



Visa Wait Times and Future Earnings: Evidence from the National Survey of College Graduates

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Abstract

This study explores the relationship between lawful permanent resident status and earnings. We begin by estimating wage differentials between lawful permanent residents and immigrants on temporary visas. We find a wide variation in earnings differentials according to category of temporary visa, and find a negative differential between lawful permanent residents and immigrants on temporary work visas. We then examine the effect of longer wait times to obtain a permanent resident visa on immigrants' income. Using data from the National Survey of College Graduates, we find that immigrants who enter the US on temporary work visas earn 2% less for each year between the time of entry into the US and when their permanent resident visa is issued. We find a similar relationship for immigrants who enter on student visas and have wait times of more than 5 years. Further, we find a larger relationship for African and Latin American and Caribbean immigrants.

Keywords Immigration · Earnings · Visa backlogs

Introduction

This study examines the relationship between lawful permanent resident (LPR) status and earnings. In particular, we estimate earnings differentials between lawful permanent residents and immigrants with temporary visas. We then estimate the relationship between earnings and time in US prior to obtaining lawful permanent residency to determine whether there is an earnings penalty associated with longer wait times to obtain LPR status. The US currently limits the number of lawful permanent resident visas (a.k.a. “green cards”) to approximately 140,000 for employment-based visas and 220,000 for family-based visas. Further, no more than 7% (~25,000) of green cards issued in a given year can be issued to immigrants from any single source country. If a particular visa category limit is reached, or a country exceeds their

annual limit, then approved applicants are put in a queue to wait until a green card becomes available. In 2017, there were more than 4 million individuals in this queue (US Department of State 2018). Actual wait times will depend on country of origin and type of visa, but in some cases, immigrants can wait more than 20 years to receive a green card. As shown on the Visa Bulletin issued by the US Department of State for June 2018, the initial approval date for employment-based immigrants who are allowed to adjust to permanent status in June 2018 is as early as January 1, 2012 for Chinese and May 1, 2008 for Indians. The wait time for family-based green cards is much longer: mainland-born Chinese applicants who are allowed to adjust their status in June 2018 have been waiting since as early as October 22, 2004, March 14, 2004 for Indians, February 15, 1997 for Mexicans, February 22, 1995 for Filipinos, and October 22, 2004 for the rest of the world.

For those who are in the US while waiting for their green card, labor market access is extremely limited. For example, those on temporary work visas can only work for the employer who sponsored their visa.¹ Students on an F-1 visa can only work on campus, or for a short period of Optional Practical Training (OPT). Limited labor market access during this

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¹ In some cases, switching employers may be possible, but is risky and extremely difficult.

queueing period can potentially hinder immigrants' wage growth. Some immigrants may accept lower wages offered by limited number of employers willing to sponsor green cards. Employers may exercise monopsony power to depress immigrant wages, and immigrants are unable to move to higher paying jobs.

Pendakur and Woodcock (2010) examine linked employer-employee data in Canada and find immigrants face substantial wage gaps, which are largely accounted for by poor access to jobs in high-wage firms. Carneiro et al. (2012) focus on the case of Portugal and find that two-thirds of the immigrant-native wage gap is attributable to match-specific and employer characteristics, and that occupational downgrading and segregation into low-wage workplaces are two major causes behind the gap. Job mobility has been shown to play an important role in improving labor market performance of immigrant workers. Damas de Matos (2017) uses longitudinal linked employer-employee data for Portugal to investigate the role of job mobility in immigrant wage assimilation. She finds that moving to firms with higher wage premiums accounts for around 30% of the immigrant wage catch-up in the first years. Mukhopadhyay and Oxborrow (2012) propose job mobility as the main source of wage premium associated with green cards for highly skilled immigrants.

More research efforts have been given to estimating the labor market benefits of obtaining citizenship in different countries. These benefits generally include lower rates of unemployment, higher wage growth, and more desirable job characteristics compared to non-naturalized immigrants (Bratsberg et al. 2002; Euwals et al. 2010; Steinhardt 2012; Gathmann and Keller 2013; Helgertz et al. 2014). In particular, Bratsberg et al. (2002) find that naturalized young male immigrants in the U.S. gain access to public-sector, white-collar, and union jobs, and enjoy higher wage growth. Euwals et al. (2010) focus on Turkish immigrants and find that naturalization in the Netherlands is related positively to employment, tenured employment and job prestige. Steinhardt (2012) examines the labor market performance of immigrants in Germany and finds that naturalized men gain a sizable wage premium of approximately 5%, driven by accelerated wage growth after naturalization. In addition, the wage premium of naturalized women is solely the result of a positive self-selection process.

Compared to the number of studies on the returns to citizenship, very limited research focuses on the process of moving from temporary visa status to permanent legal status in the United States, mainly due to data limitation. Using data from the New Immigrant Survey, Kandilov (2007) finds that becoming a permanent resident is accompanied by at least an 18% wage increase for employer-sponsored immigrants. Additionally, immigrants experience a wage gain of 25% between their first job in the U.S. and their current job after receiving a green card. Mukhopadhyay and Oxborrow

(2012) find that for employer-sponsored immigrants, the acquisition of a green card leads to an annual wage gain of about \$11,860. Chi and Drewianka (2014) find a 30% wage gain from green cards for Mexican-born men, and larger premiums for most mobile subgroups like college graduates and recent immigrants. They estimate that eliminating wait times would increase their mean earnings \$120,000 to \$150,000 in present value.

Jasso and Rosenzweig (2010) estimate the number of highly skilled immigrant workers waiting for employment-based green cards. They find that about half a million applicants were waiting in the US at the end of Fiscal Year 2006, together with over half a million family members waiting in the US and over 125 thousand applicants waiting abroad. Data show that in 2003, the average wait time was 4.3 years for adjustee employment principals, 34.5% of whom either plan to leave the US or are uncertain about remaining. The authors suggest that the long delays are a visa number problem instead of an administrative processing problem, and that the backlog cannot be eliminated without a large change in public policy.

Hunt (2017) provides a comprehensive overview of restrictions due to temporary work visas for skilled immigrant workers. She focuses on job mobility and finds that mobility is reduced during the application period by around 20% for temporary workers who receive green cards. And for the majority of temporary visa holders who are not sponsored for green cards, their voluntary job changing rate is similar to natives with similar characteristics. Her findings also suggest that green card applicants are prepared to pay a small monopsony-related temporary price for permanent access to the US labor market. Wang (2017) finds a substantial increase in workers' voluntary job mobility following receipt of green cards, and that at least 60% of the spike in mobility is driven by voluntary moving being discouraged during the green card application process.

Different from Hunt (2017) and Wang (2017), this paper focuses on the earnings penalty associated with the backlog for skilled immigrants waiting to obtain green cards. We begin by revisiting the question of wage differentials between lawful permanent residents and immigrants working on temporary visas. Our estimates that treat all temporary visa holders the same find a wage premium consistent with those found in earlier literature. However, when we control for temporary visa type, we find much larger positive differentials between lawful permanent residents and immigrants on temporary and dependent visas. Further, we find the lawful permanent residents earn, on average, less than immigrants on temporary work visas. We then explore the relationship between earnings and the number of years between entry into the US and acquisition of LPR status. We hypothesize that the inability to pursue better employment opportunities or negotiate raises during the initial years in the US has a negative impact on immigrants' earning growth and, by extension, lifetime earnings.

Using data from the National Survey of College Graduates, we estimate wage equations for lawful permanent residents, controlling for type of entry visa. Additionally, we estimate earnings separately across education levels and regions of origin, and for immigrants who had wait times of 5 years or more. Our results support our hypothesis that increased visa wait times reduce immigrants' earnings. We find that immigrants who enter the US on temporary work visas experience a 2% reduction in weekly earnings for each year between the time of entry into the US and when their permanent resident visa is issued. We find a similar relationship for immigrants who enter on student visas and have wait times of more than 5 years. Further, we find a larger relationship for African and Latin American and Caribbean immigrants.

Data and Methodology

Data for our analysis come from the National Survey of College Graduates. The sample for this survey is drawn from respondents of the American Community Survey who report having a bachelor's degree or higher. For our analysis, we draw on three waves of the survey, conducted in 2010, 2013, and 2015.² We exclude two previous waves conducted in 2003 and 1993 in order to more accurately reflect the current state of the LPR visa allocation system. Choice of the National Survey of College Graduates dataset is driven primarily to the availability of key variables not contained in other publicly available surveys. In particular, the NSGC contains detailed information on immigrants' current immigration status, i.e. whether they are naturalized citizens, lawful permanent residents, or temporary visa holders,³ as well as the type of visa immigrants held when they first entered the country. Furthermore, critical for our analysis, the NSGC identifies the year in which the immigrants first entered the US and the year lawful permanent residents obtained their Green Cards. Additionally, the survey contains a large amount of demographic and employment data. One drawback to this dataset, however, is that it is limited to college graduates. Given that only 32% of the immigrant population in the US holds a bachelor's degree or higher (US Census Bureau 2014), this survey limits our analysis to a small subset of the immigrant population. Another drawback to this dataset is we only observe immigrants who are in the US. Thus, our observations exclude immigrants who either voluntarily returned to their country of

origin, or were unable to obtain the necessary visas to remain in the US. This could potentially lead to selection bias among the observed sample. Depending on who is leaving and why, selection could either be positive or negative. Unfortunately, characteristics of return migrants are unobservable in our sample. Further, the existing literature is unclear whether selection on return migration is a significant problem, and, if so, the direction of the bias. As Mukhopadhyay and Oxborrow (2012) point out, various studies find evidence of both positive and negative selection effects due to return migration, while other studies find no significant selection effects, or that the decision to return is based more on familial and cultural factors, rather than economic opportunities (Constant and Massey 2003).

