Farmworkers and Nonfarm Work:

Evidence from the NAWS

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Abstract

Historically, U.S. farmers have relied on a highly elastic supply of low-wage labor from rural Mexico. The supply of labor to U.S. farms depends on three variables: The total supply of immigrant farmworkers, the willingness of farmworkers to engage in follow-the-crop migration, and farmworkers' commitment to agricultural work. Recent studies show that the supply of farmworkers from rural Mexico (Charlton and Taylor, 2016) and follow-the-crop migration (Fan et al., 2015) are decreasing over time. We use NAWS data to test whether farmworkers' likelihood of shifting to nonfarm work is increasing, as well. Our econometric analysis finds evidence of a recent upward trend in farmworkers' probability of working in nonfarm occupations in the U.S. and that this trend is accelerating over time. Farmworkers who are male and have more extensive off-farm networks, higher educational attainment, legal documentation, are able to speak English well, or are willing to travel substantial distances to work have a higher probability of recently working in a nonfarm occupation. The positive impact of off-farm networks indicates that farmworkers' movement to nonfarm work is self-perpetuating: farmworkers who participate in nonfarm work contribute to off-farm networks that, in turn, stimulate others to work off farm. Changes in the characteristics of Mexico's rural population, including sharp increases in rural education, appear to be at least partly responsible for the rising trend in off-farm work, suggesting that the trend is unlikely to reverse in the future. In California and the Pacific Coast regions, the share of farmworkers who will engage in nonfarm work is predicted to increase sharply over the next 20 years. An increasing trend in off-farm work may contribute to farm labor scarcity and rising farm worker wages. It may reinforce the impacts of a declining farm labor supply from rural Mexico and decreased willingness of farmworkers to engage in follow-the-crop migration once they are in the U.S.

1 Introduction

Are U.S. farmworkers leaving the farm for jobs in other sectors in the economy? If so, what is driving this trend towards nonfarm employment, and how will this affect the supply of labor to U.S. farms? According to a recent report by the USDA's Economic Research Service (Hertz, 2018), US farmers reported about 1.3 million farm jobs in 2016, which is representative of the number of full-time equivalent workers. Although the report suggests that the number of farmworkers has remained relatively constant since 2000, there have been ongoing reports of farmworker shortages during harvest time in recent years (e.g., Good, 2017; della Cava and Lopez, 2019; Oatman, 2018; Glaister, 2006; Plummer, 2013). Two studies conducted with administrative data in California argue that the number of farm jobs may not necessarily reflect the number of farmworkers (Martin et al., 2016; Khan et al., 2004). These studies find that, for each job, three Social Security numbers were reported during the 1990's, and two numbers were reported during the 2000s. However, some argue that the number of Social Security numbers is not a good measure of the farm workforce because workers may possess multiple Social Security numbers, adding further difficulty to measuring whether or not there have been significant changes in the farm labor force (Richards, 2018; Hsu, 2008).

Until recently, evidence of a diminishing farm labor supply has been anecdotal, but several data-driven studies provide evidence that the farm labor supply is shifting inward. Using rural Mexican household data, Taylor et al. (2012) find evidence that the expanding Mexican economy along with falling birthrates in Mexico is causing the farm labor supply to shrink since most of the farmworkers in the U.S. come from rural Mexico. Charlton and Taylor (2016) quantify this decline in labor supply and reveal additional factors that are contributing to it. Using a structural job search model, Richards (2018) finds evidence of farm labor shortages for harvest workers and determines that farmers are unable to raise wages high enough because of an insufficient gap between the marginal value product among workers and the market clearing wage. Hertz and Zahniser (2012) identify counties that had large increases in farm earnings but lower employment rates, which is indicative of labor shortages. And Fan et al. (2015) find that fewer farmworkers are willing to migrate to US farms (from abroad and within the U.S.), which is problematic for farmers who rely on harvest workers who follow the crop or are willing to travel to work on their farms.

