

# Medical Worker Migration and Origin-Country Human Capital: Evidence from U.S. Visa Policy

Paolo Abarcar  
Mathematica

Caroline Theoharides  
Amherst College

Development Policy Centre  
Australian National University  
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# Motivation

- Many developed countries face shortages of medical workers
- To fill these gaps, countries often recruit foreign-born nurses (Cortes and Pan, 2014)
- For migrant-sending, developing countries, recruitment may lead to scarcity, or “brain drain,” of health care professionals
  - Could contribute to poor health outcomes for local population
- Alternatively, recruitment for high-wage jobs may induce more investment in education
  - If more individuals invest in education than migrate, results in “brain gain” of health care workers



- What is the effect of demand for foreign-born health care workers on the stock of health care workers and educated labor in the country of origin?



- Examine the effect of international migration of nurses from the Philippines on post-secondary enrollment, graduation, supply of programs, and quality of degree
- Exploit two changes in U.S. visa policy that led to the expansion and subsequent contraction of visas for Filipino nurses to the U.S.
- Certain areas of the Philippines specialize in sending migrants to certain destinations and occupations (Theoharides, 2018)
  - Some areas of Philippines had larger treatment dosage than others
- Event study methodology
  - Treatment is defined as provinces with high levels of nurse migration at baseline



- Expansion and contraction of U.S. nursing visas first increased and then decreased migration of Filipino nurses
- Nursing enrollment increased after expansion, and then decreased when visas were reduced
  - Nursing graduates responded similarly but with 4-year lag
- Supply of nursing programs increased to allow for new enrollment



- Marginal nurse induced into nursing degree was less likely to pass nursing licensure exam
  - But, increase in licensed nurses far exceeded number departing
  - For each new migrant, 10 new nurses licensed in Philippines
- Brain drain or gain?
  - Increases due to individuals switching to nursing from other fields
  - Persisted to graduation at a higher rate, thus increasing college grads overall



- Provide first causal microeconomic estimates of medical worker migration on sending country human capital
  - Adds to long literature on brain drain and gain (Batista et al., 2012; Beine et al, 2001; Chand and Clemens, 2019; Dinkelman and Mariotti, 2016; Docquier et al., 2008; Khanna and Morales, 2019; Shrestha, 2017; Theoharides, 2018)
- Focus on skill-specific migration where supply of postsecondary education may not readily respond
  - Measure supply-side effects of changes in nursing programs and changes in quality of nursing programs
- Unique data allow for accurate estimates of skill prior to migration



# Policy Implications

- Results refute usual refrain about brain drain
- Directly relevant to policy debates surrounding medical worker migration and reliance of wealthy countries on medical personnel from developing countries
  - WHO, developed countries have discouraged or banned recruitment from certain countries
- Highlight importance of well-designed partnerships between migrant-sending and receiving countries
  - Caveat: results may not translate to all contexts (ie. sub-Saharan Africa)
- For low to middle income countries seeking to use migration as development tool, Philippines provides optimistic evidence





# Background on Filipino Nurse Migration

- Philippines is one of the world's largest migrant-sending countries
- Filipino nurses make up the largest group of foreign-born nurses
  - Rooted in colonial relationship with U.S.
  - United States is largest destination (74%)
  - Filipino nurses in the U.S. earn approximately 10 times higher salaries plus legal status for family members
- Migrant networks are key determinant of nurse migration patterns (Choy, 2006)



# U.S. Recruitment of Nurses

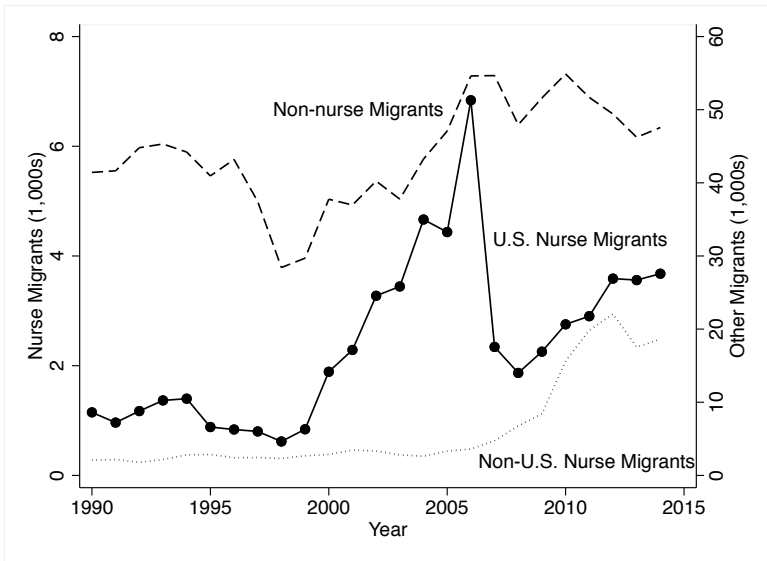
- Most common channel for foreign nurses is through permanent employment based visas (EB-3)
- 140,000 EB-3 visas granted per year
  - Nurses experience shorter processing time due to shortages of U.S. nurses (Schedule A occupations)
  - Philippines cannot receive more than 7% of EB-3 visas granted
  - Demand for visas far exceeds supply



