RELATIVE QUALITY OF FOREIGN NURSES IN THE UNITED STATES[*]

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Abstract

In recent years, the US has become increasingly reliant on foreign registered nurses to satisfy health care demands. The Philippines has emerged as the single largest source of nurses educated abroad, representing more than half of foreign nurses entering the US in the last decade. One of the main concerns raised by the importation of nurses is the quality of care that they provide. This paper addresses this question by analyzing the relative quality of foreign educated nurses and its evolution over time using Census data from 1980 to 2010 and wages as a measure of skill. We find a positive wage premium for nurses educated in the Philippines, but not for foreign nurses educated elsewhere. This premium cannot be explained by differences in demographics, education, work experience, location, or detailed job characteristics. The assimilation profile of Filipino nurses and the types of hospitals that hire them strongly suggest that the premium reflects quality differences and not just unobserved characteristics of the job that carry a higher wage but are unrelated to skill. We provide evidence that the wage premium is likely to be driven by strong positive selection into nursing among Filipinos resulting from the high and heterogeneous returns to the occupation generated by active government support for the migration of nurses in the Philippines.

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1 Introduction

The number of foreign educated nurses working in the United States has increased rapidly over the last few decades. In the mid-1980s, 6 percent of nurses taking the licensure examination (NCLEX) were foreign-educated and this proportion increased to close to 20 percent in the mid-2000s. The US has also recently become the world's largest importer of nurses, surpassing the United Kingdom, which has historically depended on foreign nurses to a larger extent (Aiken 2007). The composition of foreign nurses has also changed markedly over time, and the Philippines has emerged as the single largest source of foreign nurses to the US, accounting for over half of all nurses imported in the last two decades. Future increases in the demand for health care due to aging of the population, the passing of the Affordable Care Act and a potential shortage of primary care physicians makes it almost inevitable that the United States will have to rely more heavily on foreign nurses, even if the supply of native nurses continues its recent upward trend (Auerbach et al. 2011).

Nevertheless, the importation of foreign registered nurses (RNs) to satisfy the demand for nurses raises a number of important questions. Is the quality of care that they provide compromised by differences in training, language and culture? Do they negatively affect the wages and working conditions of native nurses as native nurse associations argue, reducing native labor supply and potentially preventing some natives from joining the occupation?[1] Is it ethical for the US to employ foreign educated nurses from developing countries with fragile health care systems?

In this paper, we aim to shed some light on these issues by characterizing the foreign nurse population in the US over time and providing systematic evidence on the existence and evolution of quality differentials between foreign and native nurses. First, to better understand the role that foreign nurses play in the US health care system, we compare the demographic and labor supply

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[1] A representative of the American Nurse Association (ANA) giving testimony in 2008 in Capitol Hill stated that "The ANA opposes the use of immigration as a means to address the growing nursing shortage" and that "In the end, ANA is concerned that the influx of foreign-educated nurses only serves to further delay debate and action on the serious workplace issues that continue to drive American nurses away from the profession." (ANA, 2008)

The position of the ANA contrast with that of the American Hospital Association (AHA): "The AHA supports streamlining and improving the immigration process to allow qualified, foreign-educated nurses and allied health professionals to come to this country. We will continue working with Congress and the Administration to improve immigration opportunities for qualified health care professionals, including maintaining the availability of employment-based visas for shortage professions." (AHA, 2007)

characteristics of native and foreign nurses using data from the US Census data and the National Sample Survey of Registered Nurses (NSSRN). We find that foreign nurses, in particular Filipinos, tend to work in more demanding settings and maintain less desirable schedules - they are more likely to work in hospitals, work full-time, and do shift work, as compared to their native counterparts. Natives are more likely to work part-time and choose jobs with standard schedules - for example, they tend to work in physicians' offices and schools, etc. In terms of educational background, the majority of foreign nurses have at least a bachelor's degree, whereas a larger fraction of natives have an associate degree. A more educated nurse workforce (as measured by the share of nurses in a hospital holding a bachelor's degree) has been associated with better patient outcomes and higher nurse productivity (Aiken et al. 2003). At the same time, hospitals have been shown to attract nurses of higher unobserved ability (Hirsch and Schumacher 2007). Therefore, at least in terms of their education levels and their place of work, foreign nurses appear to have higher levels of skill as compared to native nurses.

Next, we focus on quality differences between foreign and native nurses beyond those suggested by their observed characteristics. Absent data linking patient outcomes to nurse's country of education, we use wages as a proxy for skill. Using Census data from 1980 to 2010, we find striking evidence of a positive wage premium for Filipino nurses relative to US-born nurses. The premium is close to 2 percent in 1980 and 1990, reaches a maximum of 8 percent in 2000, and decreases to 4 percent in 2010. This wage premium cannot be explained by differences in demographics, education, location, or detailed job characteristics (such as setting, part-time status, shift work and hospital unit). Interestingly, the observed wage premium for Filipino nurses does not extend to other foreign nurses, who appear more comparable to native nurses.[2]

We present several pieces of evidence suggesting that the wage premium for Filipino nurses reflects quality differences and not just unobserved characteristics of the job that carry a higher wage but

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[2]A few recent papers have reported foreign nurses earning more (or at least not less) than native nurses. See Arends-Kuenning (2006), Huang (2011), Schumacher (2011) and Xu (2010). Ours is the first, however, to focus on Filipinos, to argue that the wage premium is likely to reflect quality differences and to explore selection into the occupation by country. In addition, none of the previous studies controls for shift work, an important dimension in this particular setting.

are unrelated to skills, such as working nonstandard schedules. First, we show that the premium is not driven primarily by Filipino nurses doing shift work. We also rule out that Filipino nurses are being paid more to compensate for lower non-wage benefits or for working in more taxing hospital units. Second, if we believe that the longer a Filipino nurse has been in the US the more likely she is to prefer the type of settings and work schedule characteristics of native nurses, then if the premium is mostly driven by job characteristics it should go down the more years the foreign nurse has been in the US. However, we find the exact opposite - the premium is highest for Filipino nurses that have been in the US for more than a decade. Finally, using the 1990 American Hospital Association Nursing Personnel Survey, we show that foreign nurses are hired disproportionately by hospitals with better characteristics - they are more likely to be private, pay higher wages, are larger, hire more educated nurses and have higher educational requirements for the nurse staff.

We examine possible explanations for the wage premium for Filipinos and its evolution over time. In particular, we use the Roy model (1951) of occupational choice to examine the conditions under which we would expect to find a positive wage premium for Filipino nurses. Active support of the Filipino government for the migration of nurses makes nursing one of the most profitable occupations. Filipino nurses who migrate to work in other countries earn between 2.5 (if they migrate to Taiwan) and 13 times more (if they migrate to the US) than nurses who remain in the Philippines. Nurses who migrate to Europe or to the US earn about 5 times more than what the average lawyer or CEO makes in the Philippines. In contrast, nursing in the US exhibits one of the lowest wage dispersion levels among major occupations, and although it pays relatively well, other professions such as medicine, law and business are associated with higher salaries and prestige. With the possibility of international migration, the Roy model predicts that the higher and more heterogeneous returns to nursing compared to any other occupation in the Philippines (a result of the Philippines' policy of nurse exportation), are likely to generate strong positive selection into nursing. Moreover, given that the US offers the highest wages, it is likely that Filipino nurses working in the US are drawn from the upper tail of the skill distribution of nurses in the Philippines. Although we do not have a direct measure of quality to compare nurses to other skilled workers in the Philippines, we show that nurses in the Philippines are significantly more likely to have highly

educated parents or husbands than other women with a bachelor's degree. The opposite pattern is observed for native nurses in the US. We also explore if the estimated wage premium for Filipino nurses is also observed for other popular occupations for Filipinos living in the US, and find no evidence that this is the case. We provide some evidence that the best nurses tend to migrate to destinations with higher wages, such as the US. Comparing the pre-migration earnings of nurses who migrate to the US to the wages of nurses in the Philippines, we find that nurses who migrate to the US are more likely to belong to the upper tail of the wage distribution of nurses in the Philippines. Furthermore, among Filipino nurses who migrated, those who migrated to the US are more likely to have higher educated parents relative to those who migrated to other destinations.

We also investigate if the evolution of the premium might be explained by changes in the quality of native nurses. We find some suggestive evidence that the quality of native nurses, as measured by passing rates in the licensure (NCLEX) examinations and by the selectivity of the institutions among entering cohorts of college freshmen who express an interest in becoming an RN, declined for cohorts entering the labor market during the 1990s and recovered somewhat starting in the early 2000s, roughly coinciding with the peak in the wage premium for Filipino nurses in 2000 and its further decline in 2007 and 2010. Using spouse's education as an alternative proxy for quality, we also find similar evidence of declines in the quality of native nurses starting in the 1990s. As to what caused this decline, the timing of the observed quality changes based on our proxies of nursing quality does not appear to support Auerbach et al.'s (2000) argument that the expansion of women's opportunities in other occupations drove down the relative quality of those entering nursing. Whereas the large expansion in the participation of women in fields such as medicine, law and business occurred for cohorts born in the 1940s and early 1950s, the popularity of nursing only started to decline for cohorts born in the 1960s and reached its lowest level for cohorts born in the first half of the 1970s. We conjecture that the decline in quality and interest in nursing among natives during the 1990s is a result of the downward trend in relative wages, employment growth, and the reported worsening of working conditions due to the significant changes in the organization and structure of the US healthcare system brought about by the expansion of managed care (Buerhaus et al. 2009; Clark et al. 2001; Currie et al. 2005).

Our findings have important implications for the use of foreign RNs to address current and future nurse shortages in the US. First, we find no evidence that foreign educated nurses, in particular Filipinos, are of lower quality than native nurses. It is difficult to imagine a situation in which Filipino nurses provide a lower quality of care and yet are paid significantly more than native nurses. Second, our results mitigate concerns raised by native nurse organizations that hospitals prefer to hire foreign nurses because they can pay them lower wages, plausibly driving down wages for natives.[3] Finally, our analysis suggests that assessing how nurse migration affects source countries is not straightforward. International demand for nurses is likely to affect, at least in the medium to long run, both the quantity and quality of individuals choosing nursing as a career. Therefore, hiring foreign nurses does not necessarily imply that nurse migration depletes sending countries of their healthcare workforce, especially for countries with the capacity to expand the supply of healthcare professionals such as the Philippines, India and Korea. Moreover, although the US attracts the best nurses from the Philippines, it is not clear that Filipino nurses in the US would have chosen a nursing career in the absence of the possibility of migration.

2   Background

Foreign educated nurses have been a part of the US workforce since the 1940s (CGFNS 2009). However their recruitment has varied significantly through time, shaped by changes in the domestic supply and demand for nurses and by immigration laws. Figure I shows the evolution of the share of foreign educated nurses and of other foreign educated workers in the labor force. The share of foreign RNs in the nursing labor force increased from 4 percent in 1970 to 8 percent in 2010; their share grew every decade, except in the 1980s where it stayed relatively constant. The observed growth in the share of foreign RNs is similar to that of foreign educated workers with a bachelor's degree or a graduate degree.

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[3]In a testimony to Congress in 2008, a representative from ANA stated that "In addition, ANA is concerned that immigrant nurses are too often exploited because employers know that fears of retaliation will keep them from speaking up" and that "their complaints are very similar to those that I have heard made by literally hundreds of other immigrants. They were promised that they would be employed as RNs, but were made to work as lesser-paid staff; they were made to work unreasonable hours; they were not paid overtime." (ANA, 2008)

Examining the flows allows for a better characterization of the fluctuations in the recruitment of foreign RNs. Figure II presents data on the number of first time takers of the board exam for RNs in the US (NCLEX) by foreigner status. As observed, since 1983, there have been two periods of significant increase in the number and share of foreigners taking the exam. The first coincides with a decline in the number of native nurses entering the labor force in the second half of the 1980s and the subsequent approval of the Nursing Relief Act of 1989, legislation that created the H-1A visa category for registered nurses for a period of 5 years. Under the Act, there were no limits placed on the number of nurses who could enter the US under this visa category. The Nursing Relief Act expired in 1995, which left nurses without a special category of their own.[4] As most nursing positions do not require a bachelor's degree, they cannot be filled by foreigners on an H1-B visa. Since 1995, most foreign nurses have to obtain a permanent visa or green card which typically involves a lengthy process, as the requests from some countries such as India, the Philippines, and China, always exceed the yearly quota.

The second spike in the share of foreign nurses taking the exam once again followed a period of continuous decline in the number of native nurses taking the exam. Starting in 2000, the share of foreign nurses increased to unprecedented levels, reaching an all time high of 22 percent in 2006, when Congress passed a legislation that allocated 50,000 immigrant visas exclusively for nurses, physical therapists and their families. The increase since 2000 also reflects important changes that have greatly facilitated the hiring of foreign nurses beyond changes in immigration laws. First, the number of US based international nurse recruitment firms experienced a ten-fold increase since the late 1990s (Pittman et al. 2007). Second, the licensure exams (NCLEX) started being offered overseas beginning in 2005 - prior to that, candidates had to apply for a temporary visa to take the exams in the US.

Immigration laws have also shaped the country of origin composition of foreign nurses. As shown in Table I, which presents the country distribution of foreign nurses by census year, before the Hart-

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[4]The exception is the H-1C Nonimmigrant Visa, which is limited to a total of 500 nurses per year and then only to 25 nurses for each state that qualifies. Only hospitals that have been determined by the U.S. Department of Health and Human Services to have a critical shortage of health care workers can apply.

Celler Act of 1965 – which replaced the country quota system with preference categories based on family and job skills – most foreign nurses came from Canada and Western Europe. The new legislation shifted the country composition of migrants to the US, with many more people coming from Asia and Latin America. In the particular case of nurses, the law led to thousands of nurses from the Philippines migrating to the US. For the last several decades, the Philippines has been the primary source of foreign educated nurses to the US. Today 4 out of 10 foreign nurses are from the Philippines and even larger shares are observed when focusing on flows (Figure III). In particular, since the early 2000s the share of foreigners taking the licensure exam (NCLEX) who were educated in the Philippines has hovered around 55 to 60 percent. Table I also shows that in the last few years, nurses from India had started to enter the US in larger numbers - nevertheless, they still represent less than 10 percent of foreign nurses.

Why the predominance from the Philippines?

Medicine and nursing constituted integral components of the American Colonial project in the Philippines (the islands were an American Colony from 1989-1946). As a result, the Philippines ended up with an Americanized hospital training system that was able to produce nurse professionals with the required training, language, and work culture comparable to that of nurses in the US. The first big wave of nurses from the Philippines came after 1948, as part of the Exchange Visitor Program. This program allowed people from other countries to come to the US to work and study for two years to learn about American culture. Originally the program did not target the Philippines or nurses specifically but was created to combat Soviet propaganda during the Cold War by exposing foreigners to U.S. democracy. Nevertheless, because of the strong relationship between the two countries, a large percentage of the exchange visitors came from the Philippines, and many of them were nurses.

With the passage of the Hart-Celler Act of 1965 in the US and the establishment of international migration as a development policy by President Marcos in the Philippines, nurse migration became a large phenomenon in the Philippines. Entrepreneurs in the Philippines set up more nursing schools as the international demand grew, and the number of nursing graduates soared. In the

1940s there were only 17 nursing schools in the Philippines, compared to 170 in 1990 and more than 300 today. Currently, the Philippines export nurses to several dozen countries worldwide.[5]

Nurse Immigration Requirements

The US has established relatively stringent rules that govern the immigration process to ensure that health care professionals educated in other countries have the credentials, nursing knowledge and English proficiency required to meet licensure requirements. Since 1996, as part of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996 (IIRIRA), the US requires that select health care professionals seeking an occupational visa to the country undergo a federal screening program. The screening includes: (1) an assessment of the individual's education to ensure that it is comparable to that of a US nurse, especially to make certain that nursing education is at the post-secondary level, (2) verification that the license at the country of origin is valid, (3) demonstration of written and oral English language proficiency[6] and (4) verification that the nurse has either passed the CGFNS (Commission on Graduates of Foreign Nursing Schools) Qualifying Exam[7] or the NCLEX examination. Upon migration to the US, foreign educated nurses have to pass the NCLEX exam to obtain an RN license.

3 Data and Descriptive Statistics

We use the 1980 to 2000 Censuses and the American Community Survey three-year aggregates for 2007 (2005-2007) and for 2010 (2008-2010) as our main data sources. The average sample

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[5] Confidential data from the Philippines Overseas Employment Administration (POEA) on all contracts of temporary migrant workers leaving the Philippines from 1992 to 2009 suggest that the country exports nurses to more than 50 countries around the world.

[6] Nurses must take either: (1) the Test of English as a Foreign Language (TOEFL), plus the Test of Written English (TWE) and Test of Spoken English (TSE); or (2) the TOEFL iBT (Internet Based TOEFL); or (3) the Test of English for International Communication (TOEIC), plus TSE and TWE; or (4) the International English Language Testing System (IELTS). Nurses educated in designated English-speaking countries are exempt from this requirement.

