

# Distortions in the International Migrant Labor Market

Evidence from Filipino Migration and Wage Responses  
to Destination Country Economic Shocks

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## Abstract

The authors use an original panel dataset of migrant departures from the Philippines to identify the responsiveness of migrant numbers and wages to gross domestic product shocks in destination countries. They find a large significant elasticity of migrant numbers to gross domestic product 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.

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

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## 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 the country in which they work (Clemens et al, 2009; McKenzie et al. 2010). 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 individual's income, as well as that of remaining family members (e.g. Cox-Edwards and Ureta, 2003; Yang 2008; Gibson et al. 2011). In recognition of this fact, a number of developing countries have put in place policy measures to help their citizens work abroad. Until recently, the Government of the Philippines was at the forefront of facilitating 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 et al, 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;<sup>1</sup> 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 enables workers to so dramatically increase their incomes by working abroad shifts all the burden of adjustment to demand shocks onto quantities rather than wages.

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<sup>1</sup> See <http://www.immi.gov.au/skilled/temporary-skilled-migration-threshold.htm> (accessed October 18, 2011).

As supporting evidence that minimum wages bind and to help rule out alternative 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. A similar difference-in-difference analysis also shows that this increase in the minimum wage for domestic helpers did in fact 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 describes the institutional setting and labor market for Filipino overseas workers, and its implications for modeling labor adjustment to GDP shocks at destination. Section 3 describes our new database. Section 4 provides the main results, highlighting the response of migrant numbers and wages to GDP shocks, and examining heterogeneity in these responses. Section 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 6 concludes and discusses implications for migration as a development strategy.

## **2. Institutional Setting and Labor Market for Filipino Overseas Foreign Workers**

### **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 program's 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 1). Countries such as Saudi Arabia, the U.A.E., and Kuwait, in the Middle East, and Japan; Hong Kong SAR, China; Taiwan, China; 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). 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,<sup>2</sup> 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, Sri Lanka and India seek to follow the Philippine model, and destination countries consider how to balance demands for labor with public concerns about migrant settlement.

## **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

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<sup>2</sup> Authors' calculation from the Survey of Overseas Filipinos (SOF), an offshoot of the Labor Force Survey in the Philippines.

actually did work abroad as overseas foreign workers in 2010.<sup>3</sup> 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 buyer’s 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.

### **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.”<sup>4</sup> 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.

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. However, the Philippine Government negotiates bilateral agreements with each destination country, which in some cases set a minimum wage. Work contracts then have to be verified by the Philippine Overseas Labor Offices (POLOs), which, for each occupation, determine the minimum prevailing wage in the host country, and will not approve contracts which set wages below these levels. Thus even more skilled occupations, whose incomes are above the Philippine minimum wage and above the overseas minimum wage

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<sup>3</sup> <http://www.census.gov.ph/data/pressrelease/2011/of10tx.html> [accessed July 19, 2011].

<sup>4</sup> <http://www.poea.gov.ph/rules/POEA%20Rules.pdf> [accessed July 19, 2011].

for low-skilled occupations, still have limits on how low their contracted wages can be.<sup>5</sup> 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 5 below.

## **2.4 Model of the Labor Market and Response to GDP Shocks Abroad**

Clemens et al. (2009) 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 don't 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

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<sup>5</sup> An additional constraint on how low wages for skilled workers can be in some destination countries such as the United States and other developed countries are immigration rules which require the wages to be offered to immigrants to not be lower than prevailing market wages, so as not to undercut local workers.

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.<sup>6</sup>

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 1. There is a binding minimum wage,  $W_m$ , 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,  $W_m$ . 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 change.

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<sup>6</sup> 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.

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.

### *Binding Migration Quotas*

An alternative form of distortions could arise from binding migration quotas. For example, the U.S. sets an annual cap of 65,000 workers under the H1-B program, and the United Kingdom has recently introduced quotas for non-EU migrants in several skilled categories. A binding quota restricts labor demand to a maximum of the quota amount  $M_Q$ , leading to a wage  $W_1$  above the market clearing level (Figure 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. Most of the main destination countries in the Middle East and Asia did not have quotas for migrants during the period of our analysis, and the countries which do have them, like the U.S., often do not change these quota numbers frequently. 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.

