ONLINE APPENDIX

for

"Distortions in the International Migrant Labor Market:

Evidence from Filipino Migration and Wage Responses to Destination Country

Economic Shocks"

David McKenzie

Caroline Theoharides

Dean Yang

This online appendix provides a number of robustness checks for the main results contained in the paper, as well as providing supplemental tables and figures referenced in the main text.

Robustness of Aggregate Impacts to Rehires, Lags, and Recessions

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. Appendix Table 2 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 appendix Table 2 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.

Taken together, these results suggest that non-competitive labor market models of the type discussed in section 2.5, in which minimum wages act to reduce quit rates and vacancies and potentially increase employment are unlikely to be driving our results here.

We also examined the robustness of our results to issues of timing, to account for the possibility that labor demand reacts slowly to changes that have occurred in GDP. We do this by adding lags of log GDP to equation (1). We test for up to 5 lags, and do not find any significant lagged effect (Appendix Table 3). The effects of GDP on labor demand therefore appear to occur contemporaneously within the same year. A likely reason for this fast adjustment is the speed of the recruiting process in the Philippines – workers are often hired and working abroad within several weeks of initial demand from employers.

Finally, an alternative story for why adjustment occurs through quantities and not through wages could be that wages are sticky (Hall, 2005). However, in practice, most of our identification is coming from relative differences in positive growth rates across countries, with only 12 percent of our country-year observations reflecting negative growth. Nonetheless, as a check to ensure that sticky wages in recessions are not driving our results, we interact the impact of GDP with whether or not there is a recession, and show the results in Appendix Table 4. We find small and insignificant interactions with recessions, providing evidence that this is not driving our results.

Robustness to Country Choice

Appendix Table 5 examines the sensitivity of our results to the composition of countries included in our sample. The first row shows our base specification in Table 2. In the second row,

we test the sensitivity of our results to dropping Saudi Arabia, which is the only country in our sample which does not appear to impose any form of labor market test or minimum wage for migrant workers, and which is the number one destination for Filipino workers. The third row takes this further and drops the five GCC countries in our sample (Bahrain, Kuwait, Oman, U.A.E., and Saudi Arabia). In both cases our coefficients are of very similar magnitudes and of the same significance levels as with these countries included, showing our results are not being driven by these countries.

The fourth row drops Switzerland, the only country in our sample with a national quota limiting the total number of immigrants, which again leads to little change in the results. We then split the sample into countries which have at least a partial quota on migration, and those that do not. Both groups contain a mix of OECD and non-OECD countries. For example, countries with partial quotas include Ghana, Hong Kong, Taiwan, South Africa and Russia along with the United States, Norway, Spain and Sweden among others, while countries without partial quotas include Belgium, France, Finland and Japan along with Kuwait, Thailand, Micronesia and China among others.

For both subgroups we find a significant impact of GDP on migrant numbers, and no significant impact on migrant wages. Our simple theory model predicts that countries with binding quotas should experience relatively more adjustment through wages and relatively less through quantities. While the point estimates for wages are consistent with slightly more pro-cyclicality in countries with wages, the point estimates for quantities suggest, if anything, more adjustment of quantities in countries with partial quotas than those without. However, splitting the sample increases the standard errors, and the 95 percent confidence interval for the impact of GDP on migrant numbers for countries with some form of a quota ranges from -0.62 to 9.43. This lack of significant difference between partial quota and non-quota countries in their response may therefore just reflect low power, but could also be a result of the quotas only covering some occupations or sectors, and not always binding due to the dual imposition of minimum wage requirements for migrant workers through labor market tests.

As a final robustness check, the last row of appendix Table 5 provides results from a weighted regression, which weights each country by its 1992 log migrant count. This ensures that our results are not driven by countries with small absolute numbers of migrants having large

relative, but small absolute, changes. These coefficients again are similar in magnitude to the unweighted estimates, showing that our results are robust to this concern.

Taken together, 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.

