Nonfarm Work and Income Smoothing Among Domestic Farmworkers

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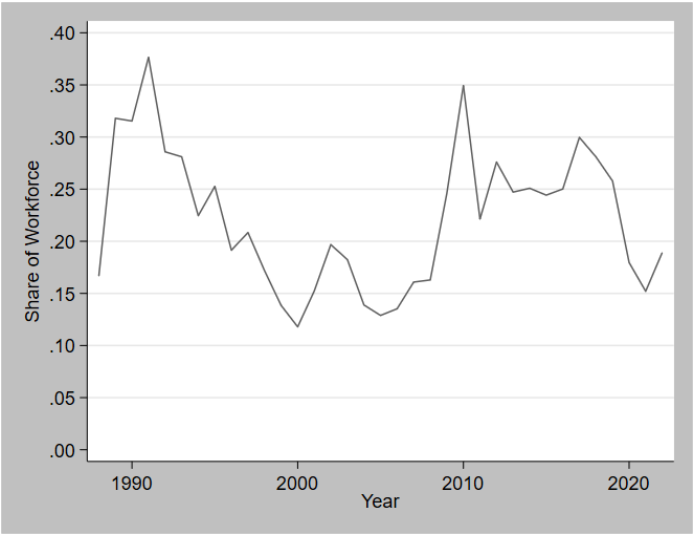
Introduction

- Labor supply pressures are a major concern in US agriculture
- Factors include
  - An aging workforce not being replaced by young immigrants
  - Changes in migratory behavior among foreign-born employees
  - Competition from other sectors of the economy
- In this paper, we
  - Examine how observables are linked to farmworkers working off the farm
  - Forecast the share of the workforce that will perform nonfarm work in the future
  - Provide insights into whether nonfarm work could be an income smoothing strategy

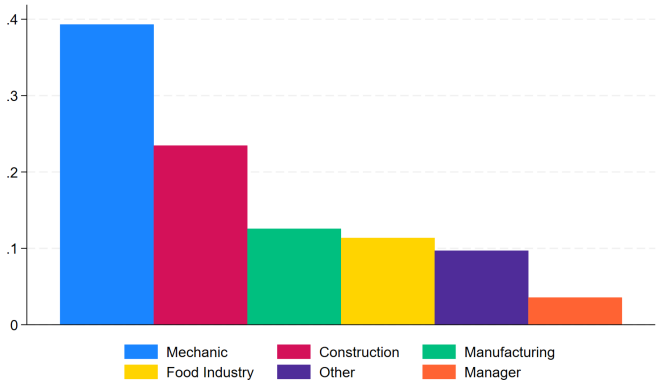
Data

- Data from the National Agricultural Workers Survey (NAWS)
- Repeated cross sectional data
- Work histories for the past 52 weeks
- Can identify farmworkers who worked off the farm
- Cannot identify farmworkers who left farm work and never returned
- Has a wealth of demographic information

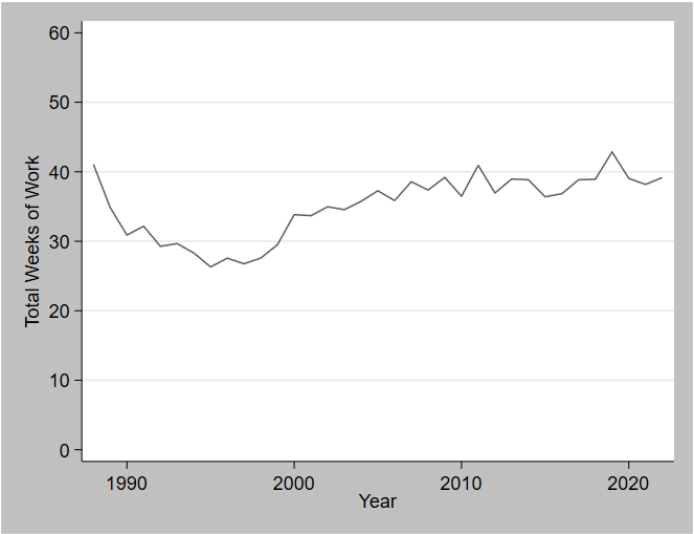
Share of Farmworkers Who Did Nonfarm Work