### **3. Data**

#### **3.1 POEA Micro Data**

The data are from the Philippine Overseas Employment Administration's (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. 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 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 1<sup>st</sup> and 99<sup>th</sup> 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),<sup>7</sup> 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.

### **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 CIA World Factbook. 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. Figure 3 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.

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<sup>7</sup> 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).

### 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. Appendix 1 presents a list of all included destination countries.

## 4. Results

### 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  $j=1,2,\dots,54$  and time periods  $t=1992,\dots,2009$ :

$$\log(M_{jt}) = \beta_0 + \beta_1 \log(GDP_{jt}) + \alpha_j + \gamma_t + \varepsilon_{jt} \quad (1)$$

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  $t$ ;  $\alpha_j$  are destination country fixed effects;  $\gamma_t$  are time period fixed effects; and  $\varepsilon_{jt}$  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. Country fixed effects remove time-invariant effects in destination 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.

Figures 4 and 5 provide scatterplots of the underlying variation behind our analysis, plotting demeaned log quantities of OFWs and demeaned log average wages respectively against

demeaned log GDP, with a regression line of best fit presented.<sup>8</sup> Figure 4 shows considerable variation in both quantity and GDP deviations in the data, and a positive relationship with a slope slightly greater than one. In contrast, Figure 5 shows much less variation around the mean in wages than Figure 4 shows in migrant quantities, and a close to flat relationship with GDP deviations.

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 panel A of Table 2. Column 1 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 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. Columns 2 and 3 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. In contrast, columns 4 through 9 of Table 2 show no significant 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 the 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.

## 4.2 Robustness of Aggregate Impacts

The results above show a strong elasticity of migrant numbers to GDP, with no responsiveness of migrant wages. We consider several checks on the robustness of these results.

First, in panel B of Table 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

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<sup>8</sup> Country-specific means are used in demeaning the data for these figures.

significance are very similar to the results in panel A, so that we still obtain the same results even holding occupation fixed.

The quantity numbers we have are for new contracts issued. Typically new hires are 38% of the total contracts issued each year, with rehires constituting the remainder. Micro data on rehires was not available from the POEA, preventing us from examining the wages for this group. Nevertheless, annual destination country level data on total quantities of migrants are available from 1998 to 2009 in the POEA's Compendium of Overseas Foreign Worker Statistics (Philippine Overseas Employment Administration, 2005-2009). We subtract the total new hires from our micro data from these totals to obtain data on rehire numbers by year.

We use this rehire and total contract worker data to examine the robustness of our migrant quantity results to the measure of migrant flows used. Table 3 presents the results. First, column 1 re-estimates equation 1 on our micro new hire data over the shortened time period 1998-2009. The point estimate suggests an even higher elasticity of quantities to GDP over this shorter period, but we cannot reject equality with our point estimate over the full sample. Columns 2 and 3 then show the same elasticity for rehires and for total migrant contract workers respectively. The point estimates are positive and significant in both cases, and we cannot reject equality of the total and rehire responses.

The stock of migrant workers at origin depends on both the flows of migrant workers, and how long these workers stay. The elasticity of the stock of contract workers with respect to GDP may therefore deviate from that of the flow if the duration of contracts varies with economic conditions at origin. Our database contains the duration of each new contract issued, and in column 4 of Table 3 we test whether the contract length (in months) varies significantly with GDP. The effect is statistically insignificant, and the point estimate is small, suggesting a 1 percent increase in GDP only increases contract duration by 0.16 months. As a result, we conclude that the stock of contract workers is likely to behave similarly to the flow in terms of its responsiveness to GDP.

We also examined the robustness of our results to issues of timing, to account for the possibility that labor demand either anticipates changes in GDP in the next year, or reacts slowly to changes that have occurred. We do this by adding leads and lags of log GDP to equation (1).

We test for up to 5 leads or lags, and do not find any significant leading or lagged effect.<sup>9</sup> The effects of GDP on labor demand therefore appear to occur contemporaneously within the same year.