[7] The CGFNS (Commission of graduates of Foreign Nursing Schools) was created in 1977 to administer a predictor exam that would be taken by foreign nurses abroad before migrating and taking the US Board Exam. The predictor exam was a recommendation of a task force conformed by the Department of Labor, Department of State, the Immigration and Naturalization Service and the American Hospital Association after a study in 1975 found that only 15-20 percent of foreign nurses working in the US at the time were able to pass the State Board Test Pool Exam.

size per year is about a hundred thousand nurses. More detailed data about the nurses' jobs is provided by the National Sample Survey of Registered Nurses (NSSRN), which has been conducted approximately every four years since 1977.[8] The sample size for each year is about a third that of the Census.

Table II presents the descriptive statistics of RNs by country of education and by census year.[9] Important differences stand out between native and foreign nurses, especially Filipinos. Foreign nurses born elsewhere tend to be in between the other two groups on most dimensions.[10] Although Filipino nurses were on average significantly younger than natives in 1980, the slowdown of nurse importation during the 1980s closed the gap. Today, the average age of nurses working in the US is more than 45 years, significantly higher than the average for workers with 2 years of college or a bachelor's degree (45.1 vs. 40.8). The greying of the nursing labor force in the US is a cause for concern given its implications for future nurse shortages.

Females continue to strongly dominate the profession in all cases, but foreign nurses are relatively more likely to be male. More than 80 percent of Filipino nurses have at least a bachelor's degree. This is in contrast to most native nurses and other foreign nurses who typically have only an associate degree or diploma. This fact is not surprising given that in the Philippines, a four-year college degree is required to become a nurse. In terms of work setting, Filipino nurses are significantly more likely to work in hospitals and much less likely to work in physicians' offices. Given that higher educational attainment and working in hospitals have been linked to better patient outcomes and higher unobserved ability of nurses (Aiken 2007; Hirsch and Schumacher

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[8]We are not able to use the 1977 survey as it does not include information about the country of birth or country of education of nurses.

[9]The Census does not ask about country of education. We assume that a nurse was educated abroad if she was 21 or older when she first arrived to the US. To calculate the age of arrival we use the variable year of immigration. The variable year of immigration is aggregated in five year periods in the 1980 and 1990 Census (for example, people arriving between 1960 and 1964 are all assigned the same code). To maximize the number of observations, we assume all migrants arrived in the latest year of the relevant period (1964 in the example above).

We estimate that about 80 percent of nurses born in the Philippines were educated abroad, 5 percent came to the US for their post-secondary education, with the rest arriving when children. We include foreign born nurses educated in the US in the group of native nurses.

[10]Naturally, the averages for foreign nurses born elsewhere hide important variation across countries. However, Filipino nurses are an outlier in most dimensions. In particular, their wages are consistently higher than the average wages for each of the other top source countries (Canada, Jamaica, India, Nigeria and Korea).

2007), at least in terms of observables, the average Filipino nurse appears more skilled than the average native nurse.

In terms of labor supply outcomes, Filipinos are at least 10 percentage points more likely to do shift work,[11] and as we will show in the next section, this difference is not fully explained by their higher likelihood of working in hospitals and nursing homes. Twice as many native nurses as Filipino nurses report working part-time, and although Filipino nurses are slightly more likely to report working 60 hours or more, they are less likely to work between 41 and 59 hours. Finally, they earn on average about 25 percent more than natives and 15 percent more than other foreign nurses.

Foreign nurses are heavily concentrated in some areas of the country. Whereas in states like DC, California and Nevada about 1 out of 5 nurses were educated abroad, in other states like Wyoming and North Dakota there are almost none (see Appendix Table A1). Filipinos represent a significant share of nurses (larger than 10%) in Nevada, California, New Jersey and Hawaii.

4   Empirical Specification

To investigate differences in labor supply outcomes between native and foreign nurses and to estimate wage premiums for nurses educated abroad, we use the following linear model:

$$Y_{ics} = \alpha + \beta Filipino_{ics} + \delta OtherForeign_{ics} + \gamma X_{ics} + \lambda_c + \tau_s + \epsilon_{ics} \tag{1}$$

where i is the individual, c is the city and s is the setting (hospitals, nursing home, physician's office and other health services). Y is either a labor supply outcome (usual hours worked per week, dummy for working part-time, dummy for doing shift work, etc) or the log hourly wage of nurses. $Filipino$ and $OtherForeign$ are dummy variables that take a value of one if the nurse was educated in the Philippines or in another foreign country, respectively. Vector X_{ict} are individual-level controls, including demographic characteristics (age, age squared, marital status, race, children), highest

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[11]We define a nurse doing shift work if she reported leaving home for work anytime between 5 pm and 4 am.

level of education dummies (2 or 3 years of college, a bachelor's degree or a graduate degree), and depending on the outcome, dummies for part-time work and shift work. In all specifications, we include city and setting fixed effects. We estimate the model (1) separately by Census year using OLS.

4.1 Labor Supply

Table III presents the estimation of (1) for labor supply outcomes. Panel A focuses on usual hours of work per week (including zeros) and presents models with different sets of controls. We find that Filipino nurses work about 4 hours more per week than natives, and that the difference is not explained by observable characteristics, in particular, by being more likely to work in hospitals. Looking at how the coefficient changes by year suggests that in recent years the gap narrowed somewhat, but it is still large in magnitude and highly statistically significant. As suggested by the descriptive statistics, outcomes for nurses from other foreign countries are in between: they also work longer than natives, but only between half an hour to an hour more.

Panel B looks at other labor supply outcomes to explore if the longer hours worked per week on average by Filipino nurses are due to differences in participation rates, the likelihood of working extra time or the probability of working part time. Depending on the year, Filipinos are either more likely or less likely to participate in the labor force than natives, but the differences are very small. Interestingly, they are slightly less likely to work more than 40 hours per week. Therefore, what drives the average difference in usual hours worked per week between natives and Filipino nurses is that the former are significantly more likely, by about 17 percentage points, to work part time. Note that the model controls for type of setting dummies, so the difference cannot be explained by the higher propensity of Filipino nurses to work in hospitals. Finally, the last column suggests that Filipino nurses are significantly more likely to do shift work, with the difference increasing by 50 percent in the last decade. The magnitude of the Filipino dummy coefficient (16 percent) is large, and is about the same magnitude as the average likelihood that a native nurse works odd hours.

To the extent that health care providers value full time availability of RNs and their willingness to

work night and evening shifts, the ability to hire Filipino and other foreign nurses has clear benefits for healthcare providers. For example, a recent survey conducted by the Texas Department of State Health Services on 274 hospitals in the state found that vacancies in evening and night shifts were reported by employers to be the most severe and difficult to fill (Texas Center for Nursing Workforce Studies 2008).

4.2 Wage Regressions

In Table IV we present the estimation of (1) when the dependent variable is the log of the hourly wage of a RN.[12] The first model does not include controls, while the other models introduce the sets of controls in turn. The unconditional wage differential between foreign and native nurses is very large - on average, Filipino nurses (other foreign nurses) make about 25 (10) percent more than natives. Differences in education levels and demographic characteristics explain about a fifth of the premium, and including job characteristics such as setting, part-time and shift dummies reduces the Filipino premium to 10 to 20 percent depending on the year. Note that job characteristics explain a larger share in later years, perhaps not surprisingly, given that in recent years Filipino and other foreign workers have become even more likely than natives to do shift work, which is generally associated with higher pay. The largest change in the wage premium is obtained when city fixed effects are included; as discussed before, Filipino and other foreign nurses are more likely to live in larger and richer areas.

Even after controlling for all observable characteristics, we find a large and highly statistically significant wage premium for Filipino nurses in all but one year. The premium starts at 2.3 percent in 1980, reaches a maximum of close to 8.5 percent in 2000, and declines to 5.4 in 2007 and to 3.6 in 2010. Columns (5) and (6) suggest that at least in the later years, the premium is not driven solely by wage differences within hospitals. The wage premium for other foreign nurses, although

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[12]The hourly wage was calculated dividing salary annual income by the product of usual hours worked per week and number of weeks worked last year. The salary annual income was deflated using the CPI, using 1990 as the base year. For 1980 observations, we multiplied annual salaries of 75000 (the top code) by 1.5. We dropped hourly wages smaller than 3.5 dollars or greater than 150 dollars. The income variable used to construct the hourly wage includes cash bonuses, which are common in the occupation.

positive and large in models with few controls, disappears or becomes negative when all observable characteristics are included.[13] In particular, we estimate that in settings other than a hospital, foreign nurses educated outside the Philippines earn about 6 percent less than natives.

An important question is whether the wage premium for Filipino nurses reflects quality differences or just unobserved characteristics of the job that carry a higher wage but are unrelated to skills, such as working nonstandard schedules. As discussed above, a premium is estimated even after controlling for a proxy for shift work and for part-time status. To further explore the role of job characteristics in explaining the premium, we present in Appendix Table A2 models with and without dummies for shift work and working part-time to see how the estimated wage premium changes. Additionally, we estimate a model that includes an interaction term between the Filipino dummy and the shift work dummy to test if the premium is driven primarily by Filipino nurses doing shift work. Our presumption is that the unobserved characteristics of the job that increase wages are likely to be correlated with observed ones. Our findings suggest a very limited role of shift work and part-time status in explaining the estimated wage premium for Filipino nurses. The coefficient of interest changes very little when these variables are added (at most the magnitude decreases by 20 percent in 2010, but we cannot reject that the coefficients are the same) and the coefficient on the interaction term is not statistically significant for most years and of the wrong sign in 2000.

An alternative explanation for the premium is that Filipinos are paid more to compensate for lower non-wage benefits, which will be the case, for example, if they are hired by a temporary agency. For most Census years we do not have information about employment benefits, however, the 2010 ACS does ask if the worker received health insurance through her employer or union. Controlling for this variable has no effect on the estimated wage premium for Filipinos (the coefficient increases slightly from 0.0362 to 0.0366).[14]

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[13]In regressions not presented in the paper, we have included dummy variables for each of the other top source countries. Nurses educated in Canada are the only other group for which we consistently estimate positive premiums. However, the premium for Canadian nurses is generally smaller than the premium for Filipinos; for example, it was half the size in 2000.

[14]Results available upon request.

Examining the assimilation profiles of Filipino nurses and other foreign nurses provides additional suggestive evidence that the wage premium for Filipino nurses is likely to reflect skill differences. These results are presented in Table V. If we believe that the longer a Filipino nurse has been in the US the more likely she is to prefer the type of job settings and work schedule characteristic of native nurses, then if the premium is mostly driven by job characteristics it should go down the more years the foreign nurse has been in the US. We find, however, the exact opposite. For the first 5 years after their arrival to the US, Filipino nurses earn less than natives or at least not more. This result is fairly typical of all immigrants, not only nurses. It takes time for a worker to find the best match for her skills and to develop host countries specific skills, such as language and knowledge of the culture. For most Census years, the premium becomes positive if the nurse arrived 6 to 10 years before. And in all years, it is large and statistically significant by the time the nurse has been in the country for 11 to 15 years. Depending on the year, the premium increases even more after that or stays relatively constant at around 10 percent. The increasing profile of the wage premium is unlikely to be explained by selective return migration - Appendix Table A3 shows that the size of arriving cohorts of Filipinos hardly decreases across census years, at least while the cohorts are of working age. Furthermore, as the US the destination of choice for migrant nurses, foreign nurses who migrate to the US typically settle as permanent migrants (Aiken 2007).

For foreign nurses educated outside the Philippines, the wage premium is negative and statistically significant when they first arrive, and although it becomes less negative with time in the US, in contrast to Filipino nurses, there is little evidence of a significant positive wage premium even for nurses that have been in the country for several decades.

Wage regressions using the National Sample Survey of Registered Nurses and the 2008 California Survey of Registered Nurses

In this section, we present wage regressions using two alternative datasets, the National Sample Survey of Registered Nurses (NSSRN) and a survey of registered nurses conducted by the California Board of Nursing. These datasets allow us to explore the role of additional job and individual characteristics that are not available in the Census in explaining the wage premium. In particular,

the NSSRN allows us to control for more detailed job setting categories,[15] for the hospital unit in which the nurse works and for whether she works for a temporary agency. The main advantage of the California Survey of Registered Nurses is that it has information on years of experience as a registered nurse,[16] tenure in most recent position, whether her position offers health insurance or a retirement plan, and indicator variables for nurses working for temporary agencies or as travel nurses. Information on years of experience is particularly valuable as it allows us to test if Filipino nurses have more experience, conditional on age, than natives (either because they graduate younger or because they are less likely to temporarily drop out of the labor force) and the extent to which differences in experience might explain the wage premium.

It is worth noting that although the NSSRN provides much more detailed information about nurses, we do not use it as our main data source as it has important limitations. In particular, it severely undercounts foreign nurses, especially Filipinos. For example, 1.5 percent of nurses in the 2000 NSSRN were found to be educated in the Philippines, which is only about half of the share estimated using the 2000 Census. Descriptive statistics of the 2000 NSSRN are presented in Appendix Table A4. A few observations are worth mentioning. First, the NSSRN portrays a similar picture as the Census with respect to the demographic and labor supply characteristics of nurses by country of education. Second, Filipino nurses are as likely as natives to work for temporary agencies (1.4 percent), while other foreign nurses are significantly more likely to work for temporary agencies (3.7 percent). Third, Filipinos tend to work more in the intensive care and general bed units of hospitals as compared to natives, and less in outpatient, labor and ER units. To the extent that wages vary by hospital unit, these differences might explain part of the premium.

In Table VI we present results using the NSSRN in 2000. We focus our attention on this survey as under-representation becomes worse in more recent years (results using other survey years are reported in Appendix Table A5).[17] The estimated wage premium for Filipino nurses is surprisingly

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[15]We use 5 categories with Census data and 11 with the NSSRNs.

[16]When using the Census, we approximate (potential) experience with age. The California survey asks explicitly for how long has the nurse practiced as an RN, excluding years since graduation during which she did not work as an RN.

[17]The NSSRN indicates little change in the number of foreign-educated nurses between 2000 and 2004, despite evidence from the NCLEX Exam Statistics of more than a tripling of the number of foreign-educated nurses who

similar to the one estimated using Census data - the unconditional wage differential is about 20 percent and it goes down to 9 percent when demographic, education, and geographic controls are included.[18] Adding job setting fixed effects and a dummy for working for a temporary agency decreases the wage premium only slightly from 8.9 to 7.5 percent. Restricting the sample to nurses working in hospitals has no effect on the magnitude or significance of the coefficient. Interestingly, the wage premium increases once we control for hospital unit fixed effects, implying that wage differences are observed within unit and are not driven by Filipinos working in better paid units.

Table VII reports our results using the California survey. Panel A examines differences in experience, tenure and other job characteristics by country of education and Panel B reports the wage regressions controlling for those characteristics. Interestingly, we find that Filipino and other foreign educated nurses have about 1.5 more years of experience than comparable natives, but have a shorter tenure (by close to a year) at their current position. As expected, controlling for experience and its square reduces the premium, but only by about 15%.[19] Adding tenure and its square has the opposite effect, such that controlling for experience and tenure leaves the premium basically unchanged. Differences between natives and foreign nurses in the probability of working for a temporary agency, as a travel nurse or in a job that offers health insurance or a retirement plant are small, and have no sizable effect on the premium when they are included as controls in the wage regressions.

4.3 Which Hospitals Hire Foreign Nurses?

In this section, we turn to hospital level data to provide additional evidence in support of the idea that the wage premium is likely to reflect real quality differences between native and foreign nurses. Using data from the 1990 American Hospital Association (AHA) Nursing Personnel Survey we show

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passed the licensing exam over that period, most of whom presumably immigrated (Aiken, 2007).

[18]The survey does not include a city identifier, only a state identifier. Our models include state fixed effects and state fixed effects interacted with a dummy for living in a metropolitan area.

[19]Note that the estimated size of the premium is similar to the one using the Census, even though we are focusing on just one state.

that foreign nurses are hired disproportionately by hospitals with better characteristics.[20] The 1990 NPS surveyed all hospitals in the US and collected detailed information about RN employment and wages (including foreign nurse hiring), education, unions, work schedules and basic characteristics about the hospital. Appendix Table A6 compares the characteristics of hospitals that hired foreign nurses to those that did not. As observed, close to 20 percent of hospitals reported sponsoring RN recruitment from foreign countries, with the average hospital hiring close to 10 foreign nurses in 1989, most of them from the Philippines. Hospitals that hire foreign nurses are more likely to be private, are much larger as measured by the number of beds and RNs, hire more educated nurses and have higher educational requirements for the nurse staff. They also pay higher wages. Given that it is likely that part of the differences is explained by the geographic distribution of hospitals and foreign nurses, in Table VIII we present regressions of hospitals characteristics on a dummy for hiring foreign nurses that control for hospital location (in particular, we include state fixed effects interacted with 6 city size dummies). We find that the coefficients do go down once we control for location, but for most characteristics, the differences remain statistically significant.[21]

5 Interpretation

What can explain that Filipino nurses earn significantly more than natives, even after controlling for detailed job characteristics? Why is the premium observed only for Filipino nurses and not for nurses from other foreign countries? Why has the premium decreased in the last few years? In this section, we explore plausible explanations to these questions. We first focus on explaining the existence of the premium and then on its changes through time.

