Growing Modern American Guestworkers: The Increasing Supply of Temporary H-2A Agricultural Workers*

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Abstract

The U.S. temporary work program (TWP) for lower skilled jobs, the American non-immigrant H-2 visa, has been admitting foreign workers for agricultural jobs for the past half century. While US policy is widely seen as having failed to control illegal entry, employer use of the H-2A program has, nevertheless, substantially increased over the past fifteen years. I describe the growth of the H-2A workforce since the 1990s with available data and benchmark it against trends in flows of migrants from Mexico. Estimates are also generated for state-level H-2A workforces from 2006 to 2009. As for why the H-2A has grown, this paper dismisses the policy or regulatory facilitation as the primary cause. And it would be premature to see the growth of the H-2A as a substitute for decreasing unauthorized migration, although some of the analysis suggests that possibility. In the same vein, it seems unlikely that the H-2A program is primarily responding to increasing shortages of domestic agricultural labor in the United States. Rather, it seems that growth of the H-2A has coincided with offsetting factors in the agricultural marketplace, as well as migrant networks and the development of a professionalized recruitment sector. These are preliminary results of research in progress which will add an additional year of data, improve measurement of some variables, and specify a more robust regression model.

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The U.S. temporary work program (TWP) for lower skilled jobs, the American non-immigrant H-2 visa, has been admitting foreign workers for agricultural jobs for the past half century (Martin, 2010). Today's temporary agricultural worker program, the H-2A visa, was split off from the original H-2 by the Immigration Reform and Control Act of 1986 to reduce unauthorized migration. While IRCA is widely seen as having failed to control illegal entry, employer use of the H-2A program has, nevertheless, increased rather notably over the past fifteen years.

The problem that the paper addresses is the substantial growth of the H-2A work program—a rather surprising growth that is little appreciated and, perhaps because it is little remarked upon, the reasons for that growth are relatively unexplored. I describe the growth of the H-2A workforce since the 1990s with available data and benchmark it against trends in flows of migrants from Mexico. Estimates are also generated for state-level H-2A workforce from 2006 to 2009. These data-driven tasks, in turn, are used to explore the possible correlates of the growth in the number of H-2A visas.

There are several possible theories for why the H-2A program has grown from fewer than five thousand workers for most of the latter half of the 20th century to over 50,000 annually in this past decade. One possibility is that the H-2A is like temporary programs in Europe which are cultivated with accommodating policies and active recruitment programs (Jensen 2007). At the least, the role of policy and especially the regulatory features of policy are facilitators of the demand for, and the supply of, temporary workers. However, there have been few changes to IRCA's original H-2A visa regime with its cumbersome "certification" of labor shortages and required "adverse effect wage rate" (AEWR). While the certification may not effectively test for domestic labor shortages, the AEWR appears to keep the H-2A wage on par with average field and livestock wages.[1] While there was a pro-facilitation attitude of the application process

[1] It is not the case, however, that the AEWR unambiguously protects the domestic worker as prevalent wages are depressed by the wage paid to unauthorized workers and it is based on prior year earnings (Goldstein 2006).

during the years of the Bush Presidency, there were few regulatory changes that would have facilitated employer desire to utilize a program they widely deride as burdensome and costly. In short, changes in policy and recruitment seem inadequate to explain the growth in use of the H-2A by US growers.

It is possible that there are increasing shortages of domestic workers and to such a degree that employers have necessarily turned to the H-2A program—especially if shortages were such that wages for domestic workers were increasing making the H-2A AEWR more palatable. This theory turns on the slowing of domestic population growth and a declining supply of young workers in particular; and may be abetted by an increasing disinclination of domestic workers to take 3D jobs (dirty, dangerous and demanding). It is, however, also consistent with the possibility that unauthorized labor has become less available over the past decade. At first blush, the possibility of a decreasing supply of unauthorized workers seems absurd on the face of it, and the claim runs quite contrary to what most experts think is the case. It is a possibility, however, that this paper at least explores as one possible incremental element of the shortage proposition.

Another class of propositions on the growth of the H-2A turns on changes in the structure of the agricultural labor market (Huffman 2006). There are several elements here including innovations in the use of existing technologies, the introduction of new technologies, and consolidation of the agricultural business and evolution of new business models. The long run history of agriculture has been capital-labor substitution on fewer and larger farms. Seasonal labor has also been reduced in that ongoing process, although it remains a substantial part of the agricultural workforce. Yet, the reduction in the absolute and relative size of the seasonal workforce is driven by the above factors, e.g., new technologies and innovations. Farms that lag in introducing innovations may prefer seasonal labor for intensive crops, while farms on the leading edge of innovations might substitute capital investments for intensive labor. Across farms that would place competitive pressures on the cost of seasonal labor while favoring labor that complements capital/technological investments. And that, in turn, opens the possibility that H-2A workers might be preferred by farmers with high capital outlays who want a

dependable workforce, even if it costs more than say unauthorized workers; and even while that demand would coexist with downward pressures on the seasonal agricultural wage among farmers who choose to retain intensive seasonal workforces.

Several factors might reinforce the restructuring of the labor market and subsequent demand for H-2A workers: a possible reduction in the supply of previously "preferred" unauthorized labor, or the perception that hiring unauthorized workers is somehow risky, or in the parallel growth of a recruitment industry that facilitates preferential hiring of H-2As, giving employers "loyal" workers at minimal additional cost. Any reduction in the supply of unauthorized workers may be not just in terms of numbers, but in those with desirable characteristics, e.g., young and footloose. As for the risk of hiring unauthorized workers, more aggressive enforcement in rural settings in industries such as meatpacking may have increased the perception of risk. But there is little to support the belief that the relative non-existence of enforcement in agriculture would cause concern for employers. Nevertheless, enforcement at the border has impacted the flow of new migrants, in turn, changing the characteristics of unauthorized workers inside the United States. As for restructuring of the recruitment process, the legal profession may have become more active in the H-2A visa business and there may be more such options for employers who want to use H-2As (Martin).[2]