These tests confirm the robustness of our findings, and show that migrant flows are procyclical with GDP at destination, whereas wages do not adjust to these destination GDP shocks. This result is not consistent with either a model in which the global market for migrant labor clears, nor with binding migrant quotas (in which adjustment would occur through wages). It is consistent with the main distortion being binding minimum wages, and means that workers both have an opportunity for substantial wage gains via migration, but also that migrant numbers will be very vulnerable to GDP shocks at destination.

### **4.3 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 et al. (2009). 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 4, 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

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<sup>9</sup> Results available upon request.

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 4 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.

#### **4.4 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 et al. (1994) show that such a change in composition leads aggregate wages in the U.S. to be less pro-cyclical 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 5 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 pro-cyclicality to domestic business cycles of native wages because of the much greater distortions in global labor markets.

## **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 2.4 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).<sup>10</sup> 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.<sup>11</sup>

Thus, for a number of countries, this policy change 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.

## 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.<sup>12</sup> We create two comparison groups for the difference-in-difference analysis. First, we use domestic helpers in countries where the average wage prior to 2007 was greater than \$400 (i.e., countries not affected by the policy change). 21 countries are included in this comparison group.<sup>13</sup> Alternatively, we restrict

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<sup>10</sup> 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,” or “domestic helpers”.

<sup>11</sup> See [http://www.poea.gov.ph/hsw/hsw\\_advisory1.html](http://www.poea.gov.ph/hsw/hsw_advisory1.html) for details about all new regulations.

<sup>12</sup> 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.

<sup>13</sup> Countries included in this comparison group are Australia, Austria, Belgium, Canada, Finland, France, Germany, Greece, Hong Kong SAR China, Israel, Italy, Japan, South Korea, New Zealand, Russia, Spain, Sweden, Switzerland, Taiwan China, United Kingdom, and United States.

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.<sup>14</sup> 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  $j=1,2,\dots,39$  and time periods  $t=2001,\dots,2009$ :

$$M_{jt} = \beta_0 + \beta_1 * Treatment + \beta_2 * After + \beta_3 * Treatment * After + \alpha_j + \gamma_t + \varepsilon_{jt} \quad (2)$$

where  $M_{jt}$  is the number of Filipino migrants leaving on new contracts to country  $j$  in year  $t$ ;  $Treatment$  is a binary indicator equal to 1 if a destination faces a minimum wage increase for domestic helpers;  $After$  is a binary indicator equal to 1 for the period after the minimum wage changes, 2007-2009;  $Treatment * After$  is the interaction of the previous two variables and the main variable of interest in this analysis;  $\alpha_j$  are destination country fixed effects;  $\gamma_t$  are year fixed effects; and  $\varepsilon_{jt}$  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 from 2001 to 2009.

## 5.2 Results

Prior to estimating equation (2), 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 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 for all jobs in aggregate.

We then turn to estimation of equation (2); results are in Table 6. Column 1 shows the results for the full sample, including destination and year fixed effects. The coefficient on

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<sup>14</sup> There are 17 main occupations that encompass 88.7% of OFWs. We compare domestic helpers to these OFWs in the other 16 occupation groups.

*Treatment\*After* 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 employment 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 weren't 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.

## **6. Conclusions**

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

international market for migrant labor via analysis of migrant flows and contracted wages in a unique data resource: the Philippine government's 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. 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 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 worker's occupation. On the migrant-source country side, the key policy relevant for our analysis is the Philippine government's 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.<sup>15</sup>

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 et al., 2007). Our results documenting the negative economic consequences of minimum-wage regulations on the part of migrant source countries should be an important input in these countries' policy-setting process.