Additional evidence suggests that farmworkers are be drawn into other sectors of the US economy. A 2009 congressional report explains that some farmworkers want more employment than what is offered by farmers, leading to a search for non-farm employment (Levine, 2009). Another report by the Pew Research Center indicates that there were only two occupations where unauthorized immigrant workers outnumbered lawful immigrant workers (farm work and construction), indicating that low-skilled sectors

of the economy (such as construction) may serve as viable employment options for farmworkers who want to get out of farm work (Pew Research Center, 2016). Card and Lewis (2007) find that there has been a shift in Latin American employment away from farm work into construction and retail. And Hashida and Perloff (1996) analyze the effects of farmworker work histories on wages, finding several factors that are linked to the probability of working off the farm, including age, farm work experience, and nonfarm networks. However, the sample period from that study only includes two years of data, and they are not focused on identifying why farmworkers are engaging in nonfarm; whereas, our study is.

This article contributes to the farm labor literature by demonstrating that U.S. farmworkers are increasingly likely to be employed in nonfarm occupations within the U.S., a trend that may bode well for farmworkers but create challenges for farmers in the long run. We identify factors that appear to increase U.S. farmworkers' likelihood of being employed in nonfarm occupations in the U.S. As farmers face increased competition from other farmers and nonfarm employers, identifying and tracking factors linked to workers leaving the farm could help guide farmers and policy makers as the farm workforce continues to evolve. We use our model to forecast how changes in the demographic composition of the farm workforce will affect the share of workers engaged in nonfarm work in the foreseeable future.

The rest of the paper is organized as follows: Section 2 presents descriptive and graphical evidence showing recent trends in farm and nonfarm work, Section 3 describes the data used in the empirical analysis, Section 4 describes the methodology used to identify factors that are linked to farmworkers working in nonfarm jobs and leaving the farm labor force, Section 5 presents the results, Section 6 provides some concluding remarks, and Section 7 provides some feedback and recommendations for the Department of Labor to consider regarding the NAWS survey methodology.

2 Background

According to the National Agricultural Workers Survey, roughly one out of every three workers in the US had recently performed some kind of nonfarm work in the early 1990s (see Figure 1).[1] By 2000, this number dropped to one in ten. However, this number has been on an upward trajectory ever since, and nearly one in four farmworkers reported engaging in some nonfarm work during the past 12 months as of 2016. Figure 2 shows that the average number of weeks of nonfarm work that farmworkers performed during the previous 12 months increased from roughly three weeks in 2000 to eight in 2012.

Although a five week increase in the average number of weeks of nonfarm work may not seem extraordinary, this figure is potentially misleading because it is driven by an increase in the share of workers

[1]The term "recently" refers to the previous 12 months from the date that respondents were interviewed by NAWS staff.

Figure 1

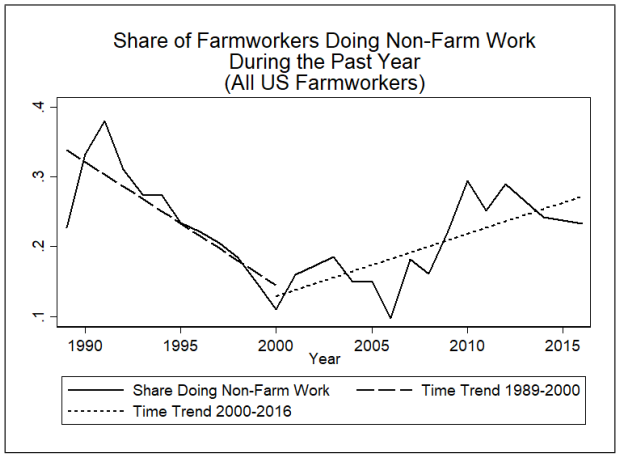
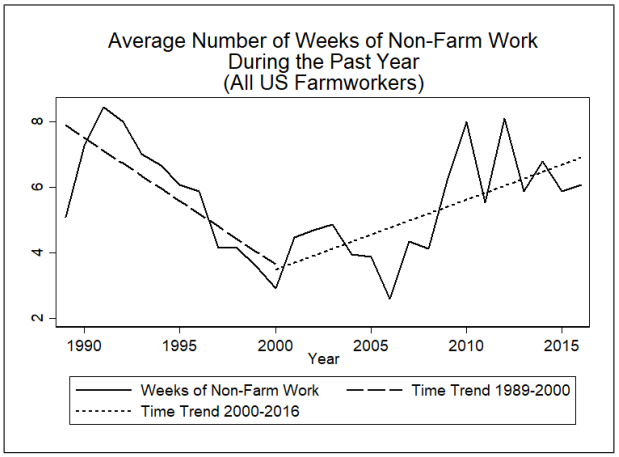


Figure 2



working off the farm rather than longer spells of off-farm work. For those workers who worked off the farm during the past 12 months, Figure 3 shows the average number of weeks of off-farm work. The trend is not statistically different from 0 after 2000, and these workers spent an average of six months in a nonfarm occupation during the previous 12 months. Figure 4 highlights the upward trend in the share of farmworkers who worked in nonfarm occupations since 2000, which demonstrates that off-farm work is becoming increasingly important to farmworkers since an increasing share of farmworkers are performing those roughly six months of work in nonfarm occupations.