Our aim in this analysis is to explore the relationship between the length of time it takes an individual to obtain lawful permanent residence and their earnings. We begin by examining the difference in earnings between lawful permanent residents and immigrants with temporary visas.⁴ We estimate the following wage equation:

$$\ln(y_i) = \alpha + \beta LPR_i + \Gamma X_i + \epsilon_i$$

where y_i is the immigrant's earnings, measured in weekly salary,⁵ LPR is an indicator for whether the immigrant has lawful permanent resident status, and X is a vector of demographic, education, and occupational controls. Demographic controls include age, race, and gender. Educational controls include highest degree obtained and whether the degree was earned in the US. For occupational controls, we include responses to seven binary variables related to the respondents' "Primary/secondary work activity on principal job," which are computer applications; development and design; management/sales; basic and applied research; teaching; a combination of research and development/design; and a combination of research, development/design, and teaching. For immigrants, we control for region and/or country of origin, type of visa first used to enter the US, and current visa held. We also include a dummy for survey year to control for any year-specific effects. In addition to LPR visas, NSGC identifies temporary visas to broad categories of work, student, dependent, and other. We restrict our sample to working age (18–65 years old) immigrants who entered the US before 2010, were at least 18 years old when they first entered the country, are not naturalized citizens, and did not have lawful

² Data for NSGC are drawn from a stratified random sample of ACS respondents. Total sample sizes for each wave are between 77,188 and 104,599, a subset of which are immigrants with varying legal statuses. After exclusion restrictions described below we use 12,630 observations.

³ The American Community Survey only differentiates between naturalized US citizens and non-naturalized immigrants. Hence it is not possible to determine whether non-citizen immigrants are lawful permanent residents, non-immigrant residents, or undocumented immigrants.

⁴ Data limitations prevent calculation of time between arrival in US and naturalization. Hence, we exclude naturalized citizens from this analysis in order to maintain comparable reference groups in the analysis that follows. Estimates including naturalized US citizens yield similar results. Results available upon request.

⁵ The survey reports annual salary and weeks worked per year. Approximately 10% of our sample reported working fewer than 52 weeks per year. To control for any bias that might arise from partial-year earnings, we normalize reported annual salary to weekly. Results obtained using annual salary yield similar estimates. Results available upon request.

permanent resident status at their time of first entry. These restrictions ensure that the decision to obtain lawful permanent resident status was a positive, proactive choice on behalf of those who did. However, this does not preclude the desire for those on temporary visas to obtain LPR status in the future.

We estimate the model first for the entire sample, comparing earnings of lawful permanent residents and all temporary visa holders. Then, recognizing that labor market structures might differ across education levels, we estimate the model again according to highest degree obtained. We then compare earnings between lawful permanent residents and holders of different categories of temporary visas. While we do not know the exact visa types held, and these broad categories can each encompass several different visa types, the characteristics of our sample allow us to narrow down which visas are most likely to be held in each category, thus allowing us to make inferences regarding the severity of labor market restrictions associated with the type of visa held. Given that everyone in our sample holds a bachelor degree or higher, individuals holding a temporary work visa are most likely to hold an H-1B (specialty occupations requiring highly specialized knowledge) or L (intra-company transfers) visas, and less likely to be H-2A (temporary agricultural worker) or H-2B (temporary or seasonal laborer) visa holders. As such, we expect those with temporary work visas to have better labor market access and higher earnings than those holding student visas or dependent visas. Based on our expectation that temporary work visas are most likely to be H-1B or L visas, it follows that temporary dependent visa holders are likely to have H-4 or L-2 visas, which may allow for spouses to work in the US under certain conditions. These visas offer greater labor market flexibility than a student F visa, which limits employment to on-campus jobs or limited time Optional Practical Training (OPT). Based on these inferences of visa type, we expect the wage differentials between lawful permanent residents to be larger for student visa holders, who have the most severe labor restrictions, than for dependent visa holders. Further, we expect the differential to be smaller for immigrants on temporary work visas. Unfortunately, we have little information regarding immigrants in the “other” category. This category could potentially include E visa holders (treaty traders and investors), P visa holders (athletes, performers, and entertainers), cultural exchange visas, and temporary religious workers, or possibly immigrants who entered without inspection or overstayed their visas. Hence, it is unclear how obtaining LPR status would affect these individuals’ earnings.

As mentioned above, prior literature largely presents citizenship or lawful permanent resident status as a binary option. That is, immigrants are either naturalized citizens or green card holders, or not. However, if they are not citizens or lawful permanent residents, there is no differentiation between different types of legal status, and labor market restrictions they might face based on this status. For example, students on F1

visas are restricted to either working jobs on their college campus (usually low-paying jobs), or are restricted to working for a short period of Optional Practical Training. Individuals on H1-B visas generally work in high-paying sectors. Some individuals may have visas that do not allow them to work, or may not have documented lawful presence in the US (i.e., those who have overstayed their visas or entered without inspection). Should they choose to work “under the table,” they would be particularly vulnerable to exploitation by employers. Not controlling for these differences could potentially bias the results on wage gains from obtaining a green card, as well as those found in the previous literature (Massey and Bartley 2005).

Summary statistics for this sample are presented in Table 1. After applying the sample restrictions described above, we have 12,630 observations. The average weekly salary is \$1915. Lawful permanent residents make up 62% of the sample. The highest obtained degree for 26% of the sample is a bachelor’s degree, 47% have master’s degrees, 24% have doctorate degrees, and 3% have professional degrees. The average person is 39 years old and has been in the US for 12 years. Approximately one-third of the sample is female, 60% are Asian, 9% are Hispanic, and 4% are black. Among the

Table 1 Selected summary statistics for model 1 ($n = 12,630$)

Variable	Mean	Std. Dev.
Weekly salary	1914.62	2575.11
Ln(weekly salary)	7.2563	0.8030
LPR	0.6232	0.4846
Highest degree earned in US	0.5368	0.4987
Bachelor	0.2630	0.4403
Master	0.4699	0.4991
Doctorate	0.2405	0.4274
Professional	0.0265	0.1607
Years in US	11.97	6.25
Age	38.86	8.61
Female	0.3494	0.4768
Asian	0.5951	0.4909
Black	0.0416	0.1996
Hispanic	0.0900	0.2862
Current visa = work	0.2645	0.4411
Current visa = student	0.0998	0.2998
Current visa = dependent	0.0049	0.0699
Current visa = other	0.0075	0.0864
Europe	0.1859	0.3890
Asia	0.6128	0.4871
Africa	0.0392	0.1941
LAC	0.0987	0.2982
China	0.1536	0.3606
India	0.2728	0.4454

population with temporary visas at the time of the survey, 70% had work visas and 26% were on student visas. The vast majority (61%) come from Asian countries, with 27% from India and 15% from China.

Once we establish earnings differences between lawful permanent residents and immigrants on temporary visas, we then examine the relationship between earnings and the length of time to obtain LPR status. We amend our wage equation such that

$$\ln(y_i) = \alpha + \beta Wait_i + \sum_{j=1}^3 \delta_{ij}(Wait_i)(Entry_j) + \Gamma X_i + \epsilon_i$$

where $Wait_i$ is equal to the number of years between first entry to the US and the year LPR status was obtained for immigrants who entered on work, temporary, and other visas, and equal to the number of years between receipt of highest degree and receipt of LPR status for immigrants who entered on student visas. We further restrict the sample to observations with positive, non-zero values of wait years.⁶ $Entry_j$ is a dummy variable corresponding to type of entry visa, where ($j \in student, dependent, other$) and work visa is excluded category. X is a vector of control variables similar to those above. Summary statistics for this sample are reported in Table 2. Average incomes for the subset of lawful permanent residents are slightly higher, at \$2094 per week. Lawful permanent residents are more likely to hold a bachelor’s degree and less likely to hold a master’s degree. Lawful permanent residents, on average, are older and have been in the US longer. The share of lawful permanent residents from Asian countries is substantially lower than in the full sample, primarily due to a lower share of Chinese immigrants who obtain LPR visas.

As above, we estimate the model first on the entire sample, then according to education level. Further, we also estimate the model according to region of origin to examine differences in effects that might arise from visa backlogs.