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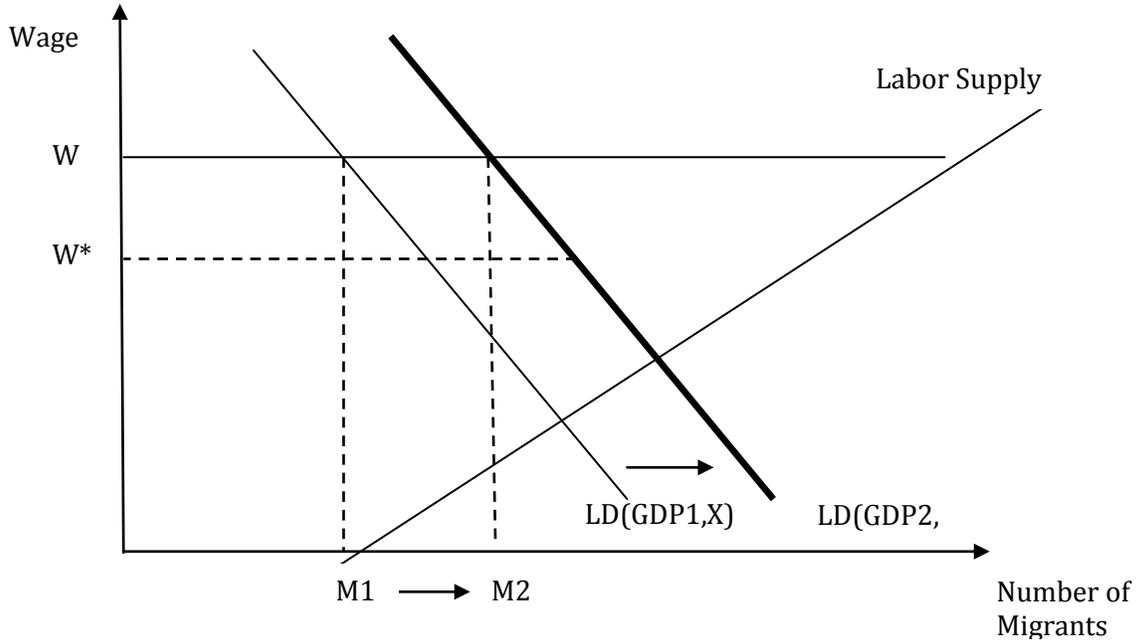
<sup>15</sup> That said, another rationale given for imposition of wage floors for occupational categories such as domestic helpers is that they lead lower-quality employers to exit the market, resulting in less physical, sexual, or mental abuse of workers. Our results cannot directly speak to such potential benefits of minimum wages in this context.