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[20]Unfortunately, the NPS was only conducted from 1990 to 1992. We use the 1990 sample because it has the highest response rate.

[21]Coefficients of very similar magnitude and of the same sign, but estimated with less precision, are obtained when the explanatory variable of interest is a dummy for hiring Filipino nurses.

5.1   Roy Model of Occupational Choice

In this section we present a very simple model of occupational choice to help explain why we might observe the positive wage premium for Filipinos. It is a simplified version of Borjas (1987).

Assume people can choose between two occupations, nursing denoted by n and non-nursing denoted by 0, and for simplicity assume both require the same level of investment (for example, a 4-year Bachelor's degree). People are endowed with skill level ε which is distributed in the population as a standard normal ($\varepsilon \sim N(0,1)$).[22] Average wages as well as the return to skill differ by occupation so that the expected wage for individual i in each occupation is given by:

$$\text{Nursing:} \qquad w_{i,n} = \bar{w}_n + r_n \varepsilon_i$$

$$\text{Non-Nursing:} \qquad w_{i,0} = \bar{w}_0 + r_0 \varepsilon_i$$

Assuming individuals choose their occupation to maximize earnings, individual i would choose nursing as long as:

$$\bar{w}_n - \bar{w}_0 > (r_0 - r_n)\varepsilon_i$$

Case 1: Suppose $r_0 > r_n$, the probability that a randomly chosen worker chooses to join nursing is equal to:

$$P = Pr[\bar{w}_n - \bar{w}_0 > (r_0 - r_n)\varepsilon_i] = Pr\left[\varepsilon_i < \frac{\bar{w}_n - \bar{w}_0}{r_0 - r_n}\right] = \Phi(z)$$

The selection of nurses in the nursing sector is given by:

$$E(\varepsilon|nurse = 1) = E\left[\varepsilon|\varepsilon_i < \frac{\bar{w}_n - \bar{w}_0}{r_0 - r_n}\right] = -\frac{\phi(z)}{\Phi(z)} < 0$$

Case 2: Suppose $r_0 < r_n$, the probability that a randomly chosen worker chooses to join nursing is

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[22]For simplicity, we have assumed a one dimension skill, but the model extends easily to the more general case of occupation specific skills. If skill endowments are positively correlated, one would also observe positive selection in the occupation with relative higher dispersion in wages and negative selection in the other. The case of negative correlation is less interesting, as it is always the case that positive selection is observed for both occupations, independent of their relative dispersion.

equal to:

$$P = Pr[\bar{w}_n - \bar{w}_0 > (r_0 - r_n)\varepsilon_i] = Pr\left[\varepsilon_i > \frac{\bar{w}_n - \bar{w}_0}{r_0 - r_n}\right] = 1 - \Phi(z)$$

The selection of nurses in the nursing sector is given by:

$$E(\varepsilon|nurse = 1) = E\left[\varepsilon|\varepsilon_i > \frac{\bar{w}_n - \bar{w}_0}{r_0 - r_n}\right] = \frac{\phi(z)}{1 - \Phi(z)} > 0$$

where $z = \frac{\bar{w}_n - \bar{w}_0}{r_0 - r_n}$ and $\Phi(.)$ and $\phi(z)$ is the CDF and PDF of the standard normal, respectively.

These equations show that the popularity of nursing depends mostly on the relative average wage, but selection depends only on the relative returns to skill: positive selection into nursing occurs if and only if the returns to skill in nursing are higher than in alternative occupations ($r_n > r_0$).

Assuming that the average wage in the nursing sector is lower than the average wage in the non-nursing sector ($\bar{w}_n < \bar{w}_0$), Panel A in Figure IV depicts the distribution of the population between the two occupations for the cases above assuming $\bar{w}_n - \bar{w}_0$ and $|r_0 - r_n|$ are constant.

Allowing for Migration

Now, suppose that nurses are allowed to migrate but there are no migration possibilities for workers choosing non-nursing occupations (a good approximation of the Philippines' case). We assume that migration increases the average wages for nurses (as would be the case if the source country is a developing country and the host country is a developed country). We further assume that migration also increases the returns to skill. Let $w_{i,n}^m$ be the wages that individual i is expected to earn if she works as a nurse abroad (superscript m is for migrant, h is for home), where

$$w_{i,n}^m = \bar{w}_n^m + r_n^m \varepsilon_i \tag{2}$$

and we assume that $\bar{w}_n^m > \bar{w}_0 > \bar{w}_n^h$ and $r_n^m > r_0 > r_n^h$. Let p be the probability of migration. A

risk-neutral worker would choose to become a nurse if:

$$pw_{i,n}^m + (1-p)w_{i,n}^h = p\bar{w}_n^m + (1-p)\bar{w}_n^h + (pr_n^m + (1-p)r_n^h)\varepsilon_i > \bar{w}_0 + r_0\varepsilon_i$$

Define $E(\bar{w}_n) = p\bar{w}_n^m + (1-p)\bar{w}_n^h$, $E(r_n) = pr_n^m + (1-p)r_n^h$ and $z' = \frac{E(\bar{w}_n) - \bar{w}_0}{r_0 - E(r_n)}$. Following the derivation above, it is easy to see that in the case where $E(r_n) < r_o$, the probability that a randomly chosen worker chooses to join nursing is equal to $\Phi(z')$ and the expected ability of individuals who choose nursing is given by $-\frac{\phi(z')}{\Phi(z')}$. And in the case where $E(r_n) > r_0$, the corresponding probability is $1 - \Phi(z')$ and the expected ability of individuals is $\frac{\phi(z')}{1-\Phi(z')}$.

Hence, the assumption of higher average wages and higher returns to skill for migrant nurses imply that the possibility of migration increases the share of the population choosing nursing and increases the average skill level of workers who select into nursing. If r_n^m and p are large enough such that $pr_n^m + (1-p)r_n^h > r_0$ then we should observe a shift from negative to positive selection into nursing. Panel B in Figure IV illustrates the three cases (a) autarky with $\bar{w}_0 > \bar{w}_n$ and $r_0 > r_n$ (b) migration with $E(\bar{w}_n) > \bar{w}_0$ and $r_0 > E(r_n)$ and (c) migration with $E(\bar{w}_n) > \bar{w}_0$ and $r_0 < E(r_n)$.

5.2 Implications of the Model for the US and the Philippines

In this section, we consider what this simple model implies for selection into nursing in the US and in the Philippines, with and without international migration.

The Nursing Sector in the US and the Philippines

Nursing is a relatively well paid occupation in the US (the ratio of the average hourly wage of nurses to the average hourly wage of workers with a bachelor's degree has hovered at around 1.2 for about 3 decades, see Figure V). Nevertheless, nursing is by no means one of the most profitable occupations, especially as women started entering more prestigious occupations, such as medicine, law and business, in large numbers. Additionally nursing is characterized by having one of the most compressed wage distributions, suggesting relatively low returns to skill. In fact, out of 41 occupations in the 2000 Census with more than 80 percent workers with two or more years

of college, registered nurses have the fourth lowest 90/10 percentile ratio in hourly wages. As a comparison, registered nurses earn on average close to 10 percent more per hour than primary school teachers, yet, the 75/25 percentile ratio for nurses is lower at 1.6 as compared to 1.92 for teachers.[23] Therefore, the model implies that nursing will be a reasonably popular occupation in the US, but nurses will be negatively selected.

A somewhat similar situation would be observed in the Philippines in the absence of international migration. Panel A of Table IX shows the average wages for the most common skilled occupations in the Philippines, as well as the 75/25 percentile ratio. As observed, and in contrast to the US, nurses' pay is relatively low.[24] On the other hand, as in the US, wage dispersion is below average. Therefore, nurses will also be negatively selected but a lower share of the population would choose a nursing career.

Philippines' Migration Policy and Model Implications

To analyze the predictions of the model given the Philippines' migration policy, we start by establishing key important facts.

1. The probability of migrating as a nurse is very high in the Philippines. We have no direct estimate of the share of Filipino nurses that eventually migrates but the comparison of the number of Filipino nurses working in the Philippines and the number working in the US and other countries suggests that it is very large. Using Census data collected in 2000 we count approximately 135 000 Filipino nurses working in their country of origin and close to 80 000 working in the US. Data from the Philippine Overseas Employment Administration (POEA) suggests that close to 40 000 nurses migrated as contract workers to other countries besides the US between 2000 and 2002. These numbers taken together imply at the very least as many Filipino nurses working abroad as working in the Philippines, given that we are missing Filipino nurses who moved to contries other than

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[23]Hirsch and Schumacher (2012) find that registered nurses earn about 15 percent more than other college educated workers, even after controlling for observable characteristics of the workers, demanding working conditions and high levels of skill required in the profession, but that they exhibit one of the lowest wage dispersion levels among major occupations.

[24]Note, however, that the actual wage in the counterfactual scenario of no international migration might be higher if the possibility of migration leads to overproduction of nurses. See the discussion in the text.

the US before 2000.

2. The probability of migration for workers in any other skilled occupation is much lower, especially for women. In Panel A of Table IX, we present the share of overseas Filipino workers (OFWs) by skilled occupation and gender. Because the shares are constructed using Census data, they provide a lower bound as the Census excludes permanent migrants and those who left with their whole family (even if temporarily). As observed, for both women and men, nursing has the largest share of OFWs (23% for men and 19% for women). For women, more than half (53%) of all migrant skilled workers are nurses. The Census estimates are in line with more recent data provided by the POEA: in 2010 6 out of 10 females who left the country to work abroad in a professional occupation were nurses (POEA 2010).

3. The average wage for nurses who migrate is very high. Panel B of Table IX shows the average wage for Filipino nurses by major destination. Even if a nurse ends up migrating to the country with the lowest pay for Filipino nurses, she would still earn about 2.5 times that of the average nurse in the Philippines. Wages in the West are much higher, about ten times the average wage for nurses and four to five times the average wage for lawyers and CEOs in the Philippines. Even the average wage for Filipino nurses in the US is more than double the 99th percentile wage for CEOs in the Philippines.

4. The large cross-country variation in the wages for nurses imply that the returns to migration are very heterogeneous. To the extent that highly skilled nurses are more likely to migrate to countries that offer the highest wages, this would result in higher returns to skill for migrant nurses $(r_n^m > r_n^h)$.

Our simple model combined with these four facts strongly suggest that the possibility of migration should have the effect of significantly increasing the popularity of nursing in the Philippines and generating positive selection into the occupation. The latter prediction requires that the probability of migration is sufficiently high and that there is large variation in nursing wages across destinations

to ensure that the returns to skill among migrant nurses is high enough such that the expected returns to skill for nurses $(E(r_n) = pr_n^m + (1-p)r_n^h)$ is larger than the returns to skill in the non-nursing sector in the Philippines (r_0). Note that this model also helps to explain why we observe the premium for Filipinos but not for nurses migrating from other countries. Unlike the Philippines that specializes in the exportation of nurses, in other countries, the likelihood of migration and the returns to migration for nurses relative to other occupations may not be particularly high (even if overall, the likelihood and returns to migration are high).

5.3   Evidence supporting the model

We can test directly if nursing is indeed a more popular occupation in the Philippines than in the US. In 2010, the number of nurses that passed the Philippines Board Examinations was 70,000; in the US, among natives, the same number was 120,000. However, the population of the US is 4.4 times that of the Philippines and its GDP per capita is 12 times higher (there is a very strong cross-country positive correlation between level of development and nurse to population ratios).

Providing direct evidence of a greater degree of positive selection of nurses in the Philippines than in the US to complement the estimation of a positive wage premium for Filipino nurses is a more difficult task. Unfortunately, we lack data on direct measures of worker quality in different occupations in the Philippines (for example, test scores on college admission exams such as the SAT in the US). We attempt to approach this issue by using the educational attainment of her parents (if she is single) and of her husband (if she is married) as proxy for worker quality. The first is based on heritable ability (Behrman and Rosenzweig 2002) and the intergenerational transmission of human capital (Currie and Moretti 2003) and the second is based on positive assortative mating.

Our data comes from the 1990 and 2000 Filipino Censuses. We focus on women ages 20 to 64 with a bachelor's degree. Unlike in the US or other Western developed countries, most adult single women in the Philippines (about 60 percent) live with their parents,[25] allowing us to observe their parents' education. Table X presents regressions where the dependent variables are the educational

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[25] In the US only about 25 percent of single women live with either of their parents.

attainment of the mother, father or husband and the explanatory variable of interest is a nurse dummy. The only additional controls are age dummies. We find that compared to other skilled women, nurses are significantly more likely to have parents (husbands) that have a bachelor's or graduate degree. The differences are large, especially with respect to the parents' education: the probability of having a highly educated parent is between 50 and 100 percent higher (depending on the outcome and year) for nurses than for other women with a bachelor's degree.[26] Panel D in the table presents similar regressions using US Census data and restricting the sample to natives. We concentrate on the education of husbands, given that only a small percentage of single women live with their parents. For all outcomes and years, nurses are less likely to be married to men with higher educational attainment. The results are similar when the sample includes all women with at least some college education.

As an alternative approach to provide indirect evidence of positive selection into nursing in the Philippines, we examine the wage premium among Filipinos in the US who work in non-nursing occupations. While this approach is imperfect, it provides us with some indication as to whether the observed positive wage premium among Filipino nurses is due to being Filipino per se, or from the quality of Filipinos selecting into nursing or nursing related occupations in the US. Appendix Table A7 presents the estimation of (1) for the most common occupations of skilled Filipinos in the US: Accountants, Physicians, Managers, Computer Software Developers, Clinical Lab Technicians and Computer Scientists. Positive wage premiums for Filipinos are estimated only for nurses and nursing aides. Filipinos in all other occupations, once we control for all observable characteristics, earn either significantly less or about the same as natives in the same occupation.

Sorting across destinations

In the previous paragraphs, we have examined positive selection into nursing in the Philippines. Next, we consider selection into migration among nurses. Specifically, we are interested in the quality of Filipino nurses that choose to migrate to the US.

We present some anecdotal and more systematic evidence that suggests that the US attracts the

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[26]Similar results are obtained when the sample includes women with at least some postsecondary education.

best Filipino nurses.[27] For example, a widely publicized Washington Post article in 2007 covered the story of Elmer Jacinto, a doctor from the Philippines who obtained the top score in the national medical exam in 2004 and migrated as a nurse to the US soon after.[28] This is not an isolated case - since 2000, 3,500 Filipino doctors have retrained as nurses and left for nursing jobs abroad and an estimated 4,000 Filipino doctors are currently enrolled in nursing schools (Labarda 2011). Moreover, surveys have also indicated that the US is the top destination country even for foreign nurses in other countries - a survey of 380 Filipino nurses working in the UK found that at least 63 percent of them were considering moving to another country, most of them to the US (Buchan, 2006).[29]

For more systematic evidence, in Table XI (and Appendix Figure A1) we present the wage distribution of nurses living in the Philippines in 2003 and the pre-migration wage distribution of Filipino nurses included in the New Immigrant Survey (NIS) in the same year.[30] Note that the number of Filipino nurses included in the NIS is very small so conclusions drawn from the survey should be considered suggestive. As observed, a nurse who ends up migrating to the US was much more likely than the average nurse to belong to the upper tail of the wage distribution of nurses

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[27]It is worth mentioning that theoretically, our model suggests that nurses select into destinations based on the returns to skill in the different countries and that we have noted that the wage distribution for nurses in the US is relatively compressed. Note, however, that this does not imply that we might observe negative selection in the type of nurses that choose to migrate to the US; what matters for selection is the dispersion relative to other countries, not to other occupations within the US. A compressed wage distribution for nurses is determined at least partially by the nature of the occupation/work and thus likely to observed in other countries as well, and even more saliently in places like the UK, where most nurses are hired by the government and their wages are based on a strict pay scale.

Even if the returns to skill where higher in a country like Saudi Arabia (the other top destination), there are several reasons as to why we might observe positive selection of those who end up in the US. First, even the most skilled nurses might still want to migrate to the US if expected wage is not the only determinant of a migrant's choice of location. Another important dimension is the possibility of bringing their families with them and the likelihood that they can become permanent migrants. While the US provides visas for family members, in many countries (SA included), nurses are not allowed to bring their family members. Furthermore, the decision to settle as permanent migrants will also depend on the overall benefits of migration such as the ease of assimilation, schooling opportunities for children and employment opportunities for other household members. Second, licensure requirements (NCLEX passing rates of foreign-educated nurses are fairly low) and strong competition for limited spots are likely to guarantee that only the best are able to migrate as nurses to the US.

[28]His story was covered by The Washington Post, USA Today and the New York Times. Link: `http://www.washingtonpost.com/wp-dyn/content/article/2007/01/07/AR2007010700163.html`

[29]In Singapore, the attrition rate of foreign nurses in 2005 was 23 percent. In particular, Filipino nurses tend to move to other countries such as the UK, US or Canada upon completion of their employment contracts (Matsuno, 2009).