- American Competitiveness in the 21st Century Act of 2000 loosened per country limits in visa allocation
  - Approximately 200,000 additional visas to Schedule A occupations
- In 2007, processing of Schedule A visas stopped
  - In 2006, 6,839 nurse visas processed from the Philippines
  - Fell to 2,342 in 2007



# Migrant Departures of Nurses and Other Migrants

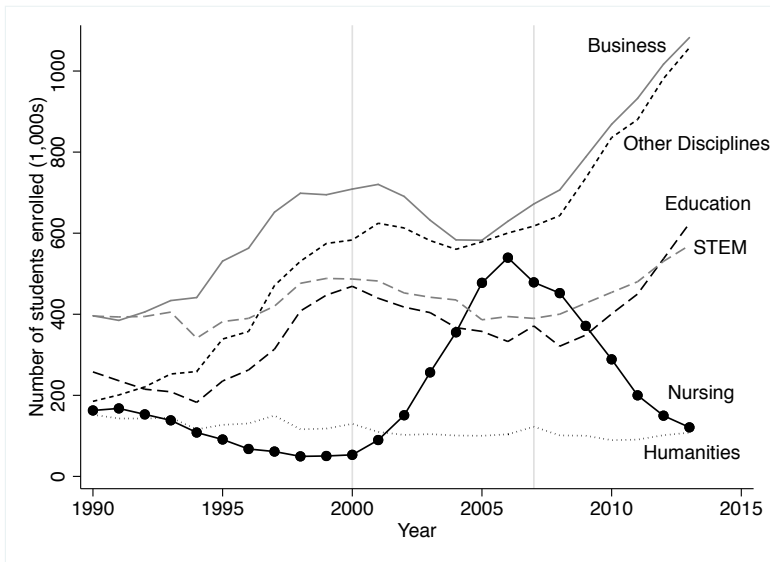


# Brain Drain or Brain Gain?

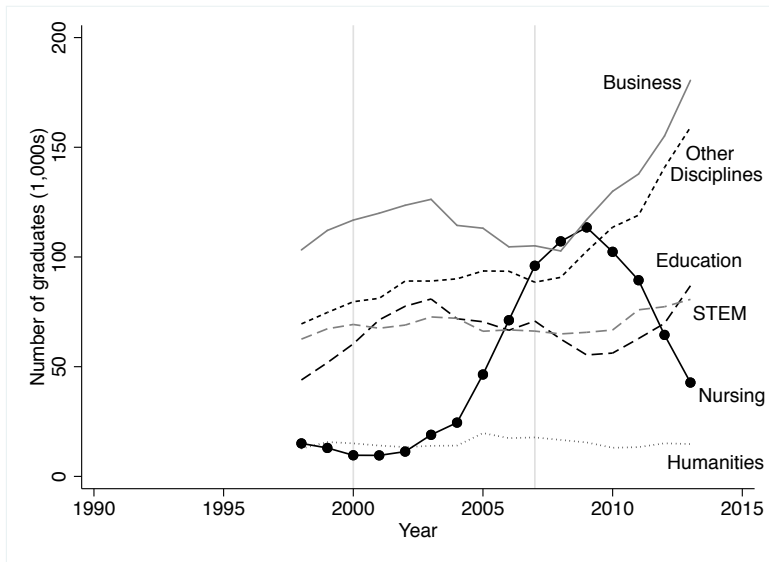
- Philippines provides compelling example of where one might anticipate a shortage of domestically employed nurses
- Government officials in the Philippines have described the migration of nurses not as a “...brain drain, but more appropriately as a brain hemorrhage of our nurses.” (Galvez-Tan, 2003)
- Despite this fear, postsecondary enrollment and graduation data suggest opposite result