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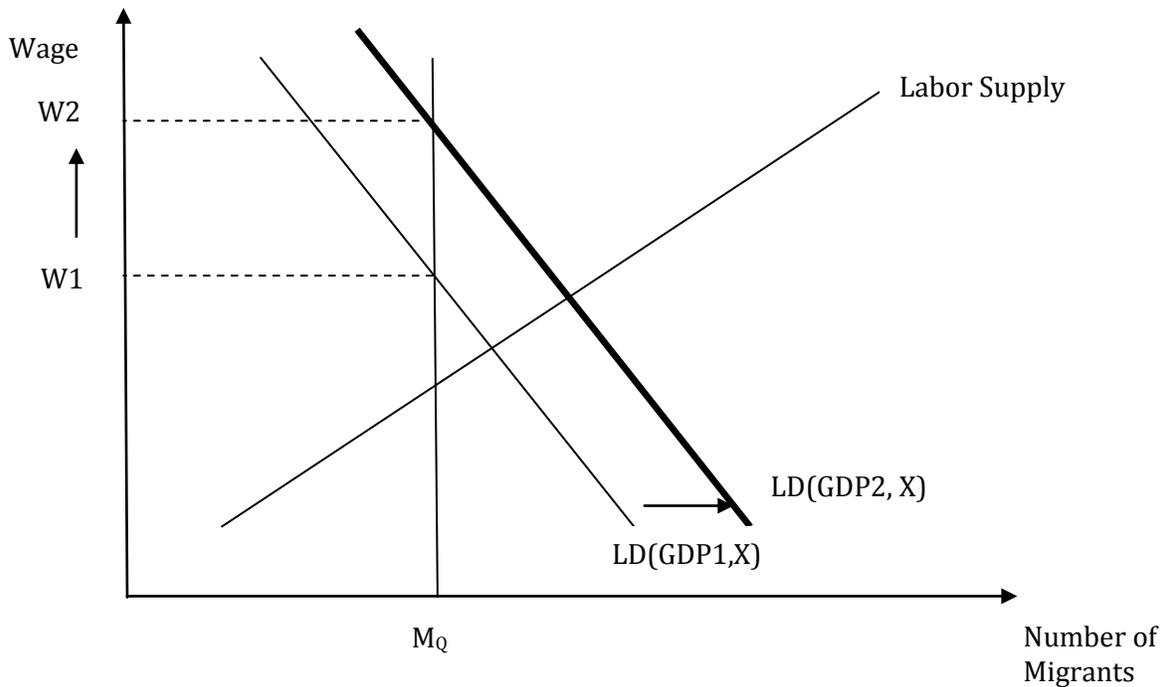
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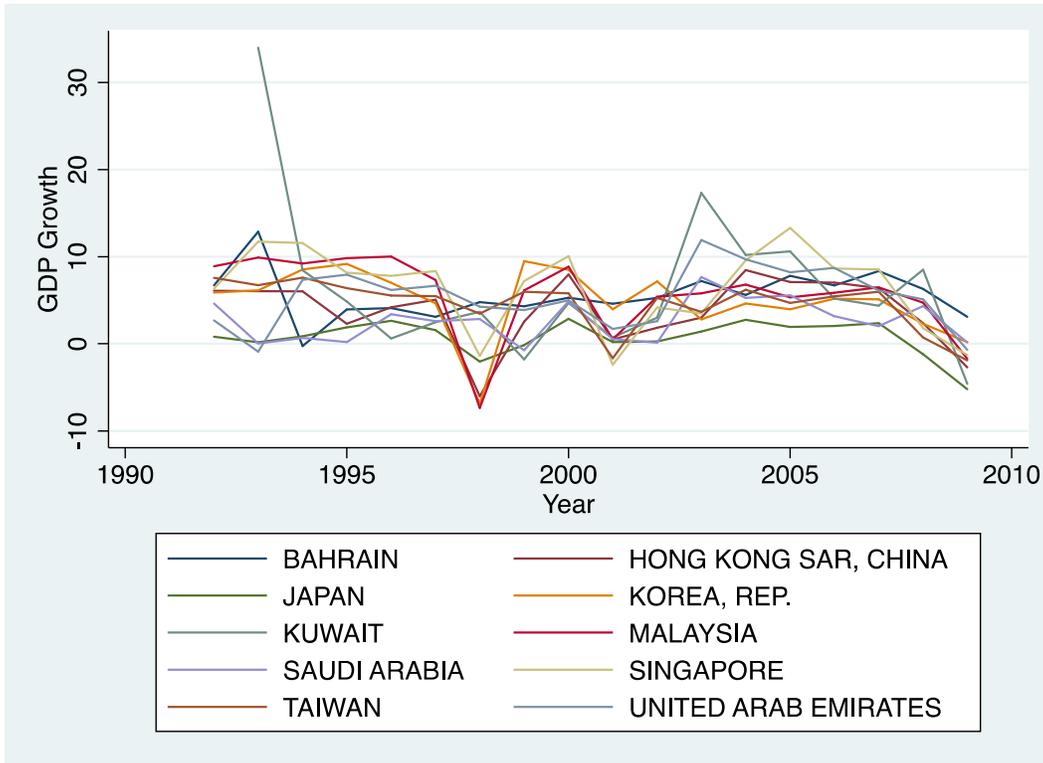
**Figure 1: Response of Demand for Filipino Workers to GDP Shock with Binding Minimum Wages**