[30]The NIS is a nationally representative sample of new legal immigrants and their children to the United States. For more information see http://nis.princeton.edu/.

in the Philippines. In Panel B, we utilize data from the 1993-2002 Survey of Overseas Filipinos[31] to provide further evidence by using parental education as a measure of quality. Similar to the evidence presented in Table X, we are interested in whether nurses who migrate to the US are more likely to have higher educated parents (the sample is restricted to migrant children of the household head who are nurses). We regress the probability that a migrant nurse has a parent with a college degree on a dummy for the nurse having migrated to the US. We find that nurses living in the US are 18 percentage points more likely to have a highly educated parent relative to nurses who had migrated elsewhere.

5.4 Implications of the model for the number of nurses working in the Philippines

Finally, we can use our model to explore how the possibility of international migration affects the size of the nursing workforce in source countries, one of the main issues raised in the debate about nurse importation. Since the model is very restrictive (only one skill type) and is based on strong functional form assumptions, this analysis is only meant to be illustrative.

As discussed in section 5.1, based on our simple model, the share of the population working as nurses in the Philippines is $\Phi(z)$ under autarky and $(1-p)(1-\Phi(z'))$ with international migration. We can calibrate the simple model to some of the key parameters observed from the data to show that there is a range of p such that $(1 - p)(1 - \Phi(z')) > \Phi(z)$. That is, the size of the nurse workforce in the source country can actually increase with the prospect of international migration. This occurs if p and $\bar{w}_n^m$ is sufficiently high, but p is not too high such that the majority of nurses migrate. Panel A of Appendix Figure A2 shows the share of nurses in the Philippines as a function of the migration probability p for key parameters calibrated from the data: $w_0 = 12$, $w_n = 10$, $w_n^m = 60$, $r_0 = 6$, $r_n = 4$ and $r_n^m = 37$.[32] Panel B graphs the corresponding selection of nurses

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[31] The Survey of Overseas Filipinos is a rider of the Philippines Labor Force Survey. We match the two datasets to obtain data on household characteristics of migrant workers.

[32] The average wages in nursing and other skilled occupations in the Philippines were computed from the Philippine Labor Force Survey (LFS). The average wage across destinations for nurses working abroad were obtained from the wage information in the 2002 POEA contracts. We proxy for the returns to nursing with the standard deviation

as a function of p. From the figures, we can see that when the probability of migration is 0, our model predicts that approximately 16% of the population chooses nursing with the nurses being largely drawn from the lower tail of the ability distribution. As p increases, the share of nurses in the Philippines increases sharply (likely due to the shape of the normal distribution) and reaches a peak of 0.94 when $p = 0.06$ and $r_0 \approx E(r_n)$. At this point, selection also switches from negative to positive and remains positive as p increases. The share of nurses in the Philippines remains high, but gradually declines as p increases since more individuals are choosing nursing, but a larger fraction of them are migrating. From our highly stylized model, the size of the nurse workforce increases with the possibility of migration compared to autarky so long as p is less than 0.8.

In sum, our simple model highlights that the possibility of international migration can indeed increase the size of the nursing workforce. This suggests that although the most skilled nurses leave, international migration will not necessarily deplete the local nursing workforce. Note, however, that the number of workers in other occupations always decreases. Which occupations are being displaced by nursing is an interesting question with important implications for the overall welfare effects of Philippines' policy of nurse exportation.

5.5   Evolution of the Wage Premium

The estimated wage premium for Filipino nurses varies in magnitude depending on the Census year: it was 2.3 percent in 1980, decreased to 1.2 percent in 1990, then reached a maximum of close to 8.5 percent in 2000, and declined to 5.4 in 2007 and to 3.6 in 2010. Changes in the premium might be caused by either changes in the quality of native nurses, Filipino nurses, or both. Due to the lack of data, we are unable to study quality changes among Filipino nurses migrating to the US. However, we do have some proxies for the quality of native nurses. In this section, we evaluate how our measures for native nurse quality evolved over time and whether they exhibited similar patterns to the change in the wage premium. Finding that other measures of quality behaved similarly to

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of wages for other skilled occupations, nurses and nurses migrating abroad. Note that the average wages for nurses abroad are a lower bound of the actual wages as these are based on nurses who are leaving the Philippines on a contract (for example, if a nurse moves permanently to the UK or US, she will not be covered in the POEA data).

the wage premium would provide suggestive evidence that wages are indeed a reasonable proxy for quality.

The first measure that we use is the passing rate of native first takers in the NCLEX exam, presented in Appendix Figure A3. We observe a sharp drop in the passing rate in the second half of the 1990s and a slight recovery afterwards, roughly coinciding with an increase in the Filipino premium in 2000 and a later decline in 2007 and 2010. The second measure comes from the Cooperative Institutional Research Program (CIRP) Freshman Surveys conducted each fall since 1966 by the Higher Education Research Institute (HERI). Each year the CIRP surveys about 300,000 first-year students attending a nationally representative sample of between 300 and 700 two-year and four-year colleges and universities. The survey includes data on background characteristics, education, attitudes and future goals of new students entering college. We focus our attention on female students who indicated a probable career in nursing and use the average institutional selectivity as measured by the institution's average score SAT of incoming freshman as a proxy for quality (see Appendix Table A8). We observe a steady decline in the institution selectivity of freshman intending to become nurses from 1982 to 1994 and a slight recovery afterwards. Given that freshman interested in nursing would have entered the labor force between 2 to 4 years after they were surveyed, the table suggests a decline in the quality of nurses entering the profession during the 1990s with a small recovery in the cohorts entering in the early 2000s.

The decline in the quality of native nurses entering the profession in the 1990s is further illustrated using their husband's education as a measure of their quality. This measure is based on the assumption of positive assortative matching and that individuals with higher education levels also tend to have higher unobserved skills. Specifically, we use the ratio of the share of nurses in the population of women with at least two years of college and a husband with a graduate degree relative to the share of nurses in the population of women with at least two years of college. We construct this ratio by cohort. As shown in Figure VI, this measure stays relatively constant for cohorts born between 1935 and 1964 and experiences a sharp and permanent decrease for cohorts born afterwards. Note that cohorts born between 1965 and 1969 entered the job market in the late

1980s to early 1990s. Unlike the other measures, we do not observe an increase in quality for the most recent cohorts.

What explains the drop in the quality of native nurses entering the profession in the 1990s? Auerbach et al. (2000) have suggested that the expanding opportunities of women in prestigious occupations such as medicine, law and business reduced the popularity of nursing and the quality of women choosing nursing as a career. Looking at the evolution in the share of a cohort choosing nursing and professional occupations suggests, however, that the timing of the trends does not quite match the hypothesis that the decline in interest in nursing coincided with the rise in alternative labor market opportunities for women (see Figure VII).[33] The popularity of nursing started its decline for cohorts born in the early 1960s whereas the share of women choosing professional occupations started its steady increase much earlier.[34] Furthermore, as depicted in Figure V, the relative wages of nurses did not really decline during the period in which the opportunities of women expanded - if anything, an upward trend is observed. A more likely explanation for the quality decline of native nurses entering the market during the 1990s is the downward trend in relative wages and in employment growth, and the reported worsening of working conditions consequence of the significant changes in the organization and structure of the US healthcare system brought about by the expansion of managed care (Buerhaus et al. 2009; Clark et al. 2001; Currie et al. 2005).

In summary, several measures of nurse quality seem to suggest that the evolution of the Filipino premium, in particular its high level in 2000 and its decline in 2007 and 2010 is explained, at least in part, by changes in the quality of native women choosing nursing as their occupation.

6   Conclusion

In recent years, the United States and many developed countries have become increasingly reliant on the importation of foreign registered nurses to satisfy health care demands. The effect of foreign

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[33]As observed in Figures 4 and 5, the timing of the expansion of opportunities for women in prestigious occupations matches the changes in the popularity and quality of teachers much better (see Bacolod, 2007).

[34]Note that this timing mismatch is also observed for the trends in spousal quality by occupation, as shown in Figure 5.

nurse importation on the quality of healthcare and the nursing labor market in both destination and source countries remains a hotly debated issue.

In this paper, we examine quality differentials between foreign and native nurses and show that foreign nurses, in particular Filipinos, earn significantly more than native nurses in the US. This wage premium holds even after taking into account differences in demographic, education, location, or detailed job characteristics between foreign and native nurses. To the extent that wages are a proxy for quality, this suggests that Filipino nurses have higher observable and unobservable skills as compared to native nurses. Moreover, we document that Filipino nurses are more likely to work in hospitals and perform hard-to-fill positions such as evening and night shifts. We also find that foreign nurse are hired disproportionately by hospitals with "better" characteristics such as private hospitals, larger hospitals and hospitals that pay higher wages, hire more educated nurses and have higher educational requirements for their nursing staff. These findings should alleviate concerns that foreign educated nurses offer a lower quality of care and also provides evidence against the claims by native nurse associations that nurses educated abroad are willing to work for lower wages and that exploitation by employers is a common phenomenon.

We argue that the positive wage premium for Filipino nurses in the US is likely to be driven by strong positive selection into nursing among Filipinos as a result of the the high and heterogeneous returns to the occupation generated by Philippine migration policy. We provide evidence showing that within the Philippines, nurses are likely to be drawn from the upper tail of the skill distribution and that by offering the highest wages, the US tends to attract the best Filipino nurses (and possibly doctors switching into nursing).

Our estimates, however, do not speak to how nurse importation might affect the wages and labor supply of native nurses, and potentially deter natives from entering the profession or delay the necessary reforms needed to guarantee that the education system can produce as many native nurses as needed. Therefore, although hiring nurses to address nurse shortages is an effective strategy in the short run, it might not be the best strategy in the long run if there is a preference or benefit to having a nursing workforce composed mostly of natives.

Finally, our analysis suggests that understanding the effects of the growing international demand on the size and quality of the healthcare workforce of sending countries is not straightforward. Our simple Roy model suggests that for countries that have the capacity to expand production for exporting nurses such as the Philippines and India, the international migration of nurses does not necessarily imply a depletion of their local nursing workforce. On the contrary, it may expand the domestic supply of nurses, although the prospect of international migration may result in a local nursing workforce that is comprised mostly of young and inexperienced nurses. Furthermore, the higher likelihood of migration for nurses compared to other occupations generates positive selection into the profession. Thus, the best nurses might migrate, but they may not have been nurses if not for the possibility of migration.

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Table I. Top Countries of Origin of Foreign Nurses Educated Abroad by Census Year
(Share of Total Foreign Nurses)

1950*		1960*		1970		1980	
Canada	0.41	Canada	0.36	Canada	0.24	Philippines	0.25
Ireland	0.13	Ireland	0.09	Philippines	0.11	Canada	0.15
Germany	0.08	Germany	0.09	Germany	0.08	Jamaica	0.05
England	0.07	England	0.06	England	0.07	India	0.05
Scotland	0.05	Philippines	0.04	Ireland	0.07	Germany	0.04

1990		2000		2007		2010	
Philippines	0.34	Philippines	0.35	Philippines	0.38	Philippines	0.38
Canada	0.09	Canada	0.08	India	0.07	India	0.07
Jamaica	0.06	India	0.06	Canada	0.07	Canada	0.06
India	0.05	Jamaica	0.05	Jamaica	0.04	Jamaica	0.04
Korea	0.03	Nigeria	0.03	Nigeria	0.03	Korea	0.04

Note. The data is from the US Census. The years with an asterisk includes all nurses born abroad as we cannot distinguish between nurses educated in the US or abroad. See text for the criteria used to determine if a foreign nurse was educated abroad.

Table II. Demographic and Labor Supply Characteristics of Stock of Nurses by Country of Education

	Nurses Educated in the US						Nurses Educated in the Philippines						Nurses Educated Abroad - Except Filipinos					
	1970	1980	1990	2000	2007	2010	1970	1980	1990	2000	2007	2010	1970	1980	1990	2000	2007	2010
Age	40.07	38.50	40.44	43.39	44.79	45.16	31.43	34.71	39.84	43.87	45.69	46.68	42.98	42.30	45.49	45.72	46.76	47.29
Female	0.98	0.96	0.95	0.93	0.92	0.92	0.99	0.95	0.94	0.91	0.86	0.86	0.97	0.95	0.94	0.91	0.89	0.89
Single	0.15	0.18	0.15	0.13	0.14	0.15	0.43	0.30	0.18	0.15	0.13	0.13	0.19	0.19	0.14	0.13	0.12	0.12
Child age 0-5	0.23	0.18	0.20	0.15	0.14	0.14	0.28	0.30	0.24	0.17	0.16	0.15	0.23	0.20	0.14	0.15	0.13	0.14
Child age 0-18	0.56	0.53	0.56	0.55	0.51	0.50	0.39	0.56	0.62	0.65	0.63	0.63	0.49	0.53	0.58	0.59	0.59	0.59
Bachelors	0.11	0.22	0.31	0.37	0.40	0.41	0.36	0.34	0.72	0.79	0.83	0.84	0.12	0.24	0.28	0.37	0.44	0.45
Graduate Deg.	0.04	0.10	0.13	0.13	0.13	0.12	0.39	0.56	0.11	0.10	0.09	0.09	0.06	0.12	0.16	0.16	0.17	0.15
Hospital	0.67	0.70	0.67	0.61	0.62	0.62	0.96	0.89	0.87	0.75	0.74	0.77	0.69	0.76	0.72	0.65	0.66	0.61
Nursing Home	0.07	0.08	0.08	0.08	0.07	0.07	0.01	0.06	0.05	0.13	0.11	0.08	0.06	0.07	0.08	0.11	0.10	0.11
Physicians Off.	0.08	0.06	0.07	0.07	0.06	0.05	0.00	0.01	0.01	0.02	0.02	0.01	0.06	0.04	0.04	0.03	0.03	0.02
Other Health	0.08	0.04	0.07	0.12	0.12	0.14	0.01	0.01	0.02	0.06	0.07	0.10	0.09	0.02	0.05	0.10	0.12	0.15
LFP	0.71	0.84	0.88	0.87	0.90	0.92	0.87	0.95	0.96	0.86	0.88	0.96	0.70	0.82	0.86	0.81	0.88	0.91
Shift Work			0.15	0.14	0.15	0.16			0.26	0.24	0.30	0.32			0.19	0.18	0.21	0.20
< 35 hrs/week	0.16	0.20	0.22	0.22	0.22	0.20	0.06	0.08	0.10	0.08	0.09	0.10	0.12	0.14	0.14	0.14	0.14	0.15
35-40 hrs/week	0.37	0.44	0.40	0.51	0.53	0.55	0.68	0.70	0.63	0.71	0.71	0.71	0.40	0.50	0.48	0.59	0.61	0.61
41-59	0.08	0.11	0.15	0.13	0.14	0.13	0.06	0.07	0.13	0.09	0.09	0.10	0.09	0.08	0.12	0.10	0.11	0.11
60+ hours	0.02	0.02	0.04	0.03	0.03	0.03	0.03	0.06	0.06	0.07	0.07	0.05	0.03	0.03	0.06	0.05	0.05	0.04
Hourly wage	11.56	10.77	14.42	15.35	16.96	17.31	13.00	13.42	18.23	20.10	22.50	22.80	12.87	11.93	16.33	17.36	18.90	18.99
(1990 dollars)	10.04	8.36	8.13	9.71	10.37	9.94	8.01	7.02	9.27	12.21	13.30	11.42	11.70	8.81	10.73	11.52	12.76	11.68
Number of Obs.	22700	71527	97769	117936	83834	89226	158	1311	2272	3535	3078	3485	1332	3988	4429	6599	5013	5564

Note. The data is from the 1970 to 2000 Census and the ACS 3-year aggregates for 2007 (2005 to 2007) and 2010 (2008 to 2010). The sample includes Registered Nurses aged 18-74.