# Enrollment in Post-Secondary Education by Discipline



# Graduations in Post-Secondary Education by Discipline



- Commission for Filipinos Overseas (CFO): Administrative data on all permanent migrant departures from 1990 to 2014
  - Demographics, place of birth, country of destination, education, profession, etc.
  - Calculate province-level migration rates for nurses
- Commission on Higher Education (CHED): Postsecondary enrollment and graduation from 1990 to 2013 disaggregated by program of study
  - Calculate enrollment, graduation rates and number of nursing programs in each province over time





# Summary Statistics

	Full Sample	
	Mean (1)	St. Dev. (2)
<i>Migration Rate (%)</i>		
Total	0.075	0.094
U.S. Nurse	0.004	0.005
Non-Nurse	0.070	0.089
<i>Postsecondary Enrollment Rates (%)</i>		
Total	21.41	12.53
Nurse	1.54	2.69
Other	19.87	11.07
<i>Postsecondary Graduation Rates (%)</i>		
Total	3.79	2.05
Nurse	0.36	0.57
Other	3.43	1.77
<i>Number of Nursing Programs</i>		
Total	4.39	8.94
Public	0.64	1.15
Private	3.75	8.16
<i>Nursing Licensure Exam (%)</i>		
Examinees/Population	0.072	0.155
Passers/Population	0.031	0.065



- Exploit plausibly exogenous policy changes that occurred in 2000 and 2007 that expanded and restricted nurse migration to US
- Aggregate results provide suggestive evidence of impacts of the policy changes
- To isolate causal effect, exploit importance of migrant networks
- Compare high baseline nurse migration areas (treatment group) to low baseline nurse migration areas (control group) before and after the policy changes



$$Y_{pt} = \sum_{\tau \neq 1999} \beta_{\tau} High_{p,0} D_t^{\tau} + \alpha_p + \gamma_t + X_{p0} * \gamma_t + \epsilon_{pt} \quad (1)$$

- $Y_{pt}$ : nursing enrollment or graduation rate in province  $p$  year  $t$
- $High_{p,0}$ : binary variable equal to 1 if province has above median nurse migration at baseline
- $D_t^{\tau}$ : binary variable equal to one if year of observation  $t$  equals the specific year,  $\tau$ , and 0 otherwise
- $\alpha_p$  and  $\gamma_t$ : province and year fixed effects
- $X_{p0}\gamma_t$ : baseline controls interacted with year fixed effects
- 1999 is omitted in order to identify the model



# Identifying Assumptions

- Identifying assumption: In the absence of the policy changes, high nurse migration provinces would not have experienced differential changes in outcomes compared to low nurse migration provinces
- If this assumption holds:
  - Should not reject null hypothesis that  $\beta_\tau$ 's prior to 2000 equal zero

