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The Labor Market Effects of Immigration Reform

Since 1965, the United States has experienced a large increase in the number of immigrants. Not only did the number of authorized immigrants increase with the lifting of national origin quotas, the number of undocumented immigrants also increased after the end of the temporary guest-worker policies such as the *bracero* program. Undoubtedly this has changed the United States labor markets and reframed policy discussions.

The issue of undocumented immigration has grown in importance during the past two decades, as the number of such immigrants has increased significantly, and as immigrants have arrived to many new destinations in the United States. These trends have prompted calls for greater immigration enforcement, but also for an eventual path to legalization for those who have lived and worked in the United States for many years.

In this study we explore the evolution of the current undocumented population over the last two decades and its demographic characteristics. We also briefly summarize the federal government's current and past policies towards immigrants. Finally, we explore the potential change in labor market outcomes among currently-undocumented immigrants if a future program that allows them to gain documents, such as the Immigration Reform and Control Act (IRCA) did in 1986, and as the proposed McCain-Kennedy immigration reform bill of 2007 would have done if enacted into law.

Our study uses a new approach to find the causal impact of IRCA on immigrant wages. We take advantage of the fact that immigrants who had been in the United States since before 1982 were eligible for IRCA, while those who came afterwards were not eligible. By estimating the likelihood that an individual Mexican migrant appearing the U.S. census is undocumented, we compare changes in the wages of those who were eligible for IRCA to those who were not.

We find that a legalization program would increase immigrant wages by more than 20 percent. We also find that most of this effect can be attributed to immigrants switching into higher paying occupations after legalization, rather than receiving higher wages in the jobs they previously held. These results, combined with other studies, suggest that a path to legal status will likely: a) help immigrants by improving their earnings, b) increase U.S. economic productivity by allowing immigrants to find jobs better matched to their skills, and c) have a negligible impact on the wages of native-born workers.

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Introduction

Over the last two decades, immigration to the United States, both authorized and unauthorized, has increased dramatically. As the population of undocumented immigrants has increased, calls for immigration reform have grown, with contentious debates over the effects of stricter enforcement and pathways to legalization on employers, undocumented workers, and native-born workers. In this report, we focus on one particular aspect of the impact of any future attempt at legalization: the extent to which the wages and employment rates of immigrants may change as a result of such legislation. In doing so, we look at data related to the last effort at comprehensive immigration reform in the United States: the Immigration Reform and Control Act (IRCA) of 1986. As we show, the current state of undocumented immigration to the United States, as well as the framework around future immigration reform, is greatly influenced by IRCA.

In analyzing this issue, we provide some important history and background information about the undocumented immigration population in the United States. First, we describe the current population, how it has changed over time, and why. We also describe the history of immigration policy in the United States over the last 50 years. Next, we summarize the literature that identifies how immigration reform affects the labor market outcomes of immigrants. Finally, we present some new evidence regarding the types of immigrants who are most likely to be affected by future immigration reform.

The Undocumented Population in the U.S.

By its very nature, undocumented immigration is generally difficult to measure. The Pew Hispanic Center has measured this population using a *residual method*, which is done by comparing changes in the estimated number of the total foreign born population living in the U.S. (from the Current Populatoin Survey) to the estimates of new *authorized* immigrants. (This group, in turn, is composed of two subgroups: 1) undocumented entrants, or those who entered the U.S. without permission, and 2) unauthorized immigrants, or those who entered the U.S. legally but have overstayed a visa, or do not possess a visa giving them the right to work).

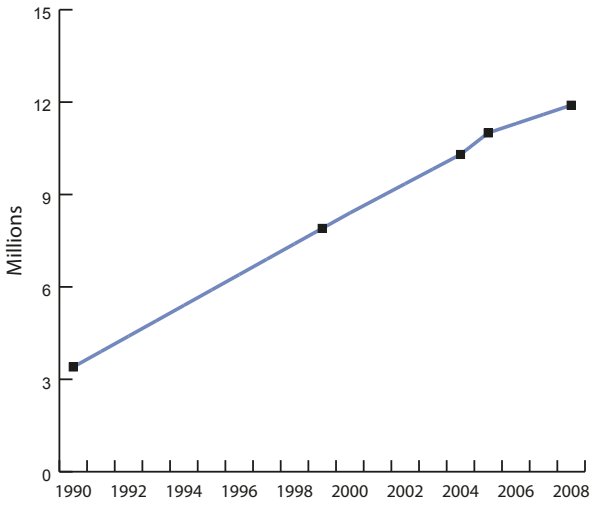
Labor market surveys, such as the Current Population Survey (CPS), provide an ostensibly representative sample of the labor market. Government agencies, such as the Department of Homeland Security, keep detailed records of the number and location of immigrants legally entering and residing in the United States.