Figure 3

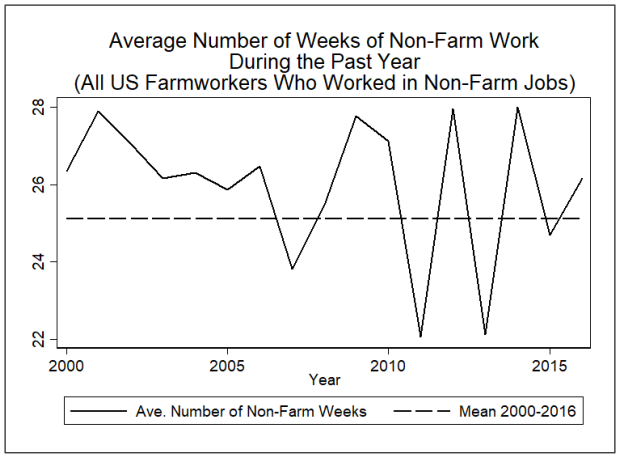
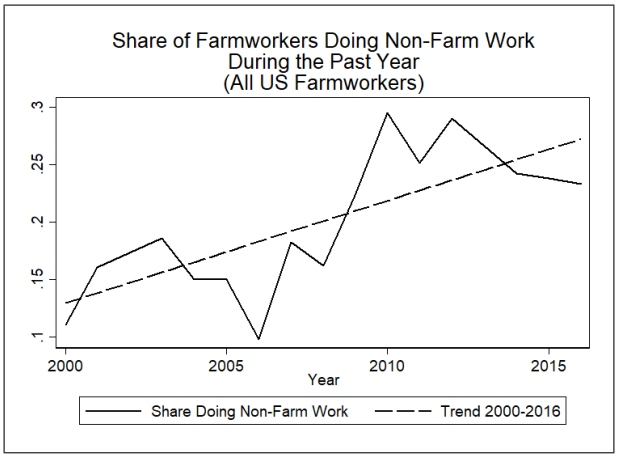
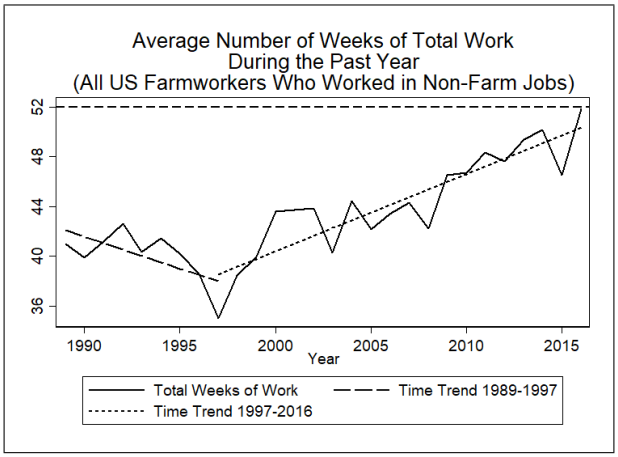


Figure 4



In fact, for those workers who report performing some nonfarm work during the previous 12 months, the number of total weeks of work (the sum of farm and nonfarm work) has increased from 38 weeks to 52 weeks over the same time span (see Figure 5). Effectively all the farmworkers who performed some nonfarm work in 2016 found enough farm and nonfarm work to stay employed for the whole year.