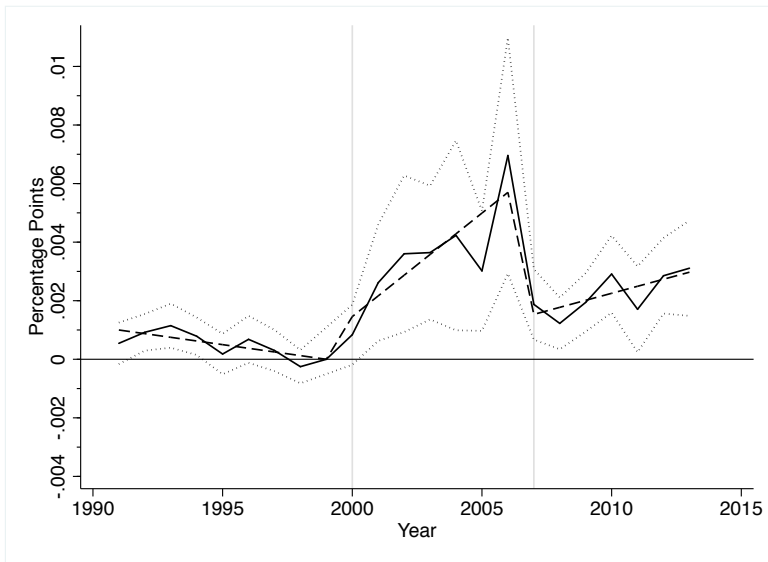


# Identifying Assumptions

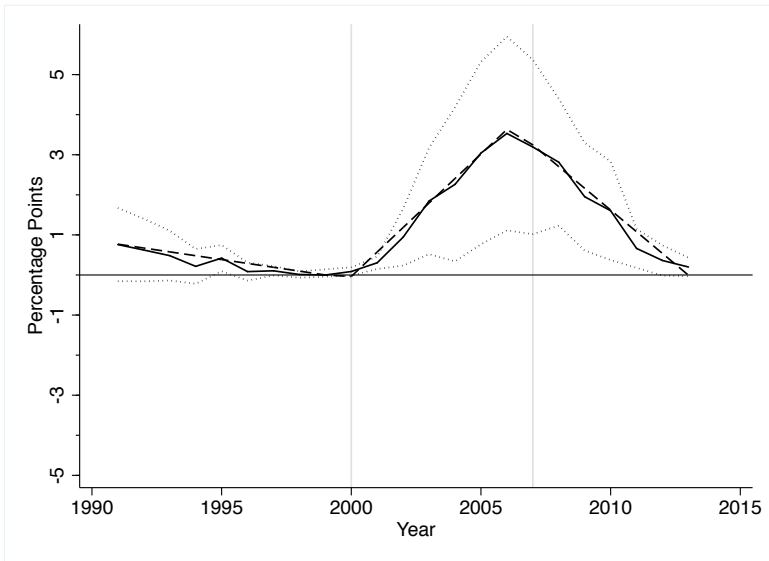
- Threats:
  - Differential trending of outcomes by high and low nurse migration provinces
    - Province fixed effects control for differences in levels
    - Baseline controls interacted with year dummies
  - Economic shocks or policy changes correlated with both nurse migration and the outcome variable
    - No major changes to healthcare system or legislation that occurred simultaneously
- Show robustness to baseline non-nurse migration x year fixed effects, dropping Manila, additional baseline controls, island x year fixed effects



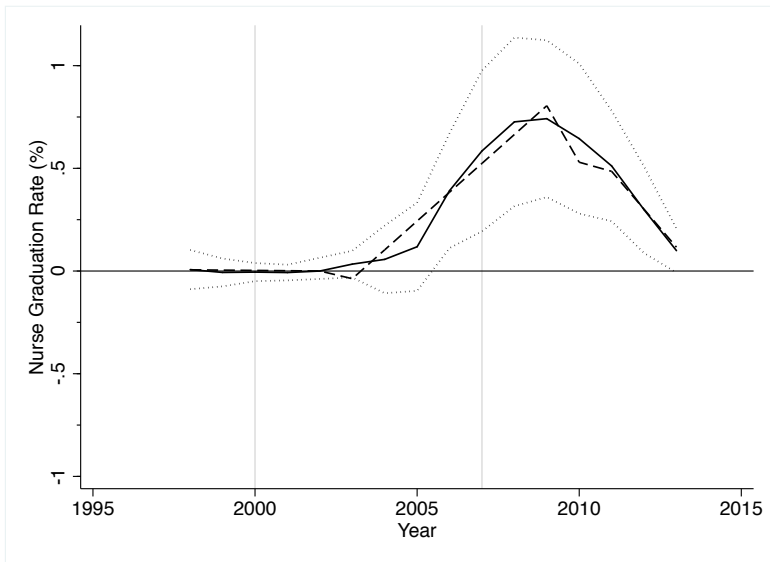
# First stage: Effect on Nurse Migration to U.S.