Results

Lawful Permanent Resident Status

Table 3 presents results of our baseline model, in which we use a set of controls similar to those found previously in the literature. In column 1, results from the full sample indicate

⁶ Our restrictions on student entry visas are designed to capture the scenario where immigrants receive an education in the US, then transition to a work visa, which eventually leads to LPR status. These restrictions exclude approximately 10 % of the observations for student visa entries. Some immigrants entering on student visas never receive a degree after entering the US, but obtain LPR status, suggesting they adjusted status through family preferences after entry, then left school. Others received LPR status several years before receiving their highest degree, suggesting that they returned to school for an advanced degree after receiving LPR status.

Table 2 Selected summary statistics for model 2 ($n = 6430$)

Variable	Mean	Std. Dev.
Weekly salary	2094.05	2965.36
Ln(weekly salary)	7.3311	0.8288
Wait years	6.3673	4.3458
Highest degree earned in US	0.4585	0.4983
Bachelor	0.3061	0.4609
Master	0.4118	0.4922
Doctorate	0.2510	0.4336
Professional	0.0311	0.1736
Years in US	13.9423	6.3762
Age	41.9033	8.2388
Female	0.3754	0.4843
Asian	0.5198	0.4996
Black	0.0404	0.1970
Hispanic	0.0988	0.2984
Entry visa = student	0.4846	0.4998
Entry visa = dependent	0.1219	0.3272
Entry visa = other	0.0622	0.2416
Europe	0.2440	0.4295
Asia	0.5297	0.4992
Africa	0.0397	0.1952
LAC	0.1078	0.3101
China	0.1501	0.3572
India	0.1891	0.3916

Lawful permanent residents earn, on average, 7.8% more than those on temporary visas. This result is consistent with results found in previous studies. Results for control variables are also consistent with previous findings. Immigrants who earn their highest degrees in the US earn 3.9% more than those who do not. Incomes are substantially higher for those with advanced degrees. Incomes rise with both age and experience in the US, but diminish over time. Female, black, and Hispanic immigrants earn less than white and male immigrants. We find no significant difference in earnings between white immigrants and ethnic Asians, but immigrants from Asian countries of origin earn significantly less. Immigrants from China earn slightly more than other Asian immigrants, and Indian immigrants earn approximately the same as the comparison group.

Columns 2–5 present results according to highest degree obtained. We find a slightly larger wage differential between lawful permanent residents and temporary immigrants with masters and doctorate degrees. We find no significant difference in earning for immigrants with bachelors or professional degrees, the latter likely due to small sample size. In general, coefficient estimates for control variables are similar to those in column 1. Notable differences include ethnic Asian immigrants with doctorate degrees earn significantly less, while differences for ethnic Asian and black immigrants with

Table 3 Wage differentials between temporary and permanent immigrants; dependent variable: ln(weekly salary)

	(1) Full sample	(2) Bachelor	(3) Master	(4) Doctorate	(5) Professional
LPR	0.0771*** (0.0160)	-0.0238 (0.0357)	0.0860*** (0.0226)	0.1392*** (0.0273)	-0.0246 (0.1272)
Highest degree earned in US	0.0389* (0.0172)	-0.0595 (0.0419)	0.0904*** (0.0244)	0.0271 (0.0305)	-0.1000 (0.1200)
Master's degree	0.1059*** (0.0178)				
Doctorate degree	0.3752*** (0.0219)				
Professional degree	0.5908*** (0.0415)				
Years in US	0.0241*** (0.0047)	0.0183 (0.0095)	0.0231** (0.0071)	0.0213** (0.0080)	0.0926** (0.0298)
(Years in US) ²	-0.0003* (0.0001)	-0.0003 (0.0003)	-0.0005* (0.0002)	0.0000 (0.0002)	-0.0015* (0.0007)
Age	0.0613*** (0.0079)	0.0437** (0.0147)	0.0774*** (0.0125)	0.0338* (0.0149)	0.0718 (0.0625)
(Age) ²	-0.0006*** (0.0001)	-0.0004** (0.0002)	-0.0008*** (0.0001)	-0.0004* (0.0002)	-0.0010 (0.0007)
Female	-0.2500*** (0.0139)	-0.3320*** (0.0308)	-0.2208*** (0.0198)	-0.1913*** (0.0232)	-0.2215* (0.0943)
Asian	-0.0261 (0.0322)	0.0996 (0.0687)	-0.0511 (0.0474)	-0.1619** (0.0537)	0.0988 (0.2029)
Black	-0.2051*** (0.0458)	-0.1001 (0.0915)	-0.2164** (0.0687)	-0.2016* (0.0842)	0.1423 (0.3303)
Hispanic	-0.1507*** (0.0439)	-0.2255* (0.0884)	-0.0732 (0.0656)	-0.1849* (0.0781)	0.2313 (0.2605)
Computer applications	0.2524*** (0.0171)	0.3043*** (0.0379)	0.2254*** (0.0230)	0.1977*** (0.0336)	0.1293 (0.2566)
Development and design	0.3010*** (0.0274)	0.3790*** (0.0869)	0.3752*** (0.0413)	0.1922*** (0.0346)	0.1832 (0.2621)
Management	0.2475*** (0.0167)	0.2640*** (0.0352)	0.2611*** (0.0238)	0.2201*** (0.0297)	-0.1174 (0.1111)
R&D	0.2380*** (0.0446)	0.0659 (0.1286)	-0.1567* (0.0729)	0.3422*** (0.0647)	0.1302 (0.4006)
R&D teaching	-0.2979*** (0.0394)	-0.1355 (0.1067)	0.0199 (0.0667)	-0.3465*** (0.0632)	-0.1254 (0.2613)
Research	-0.0268 (0.0287)	0.0985 (0.0838)	0.0199 (0.0407)	-0.0088 (0.0423)	-0.4893 (0.3442)
Teaching	-0.0115 (0.0293)	-0.1737 (0.0930)	-0.4043*** (0.0547)	0.1589*** (0.0335)	-0.0108 (0.2179)
Europe	-0.0173 (0.0169)	-0.0733* (0.0358)	-0.0082 (0.0252)	-0.0095 (0.0275)	0.2895* (0.1180)
Asia	-0.0756*** (0.0146)	-0.1183*** (0.0332)	-0.0753*** (0.0204)	-0.0409 (0.0244)	0.0367 (0.1109)
Africa	-0.1154*** (0.0295)	-0.0888 (0.0533)	-0.1356** (0.0525)	-0.0495 (0.0485)	-0.2711 (0.1610)
LAC	-0.3222*** (0.0387)	-0.3924*** (0.0777)	-0.3852*** (0.0623)	-0.1236 (0.0652)	-0.3069 (0.2144)

Table 3 (continued)

	(1) Full sample	(2) Bachelor	(3) Master	(4) Doctorate	(5) Professional
China	−0.2449*** (0.0512)	−0.4020*** (0.1029)	−0.2852*** (0.0827)	0.0571 (0.0820)	−0.7341* (0.3251)
India	−0.1562** (0.0496)	−0.1659 (0.0960)	−0.2726*** (0.0794)	0.0743 (0.0874)	−0.5015 (0.2716)
2010 survey	0.0768*** (0.0232)	−0.2354*** (0.0670)	0.1151*** (0.0340)	0.1850*** (0.0348)	−0.4029* (0.2046)
2013 survey	0.3085*** (0.0210)	0.2599*** (0.0465)	0.3539*** (0.0296)	0.1672*** (0.0397)	0.3187 (0.1657)
Constant	5.5440*** (0.1550)	6.0717*** (0.2916)	5.3113*** (0.2421)	6.3678*** (0.3035)	5.8460*** (1.2725)
<i>N</i>	12,630	3322	5935	3038	335
<i>F</i> -statistic	124.1132	37.0159	77.3637	26.8233	4.0439
<i>p</i> -value	0.0000	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses

p* < 0.05, *p* < 0.01, ****p* < 0.001

masters degrees are not significantly different than white immigrants.

In Table 4, we introduce controls for current visa types of immigrants without lawful permanent resident status. For ease of interpretation, we use lawful permanent residents as the reference group, and compare earnings of immigrants holding temporary visas in four broad categories: work, student, dependent, and other. Since lawful permanent residents are the reference group, a negative coefficient in Table 4 indicates lawful permanent residents earn more than temporary visa holders, while a positive coefficient indicates lawful permanent residents earn less than temporary visa holders. As expected, we find a significant premium associated with lawful permanent resident status relative to student and dependent visa holders. Further, the premium is larger relative to student visa holders than to those holding dependent visas. Lawful permanent residents earn over 60% more than student visa holders, and 30% more than individuals on temporary dependent visas. We also find variation across degrees. The earnings differential is smaller for students with bachelor and doctorate degrees, but larger for students with master degrees. For individuals with temporary dependent visas, those with bachelor degrees earn 42% less than lawful permanent residents, but we find no significant difference for other degrees. Interestingly, we find that lawful permanent residents earn, on average, 4.5% less than individuals on temporary work visas. This difference is much larger for individuals with bachelor degrees, 9.8% less, and slightly larger for individuals with master degrees, at 5.7% less. We also find that lawful permanent residents with doctorate degrees earn 6.2% more than those with temporary work visas.

We also control for the visa category the individuals entered the country on. In general, we find that individuals who entered on work visas earn significantly more than individuals who entered on student, dependent, or other types of visas. Differences range from 20% less to 64% less, with the smallest differences between work and student visas, and the largest differences between work and other visas.

