Foreign Student Return Rates and International Salary Differentials in STEM careers

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A very large share of STEM doctoral recipients and those in the scientific workforce of the United States are not natives of the US. In this paper, we provide some of the first evidence on medium-term stay rates from a new longitudinal survey dataset on STEM PhDs from US institutions that for the first time includes scientists who have left the US. We ask what factors matter most for the retention of foreign graduates in the US, or conversely, for the countries seeking the return of their citizens educated abroad. We also estimate salary differentials between scientists and engineers who remain in the US and their observably similar peers in other countries. We find that increases in income per capita, democratization, and spending on R&D in the home country are associated with higher return rates, but that there is little relationship between the ranking of an individual's PhD institution and the probability of remaining in the US. Those who return home experience a substantial salary reduction on average, but after adjusting for purchasing power and individual and job characteristics, returnees to the highest-income home countries experience no significant salary penalty relative to those in the US. We also observe no difference in average salaries between non-natives in the US and native US citizens, after controlling for characteristics.

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The US trains a large share of the world's PhD scientists, and in some fields of science and engineering, students of foreign origin represent the majority of doctoral degrees. Students produced by these programs who remain in the US after completing their studies are an important source of skilled labor for US universities and firms. Currently, the countries that send the most STEM doctoral students to the US – China and India -- are also among those with the highest fraction of students who stay in the US after their studies (Finn 2014, NSF 2016). However, the fraction of Chinese and Indian doctoral recipients reporting definite plans to stay in the US has fallen steadily across STEM fields since 2002 (NSF *Science and Engineering Indicators* 2016 Appendix Table 3-21). Grogger and Hanson (2015) document a positive correlation between economic growth in the home country and the likelihood that a student returns after studying in the US. This raises the question: as economic conditions improve in the major sending countries of foreign students, what implications will potentially declining stay rates have for the US STEM workforce?

In this paper, we provide some of the first evidence on the determinants of longer-term return rates from a new longitudinal survey dataset on STEM PhDs from US institutions that for the first time includes scientists who have left the US. These scientists obtained their PhDs between 2001 and 2011 and are observed in 2010 and 2013, which allows us to provide evidence on the return rates of these foreign-born scientists over a longer time frame post-PhD than has previously been reported. We ask what factors matter most for the long-term retention of foreign graduates in the US, or conversely, for the countries seeking the return of foreign-educated scientists.

Similar to Grogger and Hanson (2015), we find that country-level factors matter for predicting return rates, and 20% of the variation in US stay rates can be explained by basic demographics, controls for years since graduation, GDP per capita, distance, language and other features of the home country. Students whose primary or secondary source of financial support for graduate studies came from a foreign source are nearly 30 percentage points more likely to return, consistent with visa restrictions for such students. However, even after controlling for a large number of variables, there remains substantial

heterogeneity in return rates. It seems plausible that the unobserved factor which may be most likely to predict return is the differential between what an individual can expect to earn in the home country and what they would earn in the US.

We therefore turn to estimating the difference in salary between observably identical people in the US and abroad. Researchers have until recently been unable to estimate this differential due to a lack of data. With new data from the ISDR, we are able to observe the salaries of foreign students who leave the US. We find that those who stay in the US earn 80.34% more than those who return to home countries, evaluating salaries at spot exchange rates and controlling for basic characteristics. We then decompose this differential into several components: (1) Purchasing power: converting salaries with PPP exchange rates, this falls to 26.93%; (2) Observable individual characteristics and job characteristics: controlling for principal background characteristics (such as field of study and gender), sector of employment (academia, government or private sector), field of study and work activities (research, teaching, management, etc.) reduces the differential to 21.85%. However, we find that this differential varies considerably with the income per capita of the home country. Respondents located in a home country with GDP per capita similar to that of the US earn salaries that are no different from those of their US-based peers with the same observable characteristics.

Finally, recognizing the potential for omitted variables bias in these estimates, we provide preliminary results from instrumental variable regressions that seek to identify the causal impact of returning to one's home country.

Prior Literature

Grogger and Hanson (2015) use data from the NSF's Survey of Earned Doctorates (SED), which is administered to essentially all doctoral recipients in the US, to measure stay rates. This survey has the advantage of being very large and covering a long time span, but has the disadvantage of only listing respondents' plans to stay in the US at the time of PhD completion, not whether they actually remained. Nonetheless, Grogger and Hanson establish that intentions to stay are positively associated with the

growth of GDP per capita in the US at the time of PhD, negatively associated with prosperity in the home country, and negatively associated with the level of democracy in the home country. Finn (2014) matches the SED to Social Security data to obtain the only (to our knowledge) representative estimates to date of stay rates over time.

Clemens et al (2009) compare the earnings of immigrants in the US to the earnings of observably identical workers in the immigrant's home country, and estimate for each country the ratio of wages at home relative to the US. They also identify the "place premium," or the ratio of wages in the US relative to the home country for workers of identical intrinsic productivity, noting that if workers with high unobservable intrinsic productivity are more likely to move to the US, the ratio of wages of observably identical workers will overstate the place premium.

Clemens et al (2009) concentrate on moderately skilled workers. In the context of high-skill migration, we can imagine at least two ways in which the ratio of US to home wages, controlling for observables, may be affected by selection. First, if the most highly skilled doctoral recipients are the most likely to obtain a visa to remain in the US, the ratio of wages controlling for observables will overstate the place premium. Alternatively, it may be that certain doctoral recipients have human capital that is particularly valuable in the home country. For example, they may have skills that are particularly scarce and highly rewarded at home, or may have social connections that lead to highly-paid employment.

The National Science Foundation/National Center for Science and Engineering Statistics (2012) reports mean salaries by field and citizenship status. Within the US, there are relatively small differences between the average salaries earned by US and foreign citizens, with the largest differences in absolute value in the fields of Psychology (US natives earn 18% more than immigrants) and Health (US natives earn 7% less than immigrants). However, when comparing average salaries by field between the US and abroad, the differences are much larger, with doctoral recipients employed in Computer and Information Sciences and Health earning roughly twice as much in the US.[1] These averages do not adjust for

[1] These numbers are based on Table 4. Median annual salary of doctorate recipients employed full time, by broad field of doctorate, employment sector, and citizenship/residency group: 2008.

differences in purchasing power parity, or for differences in individual characteristics of movers vs. stayers. In what follows, we describe the data used to control for variation in characteristics that may partially explain differences in salaries across countries.

Data

Our data come from the 2010 and 2013 waves of the National Science Foundation's *International Survey of Doctoral Recipients (ISDR)* and the *Survey of Doctoral Recipients (SDR).* These are longitudinal surveys of a sample of individuals receiving doctorates in the US. The NSF has matched these people to the NSF's *Survey of Earned Doctorates (SED)*, which contains a snapshot of information on approximately 90% of doctoral recipients at the time of doctoral receipt. The NSF began systematically following doctoral recipients even if they moved abroad only from 2001 and on, although only reported on those moving abroad starting with the SDR ISDR 2010.[2]

We restrict attention to people with doctorates in STEM fields who are currently employed, who earned their doctorates in 2001 or later. There are a total of 26,222 individuals in the sample. We focus attention on those who were temporary residents at PhD or those whose visa status was unknown. We separately consider foreign-born individuals who were naturalized US citizens upon graduation. However, if citizenship status was missing at graduation and in a subsequent SDR survey year (2010 or 2013) the individual was coded as a temporary resident, we classify these as a temporary resident at time of PhD (this is true of 342 observations).[3]

The sample contains 11,222 observations on temporary residents at time of PhD completion, of whom 6,091 are in the US in the survey year, with 9.0% reporting that they had become naturalized citizens, 52.5% reporting permanent resident status, and 37.5% remaining temporary residents. Another

[2] The ISDR has been merged with the SDR starting in 2015. However, starting with the 2015 SDR, the SDR has lost most of its value for longitudinal analysis because most of its sample was newly drawn. We therefore are limited to following PhDs through 2013.

[3] We also reclassify as US citizens the 16 observations which listed a birth state inside the US but had missing citizenship status. People born in Puerto Rico or a US territory are classified as non-foreign.

5,131 observations are temporary residents at time of PhD who were in another country by the survey year. There are 2,554 observations on non-US citizens who stated that they were not temporary residents at time of PhD and are currently in the US, of whom 68.6% are currently naturalized citizens and 26.1% are permanent residents (less than 1% report that they are currently temporary residents).

The sample also includes 12,444 observations on people who stated they were US natives at time of PhD. The average salary of this group was $82,196, with those who were naturalized citizens or permanent residents at PhD earning $87,724 on average. Perhaps surprisingly, those who were temporary residents at time of PhD have an average salary of $90,922. The average salary of their counterparts outside the US is $63,907. Adjusting for purchasing power, however, this average salary is actually above US salaries, at $106,887 (salaries are adjusted for purchasing power using the price level of consumption in 2011 dollars).[4]

Naturally, differences in average salaries reflect differences in individual characteristics across these groups. Table 1 reports mean values of individual characteristics in the second panel. Those who are temporary residents at time of PhD are less likely to be female (28.1% vs. 46.7% of natives and 44.7% of non-temporary residents at time of PhD). They are more likely to be married men and less likely to be married women, and are less likely to have children. They are substantially more likely to report "Asian" race (64.6% of temporary residents vs. 4.2% of natives and 43.0% of non-temporary residents at time of PhD). However, the average number of years between the doctorate and the survey year was similar across the three groups, with 5.645 for temporary residents at PhD, 5.818 for those who were permanent non-natives at PhD and 5.880 who were natives.

To this data we add information on the characteristics of home countries. From the Penn World Table 9.0 we obtain information on macroeconomic factors including exchange rates, expenditure side real GDP at chained PPPs, real GDP per capita, and the price level of real consumption of households and

[4] Specifically, we divide nominal annualized salary by PL_CON for the current country of residence, obtained from the Penn World Tables. PL_CON is the price level of real consumption, which is equal to the PPP divided by the nominal exchange rate, with the price level of USA GDP in 2011 = 1.

government (prices constant across countries (all in 2011$).[5] From the World Bank's World Development Indicators we obtain R&D expenditure. From these variables we compute the ratio of home country GDP per capita to US GDP per capita, the growth rate of GDP in the home country in the three years prior, and R&D as a percentage of GDP in the home country. Following Grogger and Hanson (2015) we use the average Polity IV scores in the previous three years as a measure of the democratization of the home country (Marshall and Jaggers 2002).[6] We incorporate information on the home country's distance from the US from Mayer and Zignago (2011).[7]

To measure the strength of the country's science base in the individual's field of study, we use the Scimago country rankings.[8] We match the NSF fields of study to the Scimago subject areas using the concordance listed in the Appendix. For each country-field pair and year, Scimago contains information on the number of published documents, the number of citable documents, the total number of citations received by those publications, self-citations, citations per document, and the H-index of the documents. We also control for the prestige or quality of the doctoral institution. This data comes from the Academic Ranking of World Universities (ARWU), 2003-2016, which is available at the institution level for the top 500 universities and at the broad field level for the top 200 universities.[9]

We control for field of study of highest degree using 2-digit SED categories listed in Table 5 (for example, computer science, mathematics and statistics, agricultural and food sciences, biological sciences, etc.). Sector of employment is controlled for with indicators of whether the employer is an educational institution (4-year college/university or 2-year college), government (federal or state/local), or business/industry (for-profit, self-employed non-incorporated, or non-profit). Temporary and non-

[5] The ISDR and SDR ask individuals to base survey answers on the week of February 1, 2010 (or February 1, 2013). Because of this, we merge in macro data from the year prior (i.e. GDP reflects 2009 and 2012).

[6] We use POLITY2, the modified version of POLITY variable, converting the polity scores during wartimes (i.e. -66, -77 and -88) to conventional polity scores (from -10 to 10).

[7] The distance measure is calculated using the great circle formula, which uses the latitude and longitude of a country's most populous or capital city.