# Effect on Nursing Enrollment



# Effect on Nursing Graduation





# Magnitude of Effects

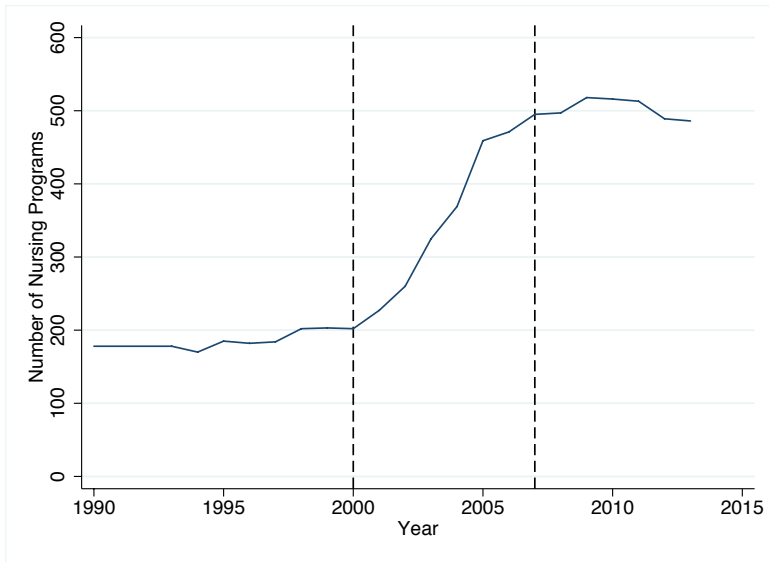
- Average effect on nurse graduation during expansion: 0.39pp per year
- Pre-period sample mean nursing graduation rate: 0.13%
- Visa expansion led to a 290% increase in graduates
- Average province had 270 nursing graduates per year, or 783 new grads
- 30 new nurses departing in average province-year during expansion period
- Implies for each additional nurse migrant, 26 additional nursing graduates
- Huge effect, but recall aggregate response
  - 1,207 nurse migrants in 1999 to 7,323 in 2006
  - 11,313 nurse grads in 2002 and 113,484 in 2009



- Proponents of brain drain argument often purport that even if returns to schooling could induce enrollment, supply constraints bind such that individuals cannot enroll
  - Particularly likely for specialized occupations
- We examine this directly by looking at the effect of policy changes on number of nursing programs in the Philippines

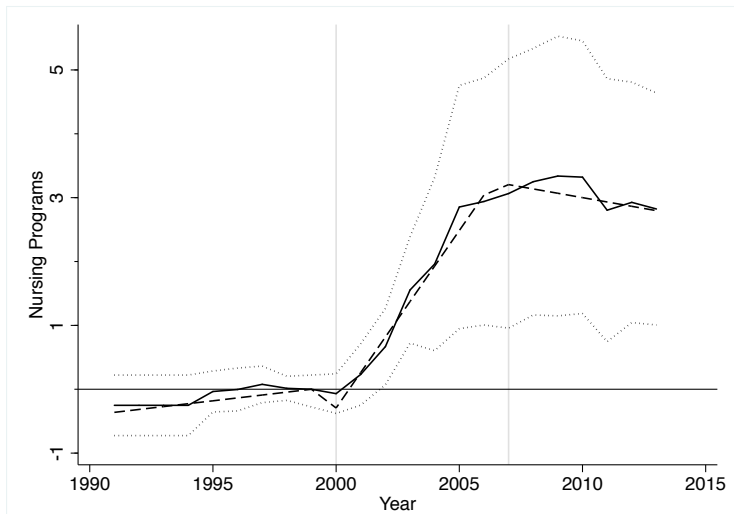


# Nursing Programs Over Time



# Effect on Supply of Nursing Programs

- Increase of approximately 0.5 new programs per year
- Driven by both public and private programs



# Quality of the Marginal Nurse

- Is the marginal nursing graduate of the same quality as graduates before the policy change?
  - New graduates may be less-skilled because new schools are less rigorous or students themselves are weaker
- Use data on pass rates from the Philippine Nursing Licensure Exam (NLE) to measure nurse quality
  - Must pass in order to practice nursing in the Philippines or apply for jobs abroad
  - National pass rates declined over sample period



# Implied Pass Rate

Year	Passers out of Population (1)	Examinees out of Population (2)	Pass Rate (Column 1/Column 2) (3)	P-value, col 3=0.58 (Pre-period pass rate) (4)
Average Effect (2000-2013)	0.033*** (0.011)	0.085*** (0.028)	0.390	0.000

