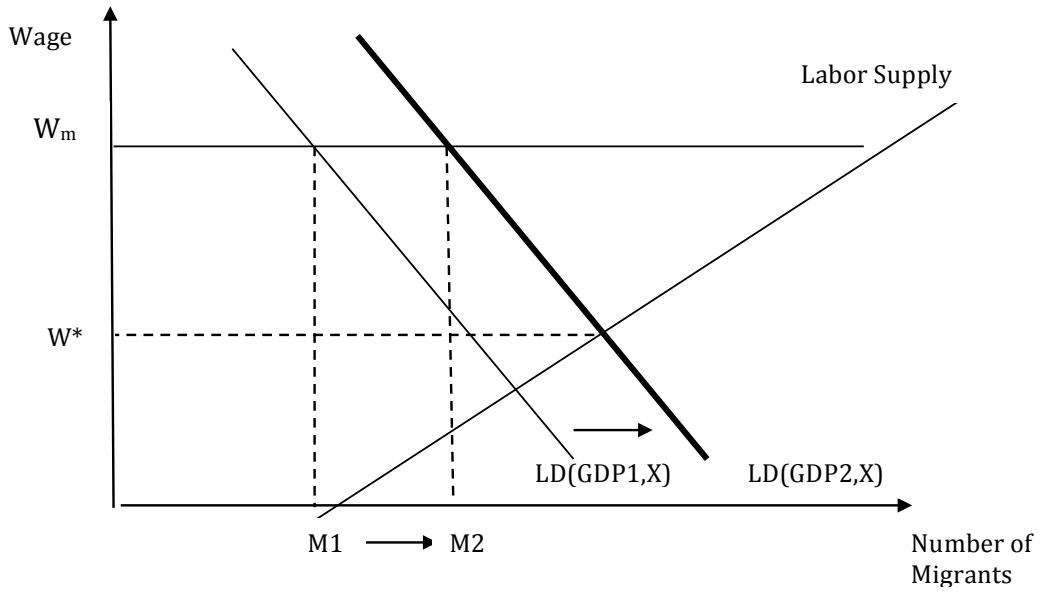


Figure 2.2: Response of Demand for Filipino Workers to GDP Shock with Binding Quotas

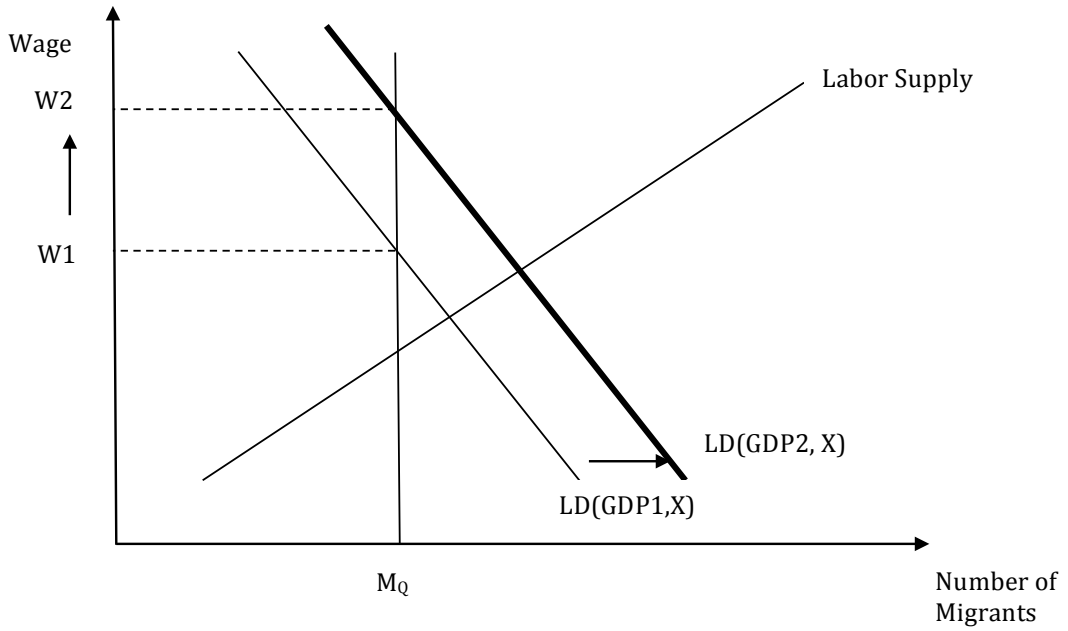


Table 2.1: Top 20 Migrant Destinations

Destination	Percent of total contracts (1992-2009)	New contracts per year		Monthly wages ($)			
		Mean	Standard deviation	Mean	Standard deviation of mean	Median	Standard deviation of median
1. Saudi Arabia	33.10	78860	25832.76	372.74	29.60	341.49	29.90
2. Japan	16.04	38205	24348.10	1779.99	164.16	1789.53	172.00
3. Taiwan	14.53	34621	14218.45	499.77	26.98	496.51	28.67
4. United Arab Emirates	10.12	24121	16313.17	347.70	66.22	279.06	61.52
5. Hong Kong	8.92	21247	4392.89	470.68	43.25	453.56	29.63
6. Kuwait	4.97	11848	8248.60	349.66	88.05	292.80	85.58
7. Singapore	1.44	3438	698.81	535.80	182.84	354.14	179.84
8. South Korea	1.44	3435	2699.86	514.18	202.45	483.67	215.76
9.Malaysia	1.38	3298	3086.11	386.53	152.79	273.58	123.48
10. Bahrain	1.32	3190	1529.07	377.31	67.25	306.01	54.71
11. Brunei Darussalam	1.29	3069	1250.75	372.28	63.18	308.53	56.86
12. Canada	1.05	2496	2770.76	1016.12	305.69	985.59	284.59
13. United States	1.00	2387	1252.49	1755.94	329.68	1754.60	490.34
14. Israel	0.67	1593	1299.48	687.82	180.12	684.28	194.81
15. Oman	0.65	1544	993.39	353.57	92.61	243.73	76.46
16. United Kingdom	0.60	1432	1706.25	1474.97	536.70	1446.43	612.99
17. Italy	0.49	1171	1305.01	681.70	131.32	611.35	108.79
18. Cyprus	0.35	844	543.51	353.68	76.86	317.11	55.92
19. Spain	0.31	729	599.73	683.56	224.11	656.01	213.78
20. Jordan	0.30	705	1184.48	312.97	95.00	277.78	94.28

Notes: Qatar is omitted from the analysis due to lack of available GDP data. Wages are trimmed at the 1st and 99th percentiles.
Source: POEA and authors' calculations

	Log Quantity of New Migrant Contracts		Log Mean Wages Paid to Migrants		Log Median Wages Paid to Migrants	
	Base Specification	Occupation Shares Constant	Base Specification	Occupation Shares Constant	Base Specification	Occupation Shares Constant
Panel A: All Migrants						
Log GDP	1.522***	1.340***	-0.041	-0.113	-0.063	-0.142
	(0.501)	(0.375)	(0.137)	(0.124)	(0.158)	(0.148)
Number of Observations	972	972	967	967	967	967
R^2	0.863	0.914	0.762	0.842	0.738	0.813
Mean of the Dependent Variable (Levels)	4482	4482	794	794	737	737
Panel B: Female Migrants						
Log GDP	1.983***	2.067***	0.043	-0.135	-0.045	-0.227
	(0.621)	(0.666)	(0.209)	(0.174)	(0.226)	(0.201)
Number of Observations	972	972	901	901	901	901
R^2	0.903	0.912	0.767	0.838	0.756	0.819
Mean of the Dependent Variable (Levels)	2814	2814	738	738	706	706
Panel C: Male Migrants						
Log GDP	1.148**	1.276***	-0.027	-0.097	-0.019	-0.096
	(0.527)	(0.438)	(0.116)	(0.112)	(0.147)	(0.146)
Number of Observations	972	972	930	930	930	930
R^2	0.835	0.861	0.699	0.780	0.678	0.751
Mean of the Dependent Variable (Levels)	1668	1668	871	871	816	816
P-value of Equality of Gender Coefficients	0.2995		0.8767		0.6390	

Notes: The sample includes all new hires from 1992-2009. All regressions include country and year fixed effects. Robust standard errors clustered at the country level are in parentheses. The unit of observation is the country-year, and all wages are trimmed at the 1st and 99th percentiles to remove outliers. Regressions where the occupation shares are held constant control for the shares of OFWs in the top 10 occupations for a country-year, plus the residual share for all other occupations. Countries are included if they have new hires and non-missing GDP data in each year from 1992-2009.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: POEA, WDI, and authors' calculations

Table 2.2: Responsiveness of the Quantity and Wages of New Migrants to GDP

	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile	p-value for test of equality
***Panel A*: Dependent Variable: Log Quantity of New Contracts in this Skill Level**					
Log GDP	0.668	1.295**	0.652	1.046***	0.7890
	(0.821)	(0.496)	(0.494)	(0.299)	
Number of country-year observations	717	904	832	861	
***Panel B*: Dependent Variable: Log Median Wages paid to Workers in this Skill Level**					
Log GDP	-0.194	-0.309**	0.020	0.101	0.6390
	(0.123)	(0.153)	(0.161)	(0.175)	
Number of country-year observations	708	893	817	823	
***Panel C*: Dependent Variable: Log Mean Wages paid to Workers in this Skill Level**					
Log GDP	-0.131	-0.257	0.060	0.151	0.8767
	(0.111)	(0.154)	(0.133)	(0.151)	
Number of country-year observations	708	893	817	823	
Percent of Individual Level Observations	13.29	52.60	22.58	11.53	

Notes: The sample includes all new hires from 1992-2009. All regressions include country and year fixed effects. Robust standard errors clustered at the country level are in parentheses. The unit of observation is the country-year, and all wages are trimmed at the 1st and 99th percentiles to remove outliers. Skill quartiles are assigned as follows: average years of education by occupation are calculated from the 1992-2003 SOF; then quartiles are assigned based on aggregated occupational cells; these quartiles are then matched by occupation to the POEA micro data. Countries are included if they have OFWs in this skill category and non-missing GDP data.

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.
Source: POEA, WDI, SOF, and authors' calculations

Table 2.3: Responsiveness of Quantities and Wages to GDP by Skill Quartile

Characteristics of first-time migrants in Survey of Overseas Filipinos

	Mean Age	Median Age	Mean from Manila	Mean Female	Mean Married	Mean Education	Median Education
Log GDP	-4.888	-6.835	-0.209	0.089	-0.097	2.391	2.257
	(6.623)	(6.788)	(0.236)	(0.287)	(0.250)	(1.924)	(1.940)
Observations	369	369	369	369	369	331	331
R^2	0.258	0.272	0.357	0.528	0.253	0.305	0.291
Mean of Dependent Variable	32.07	31.30	0.18	0.47	0.48	13.12	13.27

Notes: The sample includes all first time contract hires in the Survey of Overseas Filipinos from 1992-2003. All regressions include country and year fixed effects. Robust standard errors clustered at the country level are in parentheses. The unit of observation is the country-year.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: SOF, WDI, and authors' calculations

Table 2.4: Does who migrates vary with economic conditions at destination?

Panel A: Non-Minimum Wage Countries as Control	Full Sample		Balanced Panel	
	Log Count	Log Wages	Log Count	Log Wage
Binding Increase in Minimum Wage	-0.605*	0.238***	-0.642	0.289***
	(0.341)	(0.073)	(0.392)	(0.074)
Observations	327	324	279	276
R^2	0.918	0.907	0.910	0.942
Panel B: Other Industries as Control				
Binding Increase in Minimum Wage	-0.565**	0.377***	-0.641**	0.413***
	(0.225)	(0.057)	(0.240)	(0.058)
Domestic Helper	2.172***	-0.711***	2.717***	-0.710***
	(0.521)	(0.068)	(0.510)	(0.068)
Observations	1828	1814	1487	1481
R^2	0.648	0.377	0.649	0.370

Notes: The sample period is from 2001-2009. All regressions include country and year fixed effects. Robust standard errors clustered at the country level are in parentheses. In Panel A, columns 1 and 2 have 39 jobsites included in the estimates, and columns 3 and 4 use 31 jobsites. In Panel B, 18 jobsites are included in the estimates in columns 1 and 2, and columns 3 and 4 use 14 jobsites. Destination countries are included in the treatment group if they have a median wage less than $400 in 2006 (implying that the minimum wage change in 2007 would be binding for these destinations). Industries are included in the control group if they fall in one of the other top 16 occupations. Each of these occupations has >55,000 OFWs over the sample period, and together comprise 89% of all migration episodes over the sample period. All wages are trimmed at the 1st and 99th percentile to remove outliers.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: POEA, WDI, and authors' calculations

Table 2.5: Effect of a Change in Domestic Helper Minimum Wage on Domestic Helper Hiring

CHAPTER III

Banned from the Band: The Effect of Migration Barriers on Origin-Country Labor Market Decisions

3.1 Introduction

Global labor mobility is far from free. Immigration policies in destination countries serve as a major determinant of emigration flows (Clemens, 2011; Ortega and Peri, 2014), and policy debates around the globe currently focus on how to control the flow of migrants, be it through quotas, point systems, or border fences. Yet, international migration provides substantial benefits to poor countries, leading to increases in schooling (Cox-Edwards and Ureta, 2003; Dinkelman and Mariotti, 2014; Theoharides, 2014*b*) and household investment (Woodruff and Zenteno, 2007; Yang, 2008) as well as reductions in risk (Yang and Choi, 2007). Further, Clemens, Montenegro and Pritchett (2008) show that the same worker earns substantially different wages depending on the country of employment.