Table III. Differences in Labor Supply Outcomes between Foreign Educated Nurses and Native Nurses, by Census Year

	A. Dep Variable: Usual Hours worked per week (Including zeros)								
Year	(1)		(2)		(3)		(4)		
	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign	Obs
1980	6.795	0.338	6.028	0.679	5.035	0.531	4.897	0.589	76754
	(0.324)***	(0.253)	(0.334)***	(0.247)***	(0.344)***	(0.247)**	(0.353)***	(0254)***	
1990	5.232	0.803	4.554	1.113	4.189	1.002	4.195	1.159	104118
	(0.259)***	(0.251)***	(0.267)***	(0.243)***	(0.270)***	(0.243)***	(0.281)***	(0.249)***	
2000	5.664	0.417	5.459	0.376	5.533	0.390	5.613	0.441	128032
	(0.234)***	(0.213)** **	(0.232)***	(0.207)* *	(0.236)***	(0.207)*	(0.248)***	(0.213)**	
2007	4.368	1.238	4.186	0.849	4.372	0.818	4.279	0.808	91824
	(0.258)***	(0.248)***	(0.262)***	(0.245)***	(0.266)***	(0.245)***	(0.276)***	(0.249)***	
2010	3.625	1.222	3.501	0.752	3.604	0.681	3.372	0.538	98237
	(0.227)***	(0.208)***	(0.227)***	(0.204)***	(0.233)***	(0.204)***	(0.245)***	(0.210)**	
Controls	None		Demographic		Job charact/Education		All		

	B. Dependent Variable							
	LFP		Dummy Part time | hrs>0		Dummy Over Time | hrs>0		Dummy Shift Work	
Year	(5)		(6)		(7)		(8)	
	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign
1980	0.068	-0.005	-0.189	-0.057	-0.037	-0.001		
	(0.007)***	(0.006)	(0.009)***	(0.007)***	(0.009)***	(0.005)		
1990	0.039	0.000	-0.191	-0.075	-0.021	0.007	0.108	0.048
	(0.005)***	(0.006)	(0.008)***	(0.007)***	(0.009)***	(0.006)	(0.011)***	(0.008)***
2000	-0.021	-0.038	-0.176	-0.070	-0.007	-0.015	0.101	0.048
	(0.007)***	(0.005)***	(0.006)***	(0.005)***	(0.007)	(0.005)***	(0.009)***	(0.006)***
2007	-0.019	-0.013	-0.164	-0.061	-0.014	-0.014	0.149	0.058
	(0.007)***	(0.006)**	(0.007)***	(0.007)***	(0.008)*	(0.007)**	(0.011)***	(0.008)***
2010	0.028	-0.009	-0.131	-0.043	-0.014	-0.010	0.163	0.059
	(0.004)***	(0.004)**	(0.007)***	(0.006)***	(0.008)*	(0.006)	(0.100)***	(0.007)***
Controls	All		All		All		All	

Note. The sample includes all workers aged 18-74 who reported Registered Nurse as their occupation. The coefficient estimates for Filipino nurses and Other Foreign Nurses for each numbered column and Census year corresponds to a separate regression of the dependent variable on a dummy for Filipino nurses and Other foreign nurses (the omitted category is native nurses) controlling for various sets of demographics, education and job characteristics. Demographic controls include age, age squared, a black dummy, a male dummy, a single dummy, a dummy for children younger than 18, and a dummy for children younger than 6. Education controls include dummies for 2-3 years of college, bachelor's degree and graduate degree. Job Characteristics include a dummy for shift work, a dummy for part-time, a dummy for over-time (41 + hours a week) and dummies for working in a hospital, a nursing home, in a physician's office and other health establishments. "All" controls include demographic controls, education dummies, job characteristics and city fixed effects. ***significant at 1%, **5%, *10%.

Table IV. Wage differences between Native and Foreign Educated Nurses by Census Year

	(1)		(2)		(3)		(4)		(5)		(6)		Obs
Year	Filipino	Other Forgn	Filipino	Other Forgn	Filipino	Other Forgn	Filipino	Other Forgn	Filipino	Other Forgn	Filipino	Other Forgn	
1980*	0.181	0.086	0.099	0.053	0.101	0.049	0.023	-0.010	0.029	-0.011	-0.018	-0.019	65183
	(0.011)***	(0.008)***	(0.011)***	(0.008)***	(0.011)***	(0.008)***	(0.011)***	(0.008)	(0.011)***	(0.008)	(0.045)	(0.020)	
1990	0.230	0.101	0.149	0.090	0.120	0.078	0.012	-0.014	0.020	-0.007	-0.015	-0.031	84432
	(0.010)***	(0.009)***	(0.010)***	(0.009)***	(0.010)***	(0.009)***	(0.011)	(0.009)	(0.010)**	(0.010)	(0.044)	(0.019)	
2000	0.264	0.097	0.196	0.075	0.192	0.078	0.084	-0.010	0.084	0.009	0.074	-0.051	102625
	(0.009)***	(0.007)***	(0.009)***	(0.007)***	(0.009)***	(0.007)***	(0.009)***	(0.007)	(0.010)***	(0.008)	(0.022)***	(0.014)***	
2007	0.265	0.080	0.194	0.054	0.167	0.047	0.054	-0.034	0.058	-0.016	0.039	-0.072	83887
	(0.011)***	(0.010)***	(0.011)***	(0.010)***	(0.012)***	(0.010)***	(0.012)***	(0.010)***	(0.012)***	(0.010)	(0.029)	(0.022)***	
2010	0.262	0.077	0.187	0.049	0.157	0.043	0.036	-0.033	0.030	-0.017	0.055	-0.058	89824
	(0.009)***	(0.009)***	(0.009)***	(0.009)***	(0.009)***	(0.009)***	(0.010)***	(0.009)***	(0.010)***	(0.009)*	(0.023)**	(0.017)***	
Controls													
Demographic			X		X		X		X		X		
Education			X		X		X		X		X		
Job Charac.					X		X		X		X		
City FE							X		X		X		
Sample									Hospitals		Non-Hospital		

Note. The sample includes all workers aged 18-74 who reported Registered Nurse as their occupation. The coefficient estimates for Filipino nurses and Other Foreign Nurses for each numbered column and Census year corresponds to a separate regression of the dependent variable on a dummy for Filipino nurses and Other foreign nurses (the omitted category is native nurses) controlling for various sets of demographics, education and job characteristics. Demographic controls include age, age squared, a black dummy, a male dummy, a single dummy, a dummy for children younger than 18, and a dummy for children younger than 6. Education controls include dummies for 2-3 years of college, bachelor's degree and graduate degree. Job Characteristics include a dummy for shift work, a dummy for part-time, a dumm for over-time (41 + hours a week) and dummies for working in a hospital, a nursing home, in a physician's office and other health establishments. The 1980 Census did not include the necessary information to construct the shift dummy. ***significant at 1%, **5%, *10%.

Table V. Assimilation Profile of Foreign Educated Nurses by Country of Education (Census and ACS Data)

	(1) 1980		(2) 1990		(3) 2000		(4) 2007		(5) 2010	
	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign
Arrived to the US:										
0-5 years ago	-0.083	-0.069	-0.120	-0.108	0.001	-0.064	-0.067	-0.134	-0.043	-0.093
	(0.023)***	(0.018)***	(0.022)***	(.0022)***	(0.031)	(0.018)***	(0.022)***	(0.022)***	(0.017)***	(0.020)***
6-10 years ago	0.066	0.031	-0.001	-0.060	0.083	0.001	0.013	-0.071	0.006	-0.076
	(0.015)***	(0.015)**	(0.019)	(0.021)***	(0.018)***	(0.014)	(0.034)	(0.020)***	(0.019)	(0.018)***
11-15 years ago	0.064	0.006	0.038	0.004	0.104	-0.028	0.090	-0.034	0.040	-0.032
	(0.021)***	(0.017)	(0.020)	(0.018)	(0.019)***	(0.016)	(0.021)***	(0.017)***	(0.020)**	(0.017)*
16-20 years ago	0.021	-0.021	0.088	0.028	0.071	-0.022	0.067	-0.016	0.068	-0.041
	(0.041)	(0.023)	(0.020)***	(0.016)*	(0.018)***	(0.017)	(0.023)***	(0.018)	(0.019)***	(0.015)***
21+	0.035	0.010	0.066	0.019	0.121	0.022	0.121	0.018	0.092	0.017
	(0.049)	(0.018)	(0.021)***	(0.013)	(0.013)***	(0.011)**	(0.013)***	(0.012)	(0.011)***	(0.010)
Controls										
Demographic		X		X		X		X		X
Education		X		X		X		X		X
Job Characteristics		X		X		X		X		X
City FE		X		X		X		X		X
Number of Obs.		65183		84432		102643		75518		83348

Note. The sample includes all workers aged 18-74 who reported Registered Nurse as their occupation. The coefficient estimates for Filipino nurses and Other foreign Nurses for each numbered column and Census year corresponds to a separate regression of the dependent variable on a dummy for Filipino nurses and Other foreign nurses (the omitted category is native nurses) controlling for various sets of demographics, education and job characteristics. Demographic controls include age, age squared, a black dummy, a male dummy, a single dummy, a dummy for children younger than 18, and a dummy for children younger than 6. Education controls include dummies for 2-3 years of college, bachelor's degree and graduate degree. Job Characteristics include a dummy for shift work, a dummy for part-time, a dummy for over-time (41 + hours a week) and dummies for working in a hospital, a nursing home, in a physician's office and other health establishments. The 1980 Census did not include the necessary information to construct the shift dummy. ***significant at 1%, **5%, *10%.

Table VI. Wage Differences between Native and Foreign Educated Nurses: National Sample Survey of Registered Nurses (2000)

	Dep Variable: Log(Wage per hour)											
	(1)		(2)		(3)		(4)		(4)		(5)	
Year	Filipino	Other Forgn	Filipino	Other Forgn	Filipino	Other Forgn	Filipino	Other Forgn	Filipino	Other Forgn	Filipino	Other Forgn
2000	0.207	0.059	0.180	0.071	0.089	0.021	0.075	0.009	0.074	-0.003	0.129	0.030
	(0.020)***	(0.013)***	(0.023)***	(0.016)***	(0.020)***	(0.013)*	(0.019)***	(0.013)	(0.027)***	(0.018)	(0.026)***	(0.016)**
Sample:	All		All		All		All		Hospitals		Hospitals	
Controls												
Demographic			X		X		X		X		X	
Education			X		X		X		X		X	
State FE, MSA dummy, State*MSA					X		X		X		X	
Job characteristics:												
Setting, Temp Job							X		X		X	
Unit											X	
	25544		25146		25146		24654		14706		14706	

Note. The sample include all registered nurses aged 18 to 74. The coefficient estimates for Filipino nurses and Other foreign Nurses for each numbered column corresponds to a separate regression of the dependent variable on a dummy for Filipino nurses and Other foreign nurses (the omitted category is native nurses) controlling for various sets of demographics, education and job characteristics. Demographic controls include age, age squared, female dummy, dummy for children 0-17, dummy for children<6. Education controls include a dummy for having a bachelor's degree and a dummy for graduate degree. Job characteristics include dummies for working full-time (but not overtime) and working part-time. Columns (4) and (5) include only nurses who reported working in hospitals. ***significant at 1%, **5%, *10%.

Table VII. Wage Differences between Native and Foreign Educated Nurses: 2008 California Survey of Registered Nurses

	Panel A. Dependent Variable:									
	Experience		Tenure		Temporary Agency		Travel Nurse		Health Ins.or Retire. Plan	
	(1)		(2)		(3)		(4)		(5)	
Year	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign
2008	1.561	1.442	-0.942	-1.321	-0.010	-0.010	-0.017	-0.012	0.035	-0.005
	(0.404)***	(0.477)***	(0.398)**	(0.501)***	(0.008)	(0.010)	(0.007)**	(0.009)	(0.019)*	(0.026)
Controls										
Demographic		X		X		X		X		X
Education		X		X		X		X		X
Region FE		X		X		X		X		X
Job setting FE		X		X		X		X		X
N. Obs		4375		4324		4450		4450		4450
	Panel B. Dep Variable: Log(Wage per hour)									
	(1)		(2)		(3)		(4)		(5)	
Year	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Other Foreign
2008	0.062	0.000	0.054	-0.012	0.065	-0.001	0.064	-0.001	0.071	0.005
	(0.024)***	(0.026)	(0.024)**	(0.027)	(0.022)***	(0.027)	(0.024)***	(0.027)	(0.025)***	(0.028)
Controls										
Demographic		X		X		X		X		X
Education		X		X		X		X		X
Region FE		X		X		X		X		X
Job setting FE		X		X		X		X		X
Variables not available in the Census										
Experience, Exp squared				X		X		X		X
Tenure, Tenure Squared						X		X		X
travel nurse, temp. agency								X		X
insurance, Retirement funds										X
No. Obs		3771		3732		3719		3719		3191

Note. The sample include all registered nurses aged 18 to 74. The coefficient estimates for Filipino nurses and Other Foreign Nurses for each numbered column and year corresponds to a separate regression of the dependent variable on a dummy for Filipino nurses and Other foreign nurses (the omitted category is native nurses) controlling for various sets of demographics, education and job characteristics. Demographic controls include age, age squared, female dummy, dummy for children 0-17, dummy for children<6, black dummy and single dummy. Education controls include dummies for having a bachelor's degree, an associate degree, a master's degree and a doctorate.Job characteristics include dummies for working more than 41 hours, working part-time and a dummy for overtime. The state of California is divided into 8 regions and there are 30 different job settings. Experience refers to the number of years the worker has practiced as an RN. Excludes years since graduation during which she did not work as an RN. Temporary Agency is a dummy variable for working for a temporary agency, Travel Nurse a dummy variable for working as a travel nurse, and Health Insurance or Retirement Plan a dummy variable for employer providing health insurance or a retirement plan.

Table VIII. Which Hospitals Hire Foreign RNs, Controlling for Hospital Location and Type of Hospital

	Private	Beds	No. of RNs	Fraction of RNs with Bachelor's	Min BA required for Nurse Supervisor	Min Masters required for Chief	Hourly Wages of RNs in:			
							ICU	Maternal-Child	Medical-surgical unit	Outpatient
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Foreign RN	0.143	117.571	115.833	8.211	0.174	0.225	0.113	0.111	0.113	0.118
	(0.022)***	(9.256)***	(10.160)***	(1.069)***	(0.023)***	(0.024)***	(0.008)***	(0.009)***	(0.007)***	(0.009)***
Controls	no	no	no	no	no	no	no	no	no	no
Observations	3,246	3,246	2,590	2,688	3,025	3,126	2,311	1,808	2,624	1,984
R-squared	0.013	0.047	0.048	0.021	0.019	0.028	0.086	0.087	0.081	0.081
Foreign RN	0.075	68.767	63.557	4.384	0.058	0.085	0.01	0.010	0.011	0.02
	(0.023)***	(8.396)***	(9.963)***	(0.976)***	(0.023)**	(0.023)***	(0.006)*	(0.006)	(0.005)**	(0.007)***
Controls:										
Hospital Type	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
StateXMSA size FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Hospital Service Code	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	3,246	3,246	2,590	2,688	3,025	3,126	2,311	1,808	2,624	1,984
R-squared	0.240	0.457	0.396	0.447	0.305	0.378	0.679	0.707	0.688	0.664

Note. "StateXMSA size FE" refers to dummies for state interacted with MSA size (6 categories), resulting in a total of 209 groups. Other controls include 17 dummies for hospital type and 13 dummies for the type of service the hospital provides. ***significant at 1%, **5%, *1%.

Table IX. Share of Overseas Filipino Workers (OFWs) and Wages by Skilled Occupation and Gender in the Philippines and Top Destination Countries

	Panel A. Share of OFWs by Skilled Occupation and Average Wages								Panel B. Wages for Filipino Nurses in Top Destinations	
	2000 Philippines Census						2002 Philippines LFS (Both Sexes)		POEA Data - circa 2002	
	Males			Females						
Occupation	Share of OFWs in Occupation	Share of Occ in OFWs	Share of Occ in stayers	Share of OFWs in Occupation	Share of Occ in OFWs	Share of Occ in stayers	Average Daily Wage (US$)	75/25 Percentile Ratio	Destination	Average Daily Wage (US$)
Nursing and midwifery professionals	0.23	0.10	0.02	0.19	0.53	0.08	10.34	1.67	Canada	100.42
Directors and chief executives of corp.	0.02	0.00	0.01	0.04	0.00	0.00	26.34	2.29	Ireland	115.02
Legal professionals	0.02	0.01	0.03	0.01	0.00	0.01	23.07	1.81	Kuwait	41.36
Specialized managers	0.04	0.03	0.06	0.02	0.02	0.03	17.23	2.08	Libya	30.32
Production and operations managers	0.04	0.02	0.04	0.01	0.01	0.02	16.61	2.08	Saudi Arabia	25.40
Government administrators	0.02	0.01	0.02	0.02	0.00	0.01	16.51	2.03	Singapore	29.08
School supervisors and principals	0.01	0.00	0.01	0.01	0.00	0.01	15.40	1.38	Taiwan	21.82
Architects and related professionals	0.12	0.04	0.02	0.03	0.00	0.00	15.06	1.84	UAE	33.06
Business professionals	0.04	0.05	0.08	0.02	0.04	0.07	14.46	1.91	UK	90.28
Engineers and related professionals	0.13	0.53	0.27	0.04	0.03	0.03	13.91	1.80	USA	141.89
Life science professionals	0.04	0.01	0.02	0.02	0.00	0.01	13.82	1.67		
Health professionals (except nursing)	0.06	0.06	0.07	0.04	0.09	0.07	13.66	1.98		
Physicists, chemists and related prof.	0.11	0.01	0.01	0.02	0.00	0.00	13.36	2.14		
Mathematicians, statisticians	0.04	0.00	0.00	0.02	0.00	0.00	13.09	1.48		
College, university teaching prof.	0.01	0.01	0.04	0.02	0.02	0.03	12.90	1.58		
Social and related science professionals	0.04	0.01	0.01	0.01	0.01	0.01	12.55	2.00		
Other supervisors	0.12	0.01	0.00	0.03	0.00	0.00	11.73	2.05		
Elementary education teaching prof.	0.01	0.02	0.12	0.01	0.13	0.40	11.60	1.23		
Computer professionals	0.13	0.05	0.02	0.07	0.03	0.01	11.54	1.69		
Customs, taxation, licensing, welfare prof.	0.02	0.00	0.01	0.01	0.00	0.01	11.35	1.81		
Librarians, archivists and curators	0.09	0.00	0.00	0.00	0.00	0.00	11.30	1.78		
Secondary education teaching prof.	0.01	0.01	0.08	0.01	0.04	0.12	11.24	1.31		
Special education teaching prof.	0.02	0.00	0.00	0.02	0.01	0.02	10.81	1.53		
Administrative associate professionals	0.02	0.01	0.03	0.01	0.02	0.04	10.33	2.09		
Technical, vocational instructors	0.03	0.00	0.01	0.01	0.00	0.00	10.22	1.79		
Life science technicians associated prof.	0.04	0.01	0.01	0.01	0.00	0.01	10.05	1.65		

Note: The included occupations in Panel A were chosen based on the share of workers with a college degree and a minimum number of workers. All numbers are computed using workers with a college degree. Data comes from the Philippines' 2000 Census and 2002 Labor Force Survey. Numbers reported in Panel B are constructed using Confidential POEA data.