GROWING NUMBERS OF H-2 WORKERS SINCE THE MID-1990s

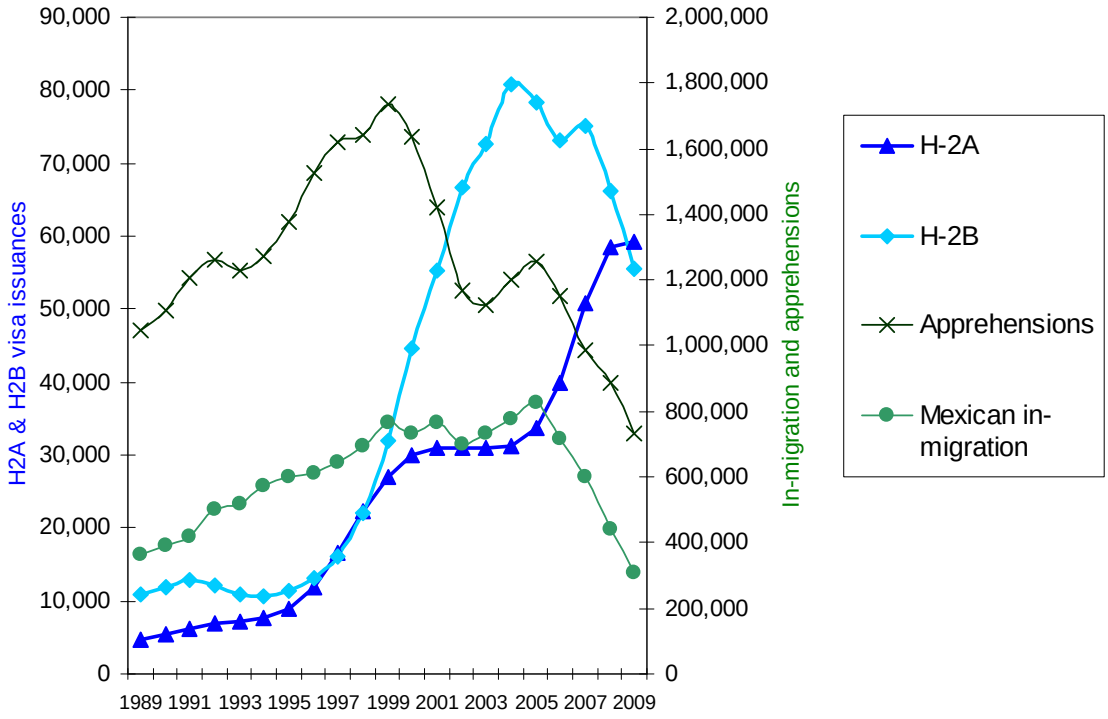
Figure one shows the growth in the number of H-2 workers since the 1990s, both the H-2A for agriculture and its twin the H-2B for seasonal workers in the hospitality and other industries. The figure shows 3-year moving averages to make the chart easier to read. Both H-2 visas are dominated by Mexicans workers. Figure one also shows trends in the flow of all Mexican migrants, as well as the apprehension of illegal entrants primarily at the southern border. Note that the H-2 visa numbers are shown along the left Y axis and the in-migration/apprehension numbers are shown on the right Y axis; and that there is an

[2] Personal note from conversation with Philip Martin, July 2010.

order of magnitude difference with the in-migration/apprehension numbers being much larger than H-2 flows.

There are two notable features of the trend in flows that are worth marking. First, the H-2 numbers being a steady and rapid climb in the mid-1990s and the H-2A numbers continue after a lull at the turn of the century to continue upward. The H-2B visa numbers tumbled in the last few years for unknown reasons likely having to do with changes in the urban economy along with regulatory impacts.[3] Thus, the first basis for the assertion that the H-2A program has grown rapidly over the past 15 years as it certainly has.

Figure 1. Number of H visas, Mexican in-migration, and apprehensions, three year moving average 1989-2009



Source: Various, see cite in text.

Second, the flow of all Mexicans legal and unauthorized slowed at the turn of the century and has declined over the past several years. The estimated flow of unauthorized

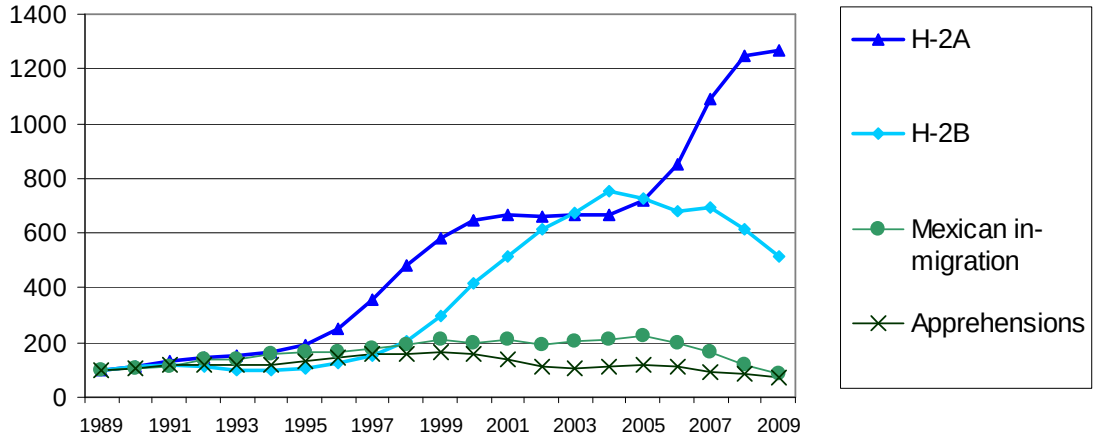
[3] The regulatory regime for the H-2B has also changed more than that for the H-2A during recent years. The short lived H-2R visa permitted the H-2B to extend their stay which, doubtless, made the H-2B visa more attractive. When it was discontinued in 2007 it likely compounded the downturn in the use of the H-2B.