Despite the benefits of migration for migrant-sending countries, the migration literature primarily has focused on the effect of immigration policies on native workers (Borjas, 2003; Card, 2009; Ottaviano and Peri, 2012), and very few studies examine the implications of such policies on the migrant-sending country. Clemens (2011)

asserts that gains from reducing barriers to international migration are much larger than gains from reducing barriers to trade or capital flows. The majority of evidence is restricted to the effects on world GDP; studies estimate that eliminating migration barriers could lead to gains in world GDP of 50 to 150 percent (Klein and Ventura, 2007; Moses and Letnes, 2004; Hamilton and Whalley, 1984; Iregui, 2001). The evidence on the microeconomic effects is even more limited. Dinkelman and Mariotti (2014) find reduced investment in education in response to a migration ban imposed by the Malawian government that halted migration of Malawians to South Africa.

At a microeconomic level, migration barriers can have a number of effects on migrant-sending countries. Understanding the consequences of such policies is of particular importance for policymakers in migrant-sending countries. As barriers are imposed, remittances from the affected destinations will halt. This reduction in income may lead to more binding credit constraints for households. As a result, households may change their labor market choices both domestically and internationally. For instance, household members that were not previously working may now seek employment, potentially causing employment or unemployment rates to rise. Child labor may also rise in response. Internal and international migration may change, though the direction is ambiguous depending on whether credit constraints prevent migration or whether fewer labor market opportunities at home encourage migration. While previous studies have examined changes in demand for migrants or changes in remittances on a variety of sending-country outcomes, migration barriers imposed by immigration policy differ from changes in host-country demand for migrants in that they typically represent a more permanent change. If households are able to adjust their employment decisions to perfectly compensate for lost income from migrants, then there should not be effects on things like consumption or education. If, on the other hand, unemployment rises, this suggests that households are not able to perfectly adjust and there will likely be adverse implications on other outcomes as

well. Thus, understanding labor market responses provides a window into the overall disruptiveness of the policy change.

In this paper, I provide empirical evidence on the effects of migration barriers imposed by the host country on migrant-sending countries. Specifically, I answer the causal question: What is the effect of the closure of a major migration channel on the labor market decisions of households in the country of origin? To answer this question, I use a policy change in Japan that imposed significant barriers to the migration of Filipino Overseas Performing Artists (OPAs) as a natural experiment. OPAs are primarily women working as hostesses in nightclubs and gentlemen's clubs. The nature of OPA migration is historically controversial. In 2005, in response to claims from the United States that OPAs were victims of trafficking, Japan dramatically raised the education and experience requirements for Filipinos migrating to Japan as OPAs. This effectively closed this migration channel, with Filipino OPA migration to Japan falling from 71,108 in 2004 to 6,696 in 2006 and to 925 by 2011.

Yet, not all geographic regions of the Philippines were affected equally by this policy change. Migrant networks matter in terms of where individuals migrate and what they do there (Munshi, 2003), and the Philippines is no exception. Certain areas of the Philippines historically send migrants to certain destinations and in certain occupations (Theoharides, 2014*b*). As a result, provinces that specialize in OPA migration receive a larger treatment dosage from the policy change than those that do not. Exploiting this natural experiment, I employ a difference-in-differences estimation strategy using the percent of OPA employment in the province population in a base year as a continuous policy variable to define the treatment dosage. The magnitude of the point estimates sheds light on if there is a multiplier effect for migration. If I find a reduction in migrants from treated provinces that is larger than the reduction imposed by the ban itself, this suggests that there are spillover effects from the policy change. If, on the other hand, I find that the reduction in migrants

is smaller than what would occur as a result of the ban, this suggests that OPAs are able to easily switch into new occupations overseas.

I find that in response to the policy change, migration decreases more for provinces with a higher baseline OPA share. Specifically, moving from the 25th to 75th percentile of the baseline OPA share is associated with a 1.2% greater decrease in migration after the policy change. The effects are larger for new hires, suggesting that new migrant contracts are more vulnerable to policy shocks. I also find a substantial multiplier effect, with migration declining by more than the amount of the policy change. The multiplier effects are larger for new migrants, and current migrants appear to crowd out new migrants by renewing contracts at a higher rate. The spillover effects of this policy lead to reductions in both female and male migration. Domestic helpers, plumbers, laborers, and production workers all are hired at a lower rate than prior to the policy change in high OPA share provinces. Domestically, the unemployment rate for women rises by 1.7% more in high OPA share provinces after the policy change than in low OPA share provinces. Child labor increases differentially by 1.3%, and 1.8% more individuals are now engaged in short-term work. The domestic labor market results suggest that when migration is reduced and remittances are no longer available, the domestic labor market choices are substantially different in order to cope with these changes, but that households cannot fully compensate for lost migration opportunities and would like to work more domestically. Robustness checks that define a treated group of provinces and construct a synthetic control group of provinces corroborate the main results.

This paper provides the first microeconomic estimates of the effects of a migration barrier on labor market decisions. It is also the first paper to examine the effects of a migration barrier imposed by the receiving country rather than the sending country. This is an important distinction because, while the effects on households may be similar, the government engagement may be vastly different. I also provide the first

estimates of the migration multiplier. This will help policy makers in migrant-sending countries predict the resiliency of their overseas workforce to changes in the migration policy of destination countries.

Finally, not only does this policy result in the closure of a major migration channel for Filipinos, but it also halts migration in a controversial migration channel. Restrictions on labor mobility are perhaps greatest when an occupation is deemed exploitive. The economics literature on trafficking is limited, and in particular the literature is silent on the implications of policies that regulate this type of employment for sending countries. My paper is the first to provide empirical estimates of the economic incentives for individuals to undertake employment opportunities in occupations often perceived as vulnerable or exploitive. Such estimates are important when considering the necessary social safety nets for households when individuals are removed from controversial employment environments.

The remainder of the paper is organized as follows. Section 3.2 provides background on migration from the Philippines with a focus on overseas performing artists in Japan and the subsequent anti-trafficking campaign that led to their decline. Section 3.3 discusses the data used in the analysis. The methodology is discussed in Section 3.4. Section 3.5 presents the results, followed by robustness checks in Section 3.6. Section 3.7 concludes.

3.2 Background

3.2.1 Filipino Migration

International migration is a common labor market option in the Philippines. Started in 1974, the Philippine Overseas Employment Program promotes contract migration of its citizens, and approximately 2% of the population migrates annually in a variety of occupations. This is legal and temporary migration through licensed

recruitment agencies, and contract duration is about two years on average. Workers are classified as either new hires who are working abroad on a new labor contract or as rehires renewing an existing contract. Family members of migrants typically remain at home in the Philippines. Contract migration is an increasingly common global phenomenon, particularly in Asia and the Middle East. While the Philippines was the first country to establish temporary contract migration as a labor market alternative, Indonesia, Sri Lanka, India, Bangladesh, and Tajikistan, among others, have all adopted or are in the process of adopting similar programs (Asis and Agunias, 2012; Rajan and Misha, 2007; Ray, Sinha and Chaudhuri, 2007; World Bank, 2011*a*).

Table 3.1 shows the top 10 occupations for new overseas Filipino workers in 2004, the year prior to the Japanese policy change. Overseas Performing Artists (OPAs) and domestic helpers are overwhelmingly the largest occupations and predominantly employ women. Migrants also go to a wide range of destination countries. For women, the largest destination in 2004 was Japan, though destinations throughout Asia and the Middle East are common. Approximately 50% of men work in Saudi Arabia. Likely due to migrant networks, location of origin in the Philippines is an important determinant of where and in what occupations migrants work while abroad. Stories of success abroad circulate in communities, and prospective migrants trust the experiences of those in their neighborhoods and choose to follow similar migration trajectories in terms of chosen recruitment agency, destination, and occupation (Barayuga, 2014). Theoharides (2014*b*) shows that province-level historic destination and occupation shares are a strong predictor of variation in contemporaneous province-level migration rates. This emphasizes the importance of migrant networks, whether through social networks or agglomeration effects, such as the prevalence of middlemen to facilitate the migration process to certain destinations or in certain occupations. In Section 3.4, I will explore the strength of OPA migrant networks in particular.

3.2.2 Overseas Performing Artist Migration

As shown in Table 3.1, OPAs compose 25.5% of new hire migration from the Philippines in 2004. Approximately 96% of OPAs are female, and 98.8% of OPAs work in Japan. In Table 3.2, I compare the characteristics of OPAs to the characteristics of all other new contract migrants in 2004. OPAs are overwhelmingly more female than the average non-OPA contract migrant. They are also younger, with an average age of 25 years compared to 32 years. This is primarily because the maximum age for OPAs hired by Japan is 35 years of age (Parrenas, 2008). OPA wages are high. Average monthly wages are $1,857 compared to $417 for other contract migrants. The contract durations are also much shorter, with an average duration of 4.6 months compared to 20.5 months. Migrants from the Philippines on average are quite well educated when compared with the Philippine population as a whole (Theoharides, 2014*b*), yet OPAs remain the exception. With a 10-year primary and secondary education system in the Philippines, the average contract worker has 13.3 years of education, or almost a college degree. OPAs, on the other hand, have 9.4 years of education on average, meaning that the average OPA is not a high school graduate.

The term "Overseas Performing Artist" is an umbrella term encompassing women employed as choreographers, dancers, composers, musicians, and singers. The nature of the employment of these women is work as hostesses in gentlemens clubs in Japan, where the dress code is "high heels and 'sexy' dresses" (Parrenas, 2008). Prior to 2005, before OPAs were hired recruiting agencies typically sent a photograph to prospective Japanese employers to aid their selection of OPAs. While POEA conducted an audition prior to deployment, this process was often tainted because recruitment agencies would find a way for selected OPAs to pass the audition, often through impersonation (Barayuga, 2014).[1]

[1]Selected OPAs without performance talent would send someone else to engage in the audition for them. Prior to the policy change in Japan, POEA was in the process of implementing a fingerprint scanning system in order to combat issues of impersonation in the interview process. The system

The actual work of OPAs in Japan is largely debated. Media reports and a number of studies assert that OPA employment is exploitive and essentially forced prostitution (Douglass, 2003; Ministry of Foreign Affairs of Japan, 2004). Alternatively, Parrenas (2011) contends that while a certain level of intimacy is expected of OPAs, forced prostitution is uncommon. In addition to the controversial nature of employment, many OPAs become attached to the Yakuza (Japanese organized crime) and are often victims of debt bondage through fees incurred during training or the confiscation of passports. OPAs typically do not receive their salaries until the end of the contract in order to ensure they do not leave prior to the completion of the contract (Parrenas, 2008).

Starting in 2000 with the passage of the Victims of Trafficking and Violence Protection Act, the U.S. began a campaign to crack down on human trafficking worldwide. In the 2004 and 2005 U.S. Trafficking in Persons Reports, Filipino OPAs in Japan were identified as victims trafficked into forced prostitution. In response, Japan adopted the Action Plan of Measures to Combat Trafficking in Persons (Ministry of Foreign Affairs of Japan, 2004). This dramatically altered the requirements for hiring OPAs bound for Japan. Before 2005 applicants were eligible for OPA employment as long as they met the requirements of a government agency in their country of origin (Parrenas, 2008).[2] Through a bilateral agreement with Japan, the Philippines only required OPAs to complete a training certificate of 6 months or less in duration and pass an audition. In response to the trafficking accusations, Japan revised their policy to require all OPAs to have 2 years of education or training in performance, and the Philippine government was no longer eligible to evaluate performers (Parrenas, 2008).[3] Because the population of OPAs from the Philippines is historically poorly

was scrapped once OPA migration fell in response to the policy change (Barayuga, 2014).

[2]Applicants were also eligible for OPA employment in Japan if they had 2 years of either training or work experience as a performing artist.

[3]While higher education standards for migrants may cause long run increases in education through aspirational effects of a higher expected wage premium (Shrestha, 2012), in the case of OPAs, poverty is believed to be the major impetus for migration for OPAs, and stigmas attached to OPA migration

educated, these policy changes imposed huge barriers to migration for traditional OPAs. Most experienced OPAs were not able to return to Japan for employment, and with limited economic opportunities at home, took part in migrant reintegration programs sponsored by the Philippine government (Parrenas, 2008).

The changes in outmigration of OPAs in response to the policy change can easily be seen from the plot of new OPA contracts over time shown in Figure 3.1. In response to the ban, annual OPA migration to Japan plummeted from 71,108 in 2004 to 6,698 workers in 2006. Overall OPA migration fell from 25.5% of all Filipino migration annually to 2.4%. It should be noted that concern over the work of Filipino OPAs in Japan was not a new phenomenon. The dip in deployment between 1994 and 1995 was in response to more stringent requirements imposed by the Philippine Labor Secretary to combat perceived exploitation of Filipinas. Upon her resignation, OPA migration returned to and surpassed its previous levels.