[8] Available at http://www.scimagojr.com/countryrank.php, accessed July 2017

[9] These fields are: Natural Sciences and Mathematics, Engineering/Technology and Computer Sciences, Life and Agriculture Sciences, and Clinical Medicine and Pharmacy. Available at http://www.shanghairanking.com/, accessed July 2017.

temporary residents at PhD in the US at the time of survey are less likely to work in government or academia than US natives, and are more likely to work in business or industry. Particularly striking is the fact that 51.6% of temporary residents at PhD in the US at time of survey were working in business or industry, while only 23.8% of those who were temporary residents at PhD but were outside the US by the survey year were working in business/industry. Also included is an indicator of whether the respondent was currently working in a post-doctoral position.

Finally, we report characteristics of the current job, including dummy variables for whether the respondent's primary or secondary activity is research, teaching, computer applications, management, or design/development. Interestingly, respondents outside the US are particularly likely to report research and teaching as their primary or secondary activities, while US natives are more likely than people in the other categories to report management activities. Temporary residents at time of PhD but in the US in the survey year are the most likely to report computer applications and the least likely to report teaching activities. We also report average hours worked per week, which is highest among US natives and temporary residents at PhD currently in the US (46.773 and 46.601 hours/week respectively) and lowest for those outside the US (44.502 hours/week on average).

Results on the Location Decision

Table 1 shows summary statistics for the variables used in this analysis for both natives and foreign students. Our regression analysis of the location decision in Table 2 includes only those who were temporary residents at time of PhD. The first 5 columns of Table 2 display coefficients from a linear probability regression in which the dependent variable is a dummy variable equal to 1 if the respondent is employed in the US in the year prior to the survey year (2009 or 2012). We present results from five different specifications. Column (1) controls for individual characteristics and country factors determined by the time of PhD. Column (2) adds factors related to the person's current job and replaces PhD-year country factors with survey-year country factors. Column (3) adds current work activities. The next two columns estimate the model for those in academic jobs separately from those in nonacademic jobs to

investigate whether the factors determining US location are substantially different for people ending up in these two sectors. All results in columns 2-6 need to be interpreted as associations, rather than as the causal impacts of right-hand-side variables on location. In all regressions we cluster by individual.

We measure five year stay rates in 2010, for those who received PhDs in 2005, to be 68% percent, identical to Finn (2014) most recent five year stay rates, for those who received PhDs in 2006.[10] However, 5-year stay rates in 2013 (for those who received PhDs in 2008, had risen to 71.6.

What are the Individual Characteristics of those who stay?

Table 1 showed that 28% of foreign PhDs in this survey were women, equally represented among those staying and those returning. Similarly, the regression analysis shows that ceteris paribus, the stay rates of single women are not significantly different from the stay rates from single men. However, marriage and children by year of PhD receipt affect stay rates of women and men somewhat differently. Married childless women are the most likely to remain in the US (11.23 percentage points[11] or *ppt.* more than single men). Married men with children, married women with children and married childless men all have stay rates between these two extremes (5.98, 4.81 and 4.53 ppt. above single men respectively.) It is quite likely that those who have spouses at PhD are more likely to be married to Americans or for other reasons are somewhat more ensconced in the US. However, family status in the survey year had similar effects, with married childless women the most likely to stay (using column 3, 12.91 ppt. more likely), and married women with children not very different (11.64). Again, married childless men are about 6 ppt. more than single men. One difference is that return rates of men with children in the survey year are essentially indistinguishable from single men. When we divide the sample by current employment sector (regressions 4 and 5), we see that married men's high probability of remaining is strongest among those not in academic jobs, and that children have relatively little impact on location choices in academia, while

[10] Our longer term stay rates were lower than Finn's. 62.9% of those who graduated in 2001 were in the US in 2010 and 58.1% of those who graduated in 2003 were in the US in 2013. In contrast, Finn found 10 year stay rates 2001-2011 were 65%. Both studies refer to those who were temporary residents at doctoral receipt.

[11] The family effects were calculated by adding the coefficients. For instance, here we added coefficients on female, female married at PhD and female with children at PhD.

they are associated with reductions in the likelihood of remaining in the US for both men and women in non-academic jobs.

Respondents reporting that they relied on foreign funding for their doctoral studies are substantially less likely to remain in the US, with a stay rate that is lower by 20.32 to 28.76 percentage points all else equal (significant at the 1% level in all specifications). This presumably reflects the fact that many of these students come to the US on visas that require return to the home country after completion of study (like the J-1 visa). The impact is slightly smaller for those in academic jobs than in non-academic ones.

Not surprisingly, coefficients on dummies for the number of years since PhD show stay rates the highest the first two years immediately after PhD, a period when many students of foreign origin hold post-docs or remain in the US on Occupational Practical Training visas. These rates show a decreasing pattern until the 7th year post-PhD, after which there is little pattern. Prior work by Finn (2014) on the stay rates of STEM doctoral recipients who were temporary residents and received their degrees in 2006 found that 75% were in the US one year later, with overall stay rates declining by an average of 3.14 percentage points each year between 2007 and 2011 (Finn 2014, Table 5).[12] Our results, which control for covariates, show a slightly lower annual decline in stay rates over the same period. For example, the coefficients on years since PhD in Column (1) imply an annual decline in stay rates over the first five years of 1.33 percentage points per year. Figure 1 displays the coefficients on the dummies for years since PhD in Table 2, and shows that, as controls for sector and work activities are added to the regression, the decline in stay rates in the initial post-PhD period is substantially less pronounced. In fact, Columns (3)-(6) show no statistically significant decline in stay rates until 7 years after graduation (with the possible exception of the coefficient on year 6 in Column 3 which is significant at the 10% level). This suggests that many of those leaving the US in the initial years following completion of their doctoral studies are taking jobs with different characteristics than those of stayers.

[12] Our 1 year stay rates for those with 2009 PhDs is 76.4%.

What is the Educational Background of Stayers? Turning to characteristics of the PhD-granting institution, we see relatively little difference in stay rates between higher-ranked academic programs (in ARWU rankings) and lower-ranked ones. Graduates of medical schools have a significantly higher stay rate for in the subsample restricted to non-academics (10.83 ppt, with a standard error of 4.36 ppt).

Consistent with Finn (2014), there are differences in stay rates across PhD fields, As seen in the Appendix Table, those with degrees in social sciences (economics, political and related sciences, psychology, sociology, anthropology, and other social sciences) are the least likely to have remained in the US (economists are 14.62 ppt. less likely, political scientists are 27.58 ppt less likely, and sociologists and anthropologists are 18.94 ppt. less likely to remain than those in computer science in Regression 1). However, this is limited to those who ended up in non-academic jobs (with the possible exception of political scientists who are 11.23 ppt less likely to remain, significant at the 10% level, in Regression 5.) Other fields with stay rates significantly below that of computer science are agricultural and food sciences (-16.20 ppt), environmental sciences (-14.75 ppt) and earth, atmospheric and ocean sciences (-11.21 ppt), all of which are insignificantly different from computer science in the specification restricted to academics

What are the Effects of Country Characteristics?

Different aspects of home countries (hc) can alternatively attract PhD scientists back home or keep them in the US. We first consider non-economic characteristics. The farther the US is from the home country (measured in thousands of kilometers), the less likely the scientist is to stay in the US, presumably because it is harder to maintain family ties. Those who grew up in countries where English was an official language are substantially more likely to remain in the US (12.94 ppt. more likely with only exogenous controls). The more democratic the home country (the higher the Polity IV score), the less likely the scientist was to remain in the US. This mirrors what Grogger and Hanson (2015) found in data on intentions to stay among new PhDs.

There appears to be a nonlinear relationship between stay rates and the home country's science base in the scientist's PhD field (as measured using Scimago's country rankings of publications). As the

home country's Scimago ranking worsens, stay rates decline, up to a ranking of approximately 83, at which point a worsening of the ranking is associated with an increase in the US stay rate. And while R&D spending as a percentage of GDP at the time of PhD is not significantly associated with stay rates, higher R&D spending as a percentage of GDP immediately before the survey year is associated with attracting more scientists to the home country, and specifically those scientists who are working outside academia.

How much does the Stay Rate depend on Home Countries' Macroeconomic Conditions?

Similar to Grogger and Hanson (2015), in Regression (1) we control for the GDP per capita[13] of the home country relative to the US in the year before PhD receipt, the growth rate of the GDP per capita over the three years prior to PhD receipt for both the home country and the US, and a dummy variable for countries with particularly high GDP per capita growth rates (above 10% per year).[14] In contrast to Grogger and Hanson, who have many more observations per home country, we cannot include country fixed effects.

First, we describe stay rates based on macroeconomic conditions around the time of PhD, which is likely to be the most similar to Grogger and Hanson's analysis of those immediately post-PhD. Consistent with their analysis, we find that students from countries with higher GDP per capita relative to the USA in the year of PhD had lower US stay rates, with a 21.04 ppt reduction if the home country increases from 0% to 100% of US GDP per capita. However, we find an insignificant relationship between the growth of GDP per capita in the home country at time of PhD and stay rates, and no significant relationship with the growth rate of US GDP or with the dummy variable for high hc growth.

This counter-intuitive result is absent when we use the home country's current macroeconomic situation at the survey year (see Columns 2-5). Low GDP per capita in the home country in the survey year is a major factor associated with keeping foreigners in the US, but so is the 3-year GDP per capita growth rate. The exception to this is in the non-academic sector, where the coefficient on the rate of

[13] Using real values adjusted by ppp exchange rates.

[14] We add this dummy because countries with extremely high growth rates (above the 90th percentile in our sample) behaved differently from others. Approximately half of the observations are China, with XX, XX, and XX representing XX% of the observations. Grogger and Hanson did not add this term.

change of GPD per capita is insignificant. We also note that people from the exceptionally high growth home countries are more likely to remain in the US, possibly because economic conditions in these countries are more volatile.

How do Sectors and Primary Work Activities correlate with Location?

In column (2), we add controls for sector of employment (academic, public or private sector). Those employed by government are 11.60 percentage points less likely (standard error 0.021) to be in the US than those working in academia, while those employed in the private sector are 17.76 percentage points more likely (standard error 0.013) to be in the US.

In column (3) we further add in controls for major work activities (research, teaching, computer applications, management, design) and columns (4) and (5) break these into academic and nonacademic jobs. (People can be categorized as being in one or two activities). Those who were teaching, managing, and to a lesser extent doing research within academia were more likely to be in the home country, while those working in computer applications and in design were more likely to be located in the US.

Who goes elsewhere?

In the final column of Table 2, we consider how the same factors affect decisions to locate in a third country (that is, not the US and not the home country). Those reporting Asian race are 6.45 ppt less likely than those reporting white or no race to leave the US for a third country, all else equal, and those in postdocs are 4.02 ppt more likely to leave. Those reporting management as one of their main work activities are 3.18 ppt more likely, and those involved in design or development are 1.71 ppt less likely to be in a third country. In contrast to the results on US stay rates in columns (1)-(5), in which the coefficient on the dummy for the 2013 survey year was statistically insignificant, we find that departures for third countries are 2.77 ppt higher in 2013 than in 2011, all else equal.

Salary Differences between the US and Home for US STEM PhDs of Foreign Origin

Location no doubt influences salary. Clemens et al (2009) identify a premium for moderately skilled immigrants working in the US but argue that this may be overstated if more productive workers move to the US. Here, we estimate the salary premium for being in the US rather than in the home country for US-trained STEM PhDs who were temporary residents at PhD receipt – the same population for whom we estimated location decisions. In these salary regressions, we exclude those who were living in third countries to capture the US-home country salary comparisons.

In Regression 1 of Table 3A, we model the log of salary (converted into 2011 US dollars using spot exchange rates) including no control variables. On average, there is indeed a large salary premium of 80.3% for these foreigners if they work in the US.

However, is this due to higher costs of living in the US than in the home country? That is, is the purchasing power actually that different for foreign PhDs living in the US and those living in home countries? To investigate this, we use the PPP exchange rates from the World Penn Tables. Using PPP-adjusted salaries, the US salary premium falls to a third of its size based on spot exchange rates, or 26.9%. The remainder of Table 3 uses these PPP-adjusted salaries.