By subtracting the change in the foreign born from the change in the known population of immigrants admitted with visas and work permits, one can infer the total number of undocumented immigrants. This residual method provides an estimate the number of undocumented immigrants in the country. Of course, this estimate is vulnerable to the problem of undercounting. The assumption that the undercounting is relatively low relies on the assumption that a large share of the undocumented population responds to government administered surveys such as the CPS or Census, as shown in Gordon Hanson's (2006) analysis of undocumented migration from Mexico to the United States.

To describe some key demographic characteristics of the undocumented population, we draw on the work of reports from the Pew Hispanic Center (Passel 2005; Passel and Cohn 2009), which is widely rspected as an authoritative source of demographic information on the undocumented population in the United States. Combining their work with some other sources, we can summarize our understanding of the undocumented population as follows:

1. The estimated population has grown by around 250,000 a year over the last 20 years.
2. Population estimates crossed the 10 million mark by 2005, and now stand at around 12 million.
3. Average education levels are low, but higher than in the past.
4. Latin American migrants represent the majority of the group.
5. These migrants are geographically concentrated in a small number of states.
6. Their numbers are growing more rapidly in states where they have traditionally not had a large presence, namely the Midwest and Southeast.

Figure 1. The Undocumented Population, 1990 to 2008

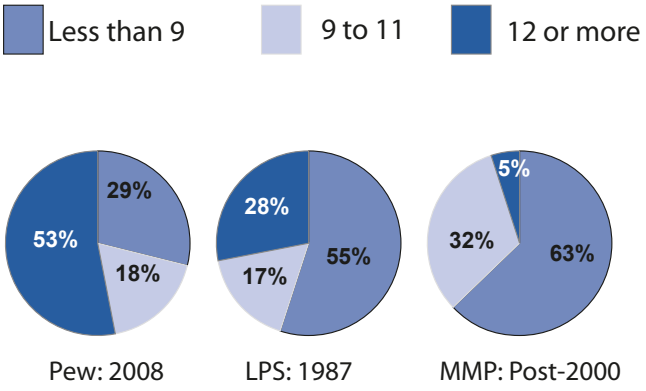


Source: Pew Hispanic Center (Passel 2005; Passel and Cohn 2009)

In Figure 1, we show the growth of the undocumented immigrants in the United States over the last 20 years. In 1990, there were fewer than 4 million undocumented immigrants in the United States. However, due to steady growth throughout this period, by 2008 the population had increased to around 12 million.

Looking beyond the raw estimates of the number of undocumented immigrants, it is also important to examine their characteristics, including education and national origin. Figure 2 shows the education distribution across three different surveys that contain data on the undocumented population in the United States. As these three samples arguably cover the same population, one would expect the education distribution to be the same. The first panel refers to immigrants estimated to be undocumented by the Pew Hispanic Center using the residual method described above. These estimates suggest that 53% of all undocumented immigrants have twelve or more years of formal education, and that 29% have less than a high school education.

Figure 2. Educational Attainment among the Undocumented



The middle panel shows estimates using the Legalized Population Survey (LPS). The LPS is a representative survey of immigrants who received amnesty under the Immigration Reform and Control Act of 1986. Unlike in the first chart, this panel shows that 55% of all immigrants have less than nine years of education and that only 28% have more than twelve years of education. Notice that there are two potential reasons why these charts differ. First, they correspond to different time periods which are separated by over twenty years. Also, they may represent different populations, either because not all undocumented immigrants may wish to apply for amnesty, or because the residual method may fail to capture a significant segment of the undocumented population -- for example, highly marginalized immigrants. The last panel shows estimates of immigrants coming to the United States in the Mexican Migration Project (MMP). The MMP is collected in Mexico, and involves surveys of communities that send large numbers of immigrants to the United States. Immigrants who have returned to Mexico are interviewed, as well as family members of those who have immigrated to the U.S. permanently or are currently away on a temporary migration.

With the MMP data, the educational distribution is different from the previous two estimates. Note that we are able to restrict the sample to all immigrants who came to the United States after the year 2000, and as the time period coincides with that of the Pew Hispanic Center studies, we would expect that these estimates would be close to each other. This is not the case, and this suggests that differences across these three surveys are due to selection (who chooses to apply for amnesty) and variations in coverage (the residual method is capturing a very different sample).