OPA migration is not distributed evenly across the Philippines. Figure 3.2 plots the province-level OPA migration rates in 1993 and shows that there is substantial variation in which provinces send OPAs. OPA migration was concentrated in the provinces surrounding Manila as well as a few provinces in the Visayas and in southern Mindanao. Figure 3.3 plots the OPA migration rates in 2004 and highlights the importance of geographic migrant networks for OPAs. Provinces that have high rates of OPA migration in 1993 continue to in 2004, whereas provinces that had low rates of OPA migration in 1993 still have very few OPA migrants as a portion of the population in 2004. Anecdotally, migrant networks are particularly important for OPAs. As for most contract migrants, word of mouth and trust play significant roles in where individuals migrate. As noted above, contract duration of OPAs is much shorter than for other contract migrants. As a result, OPAs return to the Philippines much more frequently (4 times as often) compared to other migrants, and

limit the aspirational effects.

the monetary benefits of OPA migration are thus much more visible to those still in the Philippines (Barayuga, 2014). Further, since OPAs are required to attend a training center prior to deployment, Filipinas from one province will typically enroll in a training center together, often one that is recommended by a person related to the trainee (Barayuga, 2014).

3.2.3 Multiplier Effects

While the OPA policy change only directly affected the migration of OPAs, in theory the ban may affect migration in other occupations and destinations. This would result in effects on migration that are larger or smaller than the magnitude of the ban itself. Contextualizing the magnitude of the effects of the OPA ban provides the first estimates of a "migration multiplier." Since many quotas or points systems refer specifically to migrants in certain occupations and are of course destination specific, this multiplier quantifies the importance of spillover effects and switching behavior across migration channels in determining migration outcomes.

Multiplier effects may matter for a number of reasons. First, spillover effects may occur that reduce migration in occupations other than the OPAs directly affected by the policy change. When opportunities are reduced due to migration barriers, this will lead to the elimination of remittances from that channel. If households are credit constrained, they may no longer be able to afford the migration fees for other household members to migrate to other destinations or in other occupations. This would cause migration to decline by more than the magnitude of the migration barrier. Further, the multiplier may also be larger due to changes in the presence of recruitment agencies or off-site recruiting. Recruiting agencies typically recruit for possible OPAs as well as several other occupations. After the policy change, recruiting agencies may choose to close or no longer hold off-site recruitment in the towns where they typically recruited OPAs. As a result, OPA recruitment will decline as suggested

by the policy change, but employment in other occupations will fall as the workers are recruited from other locations in the Philippines.

On the other hand, we might expect effects smaller than the magnitude of the ban if potential OPA migrants can easily switch between occupation categories and destinations. For instance, a prospective OPA migrant may instead move abroad as a domestic helper. In the case of migration from the Philippines, switching behavior seems less likely for two reasons. First, the importance of migrant networks results in rigidity in the local labor market that makes it more difficult for "OPA provinces" to easily become "domestic helper provinces." Second, there is an excess supply of migrants from the Philippines (McKenzie, Theoharides and Yang, 2014; Theoharides, 2014*b*), and so it seems unlikely that OPAs can easily switch when their employment opportunities are no longer available since a surplus of potential migrants already exists.

3.3 Data

To calculate the baseline share of OPAs, I use an original dataset of all new migrant departures from the Philippines between 1992 and 2009. I use probabilistic matching to combine two government administrative datasets from the Philippine Overseas Employment Agency (POEA) and the Overseas Worker Welfare Administration (OWWA). POEA records all new migration episodes from the Philippines in order to verify that workers are being paid wages as stipulated by their contract. The data include name and demographics, as well as destination, occupation, employer, and wages. OWWA, on the other hand, is concerned with the welfare of the workers and their families. While recording similar identifying information and demographics, OWWAs key variables of interest are the home address of the migrant so that in the event of natural disasters or other turmoil, they can contact the migrants family. Combining these two datasets creates a dataset that includes both the occupation

and destination of the migrant as well as their home address in the Philippines.[4,5] I then aggregate individual records annually by occupation and province to determine the number of new OPAs in each province in the base year. I divide by the working population at baseline as calculated from the Philippine Census of Population in order to calculate the baseline share of OPAs. I also use this original dataset to calculate both the overall number of new migrants and the number of new migrants by occupation and gender at the province level.

Figure 3.4 plots the baseline shares for each province as circles. There is substantial variation in the OPA shares at baseline, indicating that provinces will experience different dosages of treatment in response to the OPA policy change. To be clear, the shares are low, and the average OPA share at baseline is 0.05% of the population. Yet, compared to an average province-level migration rate at baseline of 0.44%, OPA migration clearly represents a significant portion of all overseas migration episodes.

I use the 1992-2011 Labor Force Surveys (LFS) from the National Statistics Office (NSO) to calculate both total province level migration rates as well as domestic labor market outcomes and a number of covariates. The LFS is a quarterly household survey conducted on a rotating panel of households. The survey asks about the recent employment status and work history of all members of the household of twelve or more years of age, including overseas members of the household. I use these data to construct employment and unemployment rates, the fraction of working aged individuals looking for work or looking for additional work, and the fraction of child aged 10 to 14 engaged in at least one or more hours of work per week.

Table 3.3 shows summary statistics for all three datasets. The new hire migration rate from the POEA data (0.44%) is much lower than the overall migration rate from

[4]I match the data using first name, middle name, last name, date of birth, destination country, gender, and year of departure using probabilistic or fuzzy matching techniques as discussed by Winkler (2004). The match rate is approximately 90% for 1993, the year in which the baseline values are calculated. See Theoharides (2014*b*) for further details.

[5]Unfortunately, home address of the migrant was not recorded by OWWA between 1999 and 2003.

the LFS (2.44%).[6] Using the POEA data, I can also calculate occupation-specific migration rates. For OPAs, the rate is on average 0.05% in 2004, the year before the policy change, and 0.01% of the population in 2006, the year after the policy change. 8.6% of the working population is currently unemployed.[7] 9.8% of children between the ages of 10 and 14 worked at least one hour in the past week. 1.5% of the working population is actively looking for work, while 4.9% of the population reports looking for additional work to supplement their current employment. Almost 12% of people report that their jobs are not permanent.

3.4 Empirical Strategy

To obtain a causal estimate of the effect of the OPA policy change on migration and employment outcomes, I exploit the fact that, due to historic migration networks, provinces with a larger share of OPAs as a portion of their population will experience a larger reduction in migration as a result of the ban compared to provinces with a smaller share of OPAs. This can be seen in Figure 3.4, which plots the OPA migration rates in 1993 (baseline) and in 2009. The dosage that each province receives in response to the policy change is the vertical distance between the circle and the triangle for each province. The further right a province is in the figure, the largest the effect of the policy change in the province.

Formally, I implement a difference-in-differences style analysis with a continuous treatment variable. I estimate the following equation:

[6]Most new hires go abroad on two-year contracts. The new hire migration rate as calculate here only includes the outflow in the current year. Thus, the LFS migration rate will include both these new hires, as well as new hires who are in the second year of their contract. As such, rehires as not simply the residual of the total LFS migration rate and the reported new hire migration rate, but will rather be less than this residual.

[7]The LFS defines unemployment as either those looking for work or discouraged workers.

$$MigrationRate_{pt} = \beta_0 + \beta_1 Post_t * ShareOPA_{p0} + \beta_2 X_{pt} + \alpha_p + \gamma_t + \epsilon_{pt} \quad (3.1)$$

where $MigrationRate_{pt}$ is the migration rate for province p in year t. $Post_t$ is a dummy variable equal to 1 for the years 2006 to 2011 and equal to 0 for 1998 to 2004. I exclude 2005 from the analysis since the ban occurred halfway through 2005. $ShareOPA_{p0}$ is the number of OPAs in province p in some base period divided by the total working population in the base period. I define the base period as 1993, though the results are also robust to using 1992 as the base year. α_p are province fixed effects, γ_t are year fixed effects, and ϵ_{pt} is the error term, which I cluster at the province level. There 80 provinces used in the analysis.[8] β_1 estimates the effect of the policy change for OPA provinces with different baseline shares on the province-level migration rate, among other outcomes.

The identifying assumption for β_1 to be a valid estimate of the causal effect of the OPA ban is that in the absence of the policy change, the migration rates in provinces with different baseline shares are parallel. I test this assumption by plotting the average total province-level migration rates before and after the policy change by quartile of the baseline OPA shares. Figure 3.5 shows the results. The trends appear parallel in the pre-period, though there does not appear to be much of an effect of the policy in the post-period. I will formally test the parallel trends assumption while controlling for covariates in Section 3.5.

In the ideal experiment, OPA migration rates would be randomly assigned at baseline across provinces. In the case of the continuous difference-in-differences identification strategy, the province fixed effects remove concern about time-invariant differences in provinces with varying baseline shares. However, a lingering question is why certain provinces historically sent a high share of OPAs while others did not.

[8] I drop four provinces that were not yet established in 1998 in order to have a balanced panel.

If these differences result in differential trending of variables related to the migration rate, this may lead to potential bias. Turning to the data, in order to determine what explains the high or low base share OPA migration rates in certain provinces, I regress the OPA share in 1993 on a vector of covariates.

The results are shown in Table 3.4, Column 1. Most of the point estimates are quite small in magnitude, and the covariates do not have a statistically significant relationship with the share OPA, suggesting that there are not systematic differences in demographics across high and low OPA share provinces. However, the percent of the population with some high school and the percent urban have precisely estimated correlations with the share OPA at baseline. High OPA share provinces are less likely to have a higher portion of the population with some high school education and are more likely to live in urban areas. Thus, while some covariates are correlated with the OPA shares, the number of statistically significant characteristics is similar to what would be found due to chance. However, to alleviate concern that differences in provinces at baseline may lead to differential trending in omitted variables related to the outcome variable, I will control for these covariates in all specifications.

Assigning baseline OPA shares 10 years before the policy change occurred reduces concern that these shares are formed endogenously. For the baseline OPA share to make sense as a measure of treatment dosage, high OPA provinces at baseline must remain high OPA sending provinces in later years prior to the policy change. In Section 3.2, I discussed the importance of both destination and occupation-specific migrant networks in explaining outmigration rates across the Philippines. I formalize this with respect to OPA migration in Table 3.4. Specifically, I regress the province-level share of OPAs in 1997, 2004, and 2009 on the share of OPAs at baseline in 1993 and a vector of covariates. In Columns 3 and 5, it is clear that baseline OPA shares are a strong predictor of later OPA migration rates. The magnitude in absolute value of the 1993 baseline share point estimate is over 250 times greater in 1997 (over 70

times greater in 2004) than the next largest point estimate, and is extremely precisely estimated. 2009 is five years after the policy change, and we can see that following the policy change, a high OPA migration rate at baseline is no longer predictive of the remaining OPA migration rate.

Figure 3.6 shows the importance of these networks graphically by plotting the province-level OPA migration rate in 1993 against the province-level OPA migration rate in 2004 along with a 45-degree line, shown as a solid line. While a best fit line (dashed) does not lie directly on the 45-degree line, suggesting that there is some movement in OPA shares over time, this figure further supports the importance of historic OPA migration rates in determining OPA migration rates over time. The main differences are due to four outliers, the four districts of Manila. In 1993, these districts composed much larger shares of OPA migration, but over time some of the migration opportunities spread across the provinces.

3.5 Results

3.5.1 Effects on Migration

In Table 3.5, Column 1, I estimate the effect of the OPA policy change on the total province-level contract migration rate, which includes both new hires and rehires and is calculated using the LFS. For a one percentage point increase in the fraction of OPAs in a province at baseline, the total migration rate decreased by -1.07 percentage points. Recall from Table 3.3 that the average fraction of OPAs out of the province population at baseline is 0.05% of the province population. Thus, interpreting the effects in terms of a one-percentage point increase is unrealistic given the magnitude of the OPA migration rate. Instead, I scale the results by the magnitude of the interquartile range of the fraction OPA, which is 0.03. As a result, the effect of moving from the 25th percentile of OPA shares at baseline to the 75th percentile

leads to a 0.03*1.07=0.03 percentage point decrease in the total migration rate. Off a migration rate with a sample mean of 2.44%, this leads to a 1.2% decline in the total migration rate in the 75th percentile of OPA provinces compared to the 25th percentile.

In Column 2, I estimate the same equation, instead calculating the total overseas migration rate using the Philippines Census of Population. Because the Census is conducted every ten years, I estimate a basic two period difference-in-differences analysis using 2000 as the pre period and 2010 as the post period. Since all Filipino households are asked in the Census about the number of international migrants in the household, using census data provides a check on the estimates using the LFS in Column 1, though the sample period is limited. When moving from the 25th percentile of baseline OPA migration to the 75th percentile, total international migration falls by 0.04 percentage points, or 1.7%, though it is not precisely estimated due to limited power from the small sample size. Though imprecisely estimated, the magnitudes of the estimated effects across the two data sources are similar.