Our findings in Table 4 highlight two important points. First, wage differences between lawful permanent residents and temporary visa holders vary across types of visa. This suggests that estimated differences that do not control for status of immigrants without LPR status could be biasing results. Second, the large positive earnings differential for immigrants with lawful permanent resident visas and those on student and dependent visas suggest that the benefits associated with permanent residency are larger for those with visas that have stricter labor market restrictions. We are careful to note, however, that our methodology does not allow for us to determine what share of the estimated difference is causal and how much may be due to positive selection into LPR status.

Our finding with respect to the earnings difference between lawful permanent residents and those on temporary work visas is a departure from previous research that finds a premium associated with LPR status, and is somewhat surprising given that LPR status grants immigrants significantly more labor market access than temporary visas. The finding of negative relationship between LPR status and earnings, however, is likely not a causal relationship, but rather due to negative selection bias. The subset of immigrants who were on temporary work visas at the time of the survey includes both those who entered with work visas and those who entered on other types of visas, but converted to work visas after arrival. As

Table 4 Wage differentials between temporary and permanent immigrants; dependent variable: ln(weekly salary)

	(1) Full sample	(2) Bachelor	(3) Master	(4) Doctorate	(5) Professional
Current visa = work	0.0451** (0.0164)	0.0983** (0.0375)	0.0574* (0.0226)	-0.0617* (0.0287)	0.0733 (0.1347)
Current visa = student	-0.6059*** (0.0251)	-0.5558*** (0.0718)	-0.7063*** (0.0347)	-0.3838*** (0.0406)	-0.3450 (0.2319)
Current visa = dependent	-0.3029*** (0.0871)	-0.4211** (0.1526)	-0.2212 (0.1217)	-0.2948 (0.2544)	-0.1817 (0.8109)
Current visa = other	-0.1441* (0.0704)	-0.1957 (0.1159)	-0.0755 (0.1110)	0.0204 (0.1659)	-0.6297 (0.5739)
Entry visa = student	-0.2679*** (0.0194)	-0.2905*** (0.0434)	-0.2043*** (0.0289)	-0.2301*** (0.0359)	-0.0033 (0.1302)
Entry visa = dependent	-0.4072*** (0.0251)	-0.4611*** (0.0486)	-0.3253*** (0.0357)	-0.3103*** (0.0594)	-0.4936** (0.1599)
Entry visa = other	-0.5685*** (0.0316)	-0.5471*** (0.0486)	-0.6383*** (0.0551)	-0.6186*** (0.1078)	-0.0322 (0.1849)
Highest degree earned in US	0.0956*** (0.0175)	-0.0310 (0.0428)	0.1202*** (0.0256)	0.0860** (0.0309)	-0.1269 (0.1195)
Master's degree	0.1164*** (0.0171)				
Doctorate degree	0.3643*** (0.0215)				
Professional degree	0.6376*** (0.0398)				
Years in US	0.0245*** (0.0045)	0.0246** (0.0092)	0.0196** (0.0068)	0.0227** (0.0078)	0.0950** (0.0293)
(Years in US) ²	-0.0002 (0.0001)	-0.0003 (0.0002)	-0.0003 (0.0002)	0.0001 (0.0002)	-0.0016* (0.0007)
Age	0.0224** (0.0077)	-0.0027 (0.0147)	0.0420*** (0.0120)	0.0155 (0.0147)	0.0571 (0.0623)
(Age) ²	-0.0003** (0.0001)	-0.0000 (0.0002)	-0.0005*** (0.0001)	-0.0002 (0.0002)	-0.0008 (0.0007)
Female	-0.2077*** (0.0138)	-0.2476*** (0.0312)	-0.1975*** (0.0198)	-0.1797*** (0.0231)	-0.1281 (0.0959)
Asian	-0.0638* (0.0307)	0.0616 (0.0658)	-0.0957* (0.0448)	-0.1607** (0.0528)	0.0313 (0.2029)
Black	-0.1913*** (0.0437)	-0.0836 (0.0877)	-0.2190*** (0.0648)	-0.2001* (0.0829)	0.1345 (0.3230)
Hispanic	-0.1389*** (0.0418)	-0.2086* (0.0850)	-0.0912 (0.0619)	-0.1842* (0.0767)	0.2076 (0.2564)
Computer applications	0.1945*** (0.0164)	0.2030*** (0.0369)	0.1797*** (0.0218)	0.1933*** (0.0330)	0.1478 (0.2512)
Development and design	0.2311*** (0.0262)	0.2846*** (0.0834)	0.2639*** (0.0392)	0.1746*** (0.0340)	0.1312 (0.2612)
Management	0.1943*** (0.0160)	0.2007*** (0.0339)	0.2066*** (0.0225)	0.2005*** (0.0292)	-0.1787 (0.1097)
R&D	0.2299*** (0.0425)	0.1444 (0.1236)	-0.0223 (0.0690)	0.3276*** (0.0634)	0.1254 (0.3927)
R&D teaching	-0.2552*** (0.0375)	-0.1889 (0.1026)	-0.0336 (0.0629)	-0.3344*** (0.0620)	-0.1634 (0.2576)

Table 4 (continued)

	(1) Full sample	(2) Bachelor	(3) Master	(4) Doctorate	(5) Professional
Research	0.0185 (0.0274)	0.1232 (0.0807)	0.0685 (0.0384)	0.0057 (0.0415)	-0.4796 (0.3366)
Teaching	-0.0009 (0.0280)	-0.0989 (0.0898)	-0.2574*** (0.0520)	0.1429*** (0.0329)	-0.0402 (0.2134)
Europe	-0.0220 (0.0161)	-0.0741* (0.0343)	-0.0127 (0.0238)	-0.0050 (0.0270)	0.2807* (0.1159)
Asia	-0.0599*** (0.0140)	-0.1050*** (0.0318)	-0.0532** (0.0193)	-0.0293 (0.0240)	0.0569 (0.1090)
Africa	-0.0464 (0.0282)	-0.0258 (0.0512)	-0.0747 (0.0498)	-0.0093 (0.0477)	-0.2591 (0.1605)
LAC	-0.1711*** (0.0371)	-0.2405** (0.0751)	-0.2329*** (0.0592)	-0.0618 (0.0642)	-0.2573 (0.2183)
China	-0.1269** (0.0490)	-0.2465* (0.0990)	-0.1533 (0.0783)	0.0908 (0.0809)	-0.7482* (0.3222)
India	-0.0770 (0.0474)	-0.0596 (0.0922)	-0.1828* (0.0751)	0.1158 (0.0860)	-0.5417* (0.2661)
2010 survey	0.0881*** (0.0222)	-0.1231 (0.0656)	0.1342*** (0.0323)	0.1591*** (0.0342)	-0.3010 (0.2046)
2013 survey	0.1917*** (0.0205)	0.1534*** (0.0459)	0.2136*** (0.0288)	0.1356*** (0.0391)	0.4130* (0.1680)
Constant	6.6677*** (0.1559)	7.2588*** (0.3034)	6.3796*** (0.2396)	7.0838*** (0.3089)	6.2401*** (1.3029)
<i>N</i>	12,630	3322	5935	3038	335
<i>F</i> -statistic	150.5426	42.5807	94.2909	26.7803	4.1077
<i>p</i> -value	0.0000	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

mentioned above, these are most likely H1-B visas, which are awarded to highly skilled workers who would command a higher salary than typical workers. While this may be a step in the process ultimately leading to LPR status, it is not the only path. Although most of the employment-based preference visas are awarded to individuals who adjust their status while in the US, it is more common for immigrants to adjust to lawful permanent residents through marriage. In 2015, for immigrants who obtained lawful permanent resident visas through status adjustment, 121,978 were issued for employment-based preferences, and 158,768 were awarded to spouses of US citizens (Department of Homeland Security 2015). Thus, we would expect the lawful permanent residents in our sample to contain immigrants from both groups, with those who converted to H1-B visas having higher earnings, and those who did not with lower earnings.