Figure 5



These trends suggest a preference (or need) for year-round employment among an increasing share of the existing farm workforce, which is being fulfilled, at least partially, through nonfarm work. It is important to note that a significant limitation of the NAWS is that it does not identify farmworkers who have chosen to leave the farm sector altogether because it only samples workers who were currently engaged in farm work at the time of the survey. Nevertheless, it is clear that, for those who remain in the farm workforce at least part of the year, there is a tendency towards working in nonfarm occupations. This pattern suggests a significant change in the farm workforce that could potentially be problematic for farmers. If nonfarm employers are able to keep farmworkers employed on a year-round basis (as is the case with some low-skilled service occupations such as food service, housekeeping, or personal services), this may induce farmworkers to leave the farm for good. Understanding the factors that are linked to farmworkers becoming employed in nonfarm occupations can enhance our understanding about forces on the U.S. side of the border that are impacting the farm labor supply.

3 Data

The data used in the analysis come from the confidential NAWS and cover the time span between 1989 and 2016.[2] These data include the number of weeks that farmworkers worked on and off the farm during the past 12 months, their age, gender, marital status, legal status, years of schooling, what type of employer they worked for, whether or not they are a migrant worker, the number of children in the household, the number of individuals in the household who were working in a nonfarm occupation at the time of the survey (used as a proxy for each individual's off-farm employment network), each individual's nonfarm

[2]These confidential NAWS data were provided by Daniel Carroll of the U.S. Department of Labor.

work experience (in years), their ability to speak English, and whether or not their farm employer provides monetary bonuses. The number of weeks worked off the farm is used to generate a dummy variable for having worked in a nonfarm occupation during the past 12 months. If an individual worked a positive number of weeks off the farm during the previous 12 months, they are assigned a 1 (and 0 otherwise). We restrict the analysis to include only farmworkers who have **not** been out of the United States during the previous 12 months to ensure that the nonfarm work performed during the previous 12 months actually occurred in the U.S. Restricting the sample in this manner leaves 76% of the total observations available for the analysis.

4 Methodology

4.1 Trend Analysis

A graphical examination of the data in Figure 1 suggests two points in time that should be tested for a structural break in the trend of farmworkers working off the farm: 2000 and 2006. However, we formally test the data to identify the first year that a structural break in the trend can be identified and whether a break in the trend can be identified in 2000 or 2006. We estimate equation (1) separately for each value of $t^j \in (1989, 2015)$. Using this process, we determine the earliest value of t^j such that a break in the trend can be identified statistically.

$$NF_{irt} = \alpha_0 + \alpha_1^j t + \alpha_2^j \text{AFTER}t^j + \alpha_3^j \text{AFTER}t^j \times t + \theta \mathbf{X_{irt}} + \phi_r + \epsilon_{irt} \tag{1}$$

NF_{irt} is a binary variable for individual i in who was surveyed in region r at time t having worked in a nonfarm occupation during the previous 12 months, t is a continuous time variable, AFTERt^j is a dummy variable identifying the years after t^j, $x^k \in \mathbf{X_{irt}}$ includes each farmworker's age, gender, marital status, legal status, years of school, employer type (direct hire or FLC), their migrant status, the number of kids in their household, the number of people in each farmworker's off-farm network (defined in Section 3), the number of years that they have performed nonfarm work, a dummy that identifies individuals who speak English well, and a dummy that identifies whether their farm employer provides a monetary bonus. ϕ_r are regional fixed effects identified by the 12 NAWS survey regions. The coefficient α_1^j is the time trend in the probability of farmworkers being recently employed in a nonfarm occupation between the years 1989 and t^j, where the subscript j on the α_1^j is added to emphasize the fact that α_1 differs for each value of t^j. The same logic for the subscript holds for α_2^j and α_3^j. The sum of the coefficients $\alpha_1^j + \alpha_3^j$ represents the time trend over the time period $t^j + 1$ to 2016. To test whether there is a structural break in the trend after the year t^j, we test

the null hypothesis that either $\alpha_1^j \geq 0$ or $\alpha_1^j + \alpha_3^j \leq 0$ against the alternative hypothesis that both $\alpha_1^j < 0$ and $\alpha_1^j + \alpha_3^j > 0$ and conclude that there is a structural break if the null hypothesis is rejected at the .01 level of confidence.[3] In addition, we also identify the year that the most well-defined break in the trend occurs by identifying $t^{j*} = \underset{t^j}{max}[\alpha_3^j]$ such that the null hypothesis above is rejected, as well as the trend in the most recent period in the sample (i.e., the trend from year $t^j + 1$ through 2016).