The differences in salaries depending on location may be due to other individual characteristics. For instance, judging from our summary statistics and location analysis, it may be that US-trained foreigners who remain in the US have different inherent ability than those who return home. On the other hand, they work longer hours. Therefore, in Regression 3, we add in a variety of personal characteristics, similar to those in the location equation but adding weekly hours (as a quadratic) and the dummy for whether English was an official language of the home country.[15] Adding these as controls has no significant effect on the US place premium (and numerically increases rather than decreases it.)

Further adding in endogenous characteristics of respondents' jobs including employment sector, main work activities, and weekly hours (Regression 4) does lower the US-based premium somewhat,

[15] Interestingly, in a regression not shown, we found that "English an official language" had virtually the same effect on salary for those remaining in the US and those returning to their home country.

from 28.44% to 21.85%. The summary statistics and the location regression show that those located outside the US work fewer hours and are more likely to be working in government jobs and less likely to be working in private sector non-academic jobs (that pay the most), less likely to be in postdocs (that pay the least) – presumably because they tend to remain in the US for their postdocs.

One might expect that the US salary premium is not the same across all countries (even controlling for English language). First, salaries are likely to be higher relative to the US in richer home countries. We therefore add interaction terms for GDP per capita (*relative to the US*). This is shown in Regression 6. Not surprisingly, the home country GDP has a large impact for those working in the home country (measured by the highly significant .3810 coefficient). However, home country GDP has no impact for those working in the US (.3810-.3765=.0044, p-value=.87), suggesting that the home country's GDP does not capture ability. Note also that for home countries with GDP per capita similar to the US (in PPP terms; in this case the relative GDP per capita=1), the coefficient on the interaction term (-0.3765) almost completely counteracts the US place premium (.3935)[16], leaving an insignificant difference of 1.7% (p-value=.73).

On the other hand, one may expect that PhDs returning to countries with strong science bases, as measured by the country's rank in the field's publications, would be more highly remunerated than those returning to countries with a poorer scientific base. Regression 7 shows that this is not the case. Salaries are not significantly different for people from countries with different science bases, either for those living in the US or for those living in the home country.

Finally, we predict that salaries for those working in the US differ by current visa/citizenship status. We therefore differentiate between naturalized US citizens, US permanent residents, and temporary residents (all at the time of the survey).[17] Of these, 62% are either permanent residents or naturalized US citizens.

[16] Technically minus .0147, the US location * GDP coefficient.

[17] Recall that we have chosen a population who were all temporary residents at PhD receipt. By survey year, ¾ of those in this group who were living in the US had either permanent residency or were naturalized citizens.

We therefore have run a complete set of the same 7 regressions, dividing up those in the US by citizenship/visa status (Table 3B). Comparing Regressions 8 and 9, once again the majority of the salary differences disappear when we convert the salaries using PPP exchange rates. However, the US (PPP) salary premia are largest for those who are naturalized citizens (40.6%), quite large for permanent residents (32.5%), and only 13.6% for temporary residents, all compared to living in the home country. Of course, these differences are no doubt highly affected by heterogeneity between those with different statuses. Those with unobserved characteristics associated with higher earning potential may be most successful in gaining citizenship or permanent residence.

In Regression (10), we add controls for background individual characteristics. Doing so narrows the place premium for naturalized citizens and for permanent residents by about only a small amount (3 - 5 percentage points). However, controlling for these characteristics widens the place premium between permanent and temporary residents by 8 percentage points. These changes bring together the salaries of people with different citizenship/visa statuses, suggesting that the difference in citizenship/visa status is indeed correlated with ability-based factors. Further adding in characteristics of the current job in Column (11) – broad sector, whether the job is a postdoc, primary work activities and weekly hours -- further lowers the differences between citizenship/visa groups. Including these controls, and adding observations on individuals located in third countries (neither home nor the US, Column (12)) completely erases the differences between permanent and temporary residents (p=.35) and further reduces the coefficients on naturalized citizen (to 10.57 ppt) and permanent resident (to 4.64 ppt). This suggests that those locating in third countries are paid particularly well, and we intend to investigate this further as this work progresses.

Regressions 13 and 14 add the interaction terms, now separately by visa type. Once again we find a much smaller salary penalty for those in rich countries. For instance, someone living in a home country as rich as the US earns essentially the same as someone living in the US as a temporary or permanent resident (Those in the US as permanent residents earn .3586-.3208=3.8% more than those in

the home country with GDP equal to the US's, while those in the US as temporary residents earn .3610-.3866 or 2.6% less than those in the home country with GDP equal to the US's.)

Allowing the impact of location on salary to depend on the (logged) country's rank in the scientist's field again yielded small, mostly insignificant coefficients and even smaller differences and less significant differences between rank's effects for those in the home country or in the US which any of the citizenship/visa statuses.

To summarize, two-thirds of the nominal salary difference between foreign scientists with US PhDs living in the US compared to those living in their home country disappears if currencies are values for their purchasing power. Background and job characteristics can account for an additional 5 percentage points of the salary difference. This place premium is due to the average lower GDP per capita in home countries. In fact, for countries with the same GDP per capita as the US, there is no salary difference. There are also differences between foreign PhDs working in the US of different citizenship/visa statuses, in this case mostly explained by background and job characteristics. We investigate this difference more fully in the next section, which compares US STEM PhDs who were temporary residents in the US at PhD receipt to other foreign born with US STEM PhDs who had more permanent status by PhD receipt, and to US native STEM PhDs.

Instrumental Variables Estimates

The effect of location on salary is clearly not exogenous. It is possible that those who choose to return to their home countries do so because they are particularly well matched with employers in the home country in ways that are unobservable to the econometrician. If this is the case, we expect the OLS estimates of the effects of US location on salary to underestimate the salary gains associated with remaining in the US. Alternatively, if people with higher productivity are more likely to secure employment in the US, OLS estimates will be biased upwards.

In Table 6, we report results of preliminary instrument variables analysis of (PPP) salary, using various instruments for location. In this preliminary work, we exclude job characteristics that may

themselves be endogenous, but exclude postdocs because their compensation is atypical.[18] For comparison, the first column is an OLS regression, similar to Table 4's column (3) but with a slightly different population. The coefficient on US location in this analysis is close to what we found there.

Prior work on scientific productivity has used visa status during graduate study as an instrument for location (Kahn and MacGarvie 2016). In column (2), we pursue a similar strategy, using the indicator for foreign support during graduate study as an instrument. Individuals who receive the majority of their funding for graduate study from a foreign fellowship or government often come to the US on J-1 visas, which stipulate that the student must spend a period of time in the home country after receiving their degree and before applying for another visa in the US. As seen in the location regressions, foreign support for graduate study is a strong predictor of leaving the US (reducing the stay rate by 28.76 percentage points in Column 1 of Table 2, with a standard error of 2.48 ppt). Using this variable as an instrument (first-stage F-statistic 240) approximately doubles the coefficient on US location, implying a 65.51% difference in salaries between people located in the US and those induced to locate abroad by foreign support.

An alternative instrument is the polity measure measuring the home country's democratization (column 3, first-stage F-statistic 283) and finds a similarly large effect of US location. Column (4) instruments using the physical distance between the home country and the US (first-stage F-statistic 36). Using this variable as an IV has little impact on the location coefficient compared to OLS, but increases the standard error substantially.

Immigrant and Native Salary Gaps for US-trained PhDs

In this section, we ask a different question: How much do salaries differ between foreign-born and native US-trained STEM PhDs working in the US? In other words, in this highly skilled workforce, is there an immigrant salary penalty?

[18] We intend to extend our IV analysis in later drafts to relax these assumptions and consider a wider variety of instruments.

There has been considerable research on less-skilled populations that searches to identify whether immigrants get paid less than equally qualified natives. The measurement problem using secondary data is to identify which people are equally qualified. Even in our population of STEM PhDs, it is evident from the observables that immigrants and natives are very dissimilar. This can be seen both in the summary statistics of Table 1 and in the distribution of the PhD fields of natives and immigrants in Table 5.

Table 1 also shows the mean salaries of immigrants and natives working in the US (Columns 2, 4 v. column 5). In this tables, we have separated immigrants into two groups: those immigrants in our earlier location and salary analysis, those who did not have permanent status (either visas or citizenship) by PhD (column 2), from those who did have some permanent status by PhD and thus were mostly likely committed to remain in the US (column 4). This Table shows that natives earn about 10% less than the first group of immigrants and 6% less than the second group. This can also be seen in Regression 1 of Table 4 (in which the excluded population group is natives). The rest of Table 4 asks how much observable heterogeneity explains this immigrant advantage. After adding controls for individuals' background characteristics (Regression 2), there are no statistically significant differences in salary between natives and non-natives. In regressions not shown, we found that the factor most responsible for eliminating the higher salaries of non-natives was field of study. For instance, there are far more engineers – particularly electrical, mechanical, civil – among immigrants than among natives, and within immigrants there are more of these among those who were temporary residents at PhD than those who had permanent status at PhD. There are also far more economists, another highly paid STEM occupation.

Columns (4)-(6) of Table 4 further divide immigrants by their current citizen/visa status as well as by their status at PhD. Without controlling for background variables or work activities, there is a large difference between some non-native groups and natives, particularly naturalized citizens and permanent residents who were temporary residents at time of PhD. Controlling for background variables erases some of these differences between categories of immigrants and natives, and even creates significant salary penalties for some groups of immigrants (temporary residents and naturalized citizens who were

permanent residents at the time of PhD receipt). Controls for job characteristics, however, erase all significant differences.

Thus we see that if we control for all observables, immigrants and natives with US STEM PhDs working in America earn similar salaries. While there may be unobservables masking actual differences in salaries, there is no evidence for either a native or an immigrant salary premium based on this analysis.

Conclusion

This paper examines the factors associated with remaining in the US among a population of STEM doctoral recipients who were temporary residents at the time of completion of doctoral studies. We find that a majority of these students remain in the US, and stay rates are particularly high for those from countries with lower levels of income per capita, democratization, and spending on R&D. We also find that, although on average those who remain in the US earn a large salary premium relative to otherwise similar returnees to the home country, this premium disappears for returnees to the highest-income countries. These two findings combined suggest that, as income per capita rises in countries that currently send large numbers of students to the US for graduate study (like China and India), it is reasonable to expect declines in the stay rate for students from these countries. We also find that students receiving a majority of their funding for graduate study from foreign sources are substantially more likely to return to their home countries, possibly due to visa restrictions. Focusing attention on this group of returnees may be a way for policymakers to increase retention of foreign students in the US. Finally, in an analysis of natives and non-natives remaining in the US, we find no significant difference in salaries by immigration status, after controlling for a rich set of variables for field, sector and work activities.