This is less likely to be true among immigrants who entered the US on temporary work visas, i.e. we would expect that H1-B visa holders would be more likely to obtain lawful permanent resident status through employment-based

preferences than through marriage. Unfortunately, the data do not allow us to differentiate between lawful permanent residents who were awarded employment preference visas, and those awarded family-preference visas. As such, the finding of a negative earnings differential for lawful permanent residents may be due more to comparing different populations than to a causal impact. There are also several other possible explanations for not finding a positive effect of obtaining LPR status. First, the desire to obtain LPR status may not be related to moving jobs, but rather to keep the job they have. Temporary work visas are, by definition, temporary. If an immigrant’s work visa expires, they have to leave the country. If employment opportunities are better for them in the US, then they may wish to remain in the country. While the immigrant may be better off than if they had left the country, this would not show up in earnings data within the US. Second, H1-B visas require that the employer pay the prevailing wage, either within the firm for the same job or within the industry, whichever is larger (Department of Labor 2018). Thus, even if an employee changes jobs after receiving lawful permanent

Table 5 Wait time by degree; dependent variable: ln(weekly salary)

	(1) Full sample	(2) Bachelor	(3) Master	(4) Doctorate	(5) Professional
Wait	− 0.0201*** (0.0043)	− 0.0180* (0.0073)	− 0.0202** (0.0073)	− 0.0305*** (0.0077)	− 0.0572 (0.0405)
Wait*student	0.0193*** (0.0053)	0.0252* (0.0101)	0.0160 (0.0088)	0.0260** (0.0090)	0.0596 (0.0427)
Wait*dependent	0.0196** (0.0076)	0.0099 (0.0156)	0.0133 (0.0112)	0.0653*** (0.0150)	0.0038 (0.0547)
Wait*other	0.0229** (0.0078)	0.0152 (0.0117)	0.0403* (0.0164)	0.0246 (0.0212)	0.0368 (0.0529)
Entry visa = student	− 0.4055*** (0.0473)	− 0.5101*** (0.1039)	− 0.3531*** (0.0758)	− 0.3697*** (0.0747)	− 0.3546 (0.3561)
Entry visa = dependent	− 0.5774*** (0.0584)	− 0.5407*** (0.1076)	− 0.5052*** (0.0900)	− 0.7537*** (0.1292)	− 0.6886 (0.4054)
Entry visa = other	− 0.7884*** (0.0672)	− 0.7006*** (0.1031)	− 0.9743*** (0.1260)	− 0.6969** (0.2178)	− 0.2963 (0.4535)
Highest degree earned in US	0.1237*** (0.0267)	0.0204 (0.0638)	0.1706*** (0.0400)	0.1185** (0.0425)	− 0.1220 (0.1809)
Master's degree	0.1333*** (0.0249)				
Doctorate degree	0.3408*** (0.0315)				
Professional degree	0.5613*** (0.0556)				
Years in US	0.0285*** (0.0069)	0.0309* (0.0133)	0.0213* (0.0108)	0.0213 (0.0115)	0.1270* (0.0562)
(Years in US) ²	− 0.0004* (0.0002)	− 0.0005 (0.0003)	− 0.0004 (0.0003)	0.0000 (0.0003)	− 0.0024 (0.0014)
Age	0.0171 (0.0124)	− 0.0091 (0.0222)	0.0433* (0.0206)	0.0143 (0.0228)	0.0241 (0.1038)
(Age) ²	− 0.0002 (0.0001)	0.0001 (0.0002)	− 0.0005* (0.0002)	− 0.0002 (0.0002)	− 0.0004 (0.0011)
Female	− 0.2608*** (0.0209)	− 0.3027*** (0.0447)	− 0.2635*** (0.0325)	− 0.2165*** (0.0316)	− 0.0378 (0.1441)
Asian	− 0.0478 (0.0474)	0.0760 (0.0915)	− 0.1105 (0.0727)	− 0.1553 (0.0827)	− 0.4551 (0.3523)
Black	− 0.1954** (0.0654)	− 0.1313 (0.1239)	− 0.1773 (0.1062)	− 0.1371 (0.1168)	0.3650 (0.4013)
Hispanic	− 0.1057 (0.0623)	− 0.2234 (0.1247)	0.0072 (0.0973)	− 0.2175* (0.1057)	0.3566 (0.3636)
Computer applications	0.2199*** (0.0254)	0.2370*** (0.0531)	0.1996*** (0.0358)	0.1973*** (0.0475)	0.0929 (0.4173)
Development and design	0.3174*** (0.0419)	0.3680** (0.1260)	0.4377*** (0.0690)	0.1924*** (0.0479)	0.3532 (0.4108)
Management	0.2219*** (0.0239)	0.2642*** (0.0488)	0.2233*** (0.0366)	0.1925*** (0.0382)	− 0.3136 (0.1626)
R&D	0.2519*** (0.0654)	0.2126 (0.1990)	− 0.2473 (0.1314)	0.3125*** (0.0830)	− 0.1252 (0.5718)
R&D teaching	− 0.3355*** (0.0571)	− 0.2613 (0.1698)	0.0311 (0.1224)	− 0.3614*** (0.0792)	− 0.5612 (0.3576)

Table 5 (continued)

	(1) Full sample	(2) Bachelor	(3) Master	(4) Doctorate	(5) Professional
Research	0.1397** (0.0427)	0.1879 (0.1189)	0.2702*** (0.0653)	0.0868 (0.0564)	0.0411 (0.5077)
Teaching	0.0587 (0.0444)	-0.0466 (0.1556)	-0.3433** (0.1086)	0.1263** (0.0446)	0.1518 (0.2845)
Europe	-0.0570 (0.0381)	-0.0120 (0.0655)	-0.1085 (0.0731)	0.0084 (0.0621)	-0.5240* (0.2167)
Asia	-0.2388*** (0.0549)	-0.2607* (0.1032)	-0.3142*** (0.0908)	-0.0953 (0.0948)	-0.2492 (0.3552)
Africa	-0.1366 (0.0709)	-0.1528 (0.1341)	-0.2548* (0.1217)	0.1195 (0.1145)	-1.3307** (0.4093)
LAC	-0.1133 (0.0691)	-0.0280 (0.1308)	-0.3095** (0.1167)	0.0910 (0.1191)	-0.6760 (0.3657)
China	0.1188*** (0.0337)	-0.1025 (0.1059)	0.2310*** (0.0518)	0.1321** (0.0478)	0.0667 (0.2796)
India	0.2528*** (0.0321)	0.2408*** (0.0692)	0.3015*** (0.0463)	0.1798** (0.0586)	0.8773** (0.2730)
2010 survey	-0.0280 (0.0235)	-0.0909 (0.0476)	0.0015 (0.0368)	-0.0097 (0.0361)	0.1142 (0.1684)
2013 survey	-0.0632** (0.0212)	-0.1177** (0.0452)	-0.0328 (0.0320)	-0.0448 (0.0325)	-0.0656 (0.1492)
Constant	6.9090*** (0.2563)	7.4462*** (0.4639)	6.5616*** (0.4215)	7.2784*** (0.4956)	7.2167** (2.1916)
<i>N</i>	6430	1968	2648	1614	200
<i>F</i> -statistic	57.3632	21.8602	25.3129	11.0959	2.7444
<i>p</i> -value	0.0000	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses

p* < 0.05, *p* < 0.01, ****p* < 0.001

residence, they might earn similar salary at the new firm. As Hunt (2017) points out, for immigrants who switch jobs, higher pay is only one of many reasons given. Other reasons include better working conditions, location, and career interests. Finally, the amount of time it takes to obtain lawful permanent resident status might impact the immigrant’s wage growth. We explore this possibility below.

Visa Wait Time

Table 5 presents results for estimates of our amended wage equation, which controls for visa wait time on weekly earnings. Our sample consists entirely of immigrants with lawful permanent resident status, who originally entered on temporary visas. Our key variable of interest is the number of years between when an immigrant entered the US and the year they obtained their LPR status, or, in the case of immigrants who entered on student visas, the number of years between when they obtained their highest degree and when they obtained LPR status. Column 1 presents results for the entire sample.

We estimate the effect across different types of entry visas, by including interaction terms between wait time and student, dependent, and other entry visa categories. Our reference group is immigrants who entered with temporary work visas. Thus, the coefficient estimate for our wait time variable without interaction (first row of Table 5) represents the effect of wait time on immigrants who entered on work visas. The relationship between wait times and earnings for other entry visa categories will be the sum of the wait time coefficient and the interaction term coefficients. We find that each additional year is associated with a 2% reduction in weekly earnings for immigrants who entered the US on a work visa. As Hunt (2017) points out, immigrants are less likely to change jobs in the period just prior to receiving lawful permanent resident visa. One reason for this may be fear that the sponsoring employer might pull support for the employee’s application. To some extent, immigrants have some control over when they begin the application process. However, once the process begins, myriad factors can impact the amount of time it takes to receive the LPR visa, including the type of visa applied for,

Table 6 Wait time by region; dependent variable: ln(weekly salary)