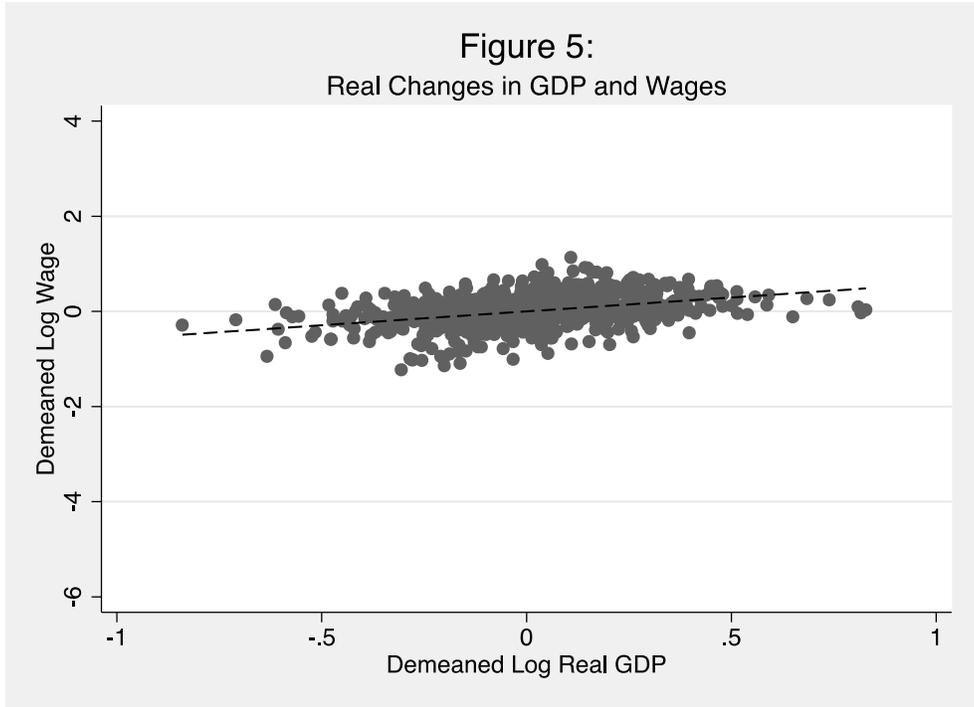
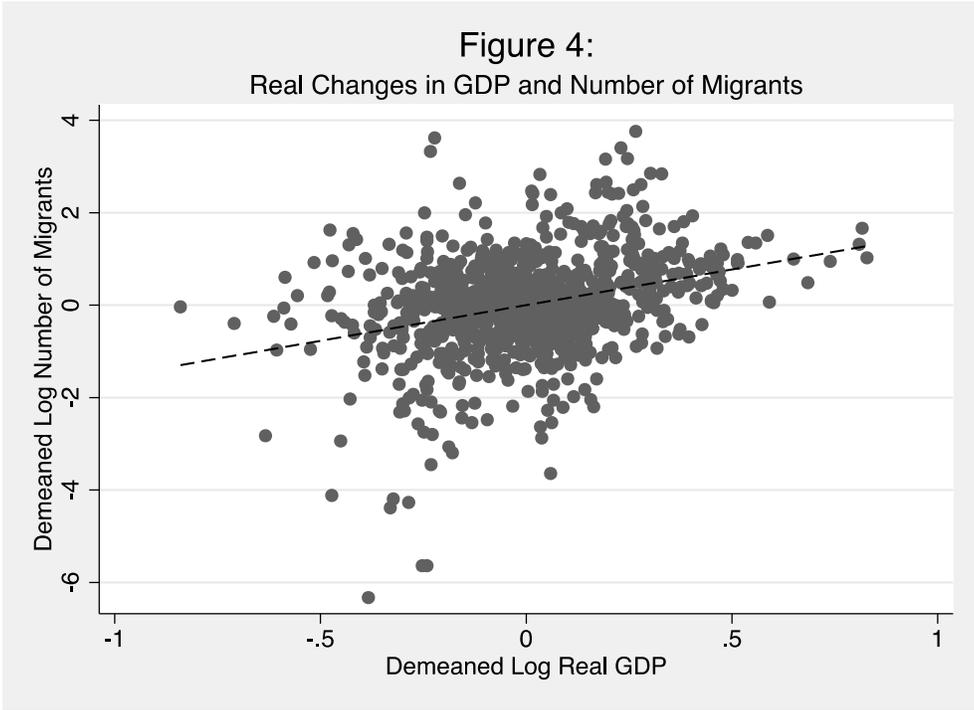
**Figure 2: Response of Demand for Filipino Workers to GDP Shock with Binding Quotas**



**Figure 3: Real GDP Growth 1992-2009 in Top 10 Filipino Migrant Destinations**



SOURCE: WDI and authors' calculations.



SOURCE: POEA, WDI, and authors' calculations.

**Table 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	1.34%	3190	1529.07	377.31	67.25	306.01	54.71
11. Brunei Darussalam	0.01%	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.