One concern with this estimation strategy is potential differential trending of the total migration rate by baseline OPA share. While Figure 3.5 suggests that the pre-trends between high and low OPA provinces are parallel, I formally test for differential trends in the migration rate by estimating the relationship between the baseline OPA share and the change in the migration rate in the pre-period. I estimate the following equation:

$$\Delta(MigrationRate_{pt}) = \beta_0 + \beta_1 ShareOPA_{p0} + \beta_2 \Delta(X_{pt}) + \gamma_t + \epsilon_{pt} \tag{3.2}$$

where t is the pre-period, $\Delta(MigrationRate_{pt})$ is the change in the province-level migration rate in province p from year $t-1$ to year t, and $\Delta(X_{pt})$ is the change in

province-year level covariates from year $t-1$ to t. The results are shown in row 2 of Table 3.5. For the LFS results, I find that a 1 percentage point increase in the OPA migration rate at baseline leads to a 0.001 percentage point increase in the change in the total migration rate, and the coefficient is not statistically different from zero. The magnitude of the point estimate is quite small, suggesting that the migration rate in provinces with higher OPA shares is not changing differentially compared to lower share provinces, and the trends in the pre-period are in fact parallel. Using Census data, the coefficient is larger than when using the LFS, but it is statistically imprecise and small relative to the estimated effect in row 1. Further, the positive trending in the pre-period would bias against the estimated effect, suggesting that the results are actually an underestimate.

Second, I also check for differential trends in the pre period using a falsification exercise. Using the LFS data, I estimate equation 1, instead using 1998 and 1999 as pre-periods, and 2000 to 2004 as the post period.[9] I find that when moving from the pre-period to the "post" period, a one percentage point increase in the OPA migration rate at baseline leads to a 0.24 percentage point increase in the total migration rate, though the coefficient is imprecisely estimated.[10]

Next, in Table 3.5, Column 3, I turn to the effect of the policy change on new contract hires only. Examining the results by just new hires rather than the aggregation of new hires and rehires allows me to examine if new employment is more responsive to policy changes than renewed employment.[11] Shifting from the 25th to 75th percentile of the OPA baseline share results in a 9.6% decline in the province-level new

[9]Because in the Census data I only have two periods in the pre-period (1990 and 2000), the results of the falsification exercise will be the same as estimating equation (2) above.

[10]One might also be concerned that the negative effects of the policy change on the migration rate are simply a result of mean reversion. For instance, high OPA provinces at baseline could be low OPA provinces in later years, causing the negative effects to be driven by this. However, the high correlation of baseline shares and later OPA migration rates shown in Table 3.4 indicates that this is unlikely to be the case. As discussed in Section 3.4, provinces that were high OPA provinces at baseline continue to be in later years as well, and thus mean reversion is not the cause of the effects.

[11]Due to lack of data, I cannot examine the effect of the policy change on rehires only. Data are only available on total migration from the LFS (rehires plus new hires) and new hires from POEA.

hire migration rate after the ban. Comparing the point estimate for total migration to the point estimate for new hire migration, magnitudes differ substantially. This indicates that new hires are more adversely affected by the policy change than total migration, which suggests that rehires are less vulnerable to policy shocks than those potential migrants seeking a new contract. I again check for parallel trends, estimating equation 1 on the pre-period of 1996 to 1997. I find that for a one-percentage point increase in the OPA migration rate, the change in the migration rate is 0.27 percentage points and statistically significant. This positive result, while concerning, implies that the effect I find is a lower bound of the true estimate, and its magnitude is much smaller than the overall result shown in Row 1.

3.5.2 Multiplier Effect

The magnitude of the point estimates provides an estimate of the migration multiplier as discussed in Section 3.2.3. The effects on outmigration may be exactly equal to the effects of the ban itself, indicating that for each OPA affected by the ban, there is one fewer migrant. Intuitively, with perfectly predictive migrant networks such that the assigned treatment dosage from the base share is exactly the treatment dosage realized, a one percentage point increase in the baseline OPA share should lead to a one percentage point decline in the total migration rate if the effect of the ban is realized without a multiplier effect.

However, while historically high OPA provinces remain high OPA provinces over time, base shares are an imperfect predictor of the future migration rate. Turning back to Table 3.4, Column 5, we see that a one-percentage point higher OPA share at baseline leads to a 0.4 percentage point higher OPA migration rate in 2004, the year prior to the policy change. Thus, while high OPA provinces still have higher OPA migration rates right before the policy change occurred, the treatment dosage actually experienced by these provinces will be less in reality than the baseline share would

suggest. Comparing the point estimates to 1 in order to determine the multiplier effect is thus incorrect given that base shares are not perfectly predictive. Specifically, a one-percentage point increase in the baseline OPA migration rate implies a 0.4 percentage point higher OPA migration rate in 2004. Thus, for the effect of the ban to be fully realized, the total migration rate should decline by -0.4 percentage points.

While multiplier effects may exist in the total migration rate, they should not be present in the OPA migration rate itself. Thus, to first examine the accuracy of this type of test for a multiplier effect, I first look at the effect of the policy change on the OPA migration rate. Shown in Table 3.6, Column 1, a one percentage point increase in the baseline OPA share causes a 0.4 percentage point decline in the OPA migration rate when moving from the pre to post period. Given that a one-percentage point increase in the baseline OPA share implies a 0.4 percentage point higher OPA migration rate in the year prior to the policy change, this indicates that the effect of the ban is fully realized. Higher OPA provinces have lower OPA migration rates by exactly the differential amount of OPAs in the province.

Turning back to Table 3.5, I can compare the point estimates to 0.4 in order to determine if there is a multiplier effect. In Column 1, while I cannot reject that 1.07 is equal to 0.4, the magnitudes are clearly quite different. This suggests that there is a substantial migration multiplier, and prospective migrants besides OPAs are differentially affected by the policy change in high OPA provinces compared to low OPA provinces. While OPAs clearly can no longer migrate, these multiplier effects may be due to recruitment agencies closing, binding credit constraints as OPA remittances are no longer received, or weakening of migrant networks, among other explanations.

An even larger multiplier can be seen for new hire migration. For the total migration rate to fall by less than the new hire migration rate, rehires must be declining at a slower rate than new hires. This suggests that households may be able to at

least partially adjust to the loss of employment opportunities from OPA migration by renewing existing contracts. As a result, given demand is rigid and determined outside the Philippines, fewer potential new migrants in the province are able to go abroad on new contracts relative to lower OPA provinces.

3.5.3 By Occupation

Above, I showed that there is a large and statistically significant multiplier effect of the policy change on new hire migration. This means that migration in occupations other than OPAs must be affected by the policy change. Using the new hire micro data from POEA, I can further explore this to see which occupations are affected. In Table 3.6, I estimate the effect of the ban on occupation-specific new hire migration rates for the top 38 occupations for Filipino contract migrants.[12] A number of other occupations appear to experience a decline as a result of the OPA ban. These declines could occur for two reaSons: first because of multiplier effects leading to spillovers from the policy change on other occupations or second because rehires increase in certain occupations in response to the policy change, thus crowding out new hires. Essentially all of the 38 occupations experience a decrease in higher OPA provinces when moving from the pre to post period, though the magnitude of the effects varies substantially across occupations. Domestic helpers experience by far the largest decline in response to the policy change.[13] Production workers, laborers, and plumbers and welders also experience quite large declines in new hire migration in high OPA provinces relative to low OPA provinces. These declines help shed light on who is affected by the multiplier effect.

[12]These 38 occupations make up 96% of all new contract migration.

[13]This result for domestic helpers, however, should be discounted as the parallel trends assumption is violated in the pre-period as determined by the two checks shown in Table 3.5, making it difficult to ascertain the true casual effect. For all other occupations, the data do not reject the parallel trends assumption.

3.5.4 By Gender

While OPA migration is a historically overwhelmingly female occupation, the occupations that decline in response to the OPA policy change are both predominantly female (in the case of domestic helpers), mixed gendered (such as production workers), and predominantly male (laborers). Because OPA migration is largely female, the direct effect of the ban should be felt exclusively by females, yet the occupation results suggest that there are some spillover effects onto male migration as well. I examine this explicitly by looking at the response of the male and female migration rates to the OPA policy change. If I find a non-zero point estimate for males, this suggests that there are spillover effects for men from the ban on female OPA migration.

As shown in Table 3.7, this is in fact what I find in both the case of total migration and new hire migration. After the policy change, male migration declines in high OPA provinces compared to low OPA provinces. Scaling the effects by the interquartile range of the OPA base share, total male migration decreases by 0.9%. This suggests that despite the fact that the policy change only affected women, there were spillover effects on the migration of men as well, and after the policy change, in high OPA provinces compared to low OPA provinces, fewer males are migrating. For females, on the other hand, the magnitude of the ban would again be fully realized if the point estimate is equal to -0.4. In the case of total female migration, while the point estimate is larger in absolute value than the 0.4, statistically I cannot reject that they are the same. Total female migration declines by the anticipated amount from the policy change. For female new hire migration, I can reject that the point estimate, -0.85, is equal to -0.4. Fewer females are able to migrate from high OPA provinces after the policy change compared to low OPA provinces than just the OPA policy would suggest. Thus, to reconcile the total female and new hire female results, females in high OPA provinces in occupations other than OPAs must be renewing their contracts at a higher rate than in low OPA provinces. Overall, these results by

gender suggest that this barrier to migration for females had spillovers to both male and female migration.

3.5.5 Domestic Employment

I next turn to examining the domestic employment choices of individuals in the Philippines in response to the OPA policy change.[14] Due to the high wages of OPAs compared to domestic employment, when OPA migration is no longer an option, households may have to reallocate labor market choices within the household. For instance, individuals who were not previously part of the labor force may seek employment or currently employed household members may try to work more hours. In Table 3.8, I examine the effect of the OPA policy change on the province-level unemployment rate. Unemployment is defined in the LFS as persons who are either currently looking for work or who would like to work, but have given up searching. I calculate this rate of unemployment out of the total working-aged population in the province. When moving from the pre-period to the post-period, the unemployment rate increases by 0.4% more in the 75th percentile of OPA share provinces compared to the 25th percentile. While the point estimate has the anticipated sign, it is not statistically different than zero.

Examining the unemployment rate by gender, the female unemployment rate rises by 1.7% over the interquartile range of OPA provinces from the pre to post period. Given a province-level average of 57,754 women who report being unemployed in the LFS, this means there are 982 more women who are looking for work or are discouraged workers after the policy change in high OPA provinces compared to low

[14] I also examine the effects of the OPA ban on internal migration. Internal migration may either increase or decrease in response to the ban. It may increase if, for instance, households now need to seek domestic employment somewhere else in the Philippines as international opportunities are no longer available, or it may decrease if households are now more credit constrained and cannot afford internal migration. I use the 1990, 2000, and 2010 Census of Population to determine the rates of out-migration and in-migration for each province. Unfortunately, the pre-trends for high and low OPA share provinces are far from parallel and so it is impossible to discern what effect is due to the policy and what effect is due to differential trending. Thus, I omit the results from the paper.

OPA provinces. The average province has 429 OPAs prior to the policy change, and these displaced workers likely account for part of the increase. The other 553 are likely migrants displaced from other occupations due to the migration multiplier or women who were not previously working that now must enter the labor force as a result of the lost OPA income.

Next, I examine a number of other domestic labor market outcomes inTable 3.9. First, I look at the response of child labor. The child labor rate of employment is defined as the number of children aged 10 to 14 working at least 1 hour per week out of the total population aged 10 to 14.[15] Moving from the pre to post period, provinces in the 75th percentile of baseline OPA migration have a 1.3% higher rate of child labor than those provinces in the 25th percentile. Given there were 10,430 children aged 10 to 14 working in a province in 2004, this means 135.6 more children are engaged in at least one hour of work per week in high OPA provinces compared to low OPA provinces. For each OPA who can no longer go abroad, 0.3 more children are now engaged in paid work. To be clear, one hour of work is not synonymous with school dropout, but it is indicative of adjustment of domestic labor market choices in response to the policy change.

Column 2 shows that 6.3% more of those currently employed in the 75th percentile of OPA provinces say they are looking for additional work when compared to those in the 25th percentile of provinces. This is not surprising since households now need to compensate for lost remittances from high salaries abroad with lower domestic wages. Column 3 shows that 3.6% fewer people are looking for work in high OPA provinces compared to low OPA provinces after the policy change. While at first glance this seems like a positive sign of the health of labor market, in reality, this may suggest that the number of discouraged workers has risen and fewer individuals are actually looking for work. Finally, individuals are more likely to be engaged in short-term

[15]On-time graduation is at age 15 or 16.

employment rather than permanent employment. 1.8% more individuals are working in short term contracts in high OPA provinces compared to low OPA provinces after the policy change.

3.6 Robustness Checks

To further alleviate concern that the results are due to differential trending across high and low base share provinces, one might still be concerned that this drives the results, I create a new counterfactual group following Abadie and Gardeazabal (2003) and Abadie, Diamond and Hainmueller (2010). This synthetic control group is made up of the convex combination of the provinces that most closely resemble the highest OPA share provinces prior to the policy change.