	(1) Full sample	(2) Europe	(3) Asia	(4) Africa	(5) LAC
Wait	−0.0201*** (0.0043)	−0.0262*** (0.0070)	−0.0037 (0.0081)	−0.0183 (0.0148)	−0.0579*** (0.0171)
Wait*student	0.0193*** (0.0053)	0.0269** (0.0095)	0.0001 (0.0091)	−0.0292 (0.0197)	0.0827*** (0.0189)
Wait*sependent	0.0196** (0.0076)	0.0469** (0.0145)	−0.0055 (0.0119)	−0.0088 (0.0302)	0.0587* (0.0241)
Wait*other	0.0229** (0.0078)	0.0155 (0.0167)	0.0064 (0.0139)	−0.0753* (0.0335)	0.0713*** (0.0199)
Entry visa = student	−0.4055*** (0.0473)	−0.4555*** (0.0888)	−0.3001*** (0.0767)	−0.1335 (0.2099)	−0.7864*** (0.1556)
Entry visa = dependent	−0.5774*** (0.0584)	−0.6638*** (0.1074)	−0.4314*** (0.0901)	−0.3817 (0.2402)	−0.9792*** (0.2078)
Entry visa = other	−0.7884*** (0.0672)	−0.8209*** (0.1345)	−0.4556*** (0.1159)	−0.3382 (0.2818)	−1.2047*** (0.1623)
Highest degree earned in US	0.1237*** (0.0267)	0.0995 (0.0546)	0.1510*** (0.0379)	−0.0248 (0.1110)	0.1871* (0.0901)
Master's degree	0.1333*** (0.0249)	0.1207* (0.0500)	0.1008** (0.0356)	0.0875 (0.1065)	0.1378 (0.0809)
Doctorate degree	0.3408*** (0.0315)	0.2939*** (0.0619)	0.2764*** (0.0447)	0.5414*** (0.1406)	0.5330*** (0.1081)
Professional degree	0.5613*** (0.0556)	0.2501* (0.1257)	0.5213*** (0.0914)	0.1344 (0.2124)	0.8374*** (0.1263)
Years in US	0.0285*** (0.0069)	0.0148 (0.0130)	0.0465*** (0.0104)	−0.0129 (0.0270)	0.0180 (0.0221)
(Years in US) ²	−0.0004* (0.0002)	−0.0001 (0.0003)	−0.0007** (0.0003)	0.0009 (0.0007)	−0.0003 (0.0005)
Age	0.0171 (0.0124)	0.0312 (0.0247)	−0.0029 (0.0181)	0.1121* (0.0511)	0.0839* (0.0384)
(Age) ²	−0.0002 (0.0001)	−0.0003 (0.0003)	−0.0001 (0.0002)	−0.0014* (0.0006)	−0.0009* (0.0004)
Female	−0.2608*** (0.0209)	−0.3756*** (0.0468)	−0.1946*** (0.0279)	−0.2075* (0.0945)	−0.2880*** (0.0645)
Asian	−0.0478 (0.0474)	−0.1873 (0.1663)	−0.0369 (0.0603)	0.2886 (0.2052)	−0.1822 (0.1558)
Black	−0.1954** (0.0654)	−0.7511** (0.2738)	0.4016 (0.2297)	−0.1011 (0.1081)	−0.1146 (0.1245)
Hispanic	−0.1057 (0.0623)	0.0320 (0.1190)	−0.2497 (0.2035)	0.1168 (0.7031)	−0.1175 (0.1010)
Computer applications	0.2199*** (0.0254)	0.1730** (0.0577)	0.2420*** (0.0314)	0.3005* (0.1251)	0.2516* (0.1012)
Development and design	0.3174*** (0.0419)	0.2466* (0.0958)	0.3131*** (0.0511)	0.2383 (0.1948)	0.3585* (0.1713)
Management	0.2219*** (0.0239)	0.3034*** (0.0532)	0.1597*** (0.0313)	0.2021 (0.1087)	0.2208** (0.0775)
R&D	0.2519*** (0.0654)	0.3254* (0.1346)	0.3727*** (0.0936)	0.2365 (0.2933)	−0.0859 (0.2169)
R&D teaching	−0.3355*** (0.0571)	−0.3813*** (0.1124)	−0.4207*** (0.0860)	−0.2066 (0.2555)	−0.1084 (0.1610)

Table 6 (continued)

	(1) Full sample	(2) Europe	(3) Asia	(4) Africa	(5) LAC
Research	0.1397** (0.0427)	0.1853 (0.0983)	0.1196* (0.0515)	0.0583 (0.2007)	0.1909 (0.1786)
Teaching	0.0587 (0.0444)	0.1098 (0.0865)	0.0884 (0.0633)	0.1879 (0.2215)	-0.0682 (0.1374)
Europe	-0.0570 (0.0381)				
Asia	-0.2388*** (0.0549)				
Africa	-0.1366 (0.0709)				
LAC	-0.1133 (0.0691)				
China	0.1188*** (0.0337)		0.1336*** (0.0345)		
India	0.2528*** (0.0321)		0.2494*** (0.0330)		
2010 survey	-0.0280 (0.0235)	-0.0553 (0.0494)	-0.0302 (0.0312)	0.1413 (0.1106)	-0.0571 (0.0772)
2013 survey	-0.0632** (0.0212)	-0.1449** (0.0459)	-0.0380 (0.0276)	0.0517 (0.1014)	-0.0566 (0.0701)
Constant	6.9090*** (0.2563)	6.6890*** (0.5179)	6.8770*** (0.3686)	4.9798*** (1.0773)	5.6199*** (0.7916)
<i>N</i>	6430	1569	3406	255	693
<i>F</i> -statistic	57.3632	17.7940	31.0095	5.2100	11.2302
<i>p</i> -value	0.0000	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses

p* < 0.05, *p* < 0.01, ****p* < 0.001

the number of applications in a given year, and the applicant’s country of origin. To the extent that this varies among immigrants, some immigrants might have a longer period of unwillingness to change jobs than others. This, in turn, could negatively affect wage growth. Likewise, during the application process employees may be less willing to ask sponsoring employers for pay raises, again out of fear of losing sponsorship. We note that some of this effect could be due to reverse causality. That is, employers willing to sponsor an immigrant for an employment-based LPR visa may want to begin the application process early for high performing immigrants in an effort to build loyalty and prevent the employee from leaving the company after receiving their visa, in which case our coefficient estimates may overstate the effect of wait times. However, there is also reason to believe that our results are biased upward due to negative selection. If wait times are excessively costly, and an immigrant has sufficient opportunities in their home country, they may opt to return home rather than wait. Thus, through attrition, we are losing those who are most adversely affected by wait times.

Our coefficient estimates for the interaction terms for other entry visa types are all significant, but they are also all positive. Table 9, panel A presents coefficient estimates and joint significant tests of the sum of the level and interaction terms, $\hat{b} + \hat{d}(Entry_j)$. We find no significant relationship between wait times and earnings for immigrants who entered on student, dependent, and other visa categories. One possible explanation might be the ability of these visa holders to search for jobs and gain job market information in the US. That is, those who enter on temporary work visas are employed prior to entering the US. If their employment is terminated they must leave the US immediately. Students and dependents, on the other hand, do not face this limitation. Their visas allow them to be in the US regardless of employment status, and may work in certain instances. Thus, while they may have large benefits from obtaining LPR status at the extensive margin, as seen in the previous section, there does not appear to be any negative association with longer wait times.

Table 7 Wait time 5+ years by degree; dependent variable: ln(weekly salary)

	(1) Full sample	(2) Bachelor	(3) Master	(4) Doctorate	(5) Professional
Wait	−0.0175** (0.0059)	−0.0218* (0.0104)	−0.0079 (0.0097)	−0.0351*** (0.0103)	0.0256 (0.0578)
Wait*student	0.0068 (0.0070)	0.0351** (0.0135)	−0.0126 (0.0117)	0.0157 (0.0119)	−0.0364 (0.0597)
Wait*dependent	0.0107 (0.0107)	−0.0037 (0.0254)	−0.0087 (0.0146)	0.0674*** (0.0191)	−0.0456 (0.1011)
Wait*other	0.0091 (0.0111)	−0.0054 (0.0167)	0.0661** (0.0240)	−0.0058 (0.0301)	−0.0063 (0.0770)
Entry visa = student	−0.2674*** (0.0701)	−0.6225*** (0.1530)	−0.0856 (0.1127)	−0.2631* (0.1151)	0.5827 (0.5516)
Entry visa = dependent	−0.4783*** (0.1013)	−0.3620 (0.2293)	−0.2886* (0.1399)	−0.7831*** (0.1898)	−0.1653 (0.9049)
Entry visa = other	−0.6203*** (0.1205)	−0.3863* (0.1812)	−1.3061*** (0.2373)	−0.2485 (0.3737)	−0.1977 (0.8619)
Highest degree earned in US	0.1185*** (0.0325)	−0.0771 (0.0788)	0.1609*** (0.0469)	0.1216* (0.0546)	−0.2003 (0.2224)
Master's degree	0.1228*** (0.0316)				
Doctorate degree	0.3239*** (0.0401)				
Professional degree	0.5472*** (0.0684)				
Years in US	0.0298** (0.0097)	0.0128 (0.0186)	0.0213 (0.0149)	0.0429* (0.0170)	0.1293 (0.0827)
(Years in US) ²	−0.0004 (0.0002)	0.0000 (0.0005)	−0.0003 (0.0004)	−0.0005 (0.0004)	−0.0025 (0.0021)
Age	0.0185 (0.0170)	−0.0121 (0.0313)	0.0654* (0.0263)	0.0116 (0.0369)	0.1150 (0.1318)
(Age) ²	−0.0003 (0.0002)	0.0001 (0.0003)	−0.0008** (0.0003)	−0.0002 (0.0004)	−0.0013 (0.0014)
Female	−0.2588*** (0.0274)	−0.2963*** (0.0593)	−0.2641*** (0.0405)	−0.2118*** (0.0447)	−0.1200 (0.1716)
Asian	−0.1008 (0.0658)	−0.0626 (0.1237)	−0.1449 (0.0953)	−0.0729 (0.1399)	−0.5021 (0.3935)
Black	−0.2110* (0.0867)	−0.0694 (0.1645)	−0.1582 (0.1328)	−0.1053 (0.1681)	1.6062 (0.9602)
Hispanic	−0.0405 (0.0800)	−0.2494 (0.1596)	0.0743 (0.1189)	−0.0161 (0.1512)	0.2157 (0.3824)
Computer applications	0.1925*** (0.0318)	0.2160** (0.0663)	0.1659*** (0.0422)	0.1781** (0.0668)	
Development and design	0.3176*** (0.0547)	0.3551* (0.1702)	0.4206*** (0.0803)	0.1761** (0.0674)	−0.3640 (0.6621)
Management	0.2059*** (0.0300)	0.2911*** (0.0609)	0.1571*** (0.0437)	0.2147*** (0.0509)	−0.2879 (0.1990)
R&D	0.1948* (0.0863)	0.4092 (0.2550)	−0.3658* (0.1715)	0.1982 (0.1173)	0.2380 (0.8037)
R&D teaching	−0.3044*** (0.0746)	−0.4170* (0.2099)	0.1096 (0.1621)	−0.2978** (0.1091)	−0.4954 (0.3942)