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Figure 1

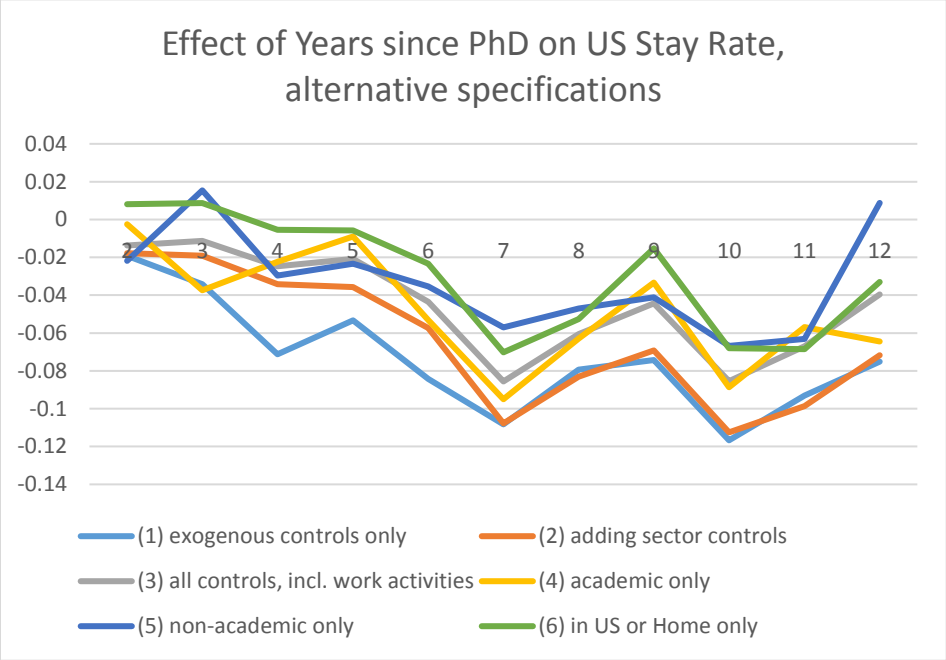
Effect of Years since PhD on US Stay Rate, alternative specifications
0.04
0.02
0
-0.02
-0.04
-0.06
-0.08
-0.1
-0.12
-0.14
2
3
4
5
6
7
8
9
10
11
12
(1) exogenous controls only
(2) adding sector controls
(3) all controls, incl. work activities
(4) academic only
(5) non-academic only
(6) in US or Home only

	Table 1 Summary Statistics					
		Temporary Residents at PhD			Foreigners not Temporary at PhD	US Natives
		All	In US	Outside US	In US	In US
		N= 11,222	**N= 6,091**	**N= 5,131**	**N=2,554**	**N=12,444**
General						
	% in US	0.6792	1	0	1	1
	% Naturalized Citizens	0.0614	0.0904	0	0.6876	0.0010
	% Permanent Residents	0.3566	0.5250	0	0.2611	0.0002
	% Temporary Residents	0.2548	0.3751	0	0.0095	0.0000
	Salary	82,257	90,922	63,907	87,724	82,196
	PPP Salary	95,365	89,978	106,887	86,815	81,296
Individual Characteristics at PhD						
	female	0.2817	0.2805	0.2843	0.4471	0.4670
	male married at PhD	0.4089	0.4258	0.3731	0.3255	0.3225
	female married at PhD	0.1502	0.1642	0.1206	0.2913	0.2672
	male with children at PhD	0.1988	0.1853	0.2275	0.1424	0.1233
	female with children at PhD	0.0557	0.0567	0.0535	0.1295	0.0862
	white	0.2233	0.2001	0.2722	0.3285	0.8306
	black	0.0259	0.0267	0.0241	0.0670	0.0432
	asian	0.6463	0.6942	0.5447	0.4304	0.0417
	hispanic	0.0621	0.0431	0.1022	0.0771	0.0331
	received foreign support	0.0610	0.0230	0.1415	0.0061	0.0009
	PhD inst. rank 1-10	0.0865	0.0828	0.0944	0.1136	0.0983
	PhD inst. rank 11-25	0.1017	0.0934	0.1191	0.1252	0.1203
	PhD inst. Rank 26-50	0.1607	0.1579	0.1668	0.1512	0.1529
	PhD inst. Rank 51-100	0.1415	0.1404	0.1440	0.1082	0.1232
	PhD inst. Rank 101-200	0.1448	0.1520	0.1295	0.1086	0.1267
	PhD inst. Rank 200+	0.1555	0.1609	0.1441	0.1390	0.1502
	PhD inst. unranked	0.2092	0.2126	0.2020	0.2542	0.2285
	PhD from Medical School	0.0220	0.0257	0.0143	0.0389	0.0289
	Years to survey	5.6451	5.4264	6.1081	5.8183	5.8803
General Characteristics of the Home Country						
	Distance US to home country	10.0052	10.1305	9.7410	8.9553	1.1611
	English official language of hc	0.2267	0.2561	0.1645	0.3102	1.0000
	Polity	3.0816	1.9448	5.5013	4.0611	10.0000
	Country rank in field	20.2880	17.6220	25.9292	29.2723	1.0815
	R&D percent of GDP (1 yr before PhD)	1.1188	1.1236	1.1088	1.0331	2.6149
	R&D percent of GDP (PhD) unavailable	0.1479	0.1245	0.1976	0.2084	0.0000
	R&D percent of GDP (1 yr before survey)	1.3368	1.3304	1.3503	1.1551	2.7510
	R&D percent of GDP (survey) unavailable	0.2400	0.2278	0.2660	0.2762	0.0000
Macroeconomic Characteristics of the Home Country at PhD						
	GDP per capita (ppp) relative to US (1 yr before P	0.3036	0.2628	0.3896	0.3438	1.0000
	Rate of growth of hc GDP per cap (3 yrs before P	0.0617	0.0689	0.0464	0.0592	0.0136
	High 3 yr GDP growth dummy	0.2226	0.2709	0.1205	0.2125	0.0000
	Rate of growth of US GDP per cap (3 yrs before PhD)					
Current Individual Characteristics						
	male and married	0.5971	0.6103	0.5690	0.4602	0.4411
	female and married	0.2066	0.2194	0.1796	0.3621	0.3559
	male with children	0.3877	0.3920	0.3785	0.3028	0.2840
	female with children	0.1269	0.1342	0.1116	0.2279	0.1938

		Temporary Residents at PhD			Foreigners not Temporary at PhD	US Natives
		All	In US	Outside US	In US	In US
		N= 11,222	**N= 6,091**	**N= 5,131**	**N=2,554**	**N=12,444**
Macroeconomic Characteristics of the Home Country Currently						
	GDP per capita (ppp) relative to US (lagged 1 yr)	0.3628	0.3183	0.4565	0.3977	1.0000
	Rate of growth of hc GDP per cap (3 yrs before s	0.0631	0.0694	0.0496	0.0559	-0.0010
	High 3 yr GDP growth dummy	0.2337	0.2828	0.1299	0.2312	0.0000
Characteristics of the Current Job						
	Academic sector	0.5037	0.4389	0.6410	0.4499	0.5345
	Government sector	0.0697	0.0453	0.1215	0.0994	0.1153
	Business/industry	0.4266	0.5158	0.2375	0.4506	0.3502
	In a Postdoc	0.1337	0.1602	0.0778	0.1007	0.0972
	Main activity: Research	0.6744	0.6569	0.7117	0.5698	0.5624
	Main activity: Teaching	0.2672	0.1871	0.4368	0.2605	0.3303
	Main activity: Computer applications	0.1424	0.1830	0.0563	0.1132	0.0679
	Main activity: Management	0.2413	0.2118	0.3038	0.3143	0.3856
	Main activity: Design/development	0.2721	0.3341	0.1407	0.2247	0.1526
	Hours worked per week	45.9279	46.6014	44.5018	45.8973	46.7734

Table 2 Location Regressions

Population: Those without US Permanent Residency Status at PhD Receipt

	Location in US						Location in 3rd Country
	exogenous only	adding sector	all, incl. work activitie	academic only	non-academic only	In US or HC only	all, incl. work activities
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual Characteristics at PhD							
female	0.0069	0.0086	0.0135	0.0253	-0.0138	0.0117	-0.0099
	[0.0195]	[0.0257]	[0.0253]	[0.0335]	[0.0366]	[0.0247]	[0.0178]
male married at PhD	0.0761***						
	[0.0162]						
female married at PhD	0.0995***						
	[0.0210]						
male with children at PhD	-0.0519***						
	[0.0174]						
female with children at PhD	-0.0621***						
	[0.0236]						
black	0.0347	0.0684*	0.0669*	0.0915*	0.0378	0.0309	-0.0551*
	[0.0389]	[0.0387]	[0.0388]	[0.0503]	[0.0566]	[0.0378]	[0.0283]
asian	0.0226	0.0309	0.0258	0.0132	0.0495*	-0.0247	-0.0645***
	[0.0213]	[0.0217]	[0.0214]	[0.0283]	[0.0301]	[0.0208]	[0.0154]
hispanic	-0.0627**	-0.0515**	-0.0471*	-0.0560*	-0.0174	-0.0784***	-0.0282
	[0.0264]	[0.0253]	[0.0248]	[0.0332]	[0.0355]	[0.0252]	[0.0178]
received foreign support	-0.2876***	-0.2362***	-0.2231***	-0.2032***	-0.2417***	-0.2703***	-0.0390***
	[0.0248]	[0.0243]	[0.0240]	[0.0300]	[0.0372]	[0.0249]	[0.0141]
PhD inst. rank 11-25	-0.0405	-0.0308	-0.0310	-0.0583	0.0032	-0.0363	-0.0053
	[0.0271]	[0.0260]	[0.0254]	[0.0384]	[0.0312]	[0.0247]	[0.0180]
PhD inst. Rank 26-50	-0.0228	-0.0186	-0.0249	-0.0290	-0.0144	-0.0409*	-0.0217
	[0.0252]	[0.0241]	[0.0234]	[0.0359]	[0.0286]	[0.0228]	[0.0162]
PhD inst. Rank 51-100	-0.0140	-0.0078	-0.0143	-0.0102	-0.0090	-0.0252	-0.0177
	[0.0254]	[0.0246]	[0.0241]	[0.0371]	[0.0295]	[0.0231]	[0.0167]
PhD inst. Rank 101-200	-0.0022	0.0011	-0.0056	0.0014	-0.0084	-0.0305	-0.0299*
	[0.0250]	[0.0242]	[0.0235]	[0.0368]	[0.0286]	[0.0231]	[0.0157]
PhD inst. Rank 200+	-0.0090	-0.0038	-0.0082	0.0071	-0.0204	-0.0124	-0.0051
	[0.0252]	[0.0241]	[0.0237]	[0.0359]	[0.0297]	[0.0226]	[0.0172]
PhD inst. unranked	-0.0088	-0.0031	-0.0093	0.0163	-0.0222	-0.0352	-0.0361**
	[0.0241]	[0.0233]	[0.0228]	[0.0350]	[0.0276]	[0.0221]	[0.0153]
PhD from Medical School	0.0530	0.0470	0.0397	0.0037	0.1083**	0.0477	0.0068
	[0.0400]	[0.0368]	[0.0355]	[0.0494]	[0.0436]	[0.0311]	[0.0231]
2 years PhD to survey	-0.0192	-0.0178	-0.0138	-0.0025	-0.0219	0.0081	0.0278**
	[0.0204]	[0.0197]	[0.0194]	[0.0275]	[0.0263]	[0.0179]	[0.0118]
3 years PhD to survey	-0.0342*	-0.0192	-0.0113	-0.0374	0.0154	0.0087	0.0314***
	[0.0199]	[0.0196]	[0.0193]	[0.0289]	[0.0252]	[0.0181]	[0.0117]
4 years PhD to survey	-0.0712***	-0.0342**	-0.0247	-0.0224	-0.0296	-0.0055	0.0248**
	[0.0180]	[0.0164]	[0.0161]	[0.0244]	[0.0221]	[0.0152]	[0.0106]
5 years PhD to survey	-0.0533**	-0.0357	-0.0208	-0.0089	-0.0234	-0.0057	0.0207
	[0.0243]	[0.0223]	[0.0221]	[0.0319]	[0.0299]	[0.0208]	[0.0132]
6 years PhD to survey	-0.0842***	-0.0574**	-0.0435*	-0.0532	-0.0353	-0.0234	0.0280**
	[0.0256]	[0.0230]	[0.0228]	[0.0340]	[0.0301]	[0.0217]	[0.0137]
7 years PhD to survey	-0.1083***	-0.1077***	-0.0856***	-0.0950***	-0.0571*	-0.0702***	0.0257*
	[0.0285]	[0.0258]	[0.0254]	[0.0362]	[0.0340]	[0.0247]	[0.0154]