Table X. Selection into Nursing in the Philippines and the US

Philippines

A. Dep Var.: Father's Education (Sample: Single Women)

	Year = 1990		Year=2000	
	Father College +	Father Grad. Edu	Father College +	Father Grad. Edu
Nurse Dummy	0.114	0.004	0.149	0.020
	(0.014)***	(0.003)	(0.011)***	(0.005)***
Mean Dep. Var.	0.249	0.010	0.250	0.021
No. Obs.	50140	50140	56388	56388

B. Dep Var.: Mother's Education (Sample: Single Women)

	Year = 1990		Year=2000	
	Mother College +	Mother Grad. Edu	Mother College +	Mother Grad. Edu
Nurse Dummy	0.125	0.008	0.194	0.026
	(0.012)	(0.003)**	(0.011)***	(0.004)***
Mean Dep. Var.	0.218	0.011	0.270	0.022
No. Obs.	58217	58217	64650	64650

C. Dep Var.: Husbands's Education (Sample: Married Women)

	Year = 1990		Year=2000	
	Husband College +	Husband Grad. Edu	Husband College +	Husband Grad. Edu
Nurse Dummy	0.146	-0.002	0.114	0.005
	(0.009)***	(0.002)	(0.009)***	(0.003)
Mean Dep. Var.	0.558	0.012	0.509	0.032
	117067	117067	140526	140526

USA

D. Dep Var.: Husbands's Education (Sample: Married Women)

	Year = 1990		Year=2000	
	Husband College +	Husband Grad. Edu	Husband College +	Husband Grad. Edu
Nurse Dummy	-0.110	-0.051	-0.108	-0.060
	(0.004)***	(0.003)***	(0.003)**	(0.003)***
Mean Dep. Var.	0.675	0.313	0.661	0.292
No. Obs.	393373	393373	530834	530834

Note. The data is from the 1990 and 2000 Philippines Census and US Census. The sample is restricted to women aged 20 to 64 with a college degree or more. Each cell corresponds to a separate regression of the dependent variable on a nurse dummy for each Census year. All regressions include age dummies. Robust standard errors in parenthesis ***significant at 1%, **5%, *10%.

Table XI. Selection into Migration to the US

Panel A. Hourly Wages of Filipino Nurses in the US in their Last Job in the Philippines Before Migration (in 2003 pesos)

| | New Immigrant Survey (2003) | | Philippine Labor Force Survey (2003) |
	Healthcare workers	Nurses	Nurses
Mean	67.2	71.8	48.7
25th Percentile	39.2	33.3	35
Median	49.9	52.2	45.4
75th Percentile	85.3	86.6	58.3
No. of obs	62	49	390

Panel B. Education Level of Parents of Temporary Migrant Filipino Nurses Living in the US vs. Other Destinations (Survey of Overseas Filipinos)

	Dep. Var: Dummy for Head of Household having a College Degree	
Nurse living in the US	0.169	0.177
	(0.060)***	(0.059)***
Controls	None	Age, Gender, Year dummies
No. Observations	477	477
Mean of Dep. Var.	0.348	
Share of Migrant Nurses living in the US	0.171	

Note Panel A: The sample includes nurses aged 25 to 35. Hourly wages of Filipino nurse migrants in their last reported job are deflated using 2003 prices (in pesos) based on the reported year that migrants were employed in their last job before entering the US. For the sample of nurses aged 25 to 35 in the 2003 NIS, the years in which migrants were last employed in the Philippines range from 1987 to 2003.

Note Panel B: Data comes from the 1993-2002 Survey of Overseas Filipinos (SOF) merged with the 1993-2002 October Labor Force Survey. SOF includes workers that have migrated within the last 5 years and are still considered members of a household in the Philippines. Sample is restricted to nurses who are the daughter/son of the household head.

Figure I.
Share of Foreigners Educated Abroad in the Skilled Population
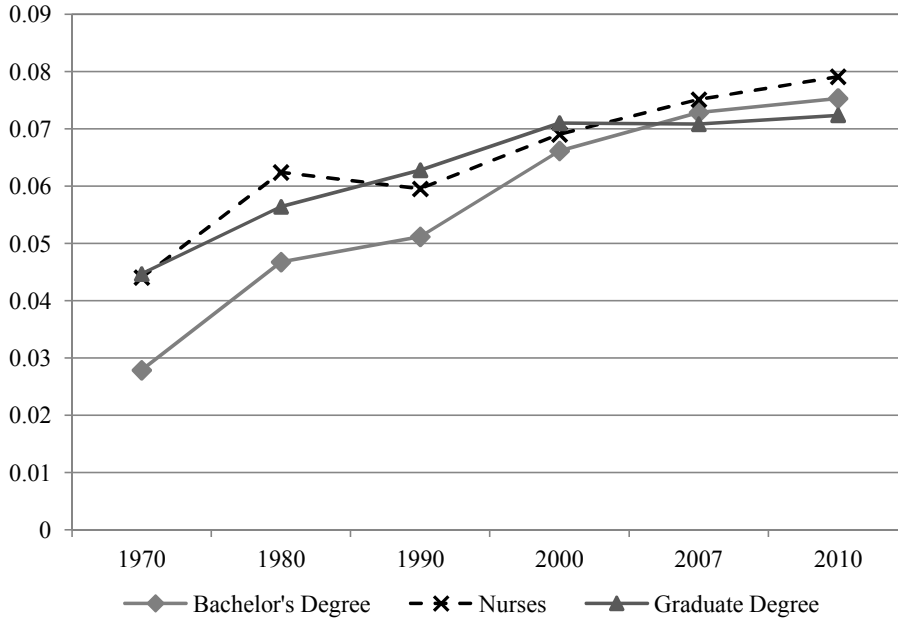
Note. The data is from the 1970 to 2000 Census and 2007 and 2010 ACS 3-year aggregates. We assume workers were educated abroad if they arrived at age 21+ and their highest education is a college degree or if they arrived at 26+ and have a graduate degree.

Figure II.
Flow of Nurses by Foreign Status – NCLEX First-Time Takers
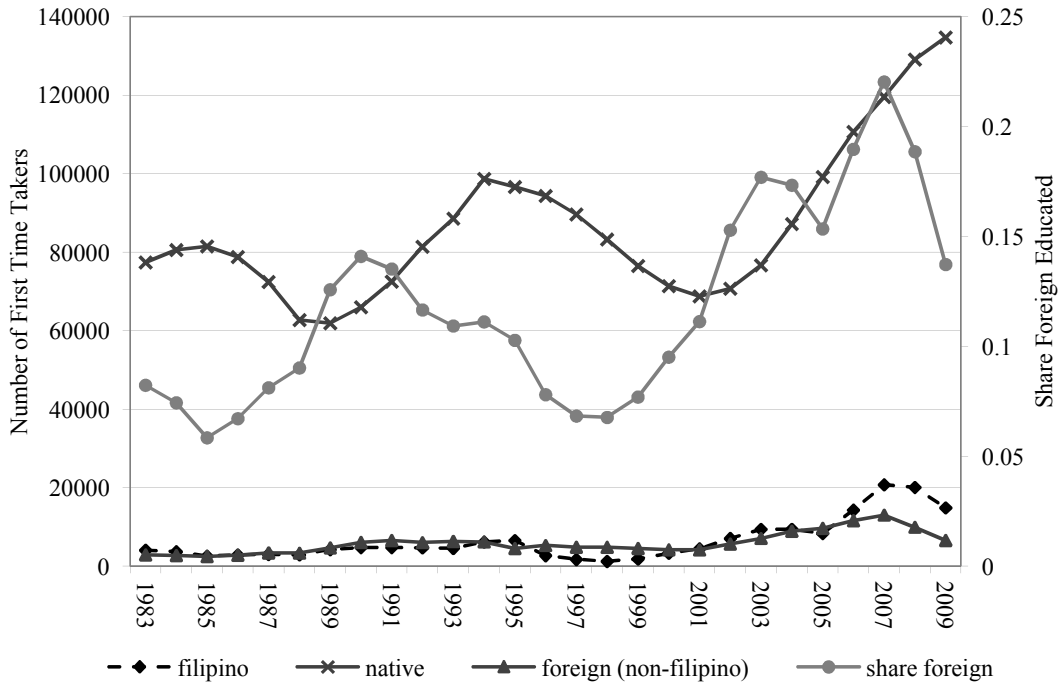
Note. The data is from the National Council of State Boards of Nursing (NCSBN) registered nurse licensure examination statistics (NCLEX). The sample is limited to first-time takers of the examination.

Figure III

Flow of Foreign Nurses by Country of Education – NCLEX First-Time Takers
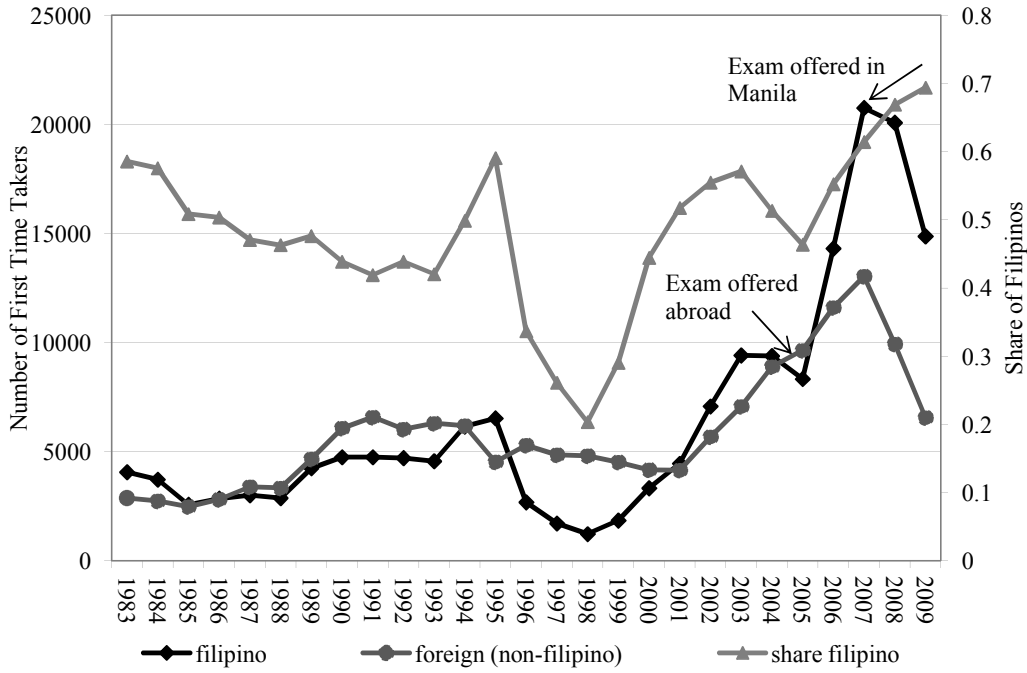
Note. The data is from the National Council of State Boards of Nursing (NCSBN) registered nurse licensure examination statistics (NCLEX). The sample is limited to first-time takers of the examination.

Figure IV
Model of Occupational Choice
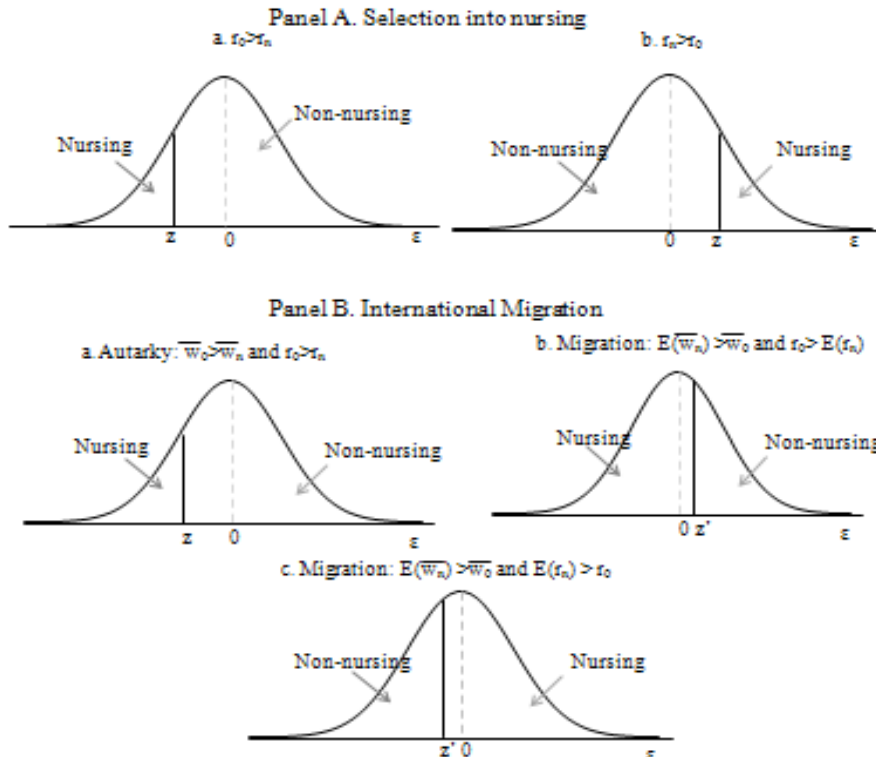
Note. Panel A. keeps constant w_n-w_o and $|r_o-r_n|$

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Figure V
Relative Wages of Nurses to Other Skilled Occupations (CPS Data)
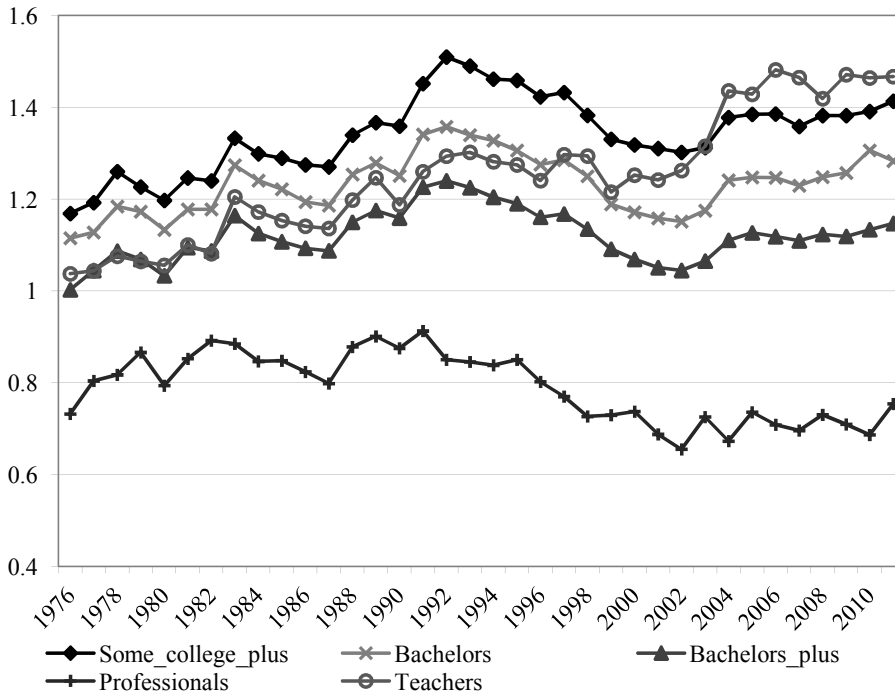
Note. The data is from the 1976 to 2010 Current Population Surveys. Professionals include doctors, dentists, lawyers and MBAs.