Table 1. National Origins among the Undocumented

`	PEW	LPS
Mexico	58.6	69.0
Central America	11.3	14.1
Asia	10.9	3.3
South America	6.5	4.0
Europe and Canada	4.4	2.9
Caribbean	4.2	3.2
Middle East	1.6	1.7
Other	2.5	1.9

Another way to characterize the undocumented population in the United States is by national origin. As Table 1 indicates, immigrants from Latin America comprise the largest share. In total, immigrants from Mexico and Central America account for an estimated 70% of unauthorized immigrants in the 2009 Pew survey and over 80% of immigrants receiving amnesty under IRCA in the Legalized Population Survey (LPS). It is important to note, however, that undocumented immigrants are not exclusively from Latin America. In the Pew survey, 10% of the population is from Asia, and the remaining 20% comes from other parts of the world, including Europe, Canada, and the Caribbean.

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Finally, we can also examine the characteristics of the undocumented population by their geographic distribution within the United States. Demographers often reference six traditional gateway states that receive a disproportionate number of immigrants: California, Texas, New York, Florida, Illinois and New Jersey. Indeed, these six states had the largest numbers of undocumented immigrants in 1990. The 2.7 million undocumented immigrants living in these states accounted for 77% of the total 3.5 million undocumented immigrants in the United States at that time. By 2008, this concentration had dropped considerably. The same six states then had around 7.1 million undocumented immigrants. To be sure, this is a large increase of nearly 300% over 18 years. However, these states now accounted for only around 60% of this population. In fact, Illinois was no longer one of the top six states, having been surpassed by Georgia and Arizona.

We put this diffusion of undocumented immigrants around the United States into some perspective in Table 2. The first column shows the size of the undocumented population in 1990, and the second column shows the percentage growth by state during the period 1990 to 2008. While every geographic unit in this sample more than doubled its population of undocumented immigrants, it is clear that the slower growing states are the states that had the larger populations of the undocumented in the past, most notably California.

Table 2. Geographic Distribution of the Undocumented Population, by numbers and growth

	Pop 1990 (thousands)	Growth 1990-2008 (%)
Georgia	34	1,397
North Carolina	26	1,346
Nevada	27	852
Colorado	31	774
Virginia	48	625
New Jersey	95	579
Oregon	26	577
Arizona	88	568
Washington	39	462
Florida	239	439
Massachusetts	53	358
Texas	438	331
New York	357	259
Illinois	194	232
California	1,476	183
Other	328	659

This change in the geographic distribution may shed some light on the recent policy debate around immigration: it is clear that there are large numbers of undocumented immigrants now settling in parts of the county that historically have not received many immigrants.[1] The economic effects of immigration should be the largest in places with the most immigrants. However, resistance to increased immigration due to cultural or political reasons may be present in places where immigrants have historically been absent, but are now arriving in large numbers.

Immigration Reform in the United States

Before talking about immigration reform in the United States, it is important to consider what the goal of the immigration policy should be. If the goal is to maximize natives' welfare, it is likely that the prescribed policy will be different than one where the goal is to maximize immigrants' welfare, such as family reunification or another humanitarian motive. The current immigration policy of the U.S. government is defined by the Hart-Celler Immigration Bill of 1965. The bill emphasized family reunification and did away with a system of national quotas. Under this system, admittance to the United States is guaranteed to immediate family members of U.S. legal residents and U.S. citizens, and there are quotas for all other family members of citizens, individuals in special skill categories as well as for refugees and asylum seekers.

Importantly, past studies (Passel 2005) find that undocumented immigrants compose almost half of all immigrants into the United States. Currently, the Federal policy to deter these immigrants from coming involves strong border enforcement (which has escalated for the last twenty years) and employer sanctions as prescribed by the 1986 IRCA (Hanson 2005). In recent years border enforcement has continued to tighten: with the Secure Fence Act of 2006, with a recent increase on workplace enforcement, and with more state and local governments passing laws aimed at reducing the undocumented population living in their jurisdiction (such at SB 1070 in Arizona).

Recently, it has been argued that immigration policy has some significant unintended consequences. For example, higher border enforcement has resulted in a change of the patterns of immigrants into the United States. Whereas before undocumented migration was cyclical and responded to changes in labor demand in the United States, stronger enforcement has instead created a stock of immigrants unwilling to return to their host country during low-demand episodes because the cost of migration is so high (Massey et al. 2003). In addition, some have argued that the 1986 amnesty established by IRCA increased the flow of undocumented immigrants who expect a

future amnesty (Arya and Glover 1995).