Table 2 Location Regressions continued

Population: Those without US Permanent Residency Status at PhD Receipt

	Location in US						Location in 3rd Country
	exogenous only	adding sector	all, incl. work activitie	academic only	non-academic only	In US or HC only	all, incl. work activities
8 years PhD to survey	-0.0793***	-0.0830***	-0.0605**	-0.0629*	-0.0470	-0.0527**	0.0142
	[0.0296]	[0.0259]	[0.0258]	[0.0377]	[0.0349]	[0.0250]	[0.0152]
9 years PhD to survey	-0.0742**	-0.0692***	-0.0443*	-0.0334	-0.0412	-0.0152	0.0318*
	[0.0330]	[0.0265]	[0.0265]	[0.0382]	[0.0358]	[0.0253]	[0.0162]
10 years PhD to survey	-0.1167***	-0.1125***	-0.0854**	-0.0886*	-0.0668	-0.0681**	0.0266
	[0.0405]	[0.0351]	[0.0344]	[0.0490]	[0.0451]	[0.0337]	[0.0229]
11 years PhD to survey	-0.0930**	-0.0986***	-0.0670**	-0.0569	-0.0631	-0.0686**	-0.0010
	[0.0413]	[0.0344]	[0.0339]	[0.0510]	[0.0443]	[0.0329]	[0.0200]
12 years PhD to survey	-0.0752*	-0.0717**	-0.0396	-0.0644	0.0088	-0.0330	-0.0019
	[0.0452]	[0.0345]	[0.0342]	[0.0502]	[0.0446]	[0.0327]	[0.0208]
General Characteristics of the Home Country at PhD							
Distance US to home country	-0.0149***	-0.0133***	-0.0129***	-0.0119***	-0.0140***	-0.0126***	0.0014
	[0.0032]	[0.0032]	[0.0031]	[0.0042]	[0.0043]	[0.0031]	[0.0022]
English official language of hc	0.1294***	0.0970***	0.0989***	0.1127***	0.0617**	0.1003***	-0.0056
	[0.0188]	[0.0192]	[0.0190]	[0.0259]	[0.0282]	[0.0184]	[0.0127]
Polity	-0.0072***	-0.0069***	-0.0063***	-0.0051***	-0.0074***	-0.0057***	0.0008
	[0.0013]	[0.0012]	[0.0011]	[0.0016]	[0.0017]	[0.0011]	[0.0008]
Country rank in field	-0.0056***	-0.0046***	-0.0042***	-0.0056***	-0.0028***	-0.0041***	0.0007
	[0.0008]	[0.0007]	[0.0007]	[0.0010]	[0.0010]	[0.0007]	[0.0005]
Country rank in field squared	0.0000***	0.0000***	0.0000***	0.0000***	0.0000	0.0000***	0.0000
	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
R&D percent of GDP (1 yr before	-0.0101						
	[0.0117]						
R&D percent of GDP (PhD) unava	0.0360						
	[0.0241]						
R&D percent of GDP (1 yr before survey)		-0.0167*	-0.0176*	-0.0008	-0.0513***	-0.0192**	-0.0022
		[0.0094]	[0.0092]	[0.0120]	[0.0137]	[0.0094]	[0.0054]
R&D percent of GDP (survey) unavailable		-0.0182	-0.0189	-0.0246	-0.0288	-0.0280	-0.0173
		[0.0188]	[0.0185]	[0.0264]	[0.0245]	[0.0177]	[0.0132]
Macroeconomic Characteristics of the Home Country at PhD							
GDP per capita (ppp) relative to	-0.2104***						
US (1 yr before PhD)	[0.0404]						
Rate of growth of hc GDP per	0.2682						
cap (3 yrs before PhD)	[0.1843]						
High 3 yr GDP growth dummy	0.0232						
	[0.0200]						
Rate of growth of US GDP per	0.0842						
cap (3 yrs before PhD)	[0.6748]						

Table 2 Location Regressions continued

Population: Those without US Permanent Residency Status at PhD Receipt

	Location in US						Location in 3rd Country
	exogenous only	adding sector	all, incl. work activitie	academic only	non-academic only	In US or HC only	all, incl. work activities
Current Individual Characteristics							
male and married	0.0655***	0.0639***	0.0476*	0.0801***	0.0529***	-0.0198	
	[0.0189]	[0.0187]	[0.0273]	[0.0242]	[0.0177]	[0.0135]	
female and married	0.1022***	0.0997***	0.1000***	0.1099***	0.1015***	-0.0191	
	[0.0233]	[0.0230]	[0.0294]	[0.0348]	[0.0219]	[0.0164]	
male with children	0.0030	0.0010	-0.0013	0.0101	-0.0310**	-0.0482***	
	[0.0134]	[0.0132]	[0.0216]	[0.0153]	[0.0126]	[0.0090]	
female with children	0.0052	0.0056	-0.0139	0.0277	-0.0328*	-0.0352***	
	[0.0190]	[0.0187]	[0.0254]	[0.0264]	[0.0175]	[0.0124]	
Characteristics of the Home Country Currently							
GDP per capita (ppp) relative to US (lagged 1 yr)		-0.1785***	-0.1721***	-0.1724***	-0.1376***	-0.1604***	0.0514**
		[0.0364]	[0.0355]	[0.0463]	[0.0524]	[0.0342]	[0.0237]
Rate of growth of hc GDP per cap (3 yrs before survey)		-0.3554**	-0.3452**	-0.6016**	0.0889	-0.1532	0.3100**
		[0.1721]	[0.1693]	[0.2385]	[0.2224]	[0.1558]	[0.1320]
High 3 yr GDP growth dummy		0.1170***	0.1109***	0.1372***	0.0665***	0.1115***	-0.0052
		[0.0168]	[0.0166]	[0.0269]	[0.0202]	[0.0156]	[0.0110]
Characteristics of the Current Job							
Government sector		-0.1160***	-0.1716***			-0.1829***	0.0147
		[0.0205]	[0.0215]			[0.0219]	[0.0135]
Business/industry		0.1776***	0.0938***		0.2449***	0.0834***	-0.0159*
		[0.0128]	[0.0150]		[0.0218]	[0.0143]	[0.0094]
In a Postdoc		0.1857***	0.1309***	0.1321***	0.1459***	0.1805***	0.0402***
		[0.0154]	[0.0161]	[0.0211]	[0.0260]	[0.0146]	[0.0113]
Main activity: Research			-0.0229*	-0.0589***	0.0090	-0.0229**	0.0037
			[0.0118]	[0.0203]	[0.0139]	[0.0112]	[0.0076]
Main activity: Teaching			-0.1239***	-0.1334***	-0.2174***	-0.1311***	0.0151
			[0.0166]	[0.0189]	[0.0515]	[0.0164]	[0.0108]
Main activity: Computer applications			0.0722***	0.0481*	0.0799***	0.0612***	-0.0168*
			[0.0131]	[0.0259]	[0.0152]	[0.0115]	[0.0086]
Main activity: Management			-0.1127***	-0.1369***	-0.0882***	-0.0997***	0.0318***
			[0.0134]	[0.0218]	[0.0164]	[0.0129]	[0.0088]
Main activity: Design/development			0.0564***	0.0448*	0.0526***	0.0450***	-0.0171**
			[0.0123]	[0.0241]	[0.0145]	[0.0115]	[0.0076]
Other variables							
2013 survey year	-0.0048	0.0063	0.0029	-0.0103	0.0108	0.0216***	0.0277***
	[0.0117]	[0.0087]	[0.0086]	[0.0128]	[0.0115]	[0.0083]	[0.0060]
Constant	1.0337***	0.8972***	0.9506***	0.9756***	0.7691***	1.0496***	0.0991***
	[0.0521]	[0.0492]	[0.0511]	[0.0773]	[0.0684]	[0.0486]	[0.0344]
Observations	**10,837**	**10,837**	**10,837**	**6,009**	**4,828**	**9,455**	**10,837**
R-squared	0.195	0.243	0.266	0.210	0.316	0.295	0.065

Robust standard errors in bracket: All regressions include 21 field dummies

*** p<0.01, ** p<0.05, * p<0.1

Excluded categories: Population: those working in home country (or abroad for (5) and (12)) ; PhD inst. Rank 1-10; 1 year PhD to survey; academic sector;

Table 3A Salary Regressions

Population: Those without US Permanent Residency Status at PhD Receipt

	logged salary	logged PPP salary					
	Only location	Only location	Background variables	All, incl. work activities	All; sample w. 3rd countries	Home GDP interaction	Home rank interaction
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Location and visa variables							
In US	0.8034***	0.2693***	0.2844***	0.2185***	0.0449**	0.3935***	0.2306***
	[0.0260]	[0.0243]	[0.0242]	[0.0243]	[0.0220]	[0.0416]	[0.0592]
In US naturalized citizen							
In US permanent resident							
In US temporary resident							
For interactions with Location							
GDPpercapita						0.3810***	
						[0.0746]	
lnCountryrank							-0.0045
							[0.0186]
GDPpercap*In US						-0.3765***	
						[0.0771]	
lnCountryrank*In US							-0.0062
							[0.0196]
GDPpercap*In US naturalized citizen							
GDPpercap*In US permanent resident							
GDPpercap*In US temporary resident							
lnCountryrank*In US naturalized citizen							
lnCountryrank*In US permanent resident							
lnCountryrank*In US temporary resident							
Individual Characteristics							
female			-0.0430	-0.0364	-0.0278	-0.0384	-0.0332
			[0.0422]	[0.0385]	[0.0391]	[0.0387]	[0.0391]
male and married			0.1383***	0.0906***	0.1109***	0.0889***	0.0888***
			[0.0342]	[0.0317]	[0.0315]	[0.0320]	[0.0324]
female and married			0.0460	0.0194	0.0400	0.0203	0.0143
			[0.0374]	[0.0342]	[0.0337]	[0.0341]	[0.0348]
male with children			0.0498***	0.0491***	0.0320*	0.0445***	0.0481***
			[0.0183]	[0.0170]	[0.0177]	[0.0171]	[0.0171]
female with children			0.0039	0.0281	0.0177	0.0233	0.0257
			[0.0350]	[0.0315]	[0.0312]	[0.0316]	[0.0319]
black			-0.1255**	-0.0812*	-0.0563	-0.0526	-0.0773
			[0.0504]	[0.0439]	[0.0456]	[0.0457]	[0.0473]
asian			-0.0042	-0.0264	-0.0169	-0.0161	-0.0348*
			[0.0192]	[0.0173]	[0.0180]	[0.0184]	[0.0187]
hispanic			0.0116	-0.0076	-0.0419	0.0305	0.0008
			[0.0310]	[0.0284]	[0.0290]	[0.0293]	[0.0290]