**Table 2: Responsiveness of the Quantity and Wages of Migrants to GDP**

	Log Quantity of New Migrant Contracts			Log Median Wages Paid to Migrants			Log Mean Wages Paid to Migrants		
	Total	Males	Females	Total	Males	Females	Total	Males	Females
<b>Panel A: Base Specification</b>									
Log GDP	1.522*** (0.501)	1.148** (0.527)	1.983*** (0.621)	-0.063 (0.158)	-0.019 (0.147)	-0.045 (0.226)	-0.041 (0.137)	-0.027 (0.116)	0.043 (0.209)
Number of Observations	972	972	972	967	930	901	967	930	901
R <sup>2</sup>	0.863	0.835	0.903	0.738	0.678	0.756	0.762	0.699	0.767
Mean of the Dependent Variable (Levels)	4482	1668	2814	737	816	706	794	871	738
P-value of Equality of Gender Coefficients		0.7956			0.5594			0.9772	
<b>Panel B: Holding Occupation Shares Constant</b>									
Log GDP	1.340*** (0.375)	1.276*** (0.438)	2.067*** (0.666)	-0.142 (0.148)	-0.096 (0.146)	-0.227 (0.201)	-0.113 (0.124)	-0.097 (0.112)	-0.135 (0.174)
Number of Observations	972	972	972	967	930	901	967	930	901
R <sup>2</sup>	0.914	0.861	0.912	0.813	0.751	0.819	0.842	0.780	0.838

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.

Panel B regressions control for the share 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.

\*\*\* indicates significance at the 1% level. \*\* indicates significance at the 5% level \* indicates significance at the 10% level.

SOURCE: POEA, WDI, and authors' calculations.

**Table 3: Robustness Checks: Effect of GDP on New Hires, Rehires, Total OFWs, and Contract Duration**

	<b>New Hires</b>	<b>Rehires</b>	<b>Total OFWs</b>	<b>Contract Duration</b>
Log GDP	2.624*** (0.710)	1.948*** (0.486)	2.155*** (0.530)	0.161 (1.836)
Obs	648	647	648	972
R2	0.914	0.947	0.950	0.611
P-value of Equality of Hiring Status Coefficients	0.0003			
Mean Dependent Variable (Levels)	4662.8256	7784.7623	12447.5880	17.2074

NOTES: The sample for new hires, rehires, and total OFWs is from 1998-2009.

Rehires are calculated for each country-year by subtracting the number of new hires in the POEA micro data from the total number of OFWs (compiled from POEA's 2005-2009 Compendium of OFW Statistics).

The sample for contract duration is from 1992-2009.

Countries are included if they have new hires and non-missing GDP data in each year 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.

All wages are trimmed at the 1st and 99th percentiles.

\*\*\* indicates significance at the 1% level. \*\* indicates significance at the 5% level \* indicates significance at the 10% level.

SOURCE: POEA, WDI, and authors' calculations.

**Table 4: Responsiveness of Quantities and Wages to GDP by Skill Quartile**

	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile	p-value for test of equality
<b>Panel A</b> - Dependent Variable: Log Quantity of New Contracts in this Skill Level					
Log GDP	0.668 (0.821)	1.295** (0.496)	0.652 (0.494)	1.046*** (0.299)	0.6357
Number of country-year observations	717	904	832	861	
<b>Panel B</b> - Dependent Variable: Log Median Wages paid to Workers in this Skill Level					
Log GDP	-0.194 (0.123)	-0.309** (0.153)	0.020 (0.161)	0.101 (0.175)	0.1102
Number of country-year observations	708	893	817	823	
<b>Panel C</b> - Dependent Variable: Log Mean Wages paid to Workers in this Skill Level					
Log GDP	-0.131 (0.111)	-0.257 (0.154)	0.060 (0.133)	0.151 (0.151)	0.1128
Number of country-year observations	708	893	817	823	
% 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 SOF 1992-2003;

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 data GDP data.

\*\*\* indicates significance at the 1% level. \*\* indicates significance at the 5% level \* indicates significance at the 10% level.

SOURCE: POEA, WDI, SOF, and authors' calculations.