It is also worth noting that U.S. immigration policy differs from that of other host countries, such as Australia or Canada. In those countries, potential immigrants are evaluated according to their attributes. Those with skills that complement or benefit the native population receive a higher score, and if a potential immigrants scores higher than a prescribed threshold then the immigrant is granted admission.

It is perhaps this ambiguity in policy—which is relatively favorable to documented immigrants and their family members, yet not favorable to undocumented immigrants—that constitutes the paradox of American attitudes towards immigration. For example, Scheve and Slaughter (2001, as cited in Hanson 2005) report that while 70% of Americans' have a positive view of immigration in general, 45% of the same respondents would like to see the number of immigrants reduced. Californians show similar contradictions in their views of immigrants: a recent Los Angeles Times poll found that 48% of Californian voters believe that immigrants benefit the state, and 59% of these voters believe that employed immigrants should be allowed to stay (LA Times, October 24, 2010). At the same time, a different survey of likely California voters report that 49% of respondents would support an immigration law similar to Arizona's SB 1070 , which would have essentially made status as an undocumented worker into a crime punishable by the state (Pasadena Star News, Dec 7, 2010).

Prior Studies

In debating the type of immigration reform that is possibly going to take place, it is important to understand how unauthorized immigrants may be affected by some sort of regularization program. Here, we discuss work that has previously been done on this issue, and present in more detail some results from our own work (Lozano and Sorensen 2010).

However, before presenting *magnitude estimates* of the effect of legal status on labor market outcomes, we first will discuss some of the *mechanisms* that could explain why such effects exist, how they relate to economic theory, and what supporting evidence of these mechanisms exist. Put another way, if regularized status will benefit the undocumented, economic theory should provide us with evidence that the undocumented are disadvantaged under current policy.

Reasons for wage gaps

Exploitation of undocumented workers is frequently cited as an explanation of low pay, with the presumption that these workers would have much more power vis-a-vis their employers if they were to gain legal status. This theory is formally examined by Hotchkiss and Quispe (2009). The authors find strong evidence that, in most cases, workers with invalid social security numbers (presumably because they are undocumented) are more attached to a particular firm. This attachment may stem from the fact that not all firms are willing to hire undocumented workers, and the intensive job search may increase the likelihood of discovery, apprehension, and possible deportation. Because of this, undocumented workers are unwilling or unable to use the competitive force of outside offers in the labor market to keep their wages on par with their documented counter parts.[2]

In addition to having less power in the wage setting process for a particular job, undocumented immigrants may also be unable to perform the same types of jobs as either native born workers or authorized immigrants. For instance, a recent study (Peri and Sparber 2009) shows that low-skilled natives and low-skilled immigrants specialize in different types of occupations: Native born workers are more likely to specialize in occupations that require more communication (taking advantage of being native speakers of English), leaving low-skilled immigrant workers to specialize in occupations that are more intensive in manual tasks.

Another study (Ball, Dube, and Sorensen 2010) argues that at least part of this specialization can be attributed to labor market segmentation between undocumented workers and others. Specifically, communicative intensive occupations in the Peri and Sparber (2009) study are more likely to require some form of occupational licensing than occupations that are manually intensive. Furthermore, Mexican-born workers of all educational categories are less likely to work in these licensed occupations than are native born workers. This is significant because Mexican-born workers make up a majority of the undocumented population in the United States, and are generally more likely to be undocumented than immigrants born in other countries.

[Undocumented immigrants] may view their attachment to the United States quite tenuously, as the threat of deportation discourages them from costly investments in language ability, formal education, or similar skills that may be less valuable in U.S. labor markets than in their home country

Human capital— skills such as education, the ability to speak English, and relevant labor market experience that make workers more productive or in high demand and that increase the wages that employers are willing to pay them—is another factor that explains the wage gap between undocumented and documented workers. For example, Cortes (2004) shows that refugees living in the U.S. invest

less in these skills than do permanent immigrants. Presumably, this is a result of lack of opportunity or of the refugees anticipating a higher likelihood of returning to their home country, where some of their U.S.-based skills will not be as highly rewarded. One can imagine that the same could be said for unauthorized immigrants: they may view their attachment to the United States quite tenuously, as the threat of deportation discourages them from costly investments in language ability, formal education, or similar skills that may be less valuable in U.S. labor markets than in their home country.