Table 3A Salary Regressions continued

Population: Those without US Permanent Residency Status at PhD Receipt

	logged salary	logged PPP salary					
	Only location	Only location	Background variables	All, incl. work activities	All; sample w. 3rd countries	Home GDP interaction	Home rank interaction
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PhD inst. rank 11-25			-0.0482	-0.0462	-0.0474	-0.0471	-0.0443
			[0.0435]	[0.0399]	[0.0400]	[0.0401]	[0.0399]
PhD inst. Rank 26-50			-0.1033***	-0.0831**	-0.0798**	-0.0783**	-0.0822**
			[0.0382]	[0.0351]	[0.0350]	[0.0354]	[0.0352]
PhD inst. Rank 51-100			-0.0963**	-0.0870**	-0.0897**	-0.0843**	-0.0859**
			[0.0391]	[0.0355]	[0.0356]	[0.0358]	[0.0356]
PhD inst. Rank 101-200			-0.1816***	-0.1560***	-0.1550***	-0.1520***	-0.1558***
			[0.0421]	[0.0396]	[0.0384]	[0.0396]	[0.0398]
PhD inst. Rank 200+			-0.2152***	-0.1620***	-0.1453***	-0.1538***	-0.1623***
			[0.0388]	[0.0351]	[0.0349]	[0.0354]	[0.0353]
PhD inst. unranked			-0.2569***	-0.2177***	-0.2267***	-0.2092***	-0.2177***
			[0.0401]	[0.0383]	[0.0378]	[0.0388]	[0.0386]
PhD from Medical School			0.0932**	0.0863**	0.1131***	0.0882**	0.0908**
			[0.0438]	[0.0373]	[0.0372]	[0.0377]	[0.0374]
2 years PhD to survey			0.0822***	0.0392	0.0684***	0.0349	0.0367
			[0.0296]	[0.0245]	[0.0263]	[0.0250]	[0.0250]
3 years PhD to survey			0.1630***	0.0824***	0.0985***	0.0777***	0.0815***
			[0.0289]	[0.0240]	[0.0256]	[0.0244]	[0.0243]
4 years PhD to survey			0.2075***	0.0819***	0.1046***	0.0748***	0.0827***
			[0.0288]	[0.0265]	[0.0267]	[0.0269]	[0.0267]
5 years PhD to survey			0.2728***	0.1502***	0.1635***	0.1430***	0.1512***
			[0.0333]	[0.0282]	[0.0305]	[0.0288]	[0.0287]
6 years PhD to survey			0.3290***	0.1805***	0.2000***	0.1731***	0.1820***
			[0.0320]	[0.0276]	[0.0297]	[0.0280]	[0.0280]
7 years PhD to survey			0.3224***	0.1798***	0.1924***	0.1649***	0.1807***
			[0.0340]	[0.0306]	[0.0337]	[0.0310]	[0.0310]
8 years PhD to survey			0.3440***	0.1835***	0.2088***	0.1708***	0.1856***
			[0.0361]	[0.0327]	[0.0336]	[0.0330]	[0.0332]
9 years PhD to survey			0.3481***	0.1885***	0.2344***	0.1762***	0.1913***
			[0.0392]	[0.0357]	[0.0368]	[0.0360]	[0.0363]
10 years PhD to survey			0.3973***	0.2441***	0.2644***	0.2284***	0.2440***
			[0.0484]	[0.0431]	[0.0440]	[0.0433]	[0.0439]
11 years PhD to survey			0.3733***	0.1944**	0.2026**	0.1806**	0.1967**
			[0.0910]	[0.0885]	[0.0844]	[0.0889]	[0.0896]
12 years PhD to survey			0.4557***	0.2790***	0.3096***	0.2566***	0.2800***
			[0.0819]	[0.0788]	[0.0746]	[0.0808]	[0.0810]
English official language of hc			0.0860***	0.0481***	0.0813***	0.0514***	0.0551***
			[0.0199]	[0.0179]	[0.0194]	[0.0184]	[0.0188]
Characteristics of the Current Job							
Government sector				0.2040***	0.1353***	0.2006***	0.2020***
				[0.0272]	[0.0281]	[0.0269]	[0.0273]
Business/industry				0.3319***	0.3254***	0.3309***	0.3316***
				[0.0211]	[0.0214]	[0.0214]	[0.0213]
In a Postdoc				-0.3754***	-0.3011***	-0.3824***	-0.3733***
				[0.0205]	[0.0223]	[0.0207]	[0.0207]

Table 3A Salary Regressions continued

Population: Those without US Permanent Residency Status at PhD Receipt

	logged salary	**logged PPP salary**					
	Only location	Only location	Background variables	All, incl. work activities	All; sample w. 3rd countries	Home GDP interaction	Home rank interaction
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Main activity: Research				0.0566***	0.0582***	0.0580***	0.0579***
				[0.0175]	[0.0179]	[0.0177]	[0.0177]
Main activity: Teaching				-0.0411	-0.0839***	-0.0364	-0.0396
				[0.0278]	[0.0276]	[0.0280]	[0.0285]
Main activity: Computer applications				0.0152	0.0305	0.0155	0.0141
				[0.0282]	[0.0283]	[0.0285]	[0.0285]
Main activity: Management				0.0469*	0.0430*	0.0517**	0.0468*
				[0.0253]	[0.0248]	[0.0256]	[0.0259]
Main activity: Design/development				0.0365*	0.0446**	0.0375**	0.0366*
				[0.0187]	[0.0192]	[0.0190]	[0.0188]
Weekly hours worked				0.0329***	0.0314***	0.0336***	0.0330***
				[0.0046]	[0.0043]	[0.0045]	[0.0046]
Weekly hours worked sq.				-0.0002***	-0.0002***	-0.0003***	-0.0002***
				[0.0000]	[0.0000]	[0.0000]	[0.0000]
Other variables							
2013 survey year			-0.1107***	-0.0969***	-0.1014***	-0.0960***	-0.0982***
			[0.0134]	[0.0127]	[0.0130]	[0.0128]	[0.0129]
Constant	10.4729***	10.9970***	11.0629***	10.0771***	10.2698***	9.8818***	10.0895***
	[0.0243]	[0.0225]	[0.0586]	[0.1389]	[0.1325]	[0.1424]	[0.1510]
Observations	**9,750**	**9,750**	**9,750**	**9,750**	**11,175**	**9,654**	**9,636**
R-squared	0.174	0.025	0.135	0.240	0.196	0.243	0.239

Robust standard errors in brackets

All regressions include 21 field dummies

*** p<0.01, ** p<0.05, * p<0.1

Excluded categories: Population: those working in home country (or abroad for (5) and (12));

PhD inst: Rank 1-10; 1 year PhD to survey; academic sector,

Table 3B Salary Regressions By Visa Group

Population: Those without US Permanent Residency Status at PhD Receipt

		logged salary	logged PPP salary					
		Only location/visa	Only location/visa	Background variables	All, incl. work activities	All; sample w. 3rd countries	Home GDP interaction	Home rank interaction
		(8)	(9)	(10)	(11)	(12)	(13)	(14)
Location and visa variables								
	ln US							
	In US naturalized citizen	0.9318***	0.4060***	0.3727***	0.2573***	0.1057***	0.4806***	0.2918***
		[0.0354]	[0.0341]	[0.0361]	[0.0349]	[0.0333]	[0.0570]	[0.0835]
	In US permanent resident	0.8448***	0.3246***	0.2897***	0.2032***	0.0464**	0.3586***	0.1917***
		[0.0277]	[0.0260]	[0.0260]	[0.0256]	[0.0234]	[0.0442]	[0.0618]
	In US temporary resident	0.6519***	0.1355***	0.2141***	0.1882***	0.0047	0.3610***	0.2071***
		[0.0276]	[0.0258]	[0.0264]	[0.0259]	[0.0239]	[0.0428]	[0.0590]
For interactions with Location								
	GDPpercapita						0.3673***	
							[0.0744]	
	lnCountryrank							-0.0090
								[0.0183]
	GDPpercap*In US							
	lnCountryrank*In US							
	GDPpercap*In US naturalized citizen						-0.5221***	
							[0.1133]	
	GDPpercap*In US permanent resident						-0.3208***	
							[0.0808]	
	GDPpercap*In US temporary resident						-0.3866***	
							[0.0812]	
	lnCountryrank*In US naturalized citizen							-0.0135
								[0.0279]
	lnCountryrank*In US permanent resident							0.0039
								[0.0201]
	lnCountryrank*In US temporary resident							-0.0121
								[0.0199]
Individual Characteristics								
	female			-0.0435	-0.0360	-0.0265	-0.0385	-0.0323
				[0.0423]	[0.0387]	[0.0392]	[0.0389]	[0.0393]
	male and married			0.1334***	0.0905***	0.1095***	0.0884***	0.0876***
				[0.0342]	[0.0318]	[0.0316]	[0.0320]	[0.0326]
	female and married			0.0355	0.0183	0.0337	0.0183	0.0123
				[0.0376]	[0.0343]	[0.0338]	[0.0343]	[0.0349]
	male with children			0.0486***	0.0495***	0.0317*	0.0446***	0.0487***
				[0.0182]	[0.0169]	[0.0177]	[0.0170]	[0.0171]
	female with children			0.0002	0.0268	0.0159	0.0216	0.0237
				[0.0352]	[0.0316]	[0.0312]	[0.0317]	[0.0320]
	black			-0.1343***	-0.0823*	-0.0618	-0.0522	-0.0778
				[0.0505]	[0.0441]	[0.0457]	[0.0464]	[0.0479]
	asian			0.0006	-0.0250	-0.0136	-0.0146	-0.0344*
				[0.0192]	[0.0173]	[0.0180]	[0.0183]	[0.0187]
	hispanic			0.0124	-0.0080	-0.0407	0.0292	0.0034
				[0.0310]	[0.0284]	[0.0290]	[0.0294]	[0.0290]

Table 3B Salary Regressions By Visa Group continued

Population: Those without US Permanent Residency Status at PhD Receipt

	logged salary	logged PPP salary					
	Only location/visa	Only location/visa	Background variables	All, incl. work activities	All; sample w. 3rd countries	Home GDP interaction	Home rank interaction
	(8)	(9)	(10)	(11)	(12)	(13)	(14)
PhD inst. rank 11-25			-0.0507	-0.0462	-0.0493	-0.0476	-0.0441
			[0.0436]	[0.0399]	[0.0399]	[0.0401]	[0.0400]
PhD inst. Rank 26-50			-0.1039***	-0.0836**	-0.0805**	-0.0787**	-0.0838**
			[0.0381]	[0.0350]	[0.0350]	[0.0352]	[0.0352]
PhD inst. Rank 51-100			-0.0981**	-0.0878**	-0.0906**	-0.0853**	-0.0869**
			[0.0390]	[0.0354]	[0.0355]	[0.0357]	[0.0356]
PhD inst. Rank 101-200			-0.1818***	-0.1560***	-0.1547***	-0.1524***	-0.1559***
			[0.0421]	[0.0396]	[0.0384]	[0.0396]	[0.0399]
PhD inst. Rank 200+			-0.2179***	-0.1628***	-0.1466***	-0.1547***	-0.1636***
			[0.0387]	[0.0351]	[0.0348]	[0.0352]	[0.0352]
PhD inst. unranked			-0.2539***	-0.2160***	-0.2252***	-0.2088***	-0.2162***
			[0.0401]	[0.0384]	[0.0378]	[0.0388]	[0.0387]
PhD from Medical School			0.0916**	0.0855**	0.1125***	0.0863**	0.0900**
			[0.0427]	[0.0370]	[0.0370]	[0.0374]	[0.0371]
2 years PhD to survey			0.0776***	0.0393	0.0653**	0.0336	0.0361
			[0.0294]	[0.0245]	[0.0263]	[0.0250]	[0.0250]
3 years PhD to survey			0.1486***	0.0802***	0.0916***	0.0737***	0.0781***
			[0.0290]	[0.0242]	[0.0259]	[0.0247]	[0.0245]
4 years PhD to survey			0.1834***	0.0776***	0.0941***	0.0683**	0.0776***
			[0.0290]	[0.0266]	[0.0268]	[0.0271]	[0.0269]
5 years PhD to survey			0.2438***	0.1453***	0.1504***	0.1373***	0.1456***
			[0.0340]	[0.0290]	[0.0312]	[0.0296]	[0.0294]
6 years PhD to survey			0.2837***	0.1705***	0.1793***	0.1605***	0.1715***
			[0.0331]	[0.0287]	[0.0308]	[0.0291]	[0.0290]
7 years PhD to survey			0.2770***	0.1709***	0.1709***	0.1532***	0.1712***
			[0.0355]	[0.0318]	[0.0349]	[0.0322]	[0.0322]
8 years PhD to survey			0.2885***	0.1693***	0.1825***	0.1534***	0.1706***
			[0.0381]	[0.0345]	[0.0353]	[0.0349]	[0.0349]
9 years PhD to survey			0.2860***	0.1715***	0.2033***	0.1535***	0.1732***
			[0.0419]	[0.0379]	[0.0390]	[0.0383]	[0.0383]
10 years PhD to survey			0.3359***	0.2271***	0.2343***	0.2071***	0.2261***
			[0.0498]	[0.0443]	[0.0451]	[0.0445]	[0.0450]
11 years PhD to survey			0.3034***	0.1729*	0.1673*	0.1551*	0.1733*
			[0.0936]	[0.0903]	[0.0860]	[0.0909]	[0.0914]
12 years PhD to survey			0.3823***	0.2549***	0.2720***	0.2285***	0.2542***
			[0.0861]	[0.0829]	[0.0779]	[0.0850]	[0.0845]
English official language of hc			0.0922***	0.0507***	0.0848***	0.0526***	0.0597***
			[0.0200]	[0.0181]	[0.0195]	[0.0188]	[0.0192]
cs of the Current Job							
Government sector				0.1990***	0.1324***	0.1957***	0.1980***
				[0.0272]	[0.0281]	[0.0271]	[0.0273]
Business/industry				0.3307***	0.3245***	0.3299***	0.3303***
				[0.0212]	[0.0214]	[0.0215]	[0.0214]
In a Postdoc							