**Table 5: Does who migrates vary with economic conditions at destination?**

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 (6.623)	-6.835 (6.788)	-0.209 (0.236)	0.089 (0.287)	-0.097 (0.250)	2.391 (1.924)	2.257 (1.940)
Observations	369	369	369	369	369	331	331
R2	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 contract hires in the Survey of Overseas Filipinos from 1992-2003 (only first time hires).

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.

\*\*\* indicates significance at the 1% level. \*\* indicates significance at the 5% level \* indicates significance at the 10% level.

SOURCE: SOF, WDI, and authors' calculations.

**Table 6. Effect of a Change in Domestic Helper Minimum Wage on Domestic Helper Hiring**

	Full Sample		Balanced Panel	
	Log Count	Log Wages	Log Count	Log Wage
<b>Panel A.</b> Non-Minimum Wage Countries as Control				
Treatment Group	-0.848*** (0.129)	-1.369*** (0.027)	-1.188*** (0.131)	-1.191*** (0.027)
After	0.644** (0.311)	0.269*** (0.092)	0.591* (0.340)	0.292*** (0.082)
Treatment*After	-0.605* (0.341)	0.238*** (0.073)	-0.642 (0.392)	0.289*** (0.074)
Constant	1.649*** (0.164)	6.868*** (0.065)	1.994*** (0.177)	6.650*** (0.053)
Obs	327	324	279	276
R2	0.918	0.907	0.910	0.942
<b>Panel B.</b> Other Industries as Control				
Treatment Group	2.172*** (0.521)	-0.711*** (0.068)	2.717*** -0.51	-0.710*** -0.068
After	0.594*** (0.200)	0.193*** (0.053)	0.747*** -0.206	0.245*** -0.055
Treatment*After	-0.565** (0.225)	0.377*** (0.057)	-0.641** -0.24	0.413*** -0.058
Constant	3.911*** (0.133)	5.950*** (0.044)	3.809*** -0.126	5.905*** -0.044
Obs	1828	1814	1487	1481
R2	0.648	0.377	0.649	0.37

NOTES: The sample period is from 2001-2009, and "After" is defined as 2007-2009.

All regressions include country and year fixed effects. Robust standard errors clustered at the country level are in parentheses.

Columns 1 and 2 have 39 jobsites included in the estimates. The estimates in Columns 3 and 4 use 31 jobsites. Destination countries are included in the treatment group if they have a median trimmed 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 the top 16 other occupations. These occupations have >55,000 OFWs over the sample period.

\*\*\* indicates significance at the 1% level. \*\* indicates significance at the 5% level \* indicates significance at the 10% level.

SOURCE: POEA, WDI, and authors' calculations.

### Appendix 1: Included Destination Countries

<u>Destination</u>	<u>Destination</u>
1 SAUDI ARABIA	28 CUBA
2 JAPAN	29 CHINA
3 TAIWAN	30 YEMEN, REP.
4 UNITED ARAB EMIRATES	31 NEW ZEALAND
5 HONG KONG SAR, CHINA	32 MICRONESIA, FED. STS.
6 KUWAIT	33 GREECE
7 SINGAPORE	34 INDONESIA
8 KOREA, REP.	35 INDIA
9 MALAYSIA	36 VIETNAM
10 BAHRAIN	37 THAILAND
11 BRUNEI DARUSSALAM	38 SYRIAN ARAB REPUBLIC
12 CANADA	39 PAKISTAN
13 UNITED STATES	40 NETHERLANDS
14 ISRAEL	41 NORWAY
15 OMAN	42 SOUTH AFRICA
16 UNITED KINGDOM	43 GHANA
17 ITALY	44 MARSHALL ISLANDS
18 CYPRUS	45 SWITZERLAND
19 SPAIN	46 BELGIUM
20 JORDAN	47 SRI LANKA
21 ALGERIA	48 FINLAND
22 AUSTRALIA	49 GERMANY
23 PAPUA NEW GUINEA	50 AUSTRIA
24 ANGOLA	51 FRANCE
25 RUSSIAN FEDERATION	52 SWEDEN
26 SUDAN	53 SOLOMON ISLANDS
27 PALAU	54 FIJI

SOURCE: POEA and authors' calculations.