Table 7 (continued)

	(1) Full sample	(2) Bachelor	(3) Master	(4) Doctorate	(5) Professional
Research	0.1522** (0.0556)	0.1626 (0.1606)	0.2733*** (0.0763)	0.1151 (0.0811)	-0.2137 (0.7669)
Teaching	0.0520 (0.0579)	0.0396 (0.1905)	-0.4256** (0.1440)	0.1156 (0.0606)	0.1944 (0.3132)
Europe	-0.0438 (0.0478)	0.0058 (0.0850)	-0.1162 (0.0872)	0.0363 (0.0805)	-0.5432* (0.2673)
Asia	-0.1963** (0.0742)	-0.1658 (0.1366)	-0.2673* (0.1158)	-0.1778 (0.1544)	-0.2249 (0.4107)
Africa	-0.2264* (0.0948)	-0.2591 (0.1835)	-0.3758* (0.1506)	0.1071 (0.1596)	-2.0940* (0.8819)
LAC	-0.1872* (0.0878)	-0.0106 (0.1674)	-0.4066** (0.1436)	-0.0587 (0.1654)	-0.5046 (0.3913)
China	0.1070* (0.0429)	-0.0774 (0.1293)	0.1841** (0.0611)	0.0939 (0.0688)	0.0487 (0.3252)
India	0.2315*** (0.0402)	0.2235** (0.0843)	0.2335*** (0.0560)	0.1659* (0.0816)	0.8811** (0.3271)
2010 survey	-0.0267 (0.0294)	-0.1190* (0.0602)	0.0032 (0.0431)	0.0061 (0.0491)	0.1329 (0.2061)
2013 survey	-0.0491 (0.0268)	-0.1040 (0.0566)	-0.0212 (0.0380)	-0.0537 (0.0449)	-0.0186 (0.1751)
Constant	6.9341*** (0.3587)	7.7648*** (0.6642)	6.2057*** (0.5444)	7.2198*** (0.8200)	4.1546 (2.7695)
<i>N</i>	4011	1263	1690	923	135
<i>F</i> -statistic	30.7317	12.5460	15.8321	6.2035	2.4345
<i>p</i> -value	0.0000	0.0000	0.0000	0.0000	0.0005

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Columns 2–5 of Table 5 present estimates according to education level. With the exception of professional degrees, we find a negative significant association between wait times and earnings for immigrants who enter on work visas. Additionally, the coefficient estimates increase according to education level. Bachelor degree holders earn 1.8% less with each additional year of wait time, master degree holders earn 2% less, and immigrants with doctorate degrees earn 3% less with each additional year of wait time. Coefficient estimates for the interaction terms are all positive, but not all are significant. Table 9 presents joint estimates and significance tests. With the exception of immigrants with doctorate degrees who entered on dependent visas, all estimates are insignificant. Interestingly, for immigrants entering on dependent visas who hold doctorate degrees, an additional year of wait time is associated with a 3% increase in wages.

Table 6 presents estimates separated by region of origin. Corresponding joint significance tests are presented in Table 9, panel B. We find that European immigrants who entered on a work visa earn 2.6% less for each additional year

of wait time. Similar immigrants from Latin American and Caribbean countries earn 5.8% less per year of wait time. We find no significant difference for immigrants from Asia or Africa who entered on work visas. However, we do find that African immigrants entering with a student visa earn 4.8% less for each additional year of wait time. Students from LAC countries earn 2.5% more for each additional year of wait time. We find no significant differences for other origin/visa combinations.

In Tables 7 and 8, we repeat the exercise in Tables 5 and 6, restricting our sample to only include immigrants who had a wait time of 5 years or more. The purpose of this exercise is to determine if the relationship is different for immigrants who had wait times longer than what might be considered normal under the immigration process. As mentioned above, immigrants from China and India can experience wait times of 5–10 years for EB-2 and EB-3 visas, which are likely to be the most common employment-based visas obtained by individuals in our sample. In Table 7, we find similar results

Table 8 Wait time 5+ years by region; dependent variable: ln(weekly salary)

	(1) Full sample	(2) Europe	(3) Asia	(4) Africa	(5) LAC
Wait	− 0.0175** (0.0059)	− 0.0368*** (0.0094)	0.0219 (0.0115)	0.0222 (0.0203)	− 0.0736** (0.0248)
Wait*student	0.0068 (0.0070)	0.0204 (0.0120)	− 0.0396** (0.0129)	− 0.0808** (0.0257)	0.1035*** (0.0268)
Wait*dependent	0.0107 (0.0107)	0.0209 (0.0198)	− 0.0233 (0.0173)	− 0.1468** (0.0459)	0.1027** (0.0336)
Wait*other	0.0091 (0.0111)	0.0569* (0.0231)	− 0.0453* (0.0208)	− 0.2029*** (0.0470)	0.0710* (0.0295)
Entry visa = student	− 0.2674*** (0.0701)	− 0.3362* (0.1326)	0.0835 (0.1172)	0.5846 (0.3253)	− 1.0629*** (0.2496)
Entry visa = dependent	− 0.4783*** (0.1013)	− 0.2825 (0.2089)	− 0.2684 (0.1506)	1.3510** (0.4891)	− 1.5136*** (0.3419)
Entry visa = other	− 0.6203*** (0.1205)	− 1.3599*** (0.2507)	0.0895 (0.2119)	1.1894* (0.4778)	− 1.1376*** (0.2990)
Highest degree earned in US	0.1185*** (0.0325)	0.0617 (0.0709)	0.1303** (0.0439)	− 0.0933 (0.1628)	0.1497 (0.1237)
Master's degree	0.1228*** (0.0316)	0.0496 (0.0657)	0.1279** (0.0435)	0.0590 (0.1509)	0.0699 (0.1112)
Doctorate degree	0.3239*** (0.0401)	0.2491** (0.0812)	0.2607*** (0.0551)	0.7421*** (0.2027)	0.5654*** (0.1424)
Professional degree	0.5472*** (0.0684)	0.1981 (0.1543)	0.5007*** (0.1131)	0.0824 (0.2774)	0.7997*** (0.1611)
Years in US	0.0298** (0.0097)	0.0488* (0.0191)	0.0312* (0.0143)	0.0250 (0.0467)	− 0.0048 (0.0316)
(Years in US) ²	− 0.0004 (0.0002)	− 0.0008 (0.0005)	− 0.0004 (0.0004)	0.0000 (0.0011)	0.0004 (0.0008)
Age	0.0185 (0.0170)	0.0156 (0.0348)	− 0.0016 (0.0243)	0.1555* (0.0755)	0.1094* (0.0549)
(Age) ²	− 0.0003 (0.0002)	− 0.0002 (0.0004)	− 0.0001 (0.0003)	− 0.0019* (0.0008)	− 0.0013* (0.0006)
Female	− 0.2588*** (0.0274)	− 0.2939*** (0.0610)	− 0.1983*** (0.0360)	− 0.3646* (0.1422)	− 0.4013*** (0.0903)
Asian	− 0.1008 (0.0658)	− 0.1398 (0.2195)	− 0.1197 (0.0862)	0.6740 (0.3473)	0.1606 (0.2224)
Black	− 0.2110* (0.0867)	− 1.0294*** (0.3112)	0.3097 (0.2477)	0.0898 (0.1683)	− 0.1471 (0.1703)
Hispanic	− 0.0405 (0.0800)	0.0680 (0.1511)	− 0.1567 (0.2492)	− 0.4099 (0.7510)	− 0.0615 (0.1346)
Computer applications	0.1925*** (0.0318)	0.0916 (0.0761)	0.2207*** (0.0382)	0.5074** (0.1726)	0.1485 (0.1350)
Development and design	0.3176*** (0.0547)	0.2094 (0.1213)	0.3043*** (0.0671)	0.3315 (0.2902)	0.2865 (0.2076)
Management	0.2059*** (0.0300)	0.3282*** (0.0680)	0.1164** (0.0385)	0.2529 (0.1592)	0.2460* (0.1017)
R&D	0.1948* (0.0863)	0.2785 (0.1772)	0.2900* (0.1221)	0.6633 (0.4063)	− 0.0524 (0.2802)
R&D teaching	− 0.3044*** (0.0746)	− 0.3401* (0.1478)	− 0.3680*** (0.1110)	− 0.6655 (0.3445)	− 0.0559 (0.2218)