Mexicans is made using Census surveys that capture almost only resident aliens and those primarily in urban places—only 4 percent of this population is thought to work in agriculture even if they make up one-quarter of the year-round agricultural workforce. In other words, the trend on these numbers is meaningful for our purposes here only to the degree that it tells us something about flows of agricultural workers. In that regard, the change in apprehensions at the borders is more likely to include agricultural workers and that trend reinforces the observation that unauthorized entries from Mexico have stabilized and even declined in recent years. It would be unwise to interpret these trends as a success of IRCA's strategy for substituting TWPs for EWIs (entrants without inspection). It is the case that the decline in illegal entrants explains almost all the recent decline in the flow of Mexican migration into the United States. Assuredly, the H-2 programs employ many Mexican workers who previously would have entered as illegal entrants. Yet, most of the recent decline in unauthorized entries has to do with changes in demand for say construction labor and not with perceptions of increased enforcement of non-agricultural establishments under the Bush administration (Passel 2009; Camarota 2009). At the same time, the timing of the downturn in illegal entries corresponds nicely to the upturn in the flow of H-2As and we will examine other data that bolster the impression that the composition of the marketplace has changed.

The H-2 temporary programs have grown rather remarkably and they represent now, in fact, a substantial number of migrants compared to the total Mexican inflow. Figure 2 shows the change in the flow of H-2s and the Mexican inflows as an index where 1989 = 100 and, by 2009 Mexican inflows show a decline of between 15 percent (all Mexican migration) and 30 percent (border apprehensions). The flow of H-2As has grown by 1200 percent and that of H-2Bs, even after its recent downturn, by 500 percent. In turn, Figure 3 shows the ratio of the flow of H-2s to the total Mexican in-migration (not apprehensions). Yes, the Figure two shows the ratio as a percent for ease of interpretation, but it is not clear that any H-2As are actually included in the in-migration estimates which are based, once again, on Census surveys that capture primarily year-round and urban populations. Regardless, the growth of the H-2 flows are not simply remarkable for its rapidity, they have come to represent a significant portion of the flow

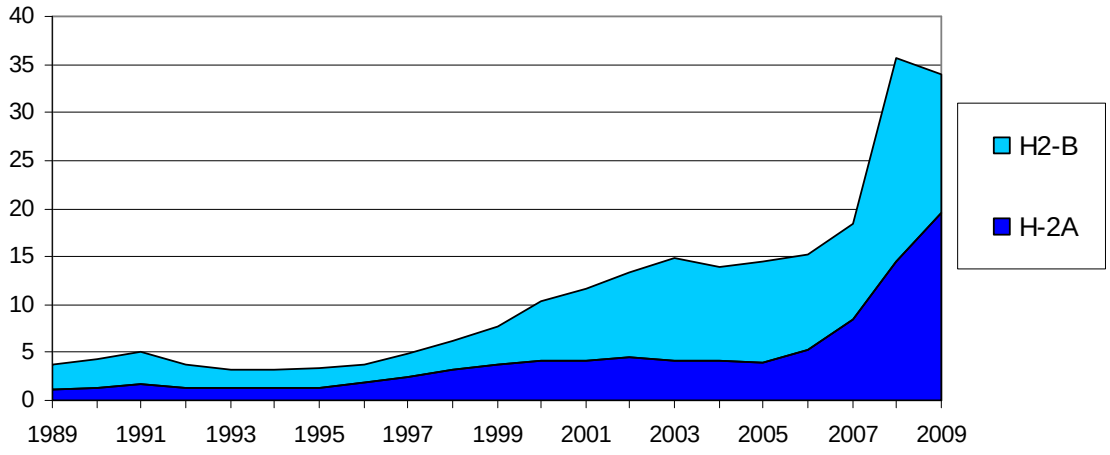
of all Mexican migrants. The story of growing H-2A numbers is not just about timing of trends, it is also a story of substantial proportions.

Figure 2. Growth index (1989=100) for H visas, Mexican in migration and apprehensions



Source: various, see text

Figure 3. H-2A and H-2B visas relative to Mexican in-migration, 1989-2009



Source: Passel and State Department

UNAUTHORIZED AND H-2A WORKERS IN SEASONAL LABOR

We turn next to an examination of trends in the seasonal agricultural workforce. There are significant hurdles in any quest to get a handle on the demography of the agricultural workforce. The US Census surveys are widely acknowledged not to capture most seasonal workers;[4] they are not designed to capture non-resident populations living in group quarters. The US Department of Agriculture takes a quinquennial Census of employers, the last two available being in 2002 and 2007, but these workforce figures tend to be substantially larger than estimated in a quarterly survey of agricultural employers (National Agricultural Statistical Service (NASS)). None of these government surveys includes detailed information about workers' legal statuses.