4.2 Linear Probability Model

After analyzing the trend in off-farm work, we use the following linear probability model to identify factors that contribute to changes in the probability of working off the farm in the U.S.:

$$NF_{irt} = \gamma_0 + \mathbf{\Gamma X_{irt}} + \phi_r + \phi_t + \phi_{rt} + \nu_{irt}. \tag{2}$$

Where NF_{irt} and $x^k \in \mathbf{X_{irt}}$ are the same variables described in the previous section. $\phi_r, \phi_t, \phi_{rt}$ are region, year, and region-by-year fixed effects. The coefficients of interest $\gamma^k \in \mathbf{\Gamma}$ are interpreted as a $100 \times \gamma^k$ percentage point increase in the probability of working in a nonfarm job caused by a 1 unit increase in x^k. When x^k is a dummy variable (such as migrant), γ^k can be interpreted as the effect of that characteristic on the probability of working off the farm.

4.3 Forecasting the Share of Workers Who Will Work in a Nonfarm Job

In order to forecast the share of farmworkers who will engage in nonfarm work in the future, we aggregate the individual-level data at the county-year level and follow a five-step procedure. In the first step, we calculate the long-run trends for each of the right-hand-side variables x^k that were used in (2) by using the following model in a series of separate regressions, one for each x^k:

$$x_{ct}^k = \omega_0 + \omega_1^k x_{ct-1}^k + \omega_2^k x_{ct-2}^k + \omega_3^k \times t + \phi_c + \delta_{ct}. \tag{3}$$

Where $x_{ct}^k \in \mathbf{X_{ct}}$ are the same variables in the vector $\mathbf{X_{irt}}$ but are aggregated at the county level instead of at the individual level, t is a continuous time variable, ϕ_c are county fixed effects, and δ_{ct} is the error term. Then we calculate the long-run trends for each x^k by using the formula: $\Omega^k = \frac{\omega_3^k}{(1-\omega_1^k-\omega_2^k)}$. In step three, we forecast how much each of the x^ks will change T years from now by multiplying Ω^k by T. In step four, we forecast how each of the variables will change the share of farmworkers working off the farm in T years by

[3] We have essentially defined a structural break in the trend as a statistically significant negative trend in the early part of the sample that is "broken" by a statistically significant positive trend that starts immediately after the year in which the negative trend ends.

using the following formula: $\Omega^k \times T \times \pi^k$, where $\pi^k \in \Pi$ are the coefficients on the variables $x^k \in \mathbf{X_{ct}}$ from the following panel regression model:

$$SNF_{ct} = \rho_0 + \Pi \mathbf{X_{ct}} + \phi_c + \epsilon_{ct}. \tag{4}$$

SNF_{ct} is the share of farmworkers who worked off the farm in county c during the 52 weeks prior to the time they were surveyed in year t, $\mathbf{X_{ct}}$ was previously defined, ϕ_c are county fixed effects, and ϵ_{ct} is the error term. Finally in step five, we forecast the change in the share of farmworkers working off the farm by taking the sum of the forecasted changes that are predicted for each variable x^k such that the overall projected change in the share of farmworkers working off the farm T years from now is: $\sum_{k=1}^{K} \Omega^k \times T \times \pi^k$. We then add this to the baseline share in 2016 to get the predicted share T years after 2016.

5 Results

Some results from the trend analysis is reported in section 5.1. The analysis provides strong evidence of a structural break in the trend of farmworkers working off the farm near the turn of the millennium. For the sake of simplicity, Table 1 only includes the trends in the more recent period of the sample, but additional details are provided in the text. The second set of results in section 5.2 identifies factors that are contributing to changes in the probability of U.S. farmworkers engaging in nonfarm work. The last set of results in Section 5.3 provide forecasts for the share of farmworkers who will engage in nonfarm work in the foreseeable future.