The aforementioned papers consider the case of a binary treatment variable. However, in the case of the OPA policy change, provinces were not treated or untreated, but rather received different treatment dosages depending on their historic migrant networks. To conduct the analysis using the synthetic control group, I assign the 9 provinces with the highest OPA base share to the treatment group. This can be seen in Figure 3.7. These provinces all have a baseline OPA migration rate of 0.15% or greater, and I refer to them as OPA provinces. Also shown in Figure 3.7, 64 provinces with a base share less than 0.07% are designated as possible controls. I exclude the provinces that are not circled since their treatment dosage is somewhat similar to those designated as the treatment group. Following Abadie and Gardeazabal (2003), I then assign weights to minimize the pre-treatment difference in total migration between the OPA and synthetic OPA groups.

Table 3.10 shows summary statistics for OPA provinces, all potential control provinces, and synthetic OPA provinces. Compared to OPA provinces, the provinces in the potential control group are married at a higher rate, much less educated, more likely to be employed, less likely to live in urban areas, and have a much higher in-

cidence of child labor. The working age population in these provinces is also much smaller, which is not surprising since the 4 districts of Metro Manila are included as OPA provinces. Turning to the synthetic OPA provinces, while the balance is not perfect, particularly with regards to the size of the working population, the balance is substantially improved in terms of education levels, employment rates, and child labor rates, and most covariates are balanced between the OPA provinces and the synthetic OPA provinces. While the synthetic OPA provinces are still less urban, the balance is much better than when compared to the overall potential control group.

The assigned weights are shown in Table 3.11. Four provinces make up the synthetic control with the majority of the weight placed on the province of Bataan. The rest of the weight is split between Batangas, Cebu, and South Cotabato provinces. Figure 3.8 shows the results. While Bataan province has much of the weight in order to balance the covariates, the total migration rate from Bataan is higher than in the OPA provinces. Thus, in the pre-period, the trends appear similar, but the level of migration differs across the OPA provinces and the synthetic control. Following the OPA policy change in 2005, the gap between the migration rates grows substantially. Migration in OPA provinces increases at a much slower rate than in the synthetic control group. Specifically, the total migration rate in OPA provinces decreases by -1.17 percentage points compared to the synthetic control group. With a standard error of 0.24, this is statistically significant at the 1% level. I cannot reject that this point estimate is statistically the same as -1.07, the main result shown in Table 3.5. Thus, the synthetic cohort analysis corroborates the robustness of the main results and further assuages concerns that differential trending over time may drive the results.

3.7 Conclusion

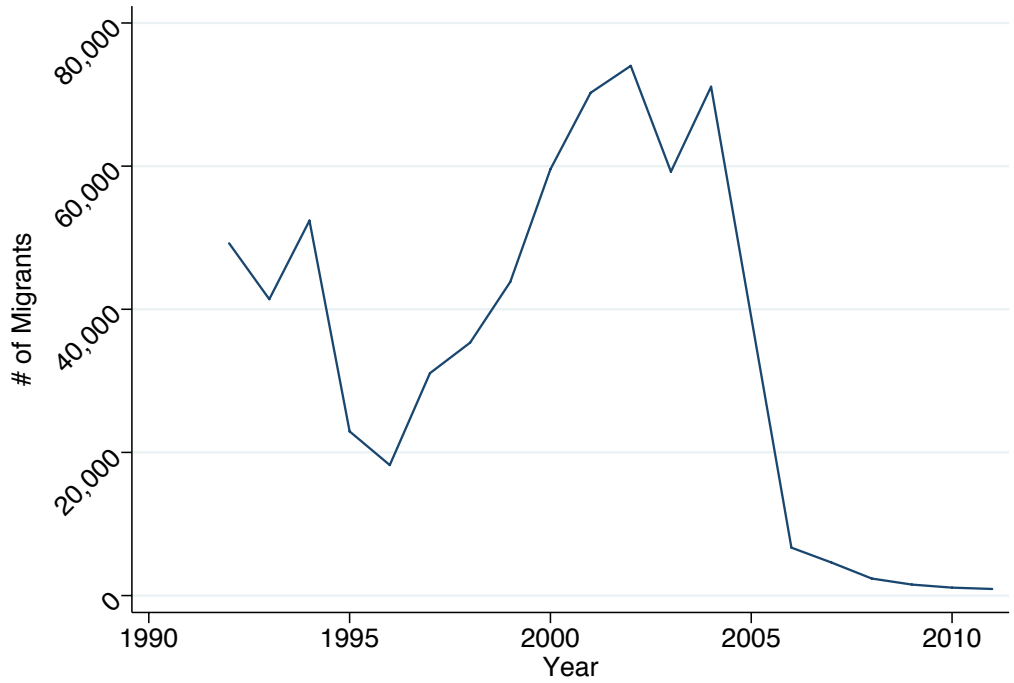
Migration policies imposed by destination countries substantially limit global labor mobility. While numerous papers have addressed the effects of such policies on native workers in destination countries, the literature is largely silent on the effects on migrant-sending countries. Using a policy change in Japan that imposed significant barriers to the migration of Overseas Performing Artists (OPAs) from the Philippines as a natural experiment, this paper provides the first estimates of the causal effects of migration barriers on labor market choices in migrant-sending countries. Exploiting this natural experiment, I employ a difference-in-differences estimation strategy using the percent of OPA employment in the province population in a base year as a continuous policy variable to define the treatment dosage. Because the policy change occurred in response to accusations of trafficking, the results also provide the first estimates of the effects of limiting migration in occupations deemed exploitive or controversial.

I find that in response to the policy change, total migration decreases more for provinces with a higher baseline OPA share. Specifically, moving from the 25th to 75th percentile of the baseline OPA share is associated with a 1.2% greater decrease in total migration. The effects are larger for new hires, suggesting that new migrant contracts are more vulnerable to policy shocks. I also find a substantial multiplier effect, with migration declining by more than the amount of the policy change. The multiplier effects are larger for new migrants, and current migrants appear to crowd out new migrants by renewing contracts at a higher rate. The spillover effects of this policy lead to reductions in both female and male migration. Domestic helpers, plumbers, laborers, and production workers all are hired at a lower rate than prior to the policy change in high OPA share provinces. Domestically, the unemployment rate for women rises by 1.7% more in high OPA share provinces after the policy change than in low OPA share provinces. Child labor increases differentially by 1.3%,

and 1.8% more individuals are now engaged in short-term work. Robustness checks that define a treated group of provinces and construct a synthetic control group of provinces corroborate the main results.

The results suggest that immigration policies imposed by destination countries have substantial implications for migrant-sending countries. Not only are OPA opportunities reduced, but there are also large spillover effects that reduce other migration opportunities. The domestic labor market results suggest that when migration is reduced and remittances are no longer available, the domestic labor market choices are substantially different in order to cope with these changes. However, higher rates of unemployment and more people looking for additional work suggest that households are not able to fully compensate for lost migration opportunities and remittances through domestic employment. Thus, while migration is a lucrative employment option, relying on these opportunities makes migrant-sending countries vulnerable to destination country policy shocks. As more quotas are imposed and anti-trafficking campaigns increase, such policies will continue to have important implications for poor, migrant-sending countries. Policymakers in these countries would do well to use their limited social safety nets to help households in the presence of such policy changes.

Figure 3.1: OPA Migration Over Time



Source: POEA.

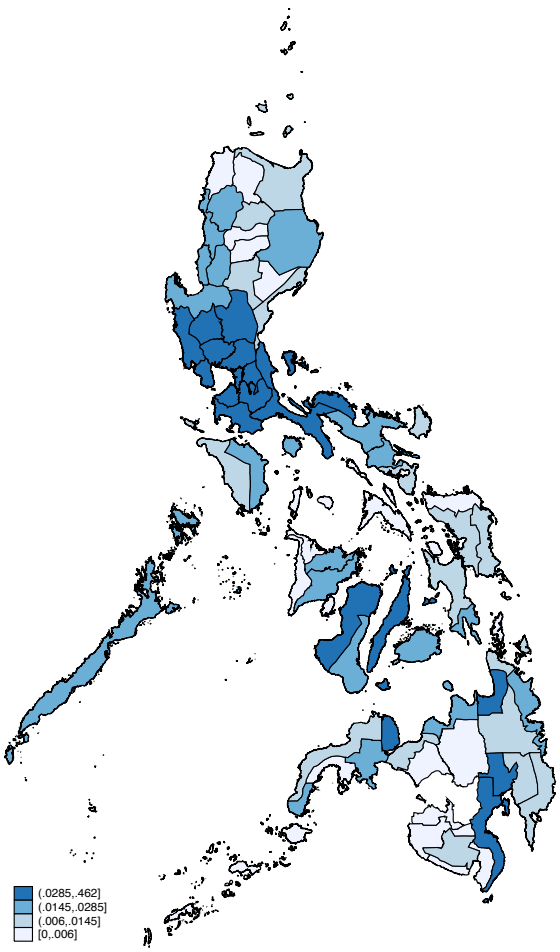


Figure 3.2: 1993 OPA Migration Rates by Province

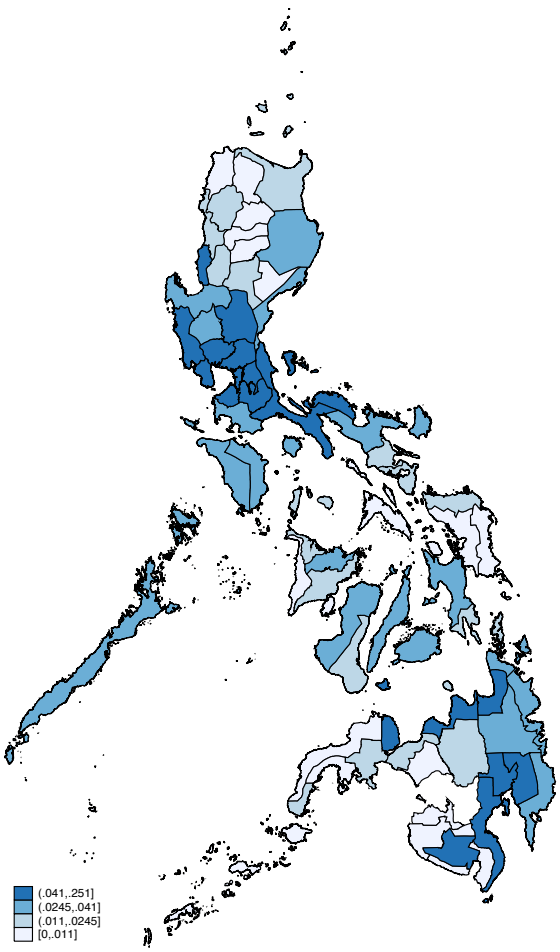


Figure 3.3: 2004 OPA Migration Rates by Province

Figure 3.4: Treatment Dosage: OPA Migration Rates in 1993 and 2009

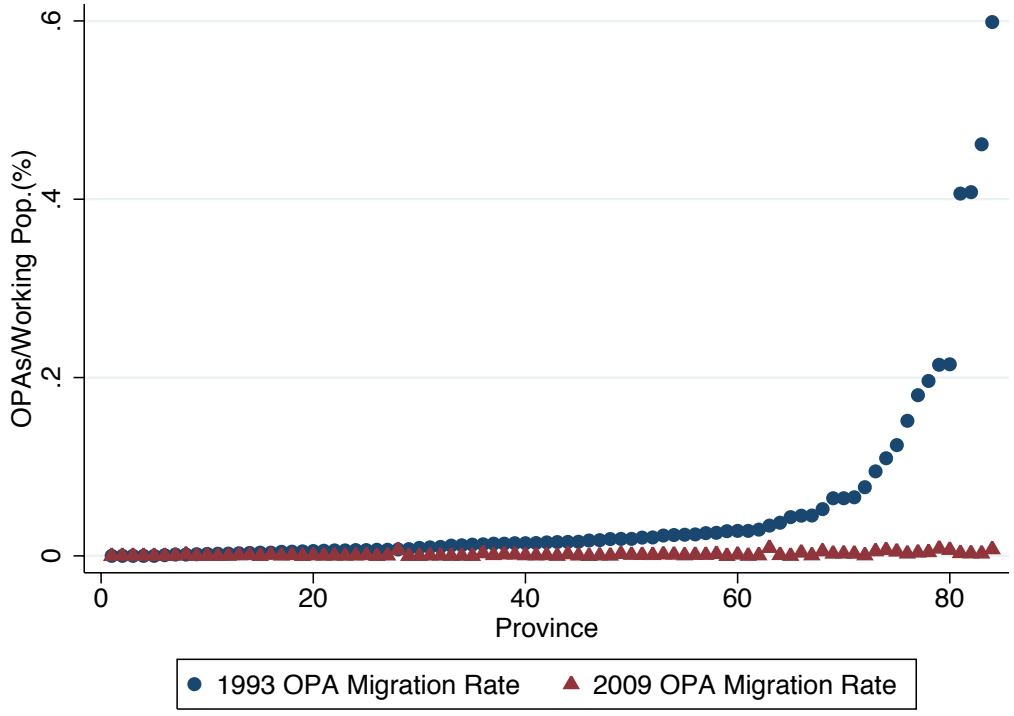
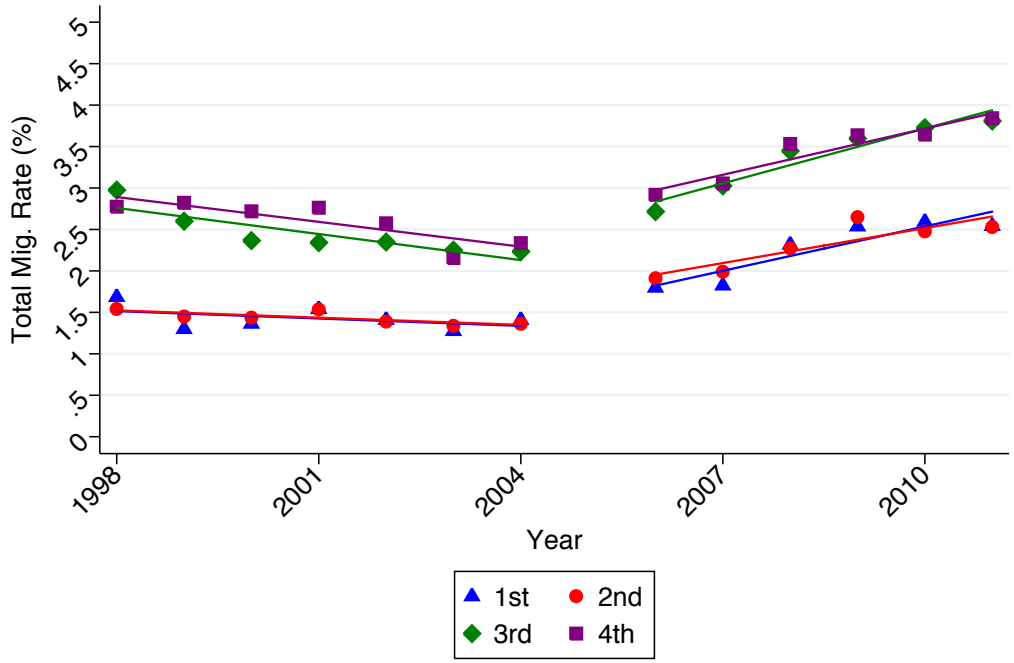