Figure VI
Trends in Spousal Quality of RNs, Teachers, Managers, Doctors and Lawyers

Outcome: Share of Occupation in Cohort with Husband with Grad Degree/ Share of Occupation in Cohort
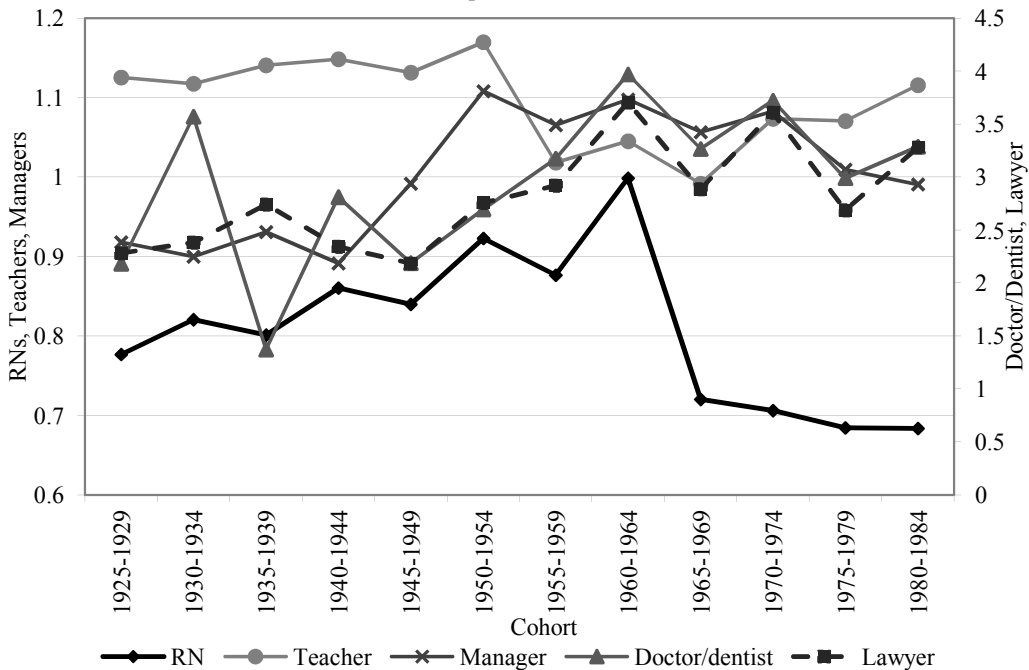
Note. The data is from the Census and American Community Surveys. The sample includes married native women with at least two years of college.

Figure VII
Occupational Distribution of Skilled Native Women by Cohort
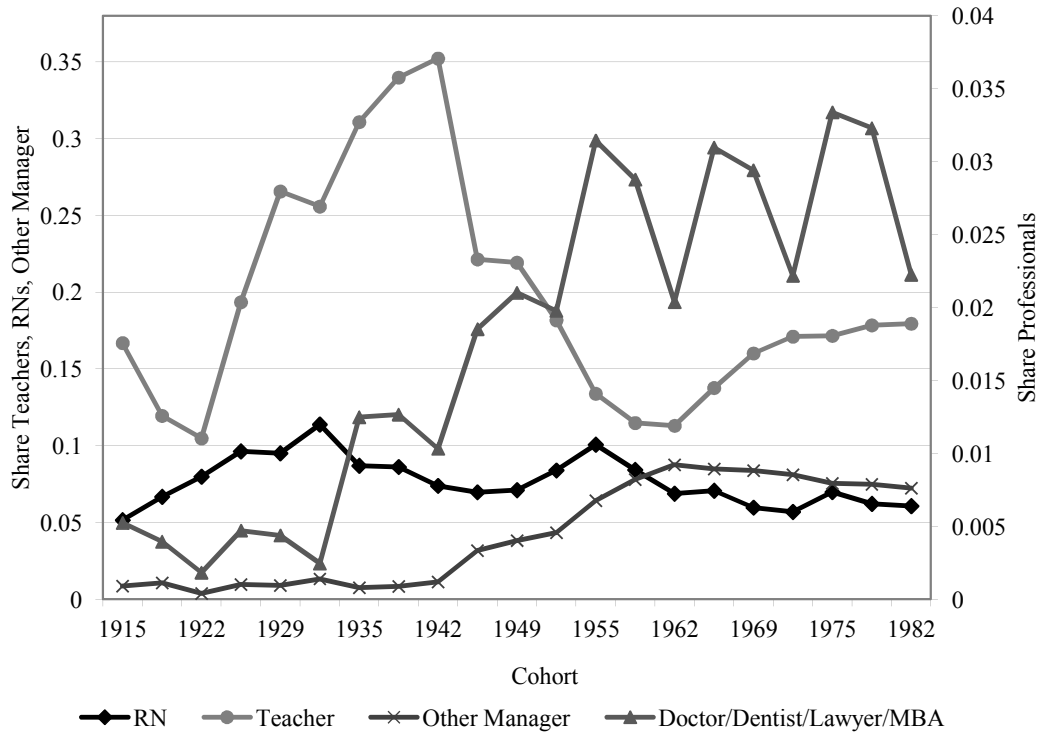
Note. The data is from the Census and the sample is restricted to native women with at least two years of college. The outcomes for cohorts 19X5 to 19X8 refer to the share who are aged 32 to 35 years old, cohorts 19X9 to 19X1 refer to the share who are aged 29 to 31 and cohorts 19X2 to 19X4 refer to the share who are aged 26 to 28 years old. Note that the dips in the graph for doctors/dentists/lawyers/MBAs for cohorts 19X2 and 19X4 are due to the fact that these cohorts are too young to have graduated from medical or law school.

Table A1. Share of Foreign Educated Nurses by State (Census Data)

State	Share Foreign Educated					Share Educated in the Philippines				
	1980	1990	2000	2007	2010	1980	1990	2000	2007	2010
DC	9.8	11.9	9.5	13.0	29.7	0.5	0.0	0.6	2.8	5.2
California	15.2	17.9	22.1	24.4	25.8	5.2	8.3	11.3	13.0	14.6
Nevada	11.7	6.7	13.4	20.7	23.4	5.2	2.5	7.4	12.8	17.6
New Jersey	10.9	12.7	18.6	21.5	20.7	4.3	6.2	10.0	11.8	10.2
New York	15.9	16.5	20.0	20.5	19.0	2.0	3.8	4.8	5.0	4.9
Maryland	6.8	6.4	12.9	15.6	16.8	1.3	1.5	3.3	3.1	4.0
Hawaii	11.7	14.9	14.6	12.9	16.7	4.9	6.0	9.3	9.0	9.6
Florida	9.6	10.5	12.7	14.7	15.3	1.4	2.0	2.7	3.5	3.3
Texas	8.5	8.0	11.3	12.6	13.7	2.3	2.7	3.3	4.9	5.1
Illinois	10.7	9.4	11.8	12.3	12.2	4.7	4.6	6.5	6.2	6.9
Washington	6.4	6.6	7.8	8.0	9.6	0.6	1.1	2.5	2.3	2.9
Arizona	4.0	3.1	6.1	7.7	9.4	0.3	0.7	1.7	1.5	3.2
Georgia	2.7	4.3	6.2	7.5	8.8	0.7	0.8	1.1	1.0	1.4
Connecticut	4.1	4.4	8.2	9.8	8.2	0.4	0.9	2.4	3.0	2.6
Virginia	4.7	5.6	4.9	7.1	7.6	1.9	2.5	1.6	1.8	2.7
Delaware	2.5	3.6	5.2	7.7	6.9	1.1	0.4	1.7	0.5	1.4
Massachusetts	3.8	4.5	6.1	6.8	6.6	0.2	0.9	0.6	1.1	1.1
Michigan	6.9	4.2	6.0	5.7	5.9	2.8	1.6	2.8	2.1	2.2
Alaska	6.2	4.6	8.7	5.1	5.8	0.9	1.5	3.0	1.3	1.4
New Mexico	4.3	1.6	4.0	4.4	5.2	0.3	0.2	0.8	0.8	0.1
Pennsylvania	2.3	1.9	2.6	3.7	5.0	0.5	0.3	0.3	0.4	1.0
Rhode Island	2.8	2.6	3.1	3.5	4.7	0.0	0.0	0.3	0.7	0.3
Maine	5.8	3.9	3.1	2.6	4.7	0.0	0.2	0.0	0.0	0.1
North Carolina	2.5	1.6	3.8	4.3	4.5	0.1	0.2	0.8	1.2	1.4
Minnesota	2.5	1.6	2.4	2.6	4.3	0.5	0.1	0.4	0.6	0.2
New Hampshire	3.4	1.3	3.9	3.2	4.2	0.0	0.0	0.2	0.4	0.2
Utah	3.0	1.6	4.6	2.3	4.0	0.3	0.0	0.3	0.2	0.1
Arkansas	6.3	2.1	3.4	2.1	3.5	1.4	0.2	1.0	0.1	0.3
Tennessee	1.9	1.4	2.1	2.6	3.3	0.4	0.3	0.6	0.5	0.7
Oregon	6.7	3.8	4.8	5.7	3.3	0.3	0.5	0.7	1.6	0.8
Colorado	3.1	3.1	3.3	5.1	3.1	0.0	0.7	0.5	0.5	0.4
South Carolina	2.5	0.9	2.5	3.8	3.1	0.3	0.4	0.4	1.3	1.2
Oklahoma	2.3	1.7	2.4	2.0	2.9	0.3	0.0	0.4	0.2	0.2
Idaho	2.0	1.5	2.4	1.7	2.8	0.0	0.0	0.2	0.3	0.0
Vermont	5.1	3.4	3.9	3.5	2.8	0.0	0.0	0.0	0.0	0.0
Indiana	1.8	1.0	1.6	2.1	2.7	0.5	0.3	0.5	0.5	1.0
Ohio	1.9	1.6	1.7	2.1	2.5	0.3	0.3	0.3	0.6	0.6
Missouri	3.1	1.7	1.7	2.1	2.3	1.1	0.8	0.4	0.5	0.8
Louisiana	2.4	2.9	2.7	2.5	2.3	0.0	0.8	0.6	0.2	0.4
Wisconsin	1.6	1.3	1.0	1.8	2.2	0.2	0.1	0.3	0.5	0.8
Kansas	2.8	1.0	2.1	2.0	2.0	0.6	0.3	0.4	0.1	0.1
Alabama	1.8	0.9	1.4	1.6	1.9	0.3	0.1	0.1	0.4	0.4
Nebraska	1.7	0.8	0.9	3.2	1.5	0.2	0.0	0.2	1.0	0.1
Montana	3.0	1.3	2.7	3.2	1.4	0.4	0.0	0.6	0.1	0.0
Iowa	1.4	0.7	1.2	1.6	1.4	0.1	0.0	0.3	0.4	0.3
Kentucky	0.8	0.3	0.9	2.3	1.3	0.1	0.1	0.3	0.5	0.2
South Dakota	1.7	0.8	1.5	0.1	1.2	0.4	0.0	0.6	0.0	0.0
Mississippi	2.0	2.3	2.4	1.8	1.2	0.4	1.0	0.8	0.8	0.7
West Virginia	0.6	0.9	0.9	1.7	0.6	0.2	0.4	0.1	0.6	0.1
North Dakota	0.4	0.6	1.1	1.8	0.4	0.0	0.0	0.2	0.0	0.0
Wyoming	0.9	2.3	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0

Note. The sample includes workers age 18-74 who reported Registered Nurse as their occupation.

Table A2. Wage Differences between Native and Foreign Educated Nurses by Census Year: Role of Shift Work

	Dep Variable: Log(Wage per hour)							
	(1)		(2)		(3)			
Census Year	Filipino	Other Foreign	Filipino	Other Foreign	Filipino	Filipino*shift	Other Foreign	Other Foreign*Shift
1990	0.008	-0.016	0.012	-0.014	0.009	0.014	-0.020	0.034
	(0.012)	(0.016)	(0.012)	(0.016)	(0.014)	(.0023)	(0.017)	(0.022)
2000	0.082	-0.009	0.084	-0.010	0.081	0.015	-0.020	0.051
	(0.016)***	(0.009)	(0.016)***	(0.009)	(0.018)***	(0.016)	(0.010)**	(0.017)**
2007	0.061	-0.031	0.054	-0.034	0.071	-0.060	-0.037	0.014
	(0.013)***	(0.012)***	(0.013)***	(0.011)***	(0.014)***	(0.020)***	(0.013)***	(0.019)
2010	0.044	-0.030	0.036	-0.033	0.033	0.009	-0.029	-0.023
	(0.011)***	(0.012)***	(0.011)***	(0.012)***	(0.013)***	(0.017)	(0.014)**	(0.016)
Controls	All		All		All			
	No shift, part-time, full-time		Yes shift, part-time, full-time		Includes Part-time, full-time			

Note. The sample includes all workers aged 18-74 who reported Registered Nurse as their occupation. The coefficient estimates for Filipino nurses and Other foreign Nurses for each numbered column and Census year corresponds to a separate regression of the dependent variable on a dummy for Filipino nurses and Other foreign nurses (the omitted category is native nurses) controlling for various sets of demographics, education and job characteristics. Demographic controls include age, age squared, a black dummy, a male dummy, a single dummy, a dummy for children younger than 18, and a dummy for children younger than 6. Education controls include dummies for 2-3 years of college, bachelor's degree and graduate degree. Job Characteristics include a dummy for shift work, a dummy for part-time, a dummy for over-time (41 + hours a week) and dummies for working in a hospital, a nursing home, in a physician's office and other health establishments. "All" controls include demographic controls, education dummies, job characteristics and city fixed effects. ***significant at 1%, **5%, *10%.

Table A3. Cohort Size of Filipino Nurses Educated Abroad by year of Immigration to the US

Census Year	Before 1960	1960-1964	1965-1969	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009
1980	500	1280	5220	9480	7220	0	0	0	0	0	0
1990	530	1353	5246	8961	9079	10962	10189	0	0	0	0
2000	511	1251	4932	8586	9730	13646	13867	18228	8428	154	0
2010	157	558	3386	8197	7397	12617	14192	19341	10668	20904	19551

Note. In some cases the size of the cohort goes up. This is likely to be due to undercounting of migrants that have arrived on the relevant Census year. This is either because they arrived after the Census or recently and were not taken into account (for example, if they were living in temporary housing).

Table A4. Descriptive Statistics - National Sample Survey of Registered Nurses 2000

	Native	Filipino	Other Foreign		Native	Filipino	Other Foreign
Demographic charateristics				*Unit*			
Age	41.80	39.33	43.61	Intensive Care	0.17	0.24	0.19
Female	0.94	0.90	0.96	General bed unit	0.41	0.50	0.45
Single	0.09	0.16	0.15	Outpatient	0.06	0.02	0.05
Child 0-6	0.18	0.25	0.16	Operating Room	0.10	0.07	0.07
Child 0-18	0.55	0.68	0.52	Recovery Room	0.03	0.04	0.02
Lives in MSA	0.75	0.89	0.86	Labor/delivery Room	0.08	0.04	0.10
				ER	0.09	0.04	0.06
Education charateristics				Home Health Care	0.01	0.00	0.00
Bachelors degree	0.29	0.72	0.14	Hospice Unit	0.00	0.00	0.00
Masters degree	0.00	0.00	0.01	Other	0.05	0.06	0.04
				Patient			
Labor Supply Characteristics				Chronic Care	0.04	0.05	0.04
Employed in Nursing	0.84	0.94	0.85	Coronary Care	0.20	0.26	0.21
Hrs per week	34.70	39.05	36.49	Neurological	0.02	0.02	0.01
Hired by Temp Agency	0.014	0.014	0.037	Newborn	0.06	0.06	0.06
				Obstetrics	0.04	0.02	0.07
Setting				Orthopedic	0.03	0.02	0.03
Hospital	0.59	0.74	0.69	Pediatric	0.07	0.01	0.06
Nursing Home	0.08	0.13	0.08	Psychiatric	0.07	0.05	0.05
Nursing Education	0.02	0.01	0.01	Rehabilitation	0.03	0.04	0.03
Public Health	0.13	0.04	0.11	Other	0.37	0.41	0.39
School Nurse	0.03	0.00	0.02				
Occupational Health	0.01	0.00	0.01				
Physicians Offices	0.09	0.04	0.06	N. Obs	62186	882	1392

Table A5. Wage Differences between Native and Foreign Educated Nurses: National Sample Survey of Registered Nurses

					Dep Variable: Log(Wage per hour)						
	Share	(1)		(2)		(3)		(4)		(5)		No. Obs.
Year	Filipinos	Filipino	Other Fgn	Filipino	Other Fgn	Filipino	Other Fgn	Filipino	Other Fgn	Filipino	Other Fgn	
1980	0.009	0.217 (0.036)***	0.101 (0.024)***	0.192 (0.037)***	0.087 (0.025)***	0.128 (0.036)***	0.039 (0.025)	0.112 (0.037)***	0.039 (0.024)			21223
1984	0.009	0.148 (0.019)***	0.065 (0.019)***	0.120 (0.019)***	0.056 (0.019)***	0.064 (0.020)***	0.022 (0.019)	0.047 (0.020)**	0.018 (0.019)			23166
1988	0.008	0.151 (0.019)***	0.107 (0.016)***	0.121 (0.019)***	0.095 (0.017)***	0.051 (0.019)***	0.054 (0.015)***	0.025 (0.019)	0.038 (0.015)**	0.057 (0.018)***	0.064 (0.017)***	25636
1992	0.009	0.235 (0.018)***	0.127 (0.018)***	0.197 (0.018)***	0.127 (0.018)***	0.109 (0.019)***	0.074 (0.017)***	0.076 (0.018)***	0.055 (0.017)***	0.109 (0.020)***	0.059 (0.017)***	25151
1996	0.013	0.167 (0.025)***	0.093 (0.022)***	0.136 (0.025)***	0.092 (0.022)***	0.063 (0.025)**	0.044 (0.023)*	0.059 (0.024)**	0.032 (0.022)	0.081 (0.027)***	0.028 (0.023)	23186
2000	0.015	0.207 (0.020)***	0.059 (0.013)***	0.180 (0.023)***	0.071 (0.016)***	0.089 (0.020)***	0.021 (0.013)*	0.075 (0.019)***	0.009 (0.013)	0.129 (0.026)***	0.030 (0.016)*	25544
2004	0.014	0.142 (0.026)***	0.090 (0.024)***	0.085 (0.026)***	0.102 (0.024)***	-0.006 (0.026)	0.051 (0.024)**	-0.017 (0.026)	0.036 (0.023)	-0.002 (0.030)	0.017 (0.029)	27090
2008	0.021	0.161 (0.018)***	0.119 (0.018)***	0.102 (0.018)***	0.111 (0.018)***	0.021 (0.017)	0.062 (0.018)***	0.005 (0.017)	0.041 (0.017)**			28607
Sample:		All		All		All		All		Hospitals		

Controls

Demographic				X		X		X		X		
Education				X		X		X		X		
State FE, MSA dummy, State*MSA						X		X		X		
Job characteristics:												
Setting, Temp Job								X		X		
Unit										X		

Note. The sample includes all registered nurses aged 18 to 74. The coefficient estimates for year 2000 correspond to those reported in Table 6. See notes to Table 6 for more details. The number of observations refer to those for the regression in Column (1). ***significant at 1%, **5%, *10%.