Extent of wage gap

A number of studies directly examine the impact of a change in legal status on a workers' wages, some of which look directly at the effect of amnesty under the 1986 Immigration Reform and Control Act (Rivera-Batiz 1999; Kossoudji and Cobb-Clark 2002; Amuedo-Dorantes et al. 2007; Pastor et al. 2010). We summarize these prior estimates in Table 3, which shows that the wage increase associated with the IRCA amnesty ranges from 5% to 15%.

One common thread in all of these papers is that, as in our work, they compare wages of those affected by IRCA to a comparison group that should not have been directly affected by IRCA. However, in previous work the comparison was usually to a group like native born Latinos. In our work, we compare the wages of those affected by IRCA to undocumented workers who would not have been eligible for IRCA.[3]

Table 3. Prior Estimates of Wage Effects

IRCA Variation	
Amuedo-Dorantes et al. 2007	9.3
Kossoudji and Cobb-Clark 2002	6
Pastor et al. 2010	9.5
Rivera-Batiz 1999	15.5
Non-IRCA Variation	
Bratsberg et al. 2002	5.1
Gass-Kandilov 2007	20.5
Kaushal 2006	3

Outside of the wage impacts of IRCA, studies examine other types of legal status adjustment to determine their impacts on immigrant wages. For instance, Bratsberg, Ragan, and Nasir (2002) study individuals who naturalized in the 1990s for various reasons, while Gass-Kandilov (2007) examines the wage effects of receiving a green card among higher skilled immigrants who have been sponsored by an employer. Finally, Kaushal (2006) studies the wage effects of the Nicaraguan Adjustment and Central American Relief Act (NACARA), which provided temporary legal status to immigrants from Central America in the wake of Hurricane Mitch. With the exception of Kaushal (2006), these studies find wage effects that are similar to those found under the IRCA amnesty.

New Estimates of the Impact of Legal Status on Earnings

Here we present new estimates of the impact of legal status on immigrant earnings, from our recent paper, "The Labor Market Value to Legal Status" (Lozano and Sorensen 2010).

The process of identifying the *causal* effect of legal status on immigrants earnings is not trivial. To begin with, we are faced with the problem that legal status is likely not random. Put another way, undocumented and documented immigrants are likely to be systematically different in ways other than their legal status. If these two groups of individuals differ only in ways that are easy to observe in the data, such as in education levels, it would be easy to control for these differences. However, these groups may also differ from one another in ways that cannot be observed in the data, such as investments in skills that pay a return only in the U.S. labor market, strength of social networks in the United States, or even the underlying motivation to succeed in U.S. labor markets. In that case, simply comparing the earnings of the documented and undocumented does not tell us what the actual effect of being documented is on earnings.

If some government program were to *randomly* grant legal status to some undocumented workers but not others, then comparing the workers who received legal status to those who did not would tell us the true causal effect of legal status on earnings. In a way, IRCA did just this, by granting a path to citizenship for immigrants who had been in the country continuously since before January 1, 1982. If we assume that undocumented immigrants who arrived in the U.S. slightly before the cutoff date for the policy are very similar to those who arrived just after the policy, we could then compare the earnings of these two groups of workers.

Empirically, estimates comparing the earnings of undocumented immigrants who came before 1982 with those who came after the cutoff date may reflect other, larger economic trends such as macroeconomic booms and recessions. This issue motivates what is called a *difference-in-difference* approach. The 1982 cutoff had no direct effect on the labor market prospects for legal immigrants, so using the 1982 cutoff for these workers should give us a good estimate of the increase in earnings that undocumented workers may have gotten even in the absence of IRCA. Then comparing the changes in wages

for the before and after 1982 undocumented workers to those same wage changes among documented workers should give us a meaningful estimates of the effect of legal status on earnings. The underlying assumption is that any secular change in the economy independent of IRCA has the same effect on documented and undocumented immigrants. Of course, the undocumented immigrants who arrived before 1982 have the additional advantage of having more years of labor market experience in U.S. labor markets. Therefore, we replicate our analysis using the 2000 Census and estimate a *difference-in-difference-in-difference* (or triple difference) parameter where the assumption is that the returns to U.S. experience is invariant across Census surveys.