Table 3B Salary Regressions By Visa Group continued

Population: Those without US Permanent Residency Status at PhD Receipt

		logged salary	**logged PPP salary**					
		Only location/visa	Only location/visa	Background variables	All, incl. work activities	All; sample w. 3rd countries	Home GDP interaction	Home rank interaction
		(8)	(9)	(10)	(11)	(12)	(13)	(14)
Main activity: Research					-0.3688***	-0.2929***	-0.3749***	-0.3653***
					[0.0210]	[0.0227]	[0.0213]	[0.0212]
Main activity: Teaching					0.0560***	0.0578***	0.0569***	0.0574***
					[0.0177]	[0.0180]	[0.0178]	[0.0179]
Main activity: Computer applic					-0.0459*	-0.0857***	-0.0415	-0.0433
					[0.0277]	[0.0274]	[0.0279]	[0.0283]
Main activity: Management					0.0166	0.0324	0.0170	0.0151
					[0.0281]	[0.0282]	[0.0283]	[0.0283]
Main activity: Design/developm					0.0441*	0.0410*	0.0486*	0.0441*
					[0.0187]	[0.0191]	[0.0190]	[0.0187]
Weekly hours worked					0.0330***	0.0316***	0.0336***	0.0330***
					[0.0046]	[0.0043]	[0.0045]	[0.0046]
Weekly hours worked sq.					-0.0003***	-0.0002***	-0.0003***	-0.0003***
					[0.0000]	[0.0000]	[0.0000]	[0.0000]
es					0.0370**	0.0443**	0.0377**	0.0376**
2013 survey year				-0.1061***	-0.0959***	-0.0996***	-0.0939***	-0.0972***
				[0.0135]	[0.0128]	[0.0131]	[0.0129]	[0.0130]
Constant		10.4964***	11.0056***	11.1075***	10.0982***	10.2859***	9.9137***	10.1259***
		[0.0243]	[0.0223]	[0.0578]	[0.1380]	[0.1319]	[0.1414]	[0.1500]
Observations		**9,750**	**9,750**	**9,750**	**9,750**	**11,175**	**9,654**	**9,636**
R-squared		0.178	0.037	0.136	0.239	0.196	0.242	0.238

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Excluded categories: Population: those working in home country (or abroad for (5) and (12));

PhD inst: Rank 1-10; 1 year PhD to survey; academic sector,

		Table 4 Salary Regressions					
		Population: All PhDs Working in the US					
		Dependent variable: Logged PPP salary					
		Only visa status	Background variables	All, incl. work activities	Only visa status	Background variables	All, incl. work activities
		(1)	(2)	(3)	(4)	(5)	(6)
Location and visa variables							
	Non-native without US Permanent	0.1074***	-0.0073	0.0142			
	Residency Status at PhD	[0.0117]	[0.0179]	[0.0151]			
	Non-native with US Permanent	0.0545***	-0.0054	0.0008			
	Residency Status at PhD	[0.0203]	[0.0223]	[0.0190]			
	Naturalized citizen without US				0.2513***	0.0569*	0.0342
	Permanent Residency at PhD				[0.0267]	[0.0298]	[0.0261]
	Permanent resident without US				0.1698***	0.0073	0.0079
	Permanent Residency at PhD				[0.0151]	[0.0203]	[0.0178]
	Temporary resident				-0.0198	-0.0475**	0.0018
					[0.0147]	[0.0199]	[0.0169]
	Naturalized citizen with US Permanent				-0.0683	-0.1015**	-0.0640
	Residency at PhD				[0.0503]	[0.0497]	[0.0461]
	Permanent resident with US Permanent				0.0982***	0.0287	0.0208
	Residency at PhD				[0.0202]	[0.0222]	[0.0186]
Individual Characteristics							
	female		-0.0115	-0.0276		-0.0124	-0.0276
			[0.0224]	[0.0194]		[0.0224]	[0.0195]
	male and married		0.0922***	0.0478***		0.0909***	0.0480***
			[0.0185]	[0.0161]		[0.0185]	[0.0162]
	female and married		0.0013	0.0235		-0.0008	0.0235
			[0.0191]	[0.0161]		[0.0191]	[0.0161]
	male with children		0.0513***	0.0466***		0.0509***	0.0472***
			[0.0130]	[0.0113]		[0.0130]	[0.0113]
	female with children		-0.0344**	0.0381***		-0.0339**	0.0386***
			[0.0168]	[0.0129]		[0.0169]	[0.0130]
	black		-0.0273	0.0162		-0.0308	0.0158
			[0.0193]	[0.0152]		[0.0192]	[0.0151]
	asian		0.0244*	0.0165		0.0277*	0.0191
			[0.0142]	[0.0119]		[0.0142]	[0.0121]
	hispanic		0.0039	0.0002		0.0019	-0.0009
			[0.0166]	[0.0135]		[0.0164]	[0.0134]
	PhD inst. rank 11-25		-0.1033***	-0.0923***		-0.1049***	-0.0929***
			[0.0211]	[0.0182]		[0.0211]	[0.0182]
	PhD inst. Rank 26-50		-0.1220***	-0.1015***		-0.1216***	-0.1011***
			[0.0180]	[0.0147]		[0.0180]	[0.0147]
	PhD inst. Rank 51-100		-0.1609***	-0.1405***		-0.1606***	-0.1400***
			[0.0207]	[0.0174]		[0.0206]	[0.0174]
	PhD inst. Rank 101-200		-0.1762***	-0.1482***		-0.1750***	-0.1472***
			[0.0205]	[0.0178]		[0.0204]	[0.0177]
	PhD inst. Rank 200+		-0.2092***	-0.1494***		-0.2080***	-0.1482***
			[0.0192]	[0.0154]		[0.0192]	[0.0154]
	PhD inst. unranked		-0.1973***	-0.1562***		-0.1956***	-0.1550***
			[0.0184]	[0.0159]		[0.0184]	[0.0159]
	PhD from Medical School		0.0641**	0.0556**		0.0597*	0.0529**
			[0.0323]	[0.0264]		[0.0322]	[0.0264]
	2 years PhD to survey		0.0459**	0.0202		0.0425**	0.0188
			[0.0181]	[0.0142]		[0.0180]	[0.0141]
	3 years PhD to survey		0.1075***	0.0349**		0.1029***	0.0340**
			[0.0189]	[0.0148]		[0.0189]	[0.0148]
	4 years PhD to survey		0.1699***	0.0685***		0.1618***	0.0667***
			[0.0160]	[0.0135]		[0.0161]	[0.0135]

		Table 4 Salary Regressions continued					
		Population: All PhDs Working in the US					
		Dependent variable: Logged PPP salary					
	5 years PhD to survey		0.2062***	0.0990***		0.1955***	0.0965***
			[0.0212]	[0.0178]		[0.0216]	[0.0182]
	6 years PhD to survey		0.2747***	0.1445***		0.2602***	0.1413***
			[0.0200]	[0.0166]		[0.0202]	[0.0167]
	7 years PhD to survey		0.2659***	0.1410***		0.2501***	0.1374***
			[0.0220]	[0.0184]		[0.0225]	[0.0188]
	8 years PhD to survey		0.3430***	0.1917***		0.3250***	0.1873***
			[0.0209]	[0.0171]		[0.0213]	[0.0173]
	9 years PhD to survey		0.3483***	0.2052***		0.3286***	0.1998***
			[0.0221]	[0.0183]		[0.0226]	[0.0184]
	10 years PhD to survey		0.3731***	0.2254***		0.3541***	0.2202***
			[0.0270]	[0.0224]		[0.0271]	[0.0224]
	11 years PhD to survey		0.4171***	0.2659***		0.3954***	0.2595***
			[0.0373]	[0.0328]		[0.0373]	[0.0324]
	12 years PhD to survey		0.4031***	0.2451***		0.3812***	0.2385***
			[0.0418]	[0.0387]		[0.0422]	[0.0389]
	English official language of hc		0.0164	0.0025		0.0200	0.0007
			[0.0166]	[0.0147]		[0.0168]	[0.0150]
Characteristics of the Current Job							
	Government sector			0.2582***			0.2559***
				[0.0117]			[0.0117]
	Business/industry			0.2568***			0.2562***
				[0.0129]			[0.0128]
	In a Postdoc			-0.4138***			-0.4127***
				[0.0119]			[0.0121]
	Main activity: Research			0.0675***			0.0676***
				[0.0095]			[0.0095]
	Main activity: Teaching			-0.1123***			-0.1124***
				[0.0128]			[0.0128]
	Main activity: Computer applications			0.0233			0.0240
				[0.0172]			[0.0173]
	Main activity: Management			0.0586***			0.0582***
				[0.0119]			[0.0119]
	Main activity: Design/development			0.0545***			0.0543***
				[0.0120]			[0.0120]
	Weekly hours worked			0.0681***			0.0681***
				[0.0027]			[0.0027]
	Weekly hours worked sq.			-0.0006***			-0.0006***
				[0.0000]			[0.0000]
Other variables							
	2013 survey year		-0.0547***	-0.0431***		-0.0534***	-0.0426***
			[0.0080]	[0.0070]		[0.0080]	[0.0069]
	Constant	11.1590***	11.3965***	9.4241***	11.1604***	11.4047***	9.4292***
		[0.0069]	[0.0335]	[0.0732]	[0.0069]	[0.0333]	[0.0732]
	Observations	**21,635**	**21,635**	**21,635**	**21,635**	**21,635**	**21,635**
	R-squared	0.006	0.139	0.382	0.015	0.141	0.382
	Robust standard errors in brackets			All regressions include 21 field dummies			
	*** p<0.01, ** p<0.05, * p<0.1						
	Excluded categories: Population: natives; PhD inst. Rank 1-10; 1 year PhD to survey; academic sector;						

Table 5 Distribution Across Fields

	Temporary Residents at PhD			Foreigners not Temporary at PhD	US Natives
	All N= 11,222	In US N= 6,091	Outside US N= 5,131	In US N=2,554	In US N=12,444
	(1)	(2)	(3)	(4)	(5)
Computer science	0.0607	0.0685	0.0442	0.0583	0.0261
Mathematics and statistics	0.0627	0.0619	0.0645	0.0524	0.0327
Agricultural and food sciences	0.0259	0.0195	0.0395	0.0211	0.0166
Biological sciences	0.1606	0.1786	0.1226	0.2293	0.2497
Environmental sciences	0.0117	0.0089	0.0178	0.0083	0.0166
Chemistry	0.0702	0.0786	0.0524	0.0753	0.0676
Earth, atmospheric and ocean sciences	0.0215	0.0192	0.0265	0.0137	0.0212
Physics and astronomy	0.0647	0.0671	0.0595	0.0361	0.0418
Other physical sciences	0.0025	0.0018	0.0037	0.0028	0.0048
Economics	0.0605	0.0431	0.0973	0.0389	0.0190
Political and related sciences	0.0190	0.0098	0.0385	0.0258	0.0363
Psychology	0.0221	0.0174	0.0320	0.0894	0.1833
Sociology and anthropology	0.0170	0.0110	0.0299	0.0316	0.0514
Other social sciences	0.0210	0.0145	0.0349	0.0274	0.0316
Aerospace engineering	0.0121	0.0137	0.0086	0.0070	0.0055
Chemical engineering	0.0336	0.0369	0.0266	0.0163	0.0171
Civil and architectural engineering	0.0355	0.0345	0.0376	0.0144	0.0088
Electrical/computer eng	0.1182	0.1296	0.0942	0.0846	0.0269
Industrial engineering	0.0150	0.0153	0.0144	0.0146	0.0035
Mechanical engineering	0.0511	0.0583	0.0357	0.0254	0.0196
Other engineering	0.0789	0.0816	0.0732	0.0576	0.0437
Health	0.0353	0.0301	0.0464	0.0697	0.0760