Figure 3.5: Parallel Trends across OPA Provinces by Base Share Quartile



Notes: The migration rate is the average province–level migration rate for each quartile.
Source: LFS.

Figure 3.6: Migrant Networks: 1993 and 2004 OPA Shares

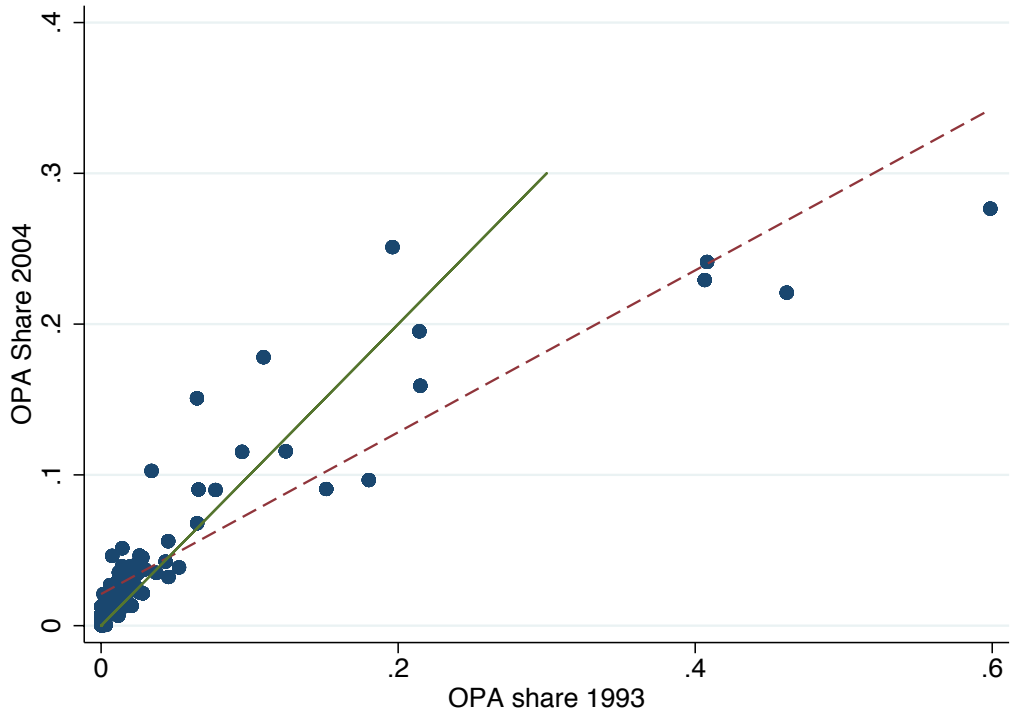


Figure 3.7: Assignment of "Treated" and Potential Control Provinces

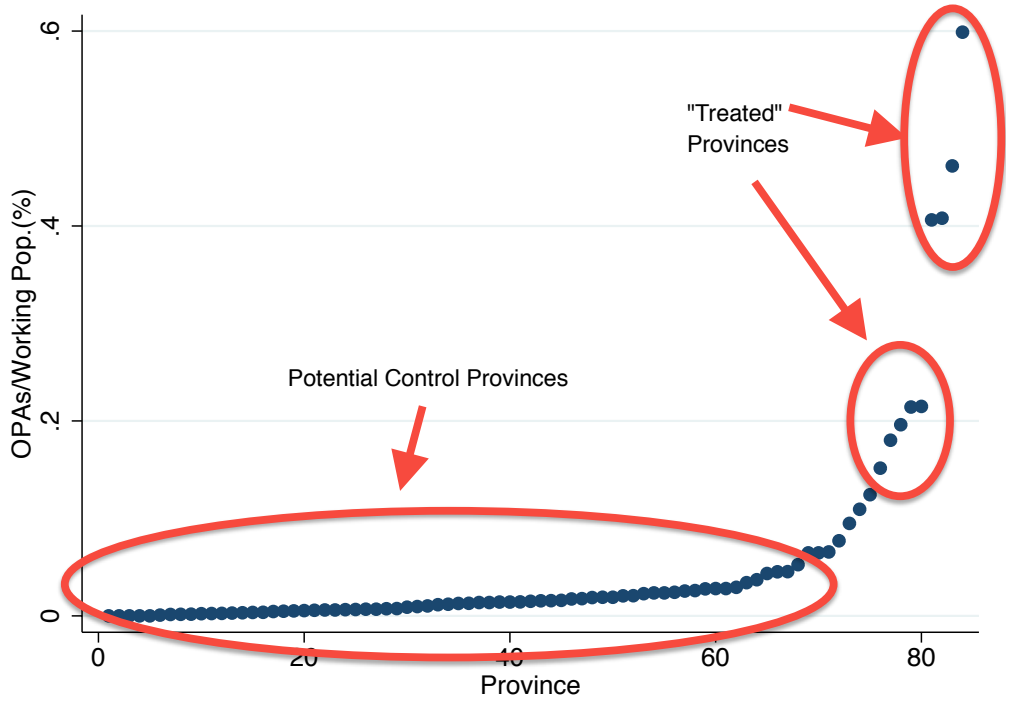
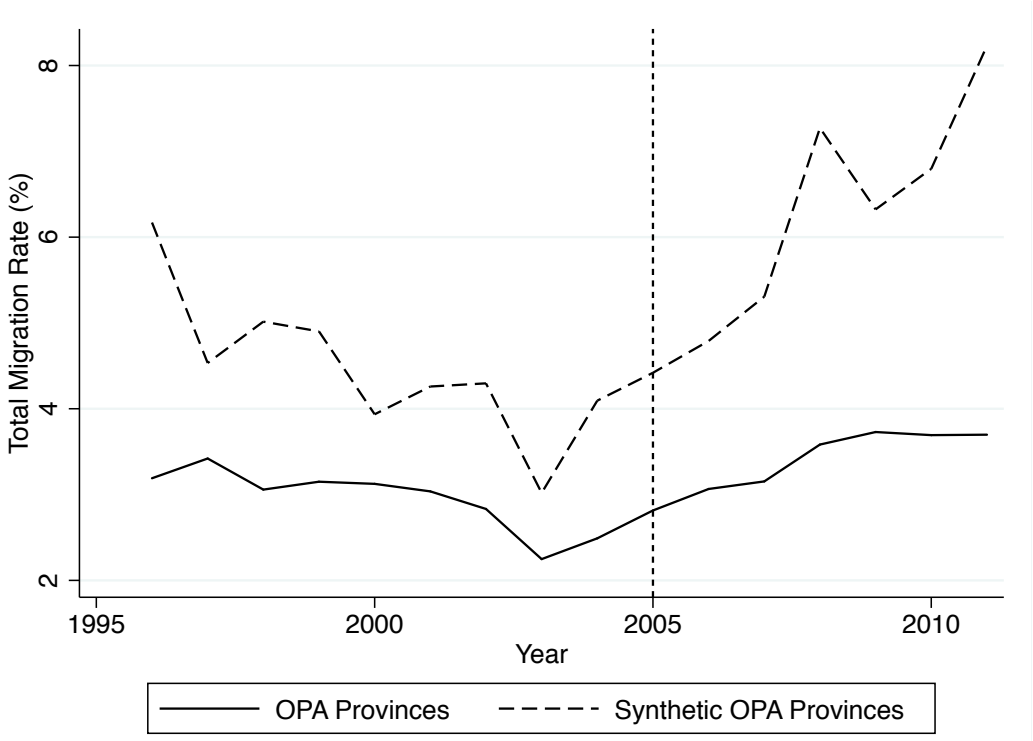


Figure 3.8: Synthetic Control Results



Occupation	Total	% of Total	% Female
Overseas Performing Artists	71,982	25.5	95.5
Domestic Helpers	63,591	22.6	98.2
Caregivers	20,349	7.2	95.8
Production NEC	18,225	6.5	52.3
Medical Workers	12,418	4.4	85.0
Building Caretakers	10,232	3.6	84.6
Cooks and Waiters	9,482	3.4	59.5
Laborers	7,874	2.8	14.9
Tailors	7,519	2.7	92.0
Engineers	7,409	2.6	5.3
Total	229,081	81	74.3

Notes: The summary statistics are for 2004 and are based on 80 occupation categories.
Source: POEA and author's calcuations.

Table 3.1: Top 10 Occupations for Contract Migrants

	OPA Migrants	Non-OPA Migrants
Female (%)	95.7	67.0
Age (Years)	25.2	32.2
Monthly Salary (USD)	1857.3	417.3
Contract Duration (Months)	4.6	20.5
Years of Education	9.4	13.3

Source: POEA, SOF, and authors' calculations.

Table 3.2: OPA and Non-OPA Characteristics in 2004

	N	Mean	Std. Dev.	Min	Max
Migration Variables					
OPA Migration Rate (1993-Base share)	80	0.05	0.11	0.00	0.60
Total Migration Rate (LFS)	1040	2.44	1.61	0.00	8.84
Total Migration Rate (Census)	160	2.53	1.25	0.50	6.19
New Hires Migration Rate	480	0.44	0.28	0.01	1.59
OPA Migration Rate (2004)	80	0.05	0.07	0.00	0.28
OPA Migration Rate (2006)	80	0.01	0.01	0.00	0.03
Domestic Labor Market Variables					
Unemployment Rate	1040	8.58	3.79	0.00	20.02
Child Employment Rate	1040	9.75	10.18	0.00	77.30
Looking for Work	1040	1.52	1.42	0.00	7.13
Looking for Additional Work	1040	4.88	4.23	0.00	24.28
Short Term Job	1040	11.97	5.75	1.81	59.90
Internal Migration Variables					
Out Migration Rate	160	2.85	1.49	0.68	11.44
In Migration Rate	160	2.67	1.80	0.06	11.12
Net Migration Rate	160	-0.17	1.74	-6.60	8.69
Working Population	1027	505,450.8	448,410.9	7,523.7	2,417,697.0

Notes: Summary statistics are not population weighted.
Source: POEA, OWWA, LFS, and Census of Population.