5.1 Trend Analysis

The results from equation (1) are shown in Table 1. The first column identifies the value of t^j that is used for each regression. Although these models were ran for each of the years in the sample, we only report those that have meaning for the trend analysis (i.e., trends after a structural break can be identified in the data). Column (1) identifies $\alpha_1^j + \alpha_3^j$ (the trend between period $t^j + 1$ and 2016). Column (2) identifies the same trend but includes the set of controls $\mathbf{X_{irt}}$. All regressions include region fixed effects defined by the NAWS survey regions, and all standard errors are clustered at the region level. Starting at the beginning of the sample, we were unable to reject the null hypothesis of a structural break in the trend described in section 4. However, once we set $t^j = 1998$, both the pre and post trends become statistically significant, and they have the expected signs (i.e., the early trend is negative and the later trend is positive). Although not shown in the table, the analysis indicates that workers were about .9 percentage points less likely to have

recently worked off the farm each year between 1989 and 1998. This negative trend reversed in 1999, and over the time period of 1999 to 2016, workers were about .9 percentage points more likely to have recently worked off the farm each year. Even though our first candidate for a structural break is the year 2000, these results show that a structural break in the trend can be statistically identified as early as 1999. As t^j gets closer to 2016, the trend in the later part of the sample is shortened, and the magnitude of the upward trend increases, indicating that the probability of working off the farm has been increasing at an increasing rate. The largest statistical break in the trend occurs when $t^{j*} = \underset{t^j}{max}[\alpha_3^j] = 2005$. That is: the largest deviation between the negative and positive trends is detected when the trend is allowed to break in 2006. If we consider the structural break to have actually occurred in 2006, then the results indicate that farmworkers were about 1.6 percentage points more likely to have worked off the farm for each year between 2006 and 2016. Since the two initial candidates were 2000 and 2006 based on a review of the graphical evidence, the statistical evidence is reassuring.

Table 1: Trend in the Probability of Farmworkers Working in Nonfarm Occupations

	(1)	(2)
	Time Trend	Time Trend
t^j	$(t^j + 1)$ through 2016	$(t^j + 1)$ through 2016
1998	.009***	.007***
	(0.002)	(0.002)
1999	.010***	.008***
	(0.002)	(0.002)
2000	011***	.008***
	(0.002)	(0.002)
2001	.011***	.009***
	(0.002)	(0.002)
2002	.012***	.010***
	(0.003)	(0.003)
2003	.014***	.011***
	(0.003)	(0.004)
2004	.016***	.012***
	(0.004)	(0.005)
2005	.016***	.012***
	(0.004)	(0.004)
	Without Controls	With Controls
Observations	50,653	40,290

Note: Standard errors are clustered at the NAWS survey region level.
All regressions include region fixed-effects. $^*p < .1$,$^{**}p < .05$,$^{***}p < .01$

5.2 Factors Contributing to Changes in the Probability of Working off the Farm

Table 2 shows factors that are contributing to changes in the probability of farmworkers working in nonfarm jobs during the previous 12 months. Each of the columns show results from equation (2) with a different set of fixed effects. The most robust set of fixed effects are found in column (4). All of the variables in the model are statistically significant at the .01 or .05 level except for the variables that identify marital

Table 2: Factors Contributing to Changes in the Probability of U.S. Farmworkers Working off the Farm (1999-2016)

	(1) Y_{irt}	(2) Y_{irt}	(3) Y_{irt}	(4) Y_{irt}
Age	-0.00274***	-0.00334***	-0.00341***	-0.00324***
	(0.000714)	(0.000751)	(0.000749)	(0.000732)
Female	-0.0404**	-0.0413**	-0.0404**	-0.0406**
	(0.0156)	(0.0160)	(0.0145)	(0.0142)
Married	-0.00337	0.000317	0.000611	-0.000662
	(0.00552)	(0.00620)	(0.00564)	(0.00524)
Undocumented	-0.0156	-0.0308**	-0.0316***	-0.0280**
	(0.0100)	(0.0109)	(0.00968)	(0.00914)
School	0.00437***	0.00281***	0.00252***	0.00290***
	(0.000707)	(0.000549)	(0.000543)	(0.000546)
Works for an FLC	-0.0385***	-0.0395***	-0.0213***	-0.0227***
	(0.00878)	(0.00823)	(0.00564)	(0.00672)
Migrant	0.0950***	0.0970***	0.0826***	0.0851***
	(0.0178)	(0.0157)	(0.0163)	(0.0169)
No. of Kids in Household	0.00149	-0.000910	-0.000294	-0.000339
	(0.00122)	(0.00111)	(0.00103)	(0.000967)
No. of People in Nonfarm Network	0.0237***	0.0220***	0.0207***	0.0209***
	(0.00306)	(0.00318)	(0.00301)	(0.00294)
Years of nonfarm Experience	0.0160***	0.0156***	0.0151***	0.0147***
	(0.000822)	(0.000770)	(0.000697)	(0.000663)
Speaks Good English	0.0347***	0.0397***	0.0184**	0.0217***
	(0.00672)	(0.00435)	(0.00728)	(0.00674)
Farm Employer Gives Monetary Bonus	-0.0332**	-0.0374***	-0.0427***	-0.0405***
	(0.0127)	(0.0108)	(0.0110)	(0.0115)
Year Fixed Effects	–	X	X	X
Region Fixed Effects	–	–	X	X
Region-by-Year Fixed Effects	–	–	–	X
N	32,146	32,146	32,146	32,146