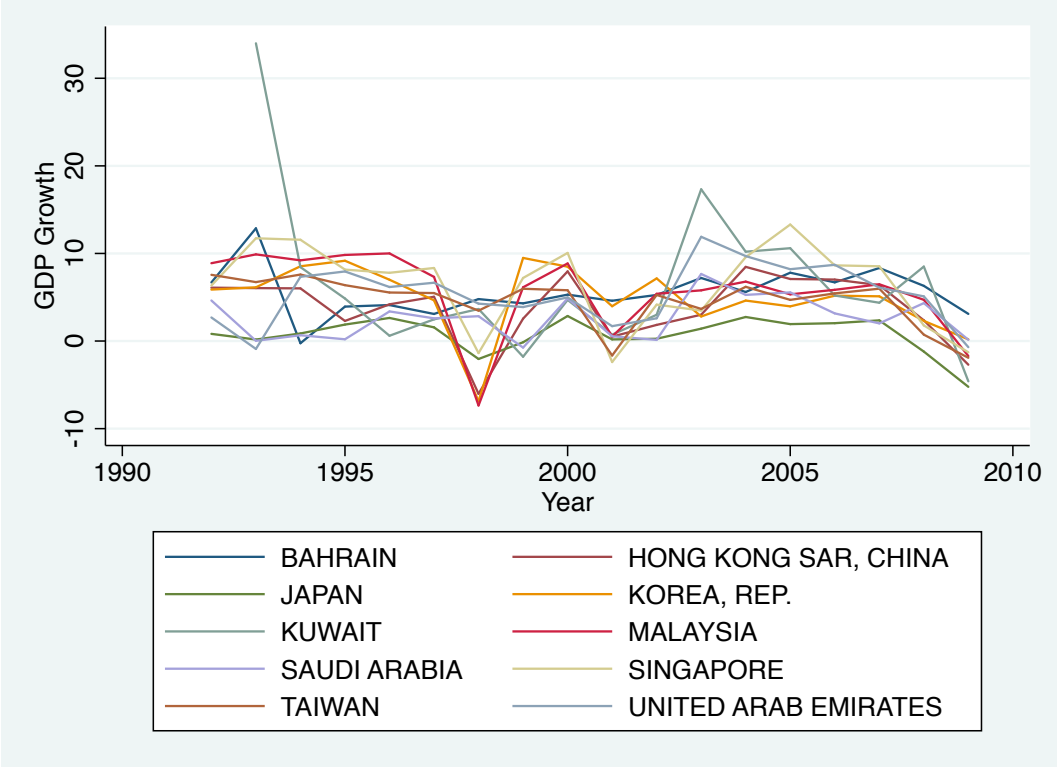
Comparing Filipino Migrant with Native Wages

Additional supporting evidence for our claim that migrant workers face binding minimum wages in destination labor markets would be evidence that migrants typically earn wages equal to or exceeding those of native workers. Unfortunately, there are little data available that would allow us to compare the wages earned by Filipinos to those of natives in most of the main destinations for Filipino workers. That said, we can conduct this exercise for the United States, the 13th largest destination for Filipino labor migrants in the POEA data. We use data from the 2000 U.S. Census, restricting the sample to Philippine-born and U.S. native-born workers (aged 18-64) in the six most common occupations of Filipino-born workers in the US: registered nurse, nursing or home health aide, accountant, cashier, retail sales person, and maid. For each occupation separately, we estimate modified Mincer wage equations of log wages on years of education, experience, experience squared, and an indicator variable for being Filipino-born.

The results are in Appendix Table 6. In the pooled sample (with all occupations in the same regression, including fixed effects for each occupation), the coefficient on Filipino-born, representing the average log difference between the wages of Filipino-born and US native workers, is positive and significantly different from zero. The coefficient on "Filipino-born" is also positive and statistically significant in four of the occupation-specific regressions, indicating that Filipino-born workers earn more than native workers of the same education and experience in the occupations of registered nurse, home health aide, cashier, and maid. The Filipino-born coefficients in the regressions for accountants and retail sales persons are negative and statistically significantly different from zero, and in these cases they are the smallest in absolute

value of all the coefficients on "Filipino-born" in the table. Overall, we view these results are consistent with the idea that Filipino workers are typically not able to migrate to the U.S. and work for lower than the prevailing wages for native workers.