Table 3.3: Summary Statistics

	1993	1997	1997	2004	2004	2009	2009
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share OPA (1993)			0.5340***		0.4382***		0.0056
			(0.0264)		(0.0519)		(0.0037)
Female	0.0027	0.0046	0.0021*	-0.0050	-0.0077*	0.0002	0.0002
	(0.0071)	(0.0056)	(0.0013)	(0.0091)	(0.0046)	(0.0003)	(0.0003)
Age	-0.0013	-0.0041	-0.0024**	-0.0193*	-0.0083	-0.0003	-0.0001
	(0.0090)	(0.0047)	(0.0011)	(0.0110)	(0.0081)	(0.0004)	(0.0004)
Married	0.0016	0.0037*	-0.0001	0.0040	0.0034*	0.0001	0.0000
	(0.0023)	(0.0020)	(0.0005)	(0.0039)	(0.0018)	(0.0001)	(0.0001)
Elementary Graduate	0.0010	-0.0005	-0.0004	-0.0004	0.0005	0.0002*	0.0002*
	(0.0015)	(0.0010)	(0.0003)	(0.0021)	(0.0013)	(0.0001)	(0.0001)
Some High School	-0.0078**	-0.0021	-0.0002	0.0047	0.0048*	0.0002*	0.0002**
	(0.0039)	(0.0027)	(0.0006)	(0.0045)	(0.0028)	(0.0001)	(0.0001)
High School Graduate	-0.0021	0.0002	0.0005**	0.0029	0.0021**	0.0001**	0.0001**
	(0.0024)	(0.0011)	(0.0002)	(0.0018)	(0.0008)	(0.0001)	(0.0000)
Some College	0.0071	0.0002	-0.0011***	-0.0066**	-0.0022	-0.0002*	-0.0002
	(0.0043)	(0.0026)	(0.0004)	(0.0030)	(0.0018)	(0.0001)	(0.0001)
College Graduate	0.0040	0.0073**	0.0006	0.0117**	0.0039	0.0002	0.0001
	(0.0039)	(0.0031)	(0.0006)	(0.0051)	(0.0029)	(0.0001)	(0.0001)
Employment Rate	0.0011	-0.0002	0.0010**	0.0026	0.0003	0.0001	0.0001
	(0.0020)	(0.0017)	(0.0005)	(0.0026)	(0.0013)	(0.0001)	(0.0001)
Urban	0.0036***	0.0015***	0.0000	0.0017***	0.0007**	0.0001**	0.0000
	(0.0009)	(0.0004)	(0.0001)	(0.0005)	(0.0003)	(0.0000)	(0.0000)
Child Unemployment Rate	-0.0004	0.0004	-0.0004**	-0.0024*	-0.0013	-0.0001**	-0.0001**
	(0.0012)	(0.0009)	(0.0002)	(0.0014)	(0.0008)	(0.0001)	(0.0001)
Unemployment Rate	-0.0035	-0.0067	0.0000	-0.0027	-0.0052*	-0.0000	-0.0001
	(0.0064)	(0.0046)	(0.0011)	(0.0047)	(0.0027)	(0.0002)	(0.0002)
Looking for Additional Work	0.0265	0.0193*	-0.0012	0.0020	0.0000	-0.0001	-0.0001**
	(0.0170)	(0.0102)	(0.0029)	(0.0022)	(0.0012)	(0.0001)	(0.0001)
Short Term Job	-0.0003	-0.0009	-0.0001	-0.0022*	0.0004	0.0001	0.0001
	(0.0012)	(0.0008)	(0.0002)	(0.0012)	(0.0007)	(0.0001)	(0.0000)
Obs	77	80	80	80	80	80	80
R2	0.865	0.860	0.994	0.740	0.888	0.539	0.579
Mean Dep. Var	0.06	0.03	0.03	0.05	0.05	0.00	0.00

Notes: Robust standard errors clustered at the province level. All regressions weighted by 1990 working population.
Source: POEA, OWWA, LFS, Census of Population.

Table 3.4: Effect of Covariates and Migrant Networks on OPA Migration Rates

	Total Migration Rate (LFS)	Total Migration Rate (Census)	New Hire Migration Rate
Main Results	(1)	(2)	(3)
Post*OPA Share	-1.073***	-1.376	-1.443***
	(0.380)	(1.126)	(0.179)
Scaled by IQR (%)	(-1.073*0.03)/2.44=-1.2%	-1.7%	-9.6%
Check for Pre-Trends			
OPA Share	0.001	0.163	0.270***
	(0.154)	(0.743)	(0.058)
Falsification Test			
"Post"*OPA Share	0.235		0.277***
	(0.413)		(0.059)
N	1040	160	477
R2	0.902	0.971	0.920
Mean Dep. Var (%)	2.44	2.53	0.45

Notes: The pre-period in Column 1 is from 1998 to 2004; in Column 2, it is 2000; in Column 3, it is 1996-1997. The post-period in Column 1 is 2006 to 2011; in Column 2, it is 2010; in Column 3 it is 2006-2009. Observations and R2 are reported for Row 1. For the falsification test in Column 1, the "pre" period is defined as 1998-1999. All regressions include province and year fixed effects, as well as controls for fraction female, average age, fraction married, average education levels, fraction employed, fraction unemployed, fraction urban, fraction looking for additional work, and the fraction working in short term work. Robust standard errors clustered at the province level. All regressions weighted by 1990 working population. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.
Source: POEA, OWWA, LFS, Census of Population.

Table 3.5: Effect of OPA Ban on Total and New Hire Migration Rate

	Post*ShareOPA		Post*ShareOPA
OPAs	**-0.404*** **	Manufacturing	-0.013***
	(0.014)		(0.002)
Agriculture	-0.004***	Material-Handling	-0.013**
	(0.001)		(0.006)
Engineers	-0.056***	Medical	-0.056***
	(0.013)		(0.012)
Machine-Tool Operators	-0.013***	Painters	-0.011***
	(0.003)		(0.002)
Cashiers	-0.001	Plumbers, Welders	-0.072***
	(0.002)		(0.019)
Carpenters	-0.043***	Processors	-0.003**
	(0.010)		(0.001)
Building Caretakers	-0.011	Production NEC	-0.120***
	(0.013)		(0.013)
Caregivers	-0.059***	Production Supervisors	-0.012***
	(0.016)		(0.004)
Clerical	-0.005***	Professional NEC	-0.006**
	(0.002)		(0.003)
Clerical NEC	-0.003	Protective Services	-0.003**
	(0.007)		(0.001)
Construction	-0.002*	Sales	-0.003*
	(0.001)		(0.002)
Cooks, Waiters	-0.013	Sales Workers NEC	0.000
	(0.014)		(0.001)
Domestic Helpers	-0.284***	Salesmen	-0.001
	(0.045)		(0.004)
Electrical	-0.052***	Scientists	-0.015***
	(0.009)		(0.002)
Food Processors	-0.000	Service NEC	-0.007
	(0.002)		(0.009)
Hairdressers	0.000	Spinners, Weavers	-0.007***
	(0.002)		(0.002)
Laborers	-0.093***	Typists	-0.004***
	(0.011)		(0.001)
Machine Fitters	-0.030***	Tailors	-0.017**
	(0.006)		(0.008)
Managers NEC	-0.003**	Transport Operators	-0.005***
	(0.001)		(0.002)
Obs	477		477

Notes: The pre period is from 1995 to 1997, and the post period is from 2006 to 2009. All regressions include province and year fixed effects, as well as a number of province-year level covariates listed in Table 5. Robust standard errors are clustered at the province level. The unit of observation is the province-year. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.
Source: POEA, OWWA, and LFS.

Table 3.6: Effect of OPA Ban on Occupation-Specific Migration Rates

	Total Female Migration Rate	Total Male Migration Rate	Female New Hire Migration Rate	Male New Hire Migration Rate
	(1)	(2)	(3)	(4)
Post*OPA Share	-0.603**	-0.470**	-0.853***	-0.589***
	(0.268)	(0.194)	(0.099)	(0.096)
Scaled by IQR (%)	-1.4%	-1.25%	-9.8%	-8.9%
N	1040	1040	477	477
R2	0.872	0.919	0.879	0.946
Mean Dep. Var	1.32	1.12	0.26	0.19

Notes: The pre-period in Columns 1 and 2 is from 1998 to 2004; in Column 2, it is 1996 to 1997. The post-period in Columns 1 and 2 is 2006 to 2011; in Column 2, it is 2006 to 2009. Observations and R2 are reported for Row 1. For the falsification test in Column 1, the "pre" period is defined as 1998-1999. All regressions include province and year fixed effects, as well as a number of province-year covariates listed in Table 5. Robust standard errors clustered at the province level. All regressions weighted by 1990 working population.

Source: POEA, OWWA, LFS, Census of Population.

Table 3.7: Effect of OPA Ban on Migration Rates, By Gender

	Total Unemployment	Female Unemployment	Male Unemployment
	(1)	(2)	(3)
Post*OPA Share	0.893	1.485***	-0.592
	(0.609)	(0.301)	(0.405)
Scaled by IQR (%)	0.4%	1.7%	-0.6%
N	1040	1040	1040
R2	0.900	0.783	0.911
Mean Dep. Var	6.19	2.59	3.59

Notes: The pre-period is from 1998 to 2004. All regressions include province and year fixed effects, as well as a number of province-year covariates listed in Table 5 but excluding all employment controls. Robust standard errors clustered at the province level. All regressions weighted by 1990 working population. The dependent variables is defined as the total number of unemployed or discouraged workers out of the total working-aged population (age 18-65).
Source: POEA, OWWA, LFS, Census of Population.

Table 3.8: Effect on Domestic Unemployment Rate

	Child Labor (Aged 10-14)	Looking for Additional Work	Looking for Work	Short-Term Employment
	(1)	(2)	(3)	(4)
Post*OPA Share	4.384**	3.186***	-5.810***	7.145***
	(2.023)	(0.384)	(1.972)	(1.776)
Scaled by IQR (%)	1.40%	6.30%	-3.56%	1.80%
N	1040	1040	1040	1040
R2	0.868	0.872	0.696	0.760
Mean Dep. Var	9.75	1.52	4.88	11.97

Notes: The pre-period is from 1998 to 2004. All regressions include province and year fixed effects, as well as a number of province-year covariates listed in Table 5 but excluding all employment controls. Robust standard errors clustered at the province level. All regressions weighted by 1990 working population. The rate of child labor is the number of children aged 10 to 14 working at least one hour in the past week out ofthe total population aged 10 to 14. Those looking for additional work are employed, but seeking additional hours.
Source: POEA, OWWA, LFS, Census of Population.

Table 3.9: Effect of OPA Ban on Domestic Labor Market Outcomes

	OPA Provinces	All Potential Control Provinces	Synthetic OPA Provinces
	(1)	(2)	(3)
Female (%)	51.49	49.36	49.83
Age (%)	35.30	36.92	35.53
Married (%)	60.73	66.97	63.68
Education			
Elementary graduate (%)	12.78	20.77	17.58
Some high school (%)	11.25	13.61	10.59
High school graduate (%)	29.96	18.70	29.20
Some college (%)	21.63	14.54	20.49
College graduate (%)	17.30	10.11	11.52
Employed (%)	59.93	68.33	59.18
Urban (%)	88.49	30.96	65.18
Working Population	1,272,158	368,864	404,376
Unemployed (%)	9.28	5.26	9.14
Child Labor (%)	2.31	12.70	3.05
Looking for Work (%)	2.02	0.72	1.56
Looking for Additional Work (%)	3.15	2.83	3.07
Short-Term Employment (%)	8.50	13.32	12.67
Number of Provinces	9	64	4

Notes: Summary statistics are calculated for the pre-period, 1996 to 2004.
Source: LFS and author's calculations.

Table 3.10: Summary Statistics for OPA, Synthetic OPA, and Control Provinces

Province	Weight
Batangas	0.036
Bataan	0.881
Cebu	0.067
South Cotabato	0.017

Source: LFS and author's calculations.

Table 3.11: Weights for Synthetic Control Group

APPENDIX

APPENDIX A

Heterogeneity by Grade Level

In Section 1.3, I assume that parents make the decision whether or not to enroll their child in high school and consider two levels of schooling, high school graduate and less than a high school graduate. I test this empirically by examining the effects of migration demand on aggregate secondary school enrollment. However, examining the effects on aggregate enrollment across all grades may miss potentially interesting dynamics. By testing for differential responses of grade level enrollments to migration demand, it is possible to further shed light on the mechanisms through which migration affects overall secondary school enrollment, namely by identifying the marginal students induced into schooling by changes in migration demand. Understanding both the location of the marginal student in the education distribution and the mechanisms through which they are induced in can help policymakers design policies to increase human capital that are targeted at these students. The responses to migration demand depend on the distribution across grades of unenrolled students from both unconstrained and constrained households as well as the benefits to partial completion of high school. Thus far, by comparing the wage premium for high school graduates compared to non-high school graduates, I have essentially assumed there is no benefit to partial completion of high school. I relax this assumption below.

First, however, consider the case where there is no benefit to partial completion of high school. There will be a reduced probability of drop out in each subsequent year of high school, with the bulk of unenrolled students dropping out prior to year one. Unconstrained households may revise their education decision in response to a change in income or the expected wage premium. Constrained households may revise their decision in response to a change in the expected wage premium or a negative income shock, but they will only be able to respond positively through the income channel if they experience a loosening of liquidity constraints. Since most unenrolled students will drop out prior to year one of high school, I anticipate that there will be a bunching on year one enrollment from either the income channel or the expected wage premium channel.[1]

Now assume there are benefits to partial completion of high school, and students may drop out in any grade. Dropout rates in the Philippines decline by grade level.[2] Thus, I anticipate that the enrollment response for both constrained and unconstrained households to the income channel will simply follow where marginal students are located in the education distribution and will have the largest effect on year one with smaller effects on each subsequent year.[3] Again, the wage premium can only increase education for constrained households if they also experience a loosening of the liquidity constraint. One might expect changes in the wage premium to have the largest effect on those entering the fourth year of high school, since labor market conditions are more likely to persist until these students graduate and enter the labor force than for first year students. However, since dropout rates decline by grade level, depending on the probability that parents assign to the chance that labor

[1]Such bunching at year one could also occur due to fixed costs of high school that force a number of students to drop out at this point in their education.