Standard errors in parentheses are clustered at the NAWS Region level

* $p < .1$, ** $p < .05$, *** $p < .01$

status and the number of kids in the household. Overall, the results show that farmworkers who are older, female, undocumented, are working for an FLC, or who receive some type of monetary bonus from their farm employer are less likely to have recently worked in a nonfarm job in the U.S. Females are about 4 percentage points less likely to have worked off the farm, and undocumented workers are about 3 percentage points less likely. An additional year of age is associated with about a .3 percentage point decrease in the probability of working off the farm, and those who receive a monetary bonus are about 4 percentage points less likely to work off the farm. Farmworkers who work for an FLC are about 2.3 percentage points less likely to have worked off the farm. On the other hand, farmworkers who are more educated, are migrant workers, who have a more extensive nonfarm network, who have more nonfarm work experience, and who speak English well are more likely to have recently worked off the farm. Migrants are about 9 percentage points more likely to work off the farm, and each year of school increases the probability by another .3 percentage points. For each additional person in the off-farm network, the probability of working off the farm increases by 2.1 percentage points, and an additional year of nonfarm work experience increases the probability by another 1.5 percentage points. The following provides an example of how these factors might lead to different outcomes: a documented male farmworker who is 30 years old with a high-school education, who has two individuals in his nonfarm network, 10 years of nonfarm work experience, and speaks English well is 35 percentage points more likely to have recently worked in a nonfarm occupation compared to a 40 year old undocumented female farmworker with an eighth-grade education, no-one in her off-farm network, and no off-farm work experience.

5.3 Forecasting the Share of Farmworkers Who Will Work in a Nonfarm Job

Our forecasts for the share of farmworkers who will engage in nonfarm work in the future are presented in Table 3 and are based on regressions that are ran over the period of time 1999-2016 (the period over which we have identified an upward trend in nonfarm work). We conduct separate analyses for the entire US, Florida, California, and the Pacific Coast regions. Based on the forecasted changes in demographics, our model only predicts a slight increase in the share of US workers who will have some nonfarm work in the foreseeable future. In 5 years (20 years), our model predicts that the share of farmworkers who will have some nonfarm work will only increase from 23.2 percent to 23.6 (24.6) percent. Our model predicts that the share in Florida will increase from 25.3 percent to 26.0 (28.1) percent in 5 years (20 years). However, once we focus on California and the Pacific Coast regions, the results are sharply contrasted. In California, the share of farmworkers who will engage in some nonfarm work is predicted to increase from 12.3 percent to 22.8 percent over the next 20 years. In the Pacific Coast region, the share

is expected to increase from 20.6 percent to 36.2 percent over the next 20 years. This means that the share of California's farmworkers who will engage in some nonfarm work is expected to double over the next 20 years, and one out of every three farmworkers in the Pacific Coast region are predicted to engage in nonfarm work.

Table 3: Forecasts for the Share of Farmworkers Who Will Engage in Nonfarm Work

	Predicted Share of Farmworkers Doing Nonfarm Work				
Year	2016	2021	2026	2031	2036
U.S.	.232	.236	.239	.243	.246
Florida	.253	.260	.267	.274	.281
California	.123	.150	.177	.204	.228
Pacific Coast	.206	.245	.284	.323	.362

Note: Baseline figures for 2016 are taken from the NAWS.