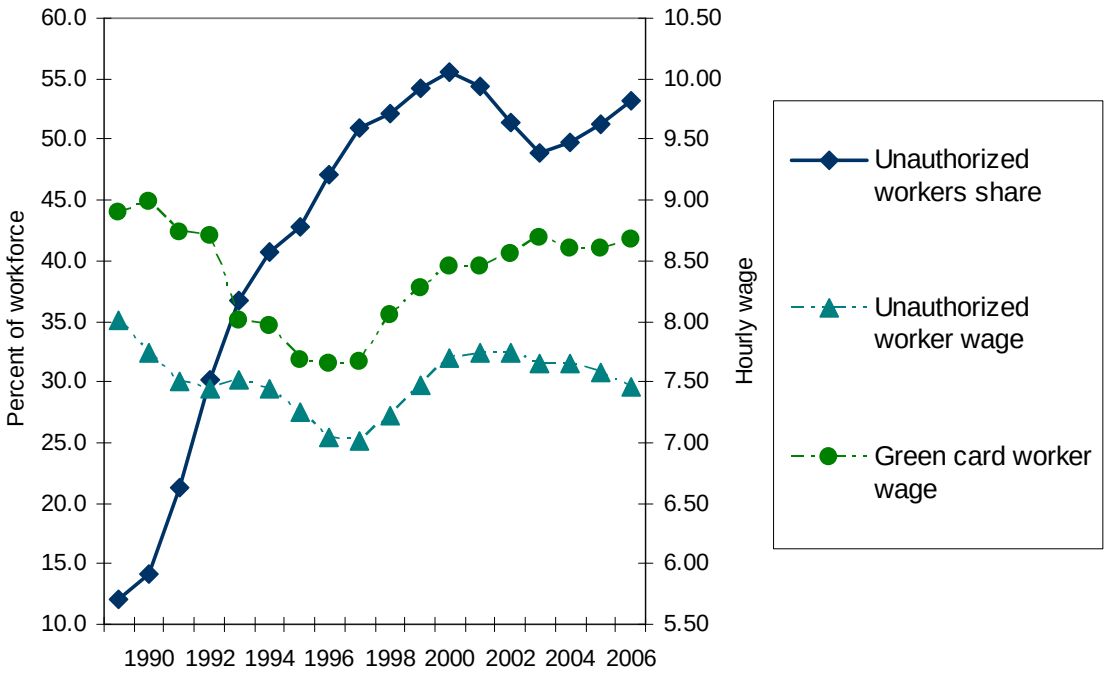
Unauthorized workers: the National Agricultural Worker Survey

Fortunately, the National Agricultural Workers Survey (NAWs) conducts an annual survey of seasonal workers and asks about legal status. Figure 4 shows that the unauthorized share of the seasonal agricultural workforce was significantly cut in the wake of IRCA that legalized many workers. Thereafter, the share of unauthorized workers began to rapidly increase reaching just over half of the seasonal workforce at the turn of the century. Since then, the share of unauthorized has decline and rebounded somewhat, but the impression is that it has remained mostly stable at around half of the workforce for the past decade. Carroll et al. (2009) also find the NAWs shows that the percentage of newcomers has declined in recent years and the share of resident migrants has increased. Workers increasingly also stay with just one employer and are less mobile between employers. Figure 4 shows the trend in legal status for the NAW workers and the wages of the unauthorized compared to legal permanent residents (not citizens) over time. Research establishes that the NAWs data finds unauthorized workers earn less than

[4] The Current Population Survey (CPS) and the American Community Survey (ACS).

legal workers after introducing controls for selectivity and human capital characteristics (Iwai et al. 2006).[5]

Figure 4. Unauthorized workers' wage and percentage of farm workforce, 1989-2006



Source: NAWS

What we seem to know, therefore, is that the share of unauthorized farm workers stabilized about a decade ago and that they earn less than legal workers. The latter point making them obvious choices for employer demand, but why didn't their share of the workforce continue to increase? It may be that the flow of unauthorized workers into agriculture was impacted by the same forces that affected the flow of unauthorized workers into urban jobs. Surely, that is the case to the extent that border enforcement or other factors affected some decrease in migrant circulation over the past 15 years; an effect that appears in the apparent greater stability of the seasonal agricultural workforce. The domestic supply of labor may also have been sufficient to supply, as we shall see, the

[5] It is interesting to note, furthermore, that those wage differentials appear to have narrowed somewhat during the mid-1990s, around the time that the H-2A program began to increase, even if the differential seems to have widened in recent years.

otherwise declining demand for seasonal workers in agriculture. The NAWs fails, on the other hand, to include seasonal workers who are legal temporaries—it excludes H-2A workers from the sample. If the H-2A workers are an increasing share of the seasonal workforce, the NAWs will not reveal if that is the case. Moreover, if the H-2As have been an increasing proportion of the seasonal workforce that, in turn, implies that the NAWs data actually suggests that the unauthorized have been a declining proportion of the workforce.[6]

H-2A legal temporary workers: visa issuances and agricultural surveys

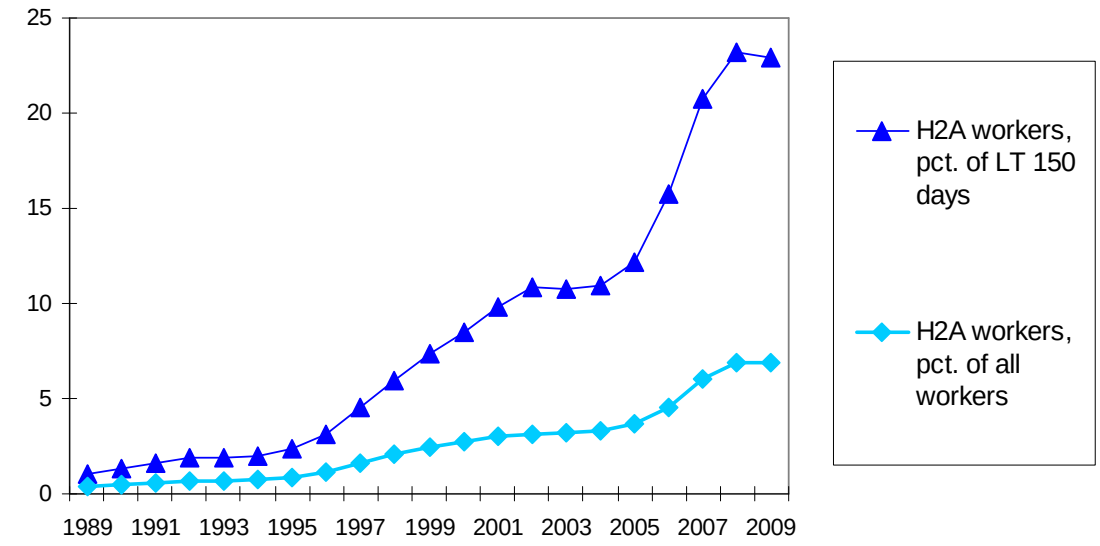
In fact, the H-2A program appears to have supplied a sizeable and increasing proportion of seasonal workers in the past few years. The US State Department issues visas and publishes those individual counts which are used to make the calculations shown in Figure 5 below. While it is possible that fewer individuals actually work in country than the visa issuances indicate, there is good reason to believe that most visas are used and that most of those visaholders work for several months.[7] When the H-2A visa numbers are taken as percentage over the NASS figures for seasonal workers (less than (LT) 150