Table A6. Which Hospitals Hire Foreign Nurses? (Data: Nursing Personnel Survey, 1990)

| | Hospital Recruited RNs from Foreign Countries: | | | |
| | No (N=2717) | | Yes (N=529) | |
	Obs.	Mean	Obs.	Mean
Number of foreign RNs			475	9.99
Fraction from:				
Philippines			475	0.427
Canada			475	0.263
England, Ireland			475	0.150
Private hospital	2717	0.67	529	0.81
No. of Beds	2717	185.84	529	303.41
Average number of FTE RNs	2179	129.53	411	245.36
Average number of FTE LPNs	2047	31.35	391	50.77
Average number of FTE Nursing aides	1998	33.63	372	58.92
Experiencing overall shortage of RNs (1	2684	0.68	523	0.80
Severity of Shortage (1=severe)	1831	0.15	417	0.19
% of full-time RNs with:				
Nursing Diploma	2269	31.90	419	27.29
Associate Degree	2269	44.18	419	40.58
Bachelor's Degree	2269	21.62	419	28.16
Master's Degree	2267	2.24	418	3.49
Doctorates	2263	0.06	417	0.50
Minimum of Bachelor's required for (1=Yes):				
Staff Nurse	2596	0.02	511	0.01
Head Nurse	2524	0.30	511	0.44
Supervisor	2521	0.31	504	0.48
Minimum of a Master's Degree required for:				
Asst. or Associate Nurse Administrato	2278	0.27	484	0.40
Chief Nurse Executive	2614	0.46	512	0.69
% of RNs certified:				
Emergency Room	2038	19.94	403	26.76
General Medical Surgery	1888	5.80	359	6.68
Intensive Care	2041	17.17	418	23.69
Maternal-Child Unit	1705	8.48	318	11.37
Psychiatric	1400	5.78	258	8.09
Operating Room	1866	9.44	364	14.12
Administration	1821	11.51	348	14.64
RN Average Hourly Wage:				
ICU or Critical care unit	1876	14.34	435	16.10
Maternal-child unit	1471	13.97	337	15.68
Medical-surgical unit	2167	13.76	457	15.45
Outpatient	1626	14.21	358	16.03
Psychiatric unit	798	14.62	222	16.30
Head nurse	1746	17.13	407	19.48
Nursing supervisor	1873	17.07	413	19.79
Fringe benefits as a % of salary for RNs	2244	23.03	465	24.83
% of RNs employed for five or more yea	2359	48.87	455	43.54
% of RNs working no rotation shifts (days, evenings or nights only)	2600	65.80	502	74.88
% of inpatient staff RNs working:				
8 hour shift	2668	67.95	522	65.70
10 hour shift	2668	2.42	522	2.76
12 hour shift	2668	28.06	522	30.29

Table A7. Wage Differences Between Native and Foreign Workers in 2000: Selected Occupations

| Occupation | Share of Skilled Filipinos working in occ.* | Dep Variable: Log(Wage per hour) | | | | No. Obs |
| | | (1) | | (2) | | |
		Filipino	Other Foreign	Filipino	Other Foreign	
Nurses	0.16	0.252 (0.008)***	0.074 (0.006)***	0.088 (0.008)***	-0.014 (0.006)**	115840
Accountants	0.06	0.058 (0.017)***	-0.011 (0.007)	-0.143 (0.018)***	-0.126 (0.008)***	85027
Physicians	0.03	0.013 (0.040)	-0.143 (0.015)***	-0.091 (0.036)***	-0.097 (0.014)***	30040
Nursing Aides	0.03	0.209 (0.019)***	0.114 (0.007)***	0.055 (0.020)***	-0.002 (0.008)	116003
Managers	0.03	-0.032 (0.024)	0.034 (0.006)***	-0.187 (0.022)***	-0.083 (0.006)***	215643
Computer Software Dev.	0.02	0.045 (0.027)	0.119 (0.006)***	-0.103 (0.025)***	-0.008 (0.006)	63278
Clinical Lab. Technician	0.02	0.288 (0.029)***	0.066 (0.016)***	0.022 (0.031)	-0.053 (0.016)***	15401
Computer Scientists	0.02	0.144 (0.028)***	0.118 (0.008)***	-0.027 (0.027)	0.008 (0.007)	78054

Controls

|						
Demographic					X	
Education/Job Characteristics					X	
Industry FE					X	
City FE					X	

Note. The data is from the 2000 Census. The sample is restricted to those aged 18 to 74 in each occupation. "Skilled" is defined as having a bachelors degree or more. Demographic controls include age, age squared, female dummy, dummy for children 0-17, dummy for children<6. Education controls include a dummy for having a bachelor's degree and a dummy for graduate degree. Job characteristics include dummies for working full-time (but not overtime) and working part-time. ***significant at 1%, **5%, *10%.

Table A8. Average Institutional Selectivity of Freshmen Women who Indicated a Probable Career in Nursing, Non-Nursing and Teachers

Time Period	Probable Career in Nursing			Probable Career in Non-Nursing			Probably Career in Teaching		
	Mean	25th Pecentile	75th Percentile	Mean	25th Pecentile	75th Percentile	Mean	25th Pecentile	75th Percentile
1982	915	850	975	943	867	1010	908	850	970
1985-1989	902	842	969	947	867	1013	919	861	970
1990-1994	890	833	950	940	867	1013	908	854	970
1995-1999	902	847	958	935	860	1010	904	841	960

Note. The data is from the Cooperative Institutional Research Program (CIRP) Freshman Surveys. The sample is restricted to freshmen aged 18 to 19. Institutional selectivity is based on the institution's average SAT/ACT score of incoming freshman.

Figure A1

**Pre-Migration Wages of Filipino Nurses in the US Relative to Non-Migrant Nurses in the Philippines in 2003**
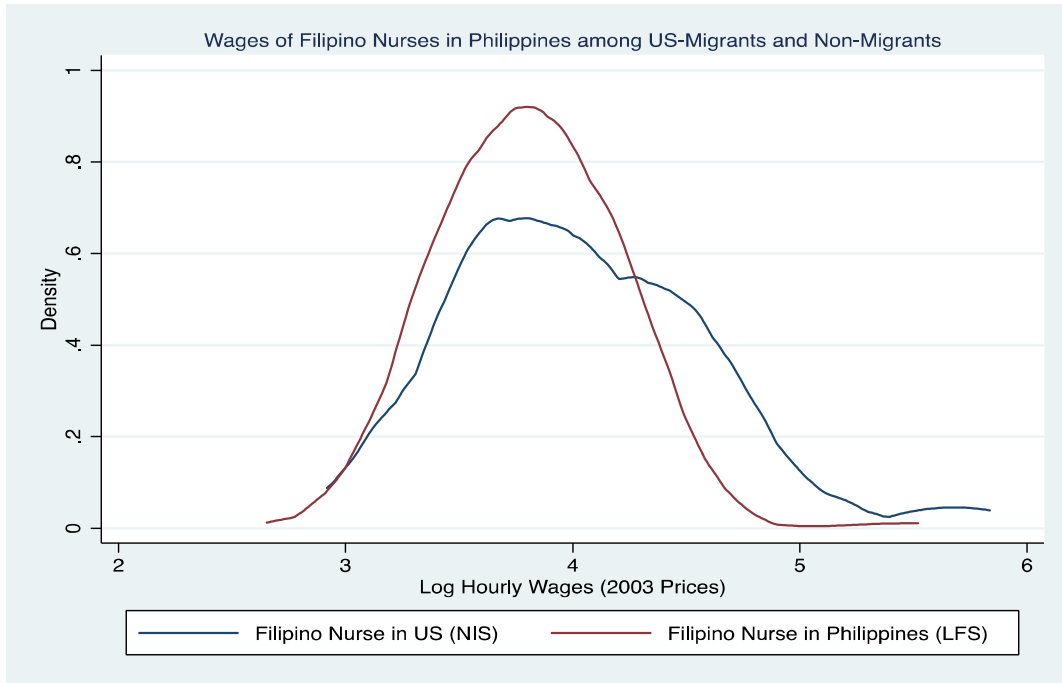
Note. The data for Filipino nurses in the US is from the New Immigration Survey and the data for Filipino nurses in the Philippine is from the 2003 Philippine Labor Force Survey. The sample includes nurses aged 25 to 35. Hourly wages of Filipino nurse migrants in their last reported job are deflated using 2003 prices (in pesos) based on the reported year that migrants were employed in their last job before entering the US. For the sample of nurses aged 25 to 35 in the 2003 NIS, the years in which migrants were last employed in the Philippines range from 1987 to 2003.

Figure A2
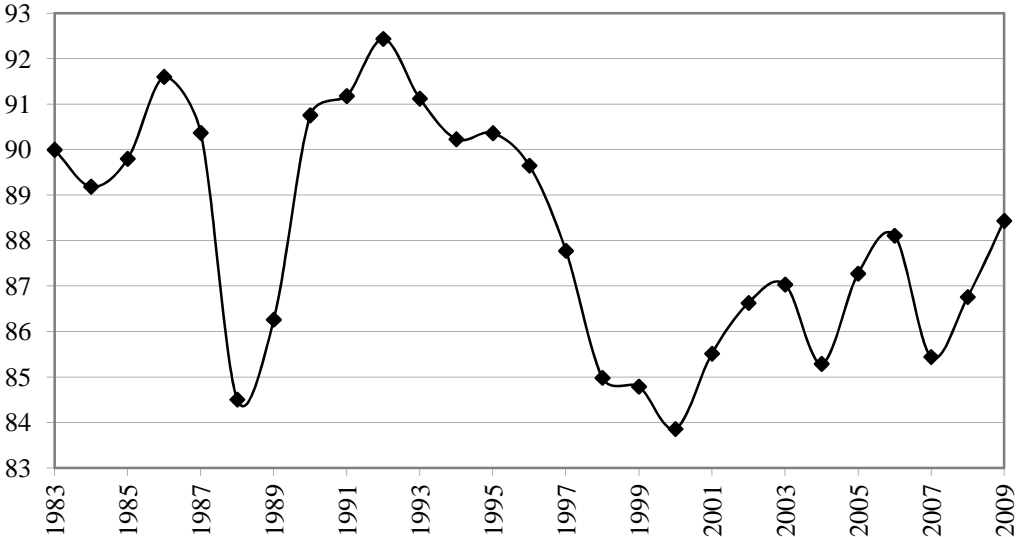**A. Predicted Share of Nurses in the Philippines based on Roy Model**

Share of Nurses in the Philippines
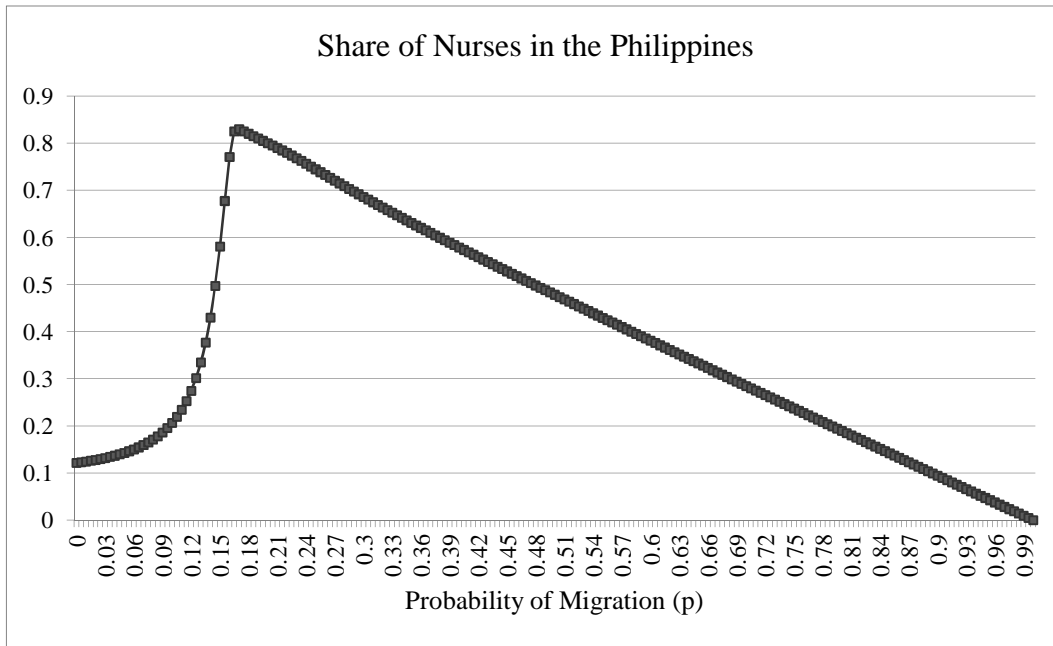
B. Selection of Nurses based on Roy Model

Selection into Nursing - E(e|nurse)
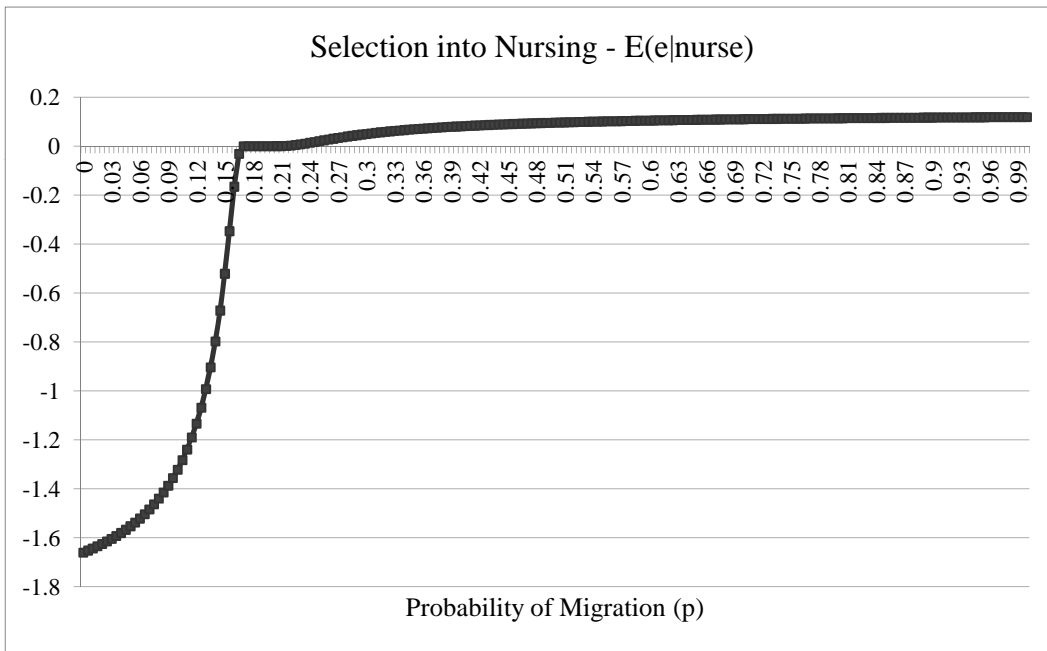
Note. These graphs are based on the Roy model detailed in Section 5.1 calibrated to w0=12, wn=10, w_abroad = 60 and r0=6, rn=4 and r_abroad=37. The key parameters were obtained from the Philippine Labor Force Survey and the POEA data. See text for more details.

Figure A3
Passing Rate of Native First-Time Takers of the RN Licensure Exam (NCLEX)

Note. The data is from the National Council of State Boards of Nursing (NCSBN)