6 Conclusion

This brief study identifies a upward trend in nonfarm work among U.S. farmworkers, which may contribute to a decline in the farm labor supply. Graphical evidence suggests that this trend starts in 2000, but statistical evidence suggests that the trend starts as early as 1999. As of 2016, one out of every four farmworkers had recently been employed in a nonfarm occupation. Of those who worked off the farm, there has been an upward trend in the number of total weeks worked throughout the year since the late 1990s. During 2016, farmworkers who worked off the farm had effectively become year-round workers by diversifying their labor supply into farm and nonfarm occupations.

The workers that appear in the NAWS are a selected sample, which cannot capture the extent to which former farmworkers quit farm work entirely to work in other sectors of the economy. The upward trend in nonfarm work identified by the NAWS likely understates the true trend of workers being pulled out of the farm labor force by higher wages or the security of year-round employment in other sectors. Nevertheless, the NAWS provides clear evidence that nonfarm work is claiming an increasing share of farmworkers' time.

In addition to this upward trend in nonfarm employment among farmworkers, a handful of factors were identified as having a statistically significant connection to working off the farm. They include off-farm networks, nonfarm work experience, education, legal documentation, migrant status, and the ability to speak English well. Farmworkers who are older, females, and those whose farm employers provide monetary bonuses have a lower probability of working off the farm. These results are consistent with our

expectation that younger, more educated immigrant men with legal documents, English skills, networks of contacts with nonfarm workers, and more nonfarm experience have better options off the farm and a lower cost of obtaining employment. Our model predicts that the overall share of US farmworkers who will engage in nonfarm work will remain around 25 percent for the foreseeable future. However, California and the Pacific Coast regions are expected to experience dramatic increases. The share of farmworkers in California who will engage in nonfarm work is predicted to double over the next 20 years, and the share in the Pacific Coast region is predicted to increase from one-fifth of the workforce to over one-third.

These results reinforce prior evidence that the farm workforce is changing and adds to the story by demonstrating that U.S. farmworkers are increasingly seeking nonfarm employment, especially on the west coast where farmers are particularly reliant upon labor inputs. Our findings almost certainly understate the extent to which workers are leaving agricultural work, inasmuch as the NAWS data do not cover those who have left farm employment altogether. These results support the conclusions of Charlton and Taylor (2016), who find that there is a trend towards nonfarm work among the pool of individuals who have typically served as the backbone of the U.S. farm labor force, and Fan et al. (2015), who find that the changing demographic composition of the farm workforce is leading to a fundamental shift in the type of workers that farmers are be able to hire.

7 Comments, Feedback, and Recommendations for the Department of Labor

The NAWS provides a rich set of data that contains a critical source of information that allows researchers to study how the farm workforce is changing in the US. The multi-stage sampling methodology is particularly important in California as different fruit and vegetable crops are cultivated and harvested throughout the year depending on the location. Therefore, we recommend continuing with the multi-stage survey methodology in regions that have historically produced labor-intensive crops throughout the year (such as California and Florida). Because research suggests that the farm labor supply is expected to decline in the future, this will affect the production practices of labor-intensive crop farmers. It is essential to have a reliable source of data that can be used to study this transition and provide suggestions to policymakers and other stakeholders. However, the NAWS does have significant limitations that preclude certain types of analyses from being conducted. Some of these limitations include a (i) small sample size, (ii) incomplete coverage at the county level, (iii) a lack of sample weights that enable researchers to calculate the number of farmworkers in the workforce (and thus conduct detailed research related to changes in the labor supply),

(iv) and a lack of information about how farmworkers are engaging with labor-saving technologies, which are becoming more prevalent in regions such as California that produce fruit and vegetable crops.

Our suggestions for improving the NAWS include:

1. Increasing the sample size in a manner that would allow for more accurate county-level statistics as well as wider geographic coverage within NAWS regions. This would enable the NAWS to be better matched to other county-level data sources (such as those provided by NASS and the QCEW) and would dramatically extend the usefulness of the data set and increase the number of applications the NAWS could be used for.

2. Construct a set of sample weights that can be used to represent the number of workers in the farm workforce. This will be useful for studying how changes in demographics or other variables are affecting the overall farm labor supply.

3. Ask new questions about the use of technology. As we move forward, the workforce is expected to become more engaged with labor-saving technologies. Understanding how the farm labor force is interacting with these can be useful for preparing the future workforce and understanding how the transition is occurring. For example, asking questions about how much time they spend interacting with technologies or the amount of training they have received.

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