Appendix Figure 1: Real GDP Growth 1992-2009 in Top 10 Filipino Migrant Destinations

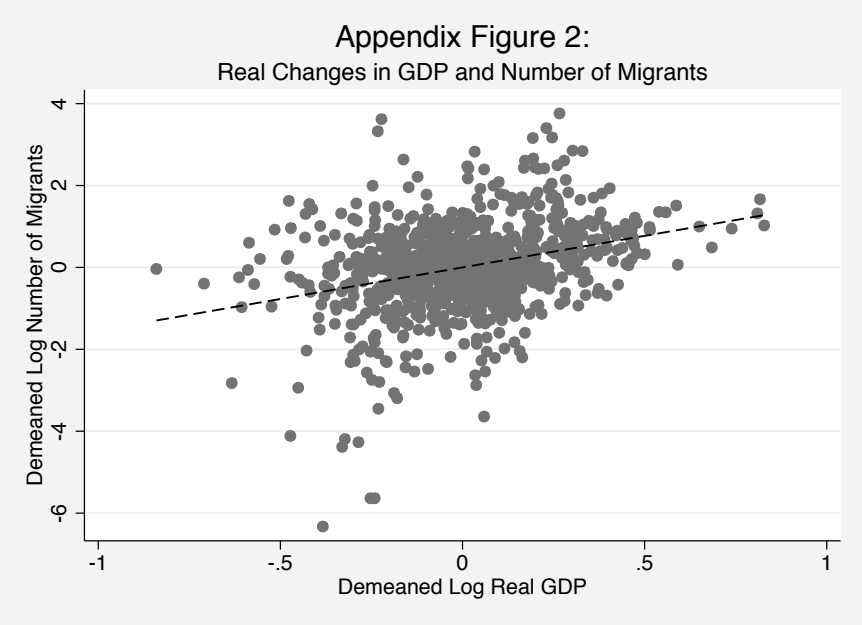


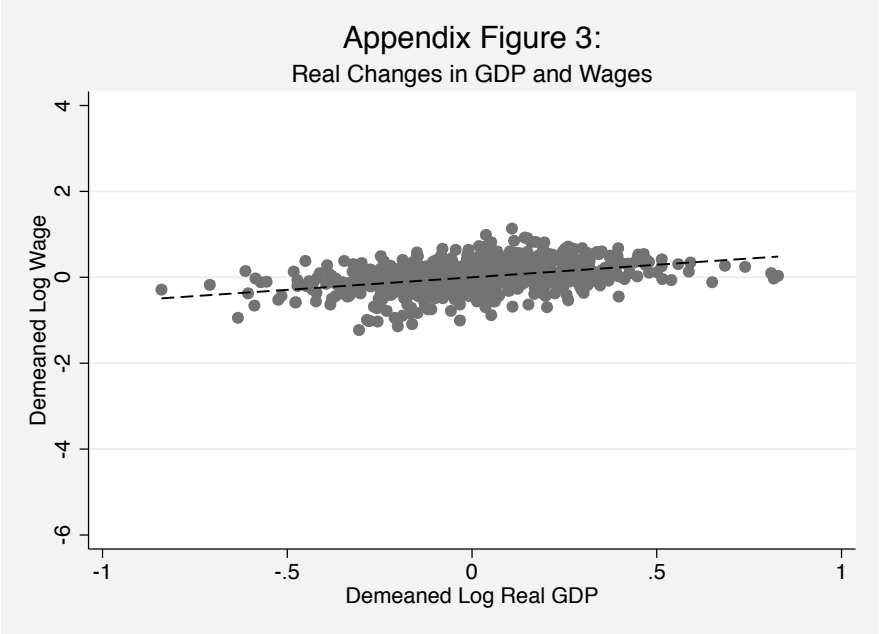
Source: WDI and authors' calculations

Scatterplots of the underlying variation in the data

Appendix Figures 2 and 3 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.[1] Appendix Figure 2 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, Appendix Figure 3 shows much less variation around the mean in wages than Appendix Figure 2 shows in migrant quantities, and a close to flat relationship with GDP deviations.

[1] Country-specific means are used in demeaning the data for these figures.





Notes: The slope coefficient in Appendix Figure 2 is 1.54 with a standard error of 0.327. The slope coefficient in Appendix Figure 3 is 0.583 with a standard error of 0.106. Robust standard errors are clustered at the country level.

Source: POEA, WDI, and authors' calculations

Appendix Table 1: Included Destination Countries

	Destination		Destination
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 REPUBL
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.