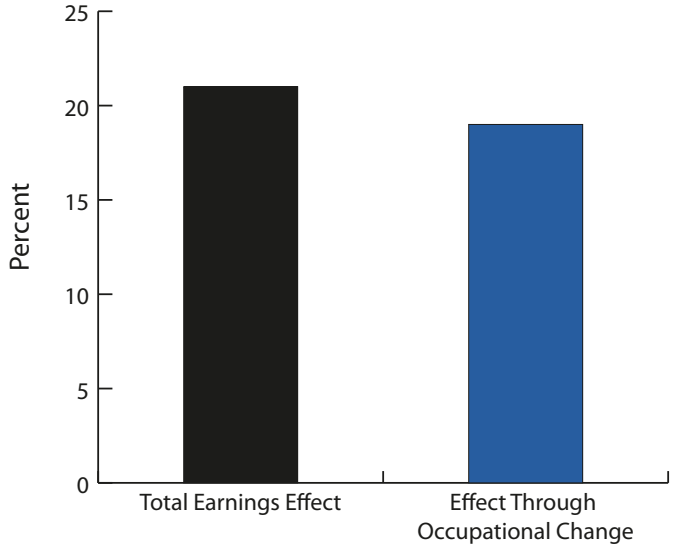
The above discussion assumes that we as researchers observe the legal status of the individual within the dataset. Using U.S. census data from 1990, we are able to observe country of birth, the year of arrival in the United States, labor market earnings, and many other demographic characteristics. However, there is no way for us to observe whether or not the individual in the survey is in the country legally or not. As we discussed above, it is very likely that, despite problems of undercounting, the U.S. census does indeed capture a large share of the undocumented population; the increase in population implied by comparing counts in the 2000 and 1990 censuses cannot be accounted for by legal immigration and natural rate of population increase alone. In fact the discrepancy between these two numbers is in the millions.

The U.S. Census covers the set of individuals that we would like to study, and it provides us with all the information that we need to know, with the notable exception of legal status. We then turn to another dataset, the Mexican Migration Project (MMP), to help us *predict* the legal status of the individuals in the census. As noted earlier, the MMP is collected in Mexico, and involves surveys of those who have returned to Mexico, as well as family members of those who have immigrated to the U.S. permanently or are currently away on a temporary migration.

Using multiple regression analysis, we estimate a model that finds the relationship between a number of variables observed in both the MMP and Census to legal status. Specifically, our model estimates the correlation between education, age at arrival in the United States, marital status, and interactions between these variables. After estimating this model using the MMP data, we are able to use our model to predict the likelihood that an individual in the Census is undocumented.

Now having this critical estimate on documentation status, we are able to employ the difference-in-difference-in-difference model as described above (in the Appendix, we provide more details on the estimates from these regressions).[4] By doing so, we find an associated increase of 21% in earnings related to legal status, a similar increase in occupational wages from finding better jobs (Figure 3).[5] Thus, our results suggest that there may be at least two mechanisms that help increase wages due to legal status: under an amnesty, previously undocumented workers are likely to be able to increase their bargaining power on the job, as well as to move up the occupational ladder to better jobs.

Figure 3. Estimated Wage Effects of Legalization



These numbers provide more evidence that obtaining legal status has a large positive impact on currently undocumented workers. To reiterate, we obtain these estimates using a new quasi-experimental design that combines data from the Census and Mexican Migration Project. Importantly, our estimates of the effect of having legal status on earnings are similar to earlier work, and we also show evidence that much of the effect is through immigrants being able to upgrade their occupation after obtaining legal status. One interpretation of this finding is that immigrants may end up finding jobs that are better matched to their skills, thereby increasing economic productivity.

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Conclusions

In this report, we have provided an overview of a number of aspects of regularization of the undocumented population, including their demographic characteristics, geographic distribution, and eligibility for amnesty in 1986. To sum up: the number of undocumented immigrants in the U.S. has grown significantly over the last two decades. A majority of these immigrants, both those granted legal status under IRCA as well as those currently in the country, are from Mexico. As a whole, the current stock of undocumented immigrants is better educated than both the set of immigrants who received amnesty under IRCA as well as migrants from rural Mexico. Mexican migrants, while a majority of the population, are not necessarily representative of the whole set of undocumented immigrants.

Our review of the literature surveys a number of earlier studies of the effect of legal status on labor market outcomes. These studies all find positive and significant effects of legal status on the wages of immigrants, on the order of a 5% to 15% increase in mean wages. We then summarize our own study, which uses a new approach to find the causal impact of IRCA on wages. We take advantage of the fact that immigrants who had been in the United States since before 1982 were eligible for IRCA, while those who came afterwards were not. After forecasting the likelihood that an individual Mexican migrant appearing in the U.S. census is undocumented, we compare changes in wages of those who should have been eligible for IRCA to changes in wages for immigrants who should not have been. If there was some falsification of arrival dates by the immigrants in this process, that would bias our results towards zero. Never the less, we find large and positive effects of about 20% on wages. We also find that most of this effect can be attributed to switching into higher paying occupations, rather than receiving higher wages in the jobs that they would have held without a status change.