Table 6 IV Salary Regressions instrumenting for US Location				
Population: Those without US Permanent Residency Status at PhD Receipt (excluding those in third country and postdocs)				
(Controlling for Background Characteristics)				
	No instrument	Instrument: Foreign support	Instrument: Polity	Instrument: Distance US-HC
	(1)	(2)	(3)	(4)
ln US	0.3313***	0.6551***	0.5920***	0.3691*
	[0.0249]	[0.1243]	[0.0906]	[0.1943]
female	-0.0890*	-0.0851*	-0.0911*	-0.0888*
	[0.0499]	[0.0500]	[0.0511]	[0.0504]
male and married	0.1242***	0.0923**	0.0986**	0.1229***
	[0.0404]	[0.0424]	[0.0427]	[0.0442]
female and married	0.0419	-0.0146	-0.0010	0.0368
	[0.0428]	[0.0499]	[0.0476]	[0.0528]
male with children	0.0440**	0.0543***	0.0497**	0.0440**
	[0.0191]	[0.0202]	[0.0201]	[0.0206]
female with children	0.0153	0.0170	0.0156	0.0125
	[0.0389]	[0.0395]	[0.0399]	[0.0395]
black	-0.1528***	-0.1676***	-0.1822***	-0.1566***
	[0.0549]	[0.0571]	[0.0592]	[0.0565]
asian	-0.0008	-0.0116	-0.0107	-0.0019
	[0.0208]	[0.0214]	[0.0220]	[0.0223]
hispanic	-0.0040	0.0384	0.0291	0.0001
	[0.0337]	[0.0387]	[0.0364]	[0.0425]
English official language of hc	0.0754***	0.0385	0.0450*	0.0712**
	[0.0217]	[0.0267]	[0.0241]	[0.0323]
PhD inst. rank 11-25	-0.0531	-0.0383	-0.0438	-0.0528
	[0.0471]	[0.0494]	[0.0475]	[0.0481]
PhD inst. Rank 26-50	-0.1007**	-0.0929**	-0.0950**	-0.0996**
	[0.0416]	[0.0431]	[0.0425]	[0.0419]
PhD inst. Rank 51-100	-0.0815*	-0.0796*	-0.0837*	-0.0816*
	[0.0423]	[0.0427]	[0.0430]	[0.0423]
PhD inst. Rank 101-200	-0.1929***	-0.1942***	-0.1925***	-0.1945***
	[0.0460]	[0.0460]	[0.0467]	[0.0463]
PhD inst. Rank 200+	-0.2236***	-0.2317***	-0.2349***	-0.2269***
	[0.0421]	[0.0412]	[0.0428]	[0.0427]
PhD inst. unranked	-0.2674***	-0.2643***	-0.2638***	-0.2665***
	[0.0438]	[0.0443]	[0.0442]	[0.0438]
PhD from Medical School	0.1169**	0.0958*	0.1018*	0.1211**
	[0.0540]	[0.0578]	[0.0566]	[0.0561]
2 years PhD to survey	0.0221	0.0194	0.0073	0.0153
	[0.0353]	[0.0364]	[0.0368]	[0.0361]
3 years PhD to survey	0.0641*	0.0633*	0.0552	0.0604*
	[0.0343]	[0.0354]	[0.0355]	[0.0350]
4 years PhD to survey	0.0496	0.0571	0.0484	0.0450
	[0.0350]	[0.0358]	[0.0358]	[0.0359]
5 years PhD to survey	0.1151***	0.1205***	0.1109***	0.1109***
	[0.0385]	[0.0395]	[0.0400]	[0.0393]
6 years PhD to survey	0.1546***	0.1679***	0.1557***	0.1523***
	[0.0366]	[0.0380]	[0.0383]	[0.0376]
7 years PhD to survey	0.1311***	0.1536***	0.1414***	0.1254***
	[0.0387]	[0.0409]	[0.0407]	[0.0412]

Table 6 IV Salary Regressions instrumenting for US Location continued				
Population: Those without US Permanent Residency Status at PhD Receipt (excluding those in third country and postdocs)				
(Controlling for Background Characteristics)				
8 years PhD to survey	0.1492***	0.1699***	0.1582***	0.1467***
	[0.0401]	[0.0414]	[0.0418]	[0.0421]
9 years PhD to survey	0.1518***	0.1669***	0.1551***	0.1492***
	[0.0432]	[0.0448]	[0.0449]	[0.0447]
10 years PhD to survey	0.1836***	0.2164***	0.2030***	0.1802***
	[0.0520]	[0.0553]	[0.0550]	[0.0556]
11 years PhD to survey	0.1685*	0.2040**	0.1873**	0.1671*
	[0.0932]	[0.0915]	[0.0945]	[0.0943]
12 years PhD to survey	0.2444***	0.2744***	0.2569***	0.2430***
	[0.0848]	[0.0865]	[0.0896]	[0.0895]
2013 survey year	-0.0937***	-0.0991***	-0.0984***	-0.0947***
	[0.0148]	[0.0150]	[0.0155]	[0.0151]
Constant	11.1985***	10.9625***	11.0212***	11.1744***
	[0.0647]	[0.1229]	[0.0922]	[0.1540]
Observations	8,594	8,594	8,440	8,499
R-squared	0.120	0.087	0.099	0.119
F-statistic first stage	na	239.7	282.9	35.6
Robust standard errors in brackets		All regressions include 21 field dummies		
*** p<0.01, ** p<0.05, * p<0.1				
Excluded categories: Population: those working in HC; PhD inst. Rank 1-10; 1 year PhD to survey				

Appendix Table 1:Coefficients on Field Dummies from Location Regressions

	Location in US						Location in 3rd Country
	exogenous only	adding sector	adding work activities	academic only	non-academic only	In US or HC only	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mathematics and statistics	-0.0487	-0.0338	0.0002	0.0163	-0.0001	0.0116	0.0119
	[0.0322]	[0.0307]	[0.0307]	[0.0496]	[0.0350]	[0.0281]	[0.0199]
Agricultural and food sciences	-0.1620***	-0.1551***	-0.1154***	-0.0660	-0.1625***	-0.1327***	-0.0110
	[0.0418]	[0.0398]	[0.0393]	[0.0585]	[0.0527]	[0.0375]	[0.0241]
Biological sciences	0.0124	-0.0009	0.0381	0.0687	0.0023	0.0046	-0.0382**
	[0.0262]	[0.0256]	[0.0258]	[0.0425]	[0.0306]	[0.0236]	[0.0162]
Environmental sciences	-0.1475***	-0.1069**	-0.0744	-0.0359	-0.1275*	-0.0721	0.0275
	[0.0488]	[0.0481]	[0.0474]	[0.0655]	[0.0693]	[0.0465]	[0.0344]
Chemistry	-0.0087	-0.0197	0.0102	0.0282	-0.0058	-0.0021	-0.0106
	[0.0296]	[0.0283]	[0.0285]	[0.0497]	[0.0317]	[0.0258]	[0.0189]
Earth, atmospheric and ocean sciences	-0.1121***	-0.0748*	-0.0536	-0.0000	-0.1151**	-0.0323	0.0233
	[0.0412]	[0.0417]	[0.0411]	[0.0624]	[0.0511]	[0.0406]	[0.0250]
Physics and astronomy	-0.0109	-0.0158	-0.0013	-0.0131	0.0397	0.0040	0.0049
	[0.0317]	[0.0304]	[0.0301]	[0.0486]	[0.0340]	[0.0271]	[0.0202]
Other physical sciences	-0.1881**	-0.1878**	-0.1434	-0.1291	-0.1750	-0.0823	0.0896
	[0.0870]	[0.0824]	[0.0908]	[0.1331]	[0.1186]	[0.0846]	[0.0714]
Economics	-0.1462***	-0.1078***	-0.0660**	0.0003	-0.1563***	-0.0259	0.0720***
	[0.0336]	[0.0327]	[0.0325]	[0.0505]	[0.0389]	[0.0322]	[0.0219]
Political and related	-0.2758***	-0.2110***	-0.1544***	-0.1123*	-0.2595***	-0.1370***	0.0581*
	[0.0446]	[0.0443]	[0.0451]	[0.0607]	[0.0618]	[0.0479]	[0.0315]
Psychology	-0.0811	-0.0583	-0.0178	0.0285	-0.0714	-0.0148	0.0098
	[0.0502]	[0.0500]	[0.0499]	[0.0630]	[0.0846]	[0.0483]	[0.0346]
Sociology and anthropology	-0.1894***	-0.1367***	-0.0863*	-0.0205	-0.3913***	-0.0640	0.0496
	[0.0451]	[0.0449]	[0.0444]	[0.0564]	[0.0672]	[0.0466]	[0.0331]
Other social sciences	-0.1674***	-0.1186***	-0.0610	-0.0342	-0.1579**	-0.0455	0.0369
	[0.0446]	[0.0449]	[0.0441]	[0.0587]	[0.0768]	[0.0444]	[0.0298]
Aerospace engineering	0.0762	0.0821*	0.0812*	0.1001	0.0746	0.0285	-0.0696***
	[0.0515]	[0.0494]	[0.0492]	[0.0929]	[0.0505]	[0.0473]	[0.0231]
Chemical engineering	-0.0148	-0.0486	-0.0345	-0.0673	-0.0055	-0.0648**	-0.0289
	[0.0351]	[0.0325]	[0.0325]	[0.0635]	[0.0316]	[0.0302]	[0.0195]
Civil and architectural engineering	-0.0388	-0.0344	-0.0136	-0.0400	0.0277	-0.0232	-0.0148
	[0.0382]	[0.0366]	[0.0360]	[0.0609]	[0.0427]	[0.0341]	[0.0199]
Electrical/computer eng	-0.0019	-0.0296	-0.0314	-0.0444	-0.0182	-0.0395*	-0.0048
	[0.0271]	[0.0256]	[0.0251]	[0.0497]	[0.0250]	[0.0224]	[0.0163]
Industrial engineering	-0.0460	-0.0310	0.0074	0.0789	-0.0320	-0.0233	-0.0443*
	[0.0469]	[0.0461]	[0.0447]	[0.0786]	[0.0505]	[0.0423]	[0.0238]
Mechanical engineering	0.0307	0.0087	0.0191	0.0469	0.0184	0.0030	-0.0148
	[0.0301]	[0.0293]	[0.0294]	[0.0563]	[0.0305]	[0.0267]	[0.0182]
Other engineering	-0.0356	-0.0610**	-0.0439	-0.0628	-0.0268	-0.0508**	-0.0003
	[0.0290]	[0.0274]	[0.0274]	[0.0498]	[0.0292]	[0.0248]	[0.0178]
Health	-0.0710*	-0.0584	-0.0227	-0.0463	0.0196	-0.0140	0.0103
	[0.0379]	[0.0357]	[0.0351]	[0.0550]	[0.0416]	[0.0325]	[0.0234]
Number of Observations	**10,837**	**10,837**	**10,837**	**6,009**	**4,828**	**9,455**	**10,837**
Excluded field: Computer science							

Appendix

Categories used to match NSF fields to Scimago subject areas:

NSF field code	NSF field	Scimago subject area
11	Computer and info sciences	computer
12	Math and stats	math
21	Agr, food sciences	agricultural and biology
22	Biological sciences	agricultural and biology,biochem, neuroscience, immunology
23	Environmental life sciences	environment
31	Chemistry, except biochemistry	chemistry
32	Earth, atmospheric, ocean sciences	earth
33	Physics and astronomy	physics
34	Other physical sciences	chemistry
41	Economics	economics
42	Political sciences	socialsci
43	Psychology	psychology
44	Sociology, anthropology	socialsci
45	Other social sciences	social sciences
51	Aerospace etc engineering	physics
52	Chemical engineering	chemicaleng
53	Civil and architectural engineering	engineering
54	Electrical and computer engineering	computers
55	Industrial engineering	engineering
56	Mechanical engineering	engineering
57	Other engineering	engineering
61	Health	health