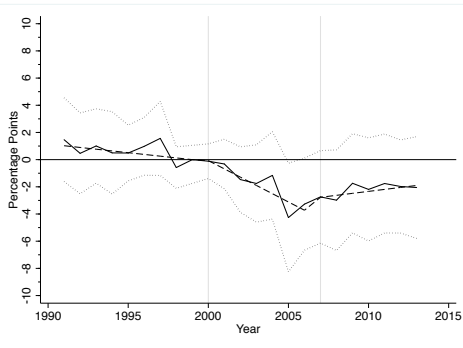
- Would like to know how pass rate (passers/examinees) responds
- Estimate two regressions comparing high versus low nurse provinces in the pre and post period (basic DID)
  - 1 Number of passers/population
  - 2 Number of examinees/population
- Divide coefficient for passers by coefficient for examinees to get implied pass rate: 39%
- Test against pre-period past rate of 58%
- Despite lower pass rates, so many individuals took and passed the exam that each new nurse migrant led to 10 new licensed nurses at home



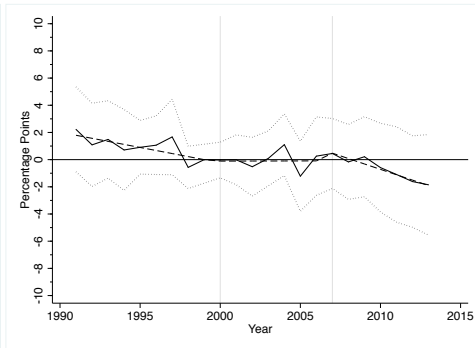
# Effect on Non-Nursing Enrollment

- Did this policy change increase the overall stock of college educated labor?

(a) Non-Nursing Enrollment Rate

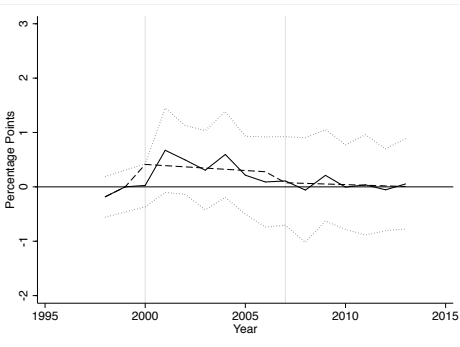


(b) Total Enrollment Rate

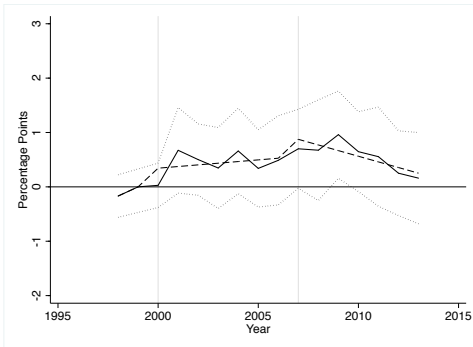


# Effect on Non-Nursing Graduation

(c) Non-Nursing Graduation Rate



(d) Total Graduation Rate



- Post-expansion effects on total graduation are jointly significant
- 126 new graduates in the average province





# What happens to nursing graduates who do not get a visa?

- Very small share migrate as nurses to other destinations
  - Also do not appear to be absorbed by temporary contracts as domestic helpers or caregivers
- Results from Census suggest a large increase in nurse employment in the Philippines
  - No major healthcare expansions during this time
  - Driven by RN HEALS program and “Professional Volunteer” nurses
- What about those that do not pass?
  - Universal Healthcare Implementers, Public Health Associates
  - Business Process Outsourcing (BPO)



# Conclusion

- Enrollment and graduation from nursing programs increased dramatically
- Number of nursing schools rapidly expanded to accommodate increased demand
- Although students passed licensure exam at lower rates, increase in licensed nurses outweighed increase in nurse migration
  - For each additional nurse migrant, 10 more graduates passed the licensure exam
- Overall increase in stock of college educated labor



- In terms of benefits, Philippines gained more nurses and many worked in underserved areas
- Those who migrated experienced huge gains in wages and sent remittances
- In terms of costs, many nurses remained unemployed or in volunteer positions
  - Switched to nursing from other fields
  - Unclear if remaining in those fields would have greater development impacts
- Ultimately, our paper provides evidence of partial equilibrium effects of demand for foreign nurses on education in the origin
  - Overall welfare calculations are beyond paper's scope
  - Should be subject of future research



- Our results provide useful evidence for many low-to-middle income countries seeking to emulate worker export process of Philippines
  - May not apply to the most underdeveloped countries with limited postsecondary infrastructure
- Highlight importance of well-designed partnerships between receiving and sending countries (Clemens, 2015; CGD, 2020)
- Such partnerships can present a win-win situation
  - Allow receiving countries to subsidize training for workers in sending countries while facilitating migration of skilled workers