These findings should help to inform policy makers involved in the immigration reform process. We cite polls showing that a large number people in the United States desire some sort of legalization process that would allow a majority of undocumented immigrants to stay in the United States. Our estimates of a 20% earnings benefit of legal status to these workers have two important implications. First, these workers themselves would benefit greatly. Second, the fact that these workers would earn more having received legal status suggests that the U.S. economy would benefit as a whole should these workers be granted legal status. The benefits to the U.S. economy are also unaffected by any negative effects that amnesty would have on the wages of native-born or legal immigrant workers who may compete for similar jobs (Orrenius and Zavodny 2004; Hotchkiss et al. 2008; Phillips and Massey 1999).

Higher earnings could also reduce transfer payments to these individuals and increase tax revenue. This point is underscored by the finding that most of the earnings growth can be attributed to working in higher paying occupations: legalization means previously undocumented workers would transition to jobs where they could produce higher value output, benefiting consumers, businesses, and workers with complementary skill sets.

Notes

[1] For a more thorough analysis of this change in settlement patterns at the city level, see (Card and Lewis 2005).

[2] This research is grounded in Manning's (2003) analysis of how to measure the power over workers that firms in otherwise competitive markets may possess, in Robinson's (1933) explanation of differential market power across different groups as an explanation for pay differentials, and in Ransom and Oaxaca's (2010, 2005) tests of this theory in the context of the male-female wage gap.

[3] Studies which examine the effects of IRCA on the wages of workers who are potential competitors to the workers receiving amnesty have found small effects to no effects (Orrenius and Zavodny 2004; Hotchkiss et al. 2008; Phillips and Massey 1999).

[4] This is done by running a regression of log wages in the 1990 census on an indicator variable for whether the individual migrated in the period directly before or directly after 1982 (we only observe bins), the continuous variable giving the likelihood that the individual is undocumented, and the interaction of the two variables.

[5] These estimates are significantly different than zero at the 11% and 2% level, respectively. The relative lack of precision in the estimates of effects on actual earnings reflects the greater amount of unexplained variation in this variable when compared to mean occupational wages.

Appendix

In attempting to identify the impact of legal status on earnings, we face two major challenges in the data. First, there is no large data set that reports labor market outcomes and documentation status for both documented and undocumented immigrants. The LPS, discussed above, provides data only for those who received legal status under IRCA, but not for those who did not.

The U.S. Census provides a large sample size and detailed high quality data on labor market outcomes. Changes in the population between 1990 and 2000 that cannot be explained by natural population growth or authorized immigration suggest that the Census captures a large share of the undocumented, however, there is no question in the census that asks about documentation status.

The Mexican Migration Project (MMP) is significantly smaller

than the U.S. census data and labor market data is of questionable quality. The MMP is a random sample of households in migrant sending communities in Mexico. It is a retrospective survey, and thus recall error brings into question the quality of the labor market data. As the survey is at the household level, information is available on immigrants currently residing in the United States, as long as their some of their family members remain in Mexico. This is a situation that is quite common in Mexican migration which typically involves sending a prime aged male to the United States to work and send remittances back home.

The sample sizes of Mexican migrants, when compared to the U.S. census, also differ by orders of magnitude. However, the MMP does contain detailed information on legal status and demographics, both of which are likely less subject to recall error than specific quantitative measures of labor market outcomes. We then use the MMP data to estimate the relationship between legal status and variables that are observed in both the MMP and the Census. This allows us to create an out of sample "forecast" of the likelihood that an individual in the Census arrived in the U.S. as an undocumented immigrant (call this doc). We discuss our approach in more depth later

A Triple Difference Approach with Known Legal Status

Using this predicted documentation variable, one might be tempted to run an OLS regression of earnings on this variable to infer the labor market returns to legal status. However, this ignores another data issue in the census: missing information on characteristics such as motivation, attachment to networks, and ability. These unobserved characteristics are likely to be correlated both with documentation status and (directly) with labor market outcomes.

In addition, it would be important in the OLS regression to control for observable characteristics that should affect labor market outcomes, such as years of education and age at arrival in the United States. If all of these variables are used in first stage as well, separately identifying the direct effect of these variables and the effect of these variable through doc would rely on non-linearity.