Table 8 (continued)

	(1) Full sample	(2) Europe	(3) Asia	(4) Africa	(5) LAC
Research	0.1522** (0.0556)	0.1192 (0.1274)	0.1524* (0.0670)	-0.0872 (0.2874)	0.1318 (0.2192)
Teaching	0.0520 (0.0579)	0.1271 (0.1090)	0.0929 (0.0838)	0.5224 (0.2972)	-0.0889 (0.1892)
Europe	-0.0438 (0.0478)				
Asia	-0.1963** (0.0742)				
Africa	-0.2264* (0.0948)				
LAC	-0.1872* (0.0878)				
China	0.1070* (0.0429)		0.1258** (0.0438)		
India	0.2315*** (0.0402)		0.2279*** (0.0414)		
2010 survey	-0.0267 (0.0294)	0.0256 (0.0631)	-0.0753* (0.0381)	0.1947 (0.1645)	-0.0225 (0.1021)
2013 survey	-0.0491 (0.0268)	-0.0737 (0.0591)	-0.0437 (0.0341)	0.0629 (0.1472)	-0.1012 (0.0951)
Constant	6.9341*** (0.3587)	6.9131*** (0.7422)	6.9264*** (0.5085)	3.1782 (1.6522)	5.4844*** (1.1503)
<i>N</i>	4011	897	2226	136	416
<i>F</i> -statistic	30.7317	8.6108	18.3585	4.4416	6.8411
<i>p</i> -value	0.0000	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses

p* < 0.05, *p* < 0.01, ****p* < 0.001

for immigrants who entered with work visas, with the exception that the estimate for those with master degrees is now insignificant. Panel C of Table 9 presents joint estimates. Interestingly, we now find significant negative estimates for immigrants entering with student visas for the full sample, and for immigrants with master and doctorate degrees. Note that our measure for wait time for student visa entries is years after receiving their highest degree. Thus, for immigrants with advanced degrees who do not get a lawful permanent resident visa within 5 years of graduation, the cumulative earnings difference associated with a 5-year difference in wait time is approximately 10% less than those who receive LPR visas earlier.

Table 8, and corresponding Panel D of Table 9, present our results for immigrants with wait times longer than 5 years, according to region of origin. For immigrants entering on work visas, our results are similar to those found in Table 6, although with larger coefficient estimates. Immigrants from Europe earn 3.7% less for

each year of wait time, and immigrants from LAC countries earn 7.4% less per year. We find a negative significant relationship between wait time and earnings for immigrants entering with student visas from Europe, Asia, and Africa, but positive significant relationship for immigrants from LAC countries. African students have the largest negative difference at 5.9%, while European and Asian immigrants earn 1.6 and 1.8% less for each additional year, respectively. We also find that African immigrants entering on dependent and other visas have the largest negative relationship, earning 12.5 and 18.1% less per year, respectively. We find no significant relationship for dependent and other visa entries from other regions.

Taken together, our results provide evidence that visa wait times are significantly negatively associated with earnings of immigrants who enter the US on work and student visas. For those entering on student visas, these effects are concentrated among students who have wait times longer than 5 years after graduation.

Table 9 Coefficient estimates and significance tests of $\hat{b} + \hat{d}(Entry_j)$

Panel A: (Table 5)

	Full		Bachelor		Master		Doctorate		Professional	
	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value
Work	-0.020***	0.000	-0.018*	0.014	-0.020**	0.006	-0.031***	0.000	-0.057	0.160
Student	-0.001	0.800	0.007	0.320	-0.004	0.434	-0.005	0.347	0.002	0.870
Dependent	-0.001	0.930	-0.008	0.576	-0.007	0.444	0.035**	0.007	-0.053	0.175
Other	-0.003	0.687	-0.003	0.770	0.020	0.180	-0.006	0.768	-0.020	0.559

Panel B: (Table 6)

	Full		Europe		Asia		Africa		LAC	
	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value
Work	-0.020***	0.000	-0.026***	0.000	-0.004	0.644	-0.018	0.216	-0.058***	0.001
Student	-0.001	0.800	0.001	0.915	-0.004	0.411	-0.048**	0.002	0.025**	0.006
Dependent	-0.001	0.930	0.021	0.112	-0.009	0.320	-0.027	0.319	0.001	0.963
Other	-0.003	0.687	-0.011	0.485	0.003	0.821	-0.094	0.003	0.013	0.300

Panel C: (Table 7)

	Full		Bachelor		Master		Doctorate		Professional	
	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value
Work	-0.018**	0.003	-0.022*	0.036	-0.008	0.415	-0.035***	0.001	0.026	0.658
Student	-0.011*	0.014	0.013	0.152	-0.021**	0.006	-0.019**	0.006	-0.011	0.524
Dependent	-0.007	0.466	-0.026	0.284	-0.017	0.163	0.032*	0.050	-0.020	0.817
Other	-0.008	0.390	-0.027	0.055	0.058**	0.010	-0.041	0.148	0.019	0.701

Panel D: (Table 8)

	Full		Europe		Asia		Africa		LAC	
	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value
Work	-0.018**	0.003	-0.037***	0.000	0.022	0.058	0.022	0.276	-0.074**	0.003
Student	-0.011*	0.014	-0.016*	0.046	-0.018**	0.005	-0.059*	0.011	0.030*	0.018
Dependent	-0.007	0.466	-0.016	0.384	-0.001	0.914	-0.125**	0.005	0.029	0.228
Other	-0.008	0.390	0.020	0.351	-0.023	0.189	-0.181***	0.000	-0.003	0.894

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Conclusion

Prior research has found an increase in earnings associated with the increase in labor market access from obtaining lawful permanent resident status (Chi and Drewianka 2014; Mukhopadhyay and Oxborrow 2012). We revisit this question using data from the National Survey of College Graduates. For our full sample, which pools immigrants on temporary visas, we find a significant relationship between lawful permanent resident status consistent with those found in the prior literature examining the question of earnings and lawful permanent residence and naturalization. However, when we control for current visa type of immigrants on temporary visas, we find that the positive wage differentials are larger for immigrants on student and dependent visas. Further, we find immigrants on temporary work visas earn more than lawful permanent residents. We suggest several factors that may be driving this result, one of which is the amount of time individuals have to wait to obtain lawful permanent residence. During this waiting period, immigrants have limited labor market access,

which can prevent them from moving to higher paying jobs and give them limited bargaining power with their employers. We find that each additional year of wait time is associated with 2% reduction in annual earnings for immigrants who enter on temporary work visas. We also find a negative relationship between earnings and wait times for immigrants who entered the US on student visas who have waited longer than 5 years to obtain LPR status. In general, we do not find a significant relationship between wait time and earnings for those who enter on dependent and other types of visas. We also examine the relationship between wait times and earnings across regions of origin. We find that longer waits are associated with larger reductions in earnings for immigrants from Europe and LAC countries who enter on work visas, and Asian and African immigrants who enter on student visas.

While it is unclear how much of these effects are causal and how much of the effects are due to negative selection, from a policy perspective reducing wait times will undoubtedly improve economic outcomes. If immigrants are negatively selecting into lawful permanent

residence, shortening wait times will prevent higher skilled immigrants from leaving the US. If the effect is causal, shortening the wait times will give immigrants earlier access to the full US labor market and allow them to compete for higher wages. Providing more resources to Citizenship and Immigration Services would help speed up processing times and allow some immigrants to obtain lawful permanent residence faster. However, the largest gains to speeding up wait times would entail reducing the size of the visa backlog. Two ways of achieving this would be to increase the total number of available visas and/or raise or eliminate per country limits. While the current administration has expressed a desire to reduce the total number of available visas, there is currently a bill in Congress, HB 392, which would eliminate country limits for high skilled workers. While this bill would significantly help Chinese and Indian immigrants, it has been stalled in committee for over a year (Sohrabji 2018).

While the current study provides some evidence that reducing visa wait times would improve economic outcomes, we acknowledge that due to data limitations we have focused on the smallest group of immigrants affected by long visa wait times. Immigrants applying for employment-based preferences other than EB-1, EB-2, and EB-3 visas and those applying for family-preference visas experience much longer wait times. It is likely that these groups would benefit much more from faster access to the labor market. Family-preference applicants would particularly benefit, as most of these applicants wait outside the US until their visa is issued. Thus, in addition to the findings presented above, another contribution of this paper is to highlight the need for better data and more research in this area. In particular, the literature would benefit from knowing the type of LPR visa each person was issued, i.e. family- or employer-sponsored, as well as having more detailed data on immigrants with less than a college degree, who make up roughly two-thirds of the immigrant population. Further, more detailed data would allow for disentangling the causal and selection effects.

Compliance with Ethical Standards

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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