[6] The NAWs sample has internal sampling weights, but does not weight up to the count of the total seasonal workforce. And the NAWs survey excludes H-2A workers by design so it is not a sample of the total workforce. There is a very small sample of quasi-legal persons in the NAWs, but these are not H-2As and analysts typically include them with legal residents. In short, if the H-2A is an increasing share of the seasonal workforce it follows that the apparently stable percentage of unauthorized workers must in actuality be a declining share, e.g., Total workforce = unauthorized + legal residents + legal temporary workers, but the NAWs = unauthorized + legal residents, or Total workforce > NAWs workforce.

[7] Two factors suggest a nearly uniform rate of visa use and stay in the United States. First, the application requirements (job advertisement and AEWR) and high rate of use of lawyers suggests that there are few frivolous applicants, albeit employers clearly apply for more workers than they ultimately hire. The number of visas issued during this period was 60 percent of the jobs certified. Still, employers who take the next step to apply for worker's visa fully intend to employ those workers because visas are not cost free. Second, visa "issuances" are an individual count, while the Department of Homeland Security measures the "admissions" of H-2As which is an event count of the number of times visaholders cross the border—so the same individual visaholder may be admitted numerous times and *admission* counts are typically several times greater than *issuance* counts for most nonimmigrant visas. For the H-2A visa, however, there is very little difference between admission and visa issuance counts which strongly suggests that all visas are used and that, once in the country, few H-2As shuttle back and forth between say Mexico and the United States for the duration of their seasonal work stint. For these reasons, and because it permits a stay bounded by one year, the H-2A may be the only nonimmigrant visa where the issuance data is a reasonable measure of the population. Albeit, the issuances are clearly not a good person-year count, e.g., this population stays only a portion of the year; it is seasonal.

days a year), the impression of substantial impact is complete.[8] While the number of H-2As has been increasing, the percentage of H-2As has increased. By 2009, the H-2As are just under 10 percent of the entire NASS agricultural workforce. At the same time, they are a little over one fifth of the NASS seasonal agricultural workforce which is arguably the correct workforce to compare them with. This is a far larger percentage than most observers might have thought was possible and, when compared to the NASS survey data, the H-2A share is indeed less.

Figure 5. Seasonal workers of all farm workers and H-2A workers of all and seasonal, percent 1989-2009



Source: NASS & DOL

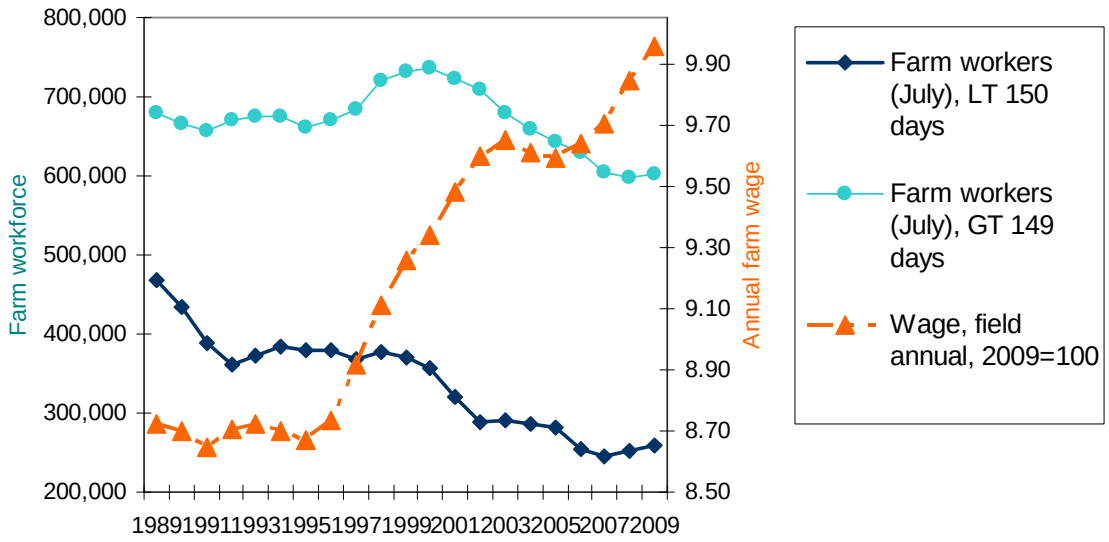
Trends in the seasonal workforce

These changes in the share of unauthorized and H-2A workers in the seasonal workforce take place in the context of changes in the structure of the agricultural industry and its workforce. Figure 6 shows that the historical decline of the workforce has continued over the past two decades since IRCA created the H-2A program. At the same time, and also a continuation of historical trends, the wage of agricultural workers has increased. Two notable facts stand out in this figure. The decrease in the seasonal workforce has been greater than that of the total workforce both in absolute and relative terms. Twenty years

[8] These are the national level July survey data which tends to have the largest seasonal figures.

ago seasonal labor made up 42 percent of the agricultural workforce and today it makes up 30 percent. At the same time, the agricultural wage for fieldworkers has increased sharply with a clear upward inflection after the mid-1990s through today.[9] Interestingly, the steady decline of the seasonal labor force and the increase in earnings also show an inflection point in the mid-1990s through today.

Figure 6. Farm workforce and annual farm wages, 1989-2009



Source: National Agricultural Statistical Service

THE H-2A WORKFORCE IN 50 STATES

The distribution of the H-2A workforce across the states is of obvious demographic interest and could shed further light on some of the factors associated with that growth. An estimate of the H-2A workforce can be made by assuming that visa issuances reliably measure the total workforce, while the state share of H-2A job application certifications reliably capture its state by state distribution.[10] Table one shows the results of that

[9] It is the case, as others point out, that the real wage in agriculture has lagged the real wage in non-agricultural employment.