Appendix Table 2: Robustness Checks: Effect of GDP on New Hires, Rehires, Total OFWs, and Contract Duration

	New Hires	Rehires	Total OFWs	Contract Duration
Log GDP	2.624***	1.948***	2.155***	0.161
	(0.710)	(0.486)	(0.530)	(1.836)
Observations	648	647	648	972
R^2	0.914	0.947	0.950	0.611
P-value of Equality of Hiring Status Coefficients	0.2446			
Mean Dependent Variable (Levels)	4663	7785	12448	17.21

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.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: POEA, WDI, and authors' calculations

Appendix Table 3: Lags of GDP Not Jointly Significant

	Quantity			Log Mean Wage		
Log GDP	2.741***	2.475**	2.716**	-0.164	-0.420	-0.501*
	(0.981)	(0.955)	(1.060)	(0.272)	(0.290)	(0.291)
Lag 1 Log GDP	-1.247	-0.722	-1.308	0.143	0.347	0.375
	(1.104)	(1.033)	(1.108)	(0.258)	(0.339)	(0.328)
Lag 2 Log GDP		0.452	1.071		0.606**	0.334
		(1.373)	(1.213)		(0.290)	(0.248)
Lag 3 Log GDP		-0.745	-0.995		-0.599**	0.184
		(1.148)	(1.286)		(0.247)	(0.286)
Lag 4 Log GDP			0.845			-0.014
			(1.137)			(0.364)
Lag 5 Log GDP			-1.111			-0.487*
			(1.136)			(0.275)
Joint Sig. of Lags (p-value)	0.26	0.74	0.59	0.58	0.11	0.16
Observations	971	965	955	966	960	950
R^2	0.863	0.864	0.866	0.762	0.765	0.770

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.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: POEA, WDI, and authors' calculations

Appendix Table 4: The Impact of GDP is Not Different in Recession Years

	Log Quantity of New Migrant Contracts	Log Median Wages Paid to Migrants	Log Mean Wages Paid to Migrants
Log GDP	1.529***	-0.104	-0.0969
	(0.503)	(0.176)	(0.147)
Log GDP*Recession	-0.0288	0.00757	-0.00197
	(0.0442)	(0.0112)	(0.00934)
Observations	918	914	914
R^2	0.877	0.744	0.773

Notes: The sample includes all new hires from 1992-2009. All regressions include country and year fixed effects, and a dummy for whether the country had negative GDP growth in the current year. Robust standard errors clustered at the country level are in parentheses.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.
Source: POEA, WDI, and authors' calculations

Appendix Table 5: Robustness to Different Country Choices

	Number of Countries in Sample	Log Quantity of New Migrant Contracts	Log Median Wages Paid to Migrants	Log Mean Wages Paid to Migrants
Base Specification	54	1.522***	-0.063	-0.041
		(0.501)	(0.158)	(0.137)
Omitting Saudi Arabia	53	1.497***	-0.076	-0.049
		(0.502)	(0.160)	(0.138)
Omitting all GCC countries	49	1.537***	-0.060	-0.020
		(0.547)	(0.171)	(0.149)
Omitting Switzerland	53	1.447***	-0.034	-0.022
		(0.500)	(0.159)	(0.138)
Countries with full or partial quota	21	4.406*	0.129	0.204
		(2.409)	(0.347)	(0.304)
Countries with no quota	28	1.344**	-0.065	-0.070
		(0.589)	(0.217)	(0.179)
Full sample weighted by 1992 size	54	1.584***	0.118	0.0939
		(0.560)	(0.157)	(0.146)

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

Appendix Table 6. Differences in Log Hourly Wages for Filipinos and Natives in Top Occupations in the U.S.

	Top 6 Occupations	Registered Nurse	Nursing or Home Health Aide	Accountant	Cashier	Retail Sales Person	Maids
Filipino-born	0.116***	0.225***	0.138***	-0.055***	0.068***	-0.087***	0.237***
	(0.007)	(0.008)	(0.017)	(0.017)	(0.020)	(0.023)	(0.025)
Educational Attainment	0.078***	0.061***	0.060***	0.131***	0.058***	0.091***	0.028***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Experience	0.028***	0.023***	0.017***	0.031***	0.023***	0.041***	0.012***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experience Squared	-0.000***	-0.000***	-0.000***	-0.001***	-0.000***	-0.001***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	453315	96872	64673	63529	86737	115552	25952
R^2	0.344	0.064	0.049	0.140	0.069	0.136	0.022

Notes: Data are from the 2000 U.S. Census. The sample is restricted to include only individuals aged 18 to 64 born in the Philippines or the United States who report that they are currently employed. Each column reports coefficients from a regression of log hourly wages on an indicator for Filipino, educational attainment, experience (age minus years of education minus 6), and experience squared. The "Top 6 Occupations" wage regression includes occupation fixed effects for each of the 6 top occupations for Filipinos in the U.S. Remaining columns are wage regressions for each of the top 6 occupations separately.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: IPUMS USA.