Economic identification would require an exclusion restriction: a demographic variable that affects doc but has no direct impact on labor market outcomes. Luckily, IRCA provides just such variation. Rather than using IRCA as an exclusion restriction in our logit model, we take a more straight forward approach of a difference-in-difference analysis in our second stage. IRCA allowed individuals present in the U.S. since before January 1st 1982 to apply for permanent residency. As there was no way to anticipate the enactment and timing of this policy in 1981/1982, one would expect that immigrants just before the end of 1981 and just after the beginning of 1982 to very similar.

The key difference between these two groups of immigrants is the that earlier immigrants were eligible for the amnesty under IRCA, while the later group were note. One other notable difference is that the earlier group should have more years of labor market experience in the U.S. To control for this potentially confounding effect, we can compare differences in outcomes in the 1990 census for the before/after 1982 undocumented group with differences in outcomes for the before/after 1982 among the document.

Our identifying assumption is then that changes in unobservables among the documented group during this period are equal to changes in unobservables for the undocumented group. If there are different returns to experience in the U.S. for these two groups, this identifying assumption may fail.

In response to this concern, we estimate a trip difference model, comparing the above described change in labor market outcomes to differential changes between the documented and undocumented before or after 1992 using the 2000 census.

In the 1990 census, we only know intervalled bins of arrival to the United States. One bin is 1980 and 1981, and another is 1982, 1983, and 1984. We similarly divide observations in the 2000 census. The estimating equation is as below:

$$y_{it} = \gamma+\gamma_{90}+\gamma_e E_i+\gamma_u U_i+\gamma_{90e} T_i E_i+\gamma_{90u} T_i U_i+\gamma_{ue} U_i E_i+\gamma_{90ue} T_i U_i E_i+x_{it}\beta+\epsilon_{it}$$

Forecasting Legal Status

We incorporate the information provided by the MMP by first running a logit on an indicator that a migrant reported being undocumented in their first migration. We select a sample of individuals in the MMP who reported their first migration to the United States taking place between 1980 and 1984, inclusively. These sample dates reflect the policy enacted by IRCA, which we discuss at more length below. We further limit our sample to males in non-agricultural occupations who were between age 16 and 44 at the time of their first migration the the U.S. Individuals below age 16 are likely tied migrants moving to the U.S with their families and not economic migrants. As individuals over age 45 are a very small share of these migrants, we drop them from the sample to avoid our logit results being driven by a small number of outliers. We also drop observations with missing values for the education and marriage variables.

The left hand side variable in our model is an indicator for an immigrant self reporting being undocumented during their first

migration. On the right hand side, we include age at first migration, its square, years of education, its square, indicators for marital status (divorced or widowed being the omitted categories), and all pairwise interactions of the variables.

Using this model, we forecast the probability of being undocumented in the U.S. census and attempt to estimate the returns to being documented with three estimators (see Appendix Table 1). First, we ignore the forecast of being undocumented, and run a simple difference-in-difference regression comparing Mexican migrants before and after 1982 with migrants before and after 1992. Second, we run a difference-in-difference estimation using only the observations from the 1990 census, comparing changes before and after 1982 with the "more likely documented" and the "less likely documented." Finally, in the right most column, we run our triple difference estimator.

Appendix Table 1. Results From Full Regression

	DD Time	DD Yhat	DDD
Earnings	0.02	0.15	0.21
SE	(0.02)	(0.08)	(0.10)
N	33,898	12,407	33,898
Occup Wage	0.02	0.16	0.19
SE	(0.01)	(0.05)	(0.06)
N	33,898	12,407	33,898
Any Earnings	-0.02	-0.02	0.03
SE	(0.01)	(0.03)	(0.04)
N	39,197	14,032	39,197

We explore the effect of legalization on three different outcomes: (1) annual earnings, (2) mean annual earnings in the occupation the migrant works in, and (3) an indicator variable for any earnings by the migrant. Our simple difference- in-difference estimator that ignores our forecast of legal status find small effects on all three measures. Both the other estimators find strong positive effects on the level of earnings, though not on the indicator variable for any earnings (i.e. labor force participation).

For both estimators, the effect of treatment on occupational level earnings is very simple to the effect on total earnings. At least for this sample of immigrants affected by a mass legalization, this suggests that most of the earnings deficit stemmed from employment in subpar occupations, rather than employer market power over the workers.

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The Labor Market Effects of Immigration Reform

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