[10] The Department of Labor posts their H-2A certification databases for 2006 to 2009 online. Those data are tabulated for the calculations shown here. There may be a differential rate of over application for jobs across states, but it is hard to either argue why that would be the case or how to best adjust for such variation. Note that visa issuances are available only at the national level and not for states.

estimation along with other population data and calculations of interest, especially the H-2A share of each state's seasonal workforce. These comparisons are of interest to give an idea of the relative size and distribution of the various populations, as well as to see if H-2As tend to cluster in the same states as other migrants which is commonplace assumption in migration theory.

Table one first shows ACS estimates of the non-metropolitan population born in Mexico, Central America and the West Indies (the H-2A source countries).[11] Then the table shows ACS estimates of the agricultural workforce by state, in this case both native and foreign-born workers from any origin. Next to that column is the workforce of seasonal workers reported in the 2007 Census of Agriculture. Clearly, there is a discrepancy in these measures as the ACS or general US survey finds fewer workers in agricultural occupations than the Department of Agriculture finds in seasonal, agricultural jobs. Of interest otherwise, the non-metropolitan population is not highly correlated with the estimated H-2A distribution across states ($p = 0.33$), albeit the correlation between the seasonal agricultural workforce and H-2As is strong ($p = 0.59$). This implies that H-2As are more likely to work in states of employer demand than they are in places with large concentrations of their countrymen. This may appear unsurprising, but it does not square readily with assumptions that H-2As favor states where they can leave legal work and blend in readily with other migrants; or the converse that migrant networks attract H-2As.

About half of the H-2A population is working in states in the Eastern and Southern states: North Carolina (18.4 percent), Georgia (7.9 percent), Louisiana (6.2 percent), Kentucky (5.7 percent), Florida (5.5 percent), Virginia (5.0 percent), and New York (4.7 percent). On the one hand, this comports with impressions that the H-2A program is predominantly dominated by Eastern states, but it also makes clear that southern states are players. Appendix table one also shows that the rate of growth of the H-2A workforce between 2006 and 2009 has been remarkable, even starting from small numbers, in many states. Yet, the largest H-2A workforces do not necessarily make up the greatest concentration of seasonal workers.

[11] Tabulations by the author of ACS microdata averaged over 2006-2008 (e.g., centered on 2007).

Perhaps of greater interest are estimates of the H-2A workforce by state and its percentage of the total seasonal agricultural workforce. Table one below shows estimates of the H-2A share of the seasonal workforce *within* each state. The H-2A share of each state's seasonal workforce is calculated using in the denominator the seasonal figure reported in the 2007 Census of Agriculture.[12] By this measure about 3 percent of the US seasonal workforce is made up of H-2A workers with substantial variation across states. The leading states in terms of share of the seasonal workforce are Nevada (49.7 percent), North Carolina (19.3%), Louisiana (17.0 percent) and Georgia (13 percent). Next come states with just under a tenth, Virginia (9.9 percent), Arizona (9.5 percent), Arkansas (9.2 percent) and South Carolina (8.9 percent). These concentrations are somewhat related to the distribution of H-2As across states, but also reflects the fact that H-2As can play a substantial role in small state workforces. Certainly, H-2As do not play a strong role in California or other Pacific region states (Huffman 2006).

[12] The NASS does not post its survey data on seasonal workers by state. The Agricultural Census data are only available for 2002 and 2007, so the figures in table one are based on contemporaneous estimates. The data for 2006 through 2009 which are used in later analysis were made by simple linear interpolation. On the one hand, this is not fully satisfactory. On the other hand, no other data are available for the calculation and the 2002 to 2007 trends show a strong, linear decline in the seasonal workforce. In short, in lieu of other data this procedure should yield reliable estimates for the analytic purposes here.

Table 1. Foreign born non-metropolitan populations; seasonal labor and H-2A workforces and H-2A share of seasonal workforce by state