[2]Author's calculations from Philippine Department of Education data.

[3]This could, however, be more nuanced for parents with more than one child. In the event that the household receives just enough extra income to send one child to school for one more year, sheepskin effects may mean that the parent may enroll the older student rather than the younger student.

market conditions will persist, any pattern of enrollment responses is possible. Based on these potential scenarios, the location in the education distribution of marginal students induced into schooling by increased migration demand is ambiguous. I test these predictions empirically in Section 6.4.

Occupation	% of Total	% Female
Farmhand and Laborers	18.17	39.9
General Managers in Wholesale and Retail Tra	6.74	73.5
Rice Farmer	5.96	7.85
Salesperson	4.27	62.0
Corn Farmer	3.39	9.59
Domestic Helper	3.18	88.6
Motorcycle Driver	2.76	1.20
Fisherman	2.05	2.40
Coconut Farmer	1.95	10.6
Market and Sidewalk Stall Vendor	1.93	64.1
Car Driver	1.84	0.75
Carpenter	1.62	40.3
Street Vendor	1.56	0.54
Elementary Teacher	1.36	87.0
Hand Packer	1.30	40.3
Hog Farmer	1.24	71.2
Protective Service Worker	1.17	5.61
Vegetable Farmer	1.11	31.0
Fishery Laborer	1.05	17.1
Hand Launderers	1.03	97.2
Hotel Cleaner	0.94	25.9
Building Construction Laborer	0.89	1.30
Waiter	0.89	51.0
Root Crop Farmer	0.86	33.9
Construction and Maintenance (Roads)	0.77	1.96
Deep Sea Fisherman	0.73	0.87
General Manager (Transport)	0.66	7.80
Messenger	0.66	12.5
Cashiers and Ticket Clerks	0.63	81.4
Sewers	0.62	83.1
Hairdresser	0.60	66.9
Heavy Truck Driver	0.55	0.75
Office Clerk (Other)	0.54	58.2
Bricklayer	0.54	0.76
Secondary Teacher	0.53	73.7
General Managers (Restaurant)	0.52	69.1
Electronics Fitter	0.51	12.9

Notes: This table lists the top occupations for domestically employed Filipinos in 2007.
Source: LFS and author's calculations.

Table A.1: Top Domestic Occupations

	Index Type		
	Destination	Occupation	Occupation x Destination
	(1)	(2)	(3)
Panel A. Total Migration Demand Index	10.324***	6.038	4.858
	(3.578)	(5.815)	(3.354)
N	502	502	502
R^2	0.927	0.930	0.930
F-Statistic	46.12	24.06	38.06
Panel B. Female Migration Demand Index	5.452	8.430***	7.875***
	(3.644)	(2.770)	(2.611)
N	502	502	502
R^2	0.931	0.931	0.931
F-Statistic	73.64	71.38	145.74

Notes: The sample period is from 2004 to 2009 with 1993 used as the base year in the construction of the instrument. Column 1 uses the destination-based index which is used for the main analysis. Column 2 creates the index in the same manner, but instead of destinations, it uses 38 occupation categories. Column 3 uses 38 x 32 occupation-destination groups to create the instrument. All regressions include province and year fixed effects as well as province-specific linear time trends. Robust standard errors clustered at the province level are in parentheses. The unit of observation is the province-year. The mean change in migration demand is measured in percentage points and is the average annual province-level change in migration demand. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.
Sources: POEA, OWWA, DepEd, and author's calculations.

Table A.2: Effect of Total and Female Migration Demand on Total Secondary Enrollment, by Index Type

	Percentile					
	25th	**50th**	**75th**	**SD**	**Min**	**Max**
Algeria	0.00	0.00	0.00	3.47	0.00	17.39
Angola	0.00	0.00	0.00	3.03	0.00	14.00
Australia	0.00	0.00	0.00	7.18	0.00	60.00
Bahrain	0.14	0.26	1.30	2.10	0.00	10.22
Brunei	0.14	0.39	1.13	1.96	0.00	10.34
Canada	0.00	0.08	1.32	2.43	0.00	13.25
Cyprus	0.00	0.00	1.43	2.71	0.00	15.71
Guam	0.00	0.05	0.48	4.21	0.00	35.48
Hong Kong	0.11	0.24	1.60	1.95	0.00	9.48
Ireland	0.00	0.00	0.00	10.91	0.00	100.00
Israel	0.00	0.00	0.00	3.74	0.00	10.09
Italy	0.02	0.24	1.27	2.41	0.00	15.55
Japan	0.03	0.08	0.47	3.46	0.00	21.38
Jordan	0.00	0.00	0.66	2.99	0.00	19.10
South Korea	0.00	0.23	1.48	2.21	0.00	12.27
Kuwait	0.06	0.17	0.84	2.64	0.00	14.20
Lebanon	0.13	0.36	1.07	2.14	0.00	10.31
Libya	0.02	0.15	0.65	2.72	0.00	16.40
Malaysia	0.11	0.31	1.75	1.90	0.00	1.19
Nigeria	0.00	0.14	0.69	3.13	0.00	21.73
Northern Mariana Islands	0.06	0.12	0.85	2.86	0.00	16.62
Oman	0.13	0.38	1.29	2.26	0.00	14.27
Other	0.02	0.12	0.59	2.67	0.00	12.64
Papua New Guinea	0.00	0.03	1.09	2.82	0.00	18.92
Qatar	0.10	0.31	1.17	2.35	0.00	13.24
Russia	0.00	0.08	0.94	2.97	0.00	1.19
Saudi Arabia	0.10	0.21	0.83	2.60	0.00	1.19
Singapore	0.12	0.40	1.22	1.95	0.00	9.96
Taiwan	0.07	0.15	0.95	2.57	0.00	15.14
United Arab Emirates	0.15	0.49	1.43	1.94	0.00	10.09
United Kingdom	0.00	0.00	0.00	4.29	0.00	25.00
United States	0.04	0.18	0.94	3.08	0.00	20.96

Notes: The baseline shares are defined as M_{pi0}/M_{i0}. Summary statistics for the baseline shares are presented for each of the 32 destinations (expressed as percentages). The base year is defined as 1993. The unit of observation is the province, and 84 provinces are included in the analysis. The category "Other" includes migrants to all destination countries besides the 31 listed here. 2% of observations fall in the "Other" category.
Source: POEA, OWWA, and author's calculations.

Table A.3: Summary Statistics for Base Shares used in Construction of the Bartik-Style Instrument

	Log GDP		Log GDP
Algeria	-20.245	Lebanon	9.793
	(14.886)		(9.783)
Angola	5.131	Libya	-1.185
	(4.112)		(0.739)
Australia	-0.029	Malaysia	-14.327
	(5.566)		(7.395)
Bahrain	-2.570	Nigeria	0.077
	(4.884)		(3.323)
Brunei	2.457	Northern Mariana Islands	0.096
	(2.562)		(4.808)
Canada	-6.720	Oman	-12.982
	(3.549)		(8.091)
Cyprus	6.306	Other	-1.793
	(10.446)		(1.276)
Guam	-7.734	Papua New Guinea	-0.505
	(7.315)		(0.926)
Hong Kong	-6.380	Qatar	-0.323
	(3.437)		(5.842)
Ireland	-3.445	Russia	-4.955
	(4.084)		(5.512)
Israel	-0.889	Saudi Arabia	0.954
	(1.732)		(6.155)
Italy	0.181	Singapore	-9.278*
	(2.319)		(4.258)
Japan	18.597*	Taiwan	-3.765
	(9.272)		(7.071)
Jordan	7.113	UAE	4.541
	(3.987)		(2.817)
South Korea	-13.429	United Kingdom	-3.559
	(10.367)		(4.397)
Kuwait	0.976	United States	-19.170*
	(1.871)		(7.849)

Notes: Each cell represents a separate regression of the log number of migrants on log GDP in the Philippines and the top 10 destination countries for OFWS in each of the 32 destinations used in construction of the migration demand index. The time series is from 1992 to 2009.
Source: POEA, OWWA, WDI, and author's calculations.

Table A.4: Effect of Philippine GDP on Number of Departing Migrants by Occupation Category

	Pre-Period	Post-Period	Full Sample		Pre-Period	Post-Period	Full Sample
Algeria	-67.670	-1392.519	-638.118	Lebanon	51.557	-86.430	-8.137
	(2427.689)	(3524.548)	(2057.687)		(59.319)	(85.743)	(50.221)
Angola	-207.951	-756.388	-454.732	Libya	-5.791	-4.809	-5.366
	(1319.069)	(1841.143)	(1098.809)		(24.768)	(35.834)	(20.961)
Australia	689.174	10656.617	4965.825	Malaysia	-11.848	13.102	-0.979
	(7147.079)	(10398.928)	(6064.321)		(8.118)	(11.672)	(6.862)
Bahrain	2.203	10.646	5.868	Nigeria	58.404	34.243	47.950
	(34.712)	(50.046)	(29.333)		(152.460)	(220.444)	(128.996)
Brunei	-22.738	49.883**	8.768	Northern Mariana Islands	-8.797	-52.478	-27.758
	(16.699)	(24.018)	(14.133)		(36.411)	(52.444)	(30.758)
Canada	-158.161	-161.486	-159.606	Oman	-10.686	139.046	54.372
	(456.752)	(657.799)	(385.784)		(86.868)	(124.977)	(73.361)
Cyprus	-63.828	1329.034	538.462	Other	-0.072	-32.654	-14.119
	(800.557)	(1156.553)	(677.290)		(26.562)	(38.498)	(22.500)
Guam	2.313	-72.079	-29.694	Papua New Guinea	-24.111	-316.706	-153.707
	(61.575)	(89.410)	(52.200)		(194.792)	(275.471)	(163.248)
Hong Kong	-1.580	-1.907	-1.722	Qatar	2.617	19.678	9.954
	(3.585)	(5.175)	(3.031)		(10.750)	(15.602)	(9.112)
Ireland	3322.300	-1.01e+04	-2426.762	Russia	-47.151	456.172	170.619
	(8928.155)	(13006.084)	(7580.403)		(359.627)	(519.576)	(304.232)
Israel	-2216.072	-6637.257	-4158.360	Saudi Arabia	-0.164	-0.179	-0.170
	(4426.718)	(6308.695)	(3721.969)		(1.076)	(1.550)	(0.909)
Italy	-21.201	10.809	-7.316	Singapore	-19.797	-94.196**	-52.946**
	(103.436)	(149.221)	(87.431)		(30.703)	(43.050)	(25.639)
Japan	-0.674	-2.220	-1.341	Taiwan	-1.532	-5.856	-3.413
	(2.272)	(3.291)	(1.924)		(4.842)	(6.964)	(4.087)
Jordan	83.597	150.931	112.627	UAE	2.131	4.908	3.349
	(792.773)	(1149.835)	(671.648)		(8.392)	(11.981)	(7.061)
South Korea	-214.572	166.267	-49.729	United Kingdom	-2160.414	303.421	-1101.018
	(130.856)	(189.396)	(110.927)		(4769.007)	(6934.382)	(4044.996)
Kuwait	-2.720	4.709	0.505	United States	-2.174	-51.719	-23.658
	(34.455)	(49.668)	(29.114)		(38.213)	(55.094)	(32.296)

Notes: The unit of observation is the province-year. In the pre-period, there are 628 observations, and the sample period is from 1993 to 2000. In the post-period, there are 498 observations, and the sample period is 2006 to 2011. In the full sample, there are 1,126 observations, and the sample period is 1992 to 2000 and 2006 to 2011. All regressions include year fixed effects. The dependent variable, the change in enrollment, is expressed as a percent. The destination-specific province migration rate at baseline is also expressed as a percent. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.
Source: POEA, OWWA, LFS, and author's calculations.

Table A.5: Effect of Baseline Destination-Specific Migration Rate on Change in High School Enrollment Rate

	Effect of Male Migration Rate on Female Index	Effect of Female Migration Rate on Male Index
	(1)	(2)
	0.066	-0.196*
	(0.109)	(0.104)
N	501	501
R^2	0.982	0.985

Notes: The sample period is from 2005 to 2010 with 1993 used as the base year in the construction of the instrument. All regressions include province and year fixed effects as well as province-specific linear time trends. Robust standard errors clustered at the province level are in parentheses. The unit of observation is the province-year. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.
Sources: POEA, OWWA, DepEd, and author's calculations.

Table A.6: Identification Check for Gender-Specific Demand Indices

	Change in Enrollment Rate		
	Total Public	Female Public	Male Public
Share OPA	-0.868	-1.487**	-0.326
	(0.600)	(0.629)	(0.668)
N	154	154	154
R^2	0.238	0.225	0.234

Notes: The sample period is from 2002 to 2004, and the dependent variable is the change in the enrollment rate. All regressions include year fixed effects. Robust standard errors are clustered at the province level. The unit of observation is the province-year. *** indicates significance at the 1% level. ** indicates significance at the 5% level * indicates significance at the 10% level.

Sources: DepEd, OWWA, POEA, and author's calculations.

Table A.7: Check for Pre-trends in the Enrollment Rate

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