	(1) Non-metropolitan foreign-born population		(2) Farm labor			H-2A workers of seasonal labor, percent
	Mexican, Central Am., West Indies population	Other foreign-born population	Farming, fishing, and forestry occupations, incl. supervisors	Seasonal farm labor, LT 150 days	H-2A workers	
	2007	2007	2008	2007	2007	2007
US Total	1,590,380	1,548,541	864,690	1,725,070	50,791	2.9%
Alabama	16,853	20,485	9,473	21,489	331	1.5%
Alaska	20,973	4,062	609	1,183	14	1.2%
Arizona	34,857	74,879	13,955	13,404	1,280	9.5%
Arkansas	19,002	24,691	11,719	19,509	1,786	9.2%
California	45,444	163,412	223,685	256,745	1,445	0.6%
Colorado	35,223	44,559	13,010	23,429	1,374	5.9%
Connecticut	100,346	18,643	2,668	7,515	452	6.0%
Delaware	5,194	6,486	1,372	1,880	50	2.6%
Florida	65,946	72,845	51,350	63,165	2,778	4.4%
Georgia	64,376	112,657	21,618	30,901	4,004	13.0%
Hawaii	50,295	4,405	4,567	4,911	58	1.2%
Idaho	21,105	32,724	16,029	28,190	1,726	6.1%
Illinois	28,929	20,956	17,723	37,797	219	0.6%
Indiana	22,157	22,361	11,819	29,060	108	0.4%
Iowa	32,204	23,596	15,653	50,266	456	0.9%
Kansas	31,061	38,704	12,460	30,682	503	1.6%
Kentucky	44,676	19,080	12,905	59,533	2,914	4.9%
Louisiana	19,654	9,143	6,804	18,406	3,138	17.0%
Maine	35,375	2,029	3,526	12,073	325	2.7%
Maryland	21,731	5,786	5,087	8,340	453	5.4%
Massachusetts	29,712	3,604	4,347	8,303	403	4.9%
Michigan	40,381	13,885	21,324	61,788	321	0.5%
Minnesota	31,734	16,578	17,009	54,851	282	0.5%
Mississippi	18,247	13,390	9,034	21,527	1,381	6.4%
Missouri	27,299	12,514	13,490	33,424	177	0.5%
Montana	20,524	1,430	6,219	14,285	438	3.1%
Nebraska	11,562	28,096	14,476	29,583	127	0.4%
Nevada	9,392	18,498	2,839	1,990	989	49.7%
New Hampshire	49,289	3,719	1,385	3,293	151	4.6%
New Jersey	0	0	5,684	14,693	241	1.6%
New Mexico	15,154	42,545	8,685	13,631	222	1.6%
New York	72,167	12,705	20,788	35,690	2,400	6.7%
North Carolina	49,175	87,906	24,826	48,305	9,324	19.3%
North Dakota	10,560	970	5,574	16,399	355	2.2%
Ohio	33,673	8,317	15,544	40,285	658	1.6%
Oklahoma	35,228	30,689	12,105	34,326	269	0.8%
Oregon	39,328	40,513	28,511	77,936	41	0.1%
Pennsylvania	44,824	13,273	23,282	36,223	180	0.5%
Rhode Island	16,099	1,161	700	857	6	0.8%
South Carolina	33,197	29,331	7,331	13,917	1,233	8.9%
South Dakota	9,104	2,349	7,741	16,472	250	1.5%
Tennessee	27,374	28,541	10,843	35,594	1,673	4.7%
Texas	60,525	291,592	54,737	100,964	1,116	1.1%
Utah	15,120	19,704	4,344	12,756	957	7.5%
Vermont	25,996	1,218	2,767	5,050	263	5.2%
Virginia	35,025	22,994	13,750	25,837	2,563	9.9%
Washington	45,093	55,656	40,761	189,532	955	0.5%
West Virginia	24,264	4,497	2,113	7,774	23	0.3%
Wisconsin	33,376	14,447	25,016	45,921	99	0.2%
Wyoming	11,557	6,916	3,433	5,386	282	5.2%

(1) Non-metropolitan population tabulated by author from American Community Survey microdata, 2006-2007. Note, New Jersey has no population classified as non-metropolitan.

(2) Year total occupational data from online American Community Survey estimates (US Census Bureau); Seasonal farm labor from US Agricultural Survey (USDA); H-2A population estimates by author (see text) .

CORRELATES OF H-2A WORKFORCE SHARES

Next, we analyze the state level data for the H-2As workforce share from 2006 to 2009 with a simple regression that introduces several variables to help explain the growth of H-2A concentration across states. The primary factor of interest is on the offsetting costs of seasonal labor and the corollary expenditure of capital and investment in new technology—all measured at the state level. Additionally, we will evaluate the possibility that the growth of a recruitment industry facilitates H-2A hiring, as well as introducing a variable for the more typically studied network impact of same-origin foreign-born populations. Other control variables for size of farm in acreage and earnings are included, as well as dummies for year (2006 omitted) and for the agricultural region in which the state is located.[13]

First, we run regressions that compare the percentage of H-2As of the total agricultural workforce with the percentage of all those who work less than 150 days of the total agricultural workforce. Seasonal labor has traditionally been operationalized as those workers of 150 days or less and H-2As are known as "seasonal" workers; yet, the H-2A visa permits a stay of up to one year and the modal stay is reported to be nine months. The comparison of these two workforces permits us to test the traditional proposition regarding seasonal labor, i.e., that large, technology using farms substitute out seasonal labor. That has been the historical trend and, as Figure 6 above shows, while the number of all agricultural workers has been decreasing since the 1990s the share that works less than 150 days has fallen faster from about 40 to 30 percent of all workers. At the same time, the average number of weeks worked by all workers has increased from about 25 to 35 weeks. And the turnover among employers has decreased, each worker averaging about 1.2 employers annually down from 2.5 at the outset of the 1990s.

[13] This is, essentially, a fixed effect pooled cross sectional and time series model with roughly 200 observations. The variance explained (R^2) for these models is good and the pattern of significance for the individual coefficients appears reasonable. In a next iteration of the analysis a GLS or WLS estimation might be preferable; however, introducing a full two-way cross-sectional fixed effect (50 states) is of questionable utility with such a small sample. At any rate, a formal test should be made of the preferability of fixed versus random effects, however, not that estimations made here with simple random effects are clearly less suitable as both the R^2 and individual coefficients are relatively poor to the estimation shown.

Table 2. Workforce share of H-2A legal seasonal workers and *all* seasonal workers, farm characteristics and relative labor costs: log-log, OLS regression all states 2006-2009

Variables	H-2A workers	All hired LT 150 days
	B	B
(Constant)	-15.64 ***	5.81 ***
Farm size, average acres	0.01	0.01
Crop land value, per acre	-0.30	-0.06 ***
Capital consumption, per farm	1.97 ***	-0.13 ***
Ratio labor expense to cap. consume	0.71 *	-0.10 ***
yr07	0.54 **	0.00
yr08	0.76 ***	0.00
yr09	0.69 ***	-0.01
Appalachian	1.30 ***	0.01
CornBelt	-1.20 ***	-0.02
DeltaStates	1.55 ***	-0.11 ***
LakeStates	-2.22 ***	0.01
Mountain	0.08	-0.15 ***
Non48	-0.59	-0.14 ***
NorthernPlains	-1.57 ***	-0.09 *
Pacific	-3.44 ***	0.20 ***
Southeast	0.79 **	-0.07 **
SouthernPlains	-0.35	-0.12 **
Adjusted R Square	0.62	0.65

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

In short, the century old trend continues to play out in past 15 years during the same time that H-2A employment has grown. We hypothesize that if H-2A employment is running contrary to the historical trend, then the determinants for H-2A employment also run counter to the commonplace expectation that large, capital intensive farming lead to fewer "seasonal" workers. Employment of H-2As may be driven by other factors, perhaps heightened perceptions of risk in hiring unauthorized workers and most certainly a trend toward longer spells of employments, reinforced by the benefit of their contracted status among the decreasing number of agricultural employers. Table 2 shows preliminary results that support the proposition that H-2As supply a specialized demand in the agricultural labor market, while workers employed for less than 150 days are

Table 3. Workforce share of H-2A legal seasonal workers and *all* seasonal workers, farm characteristics and migrant drivers: log-log, OLS regression all states 2006-2009

Variables	H-2A workers, share	
	B	B
(Constant)	-18.56 ***	-21.40 ***
Farm size, average acres	0.33 *	0.33 *
Capital consumption, per farm	1.10 ***	1.03 ***
Crop land value, per acre	0.38 ***	0.38 ***
Lawyer H2-A applications, no.	0.52 ***	0.52 ***
Foreign born %, 5-year lag	0.21 **	0.25 *
H-2A wage, average	---	1.38
yr07	0.47 ***	0.42 **
yr08	0.47 ***	0.38 **
yr09	0.55 ***	0.48 **
Appalachian	0.26	0.43 **
CornBelt	-1.43 ***	-1.40 ***
DeltaStates	0.96 **	1.24 **
LakeStates	-2.15 ***	-2.13 ***
Mountain	-0.19	0.00
Non48	0.15	-0.02
NorthernPlains	-1.73 ***	-1.66 ***
Pacific	-2.42 ***	-2.41 ***
Southeast	0.61 **	0.78 **
SouthernPlains	-0.97 **	-0.84 **
Adjusted R Square	0.76	0.76

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

responding to historical trends. States with high capital outlays per farm (capital consumption), as well as high labor costs (ratio of labor costs) are *less* likely to employ workers less than 150 days—but they are *more* likely to employ H-2A workers. Thus, the employment of H-2As appears to be driven by factors other than those otherwise associated with either a decreased demand for seasonal labor *per se*.

Second, we want to explore the effects of what might more commonly be thought of as migration determinants and H-2A employment. Table 3 shows the result of two regressions that include the above variables, plus the addition of three new variables. Column one in Table 3 shows that a lagged foreign-born population variable increases

the observed workforce share of H-2As; this conforms to the typical operationalization of migrant networks and findings for other migrant populations. Additionally, we include a scale variable on the number of H-2A applications that are filed by agents/lawyers for the ultimate employer. This also has a significant effect on increasing the state share of H-2As which supports speculation that demand has been stimulated by the growth of a professional recruitment industry.[14] The second column in table 3 includes these two variables, which remain statistically significant, and adds the wage offer for H-2As in the state. It is not clear that this variable should be corrected for endogeneity, although perhaps it should, because the job-wage offer for H-2As is one in which government mechanisms regulate wages. The wage of H-2As is nearly $2 dollars an hour more than unauthorized workers and about the same as legal workers. At any rate, the contemporaneous H-2A wage has no statistically significant association with H-2A employment.[15]

CONCLUSIONS

This paper sets out the growth of the H-2A workforce as an issue to be explained because there has been little recognition that it has become a more important source of labor supply. Much of the literature focuses on abuses of labor rights among this workforce or (Goldstein 2006), its relationship to the unauthorized and surrounding community (Griffith 2006). Another literature evaluates the relationship of the H-2A to agricultural labor shortages (Martin 2010) and similarities of the H-2A program to the evolution of modern-day guestworker programs in Europe and elsewhere (Jensen 2007). The focus in this paper, in contrast, is not on the concomitant issues surrounding the H-2A workforce, but more straightforwardly on a demographic evaluation of its growth. The analysis should demonstrate that the H-2A program is no longer a backwater and is worthy of the increasing amount of attention it is receiving.

[14] Field researchers report that the new settlement states, North Carolina in particular, have seen robust growth of lawyers who market their services to make applications to the US Department of Labor and State Department.

[15] The ratio of H-2A to market wages is not likely to vary markedly across states due to regulations. However, it might have during the period 2005-2008 when regulations permitted the prevailing wage to be linked to "experience" and, thus, could have led to H-2A wages that were lower than average in some states. It would be worthwhile to consider alternative rationales and specifications for this variable.

As for why the H-2A has grown, this paper has dismissed the policy or regulatory facilitation as the primary cause. The most notable policy changes affecting wage setting occurred in the second Bush administration while the increase in H-2As began much earlier in the latter 1990s under the Clinton administration. Measuring such policy effects, however, is difficult if not intractable since 2009 due to reversions to (higher) prevailing wage standards in the Obama administration coincident with the impact of the economic recession. It would also be premature to see the growth of the H-2A as a substitute for (decreasing) unauthorized migration, although some of the foregoing analysis is consistent with that possibility. Much more research needs to be done because the apparent timing of changes in the structure of the northward flow of unauthorized migrants corresponds with marked changes in the structure of the US agricultural economy. In the same vein, it seems unlikely that the H-2A program is primarily responding to increasing shortages of domestic agricultural labor in the United States (Martin 2010).

Rather, it seems that growth of the H-2A has coincided with offsetting factors in the agricultural marketplace, as well as the development of a professionalized recruitment sector. On the one hand, there is downward pressure on the hiring of truly seasonal, casual workers who labor less than 150 days in states with high total capital and relative labor expenditures per farm that is predictable with the secular decrease in demand for such labor. On the other hand, high levels of capital expenditures are associated with an increased share of H-2A workers, possibly because such employers wish to complement their investment with a dependable supply of workers. The growing demand for H-2As is may not be primarily led by farmers seeking the least expensive, e.g., unauthorized labor—although some farmers might be seeking to offset risks of fines for hiring illegal labor and are willing to pay a premium—but rather by changes in the structure of demand for longer-term agricultural workers and niche markets. How robust that demand will remain in the current policy and economic climate remains to be seen.

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