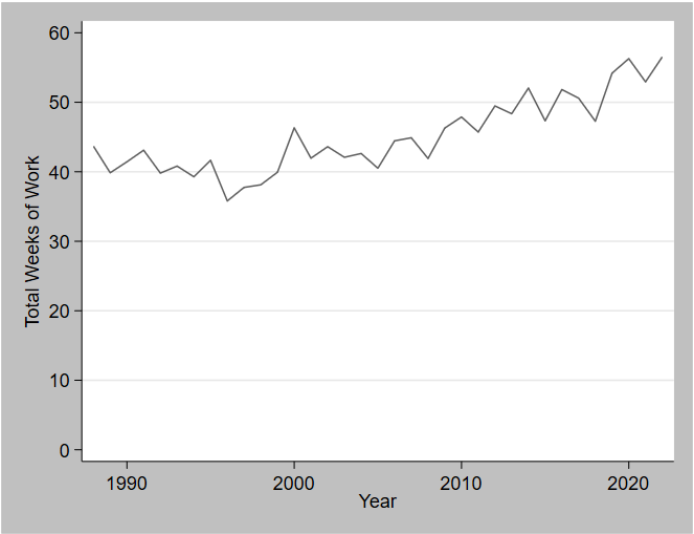
Sectors of Nonfarm Work



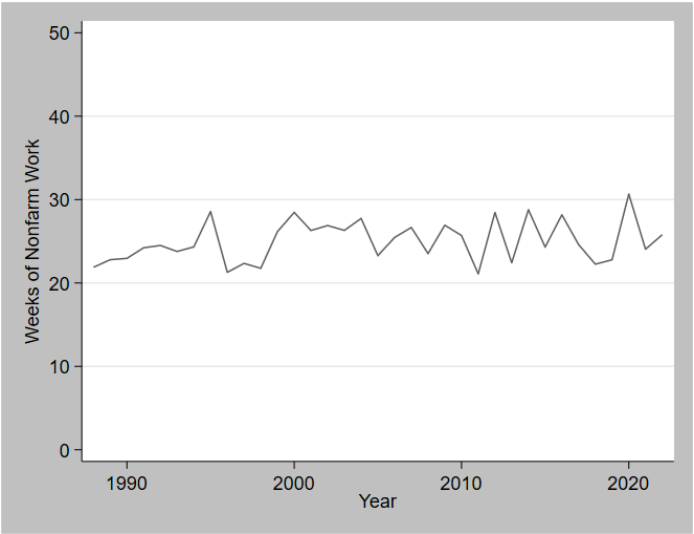
Total Number of Weeks Worked (Farm Workers Only)



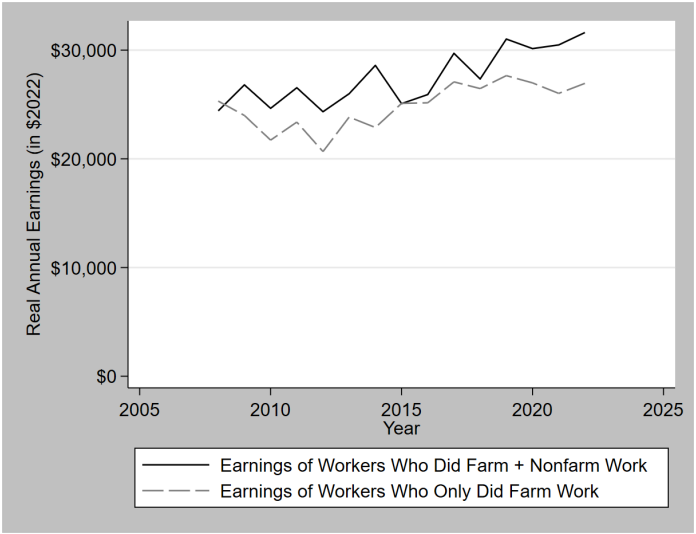
Total Number of Weeks Worked (Farm and Nonfarm Workers)



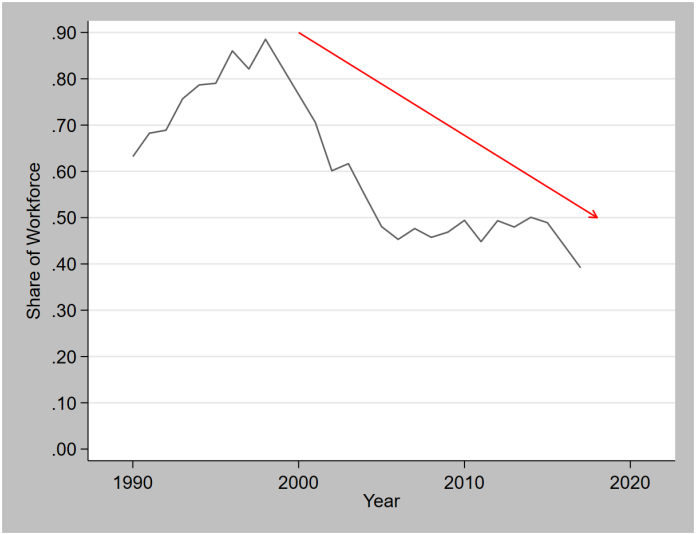
Number of Weeks of Nonfarm Work



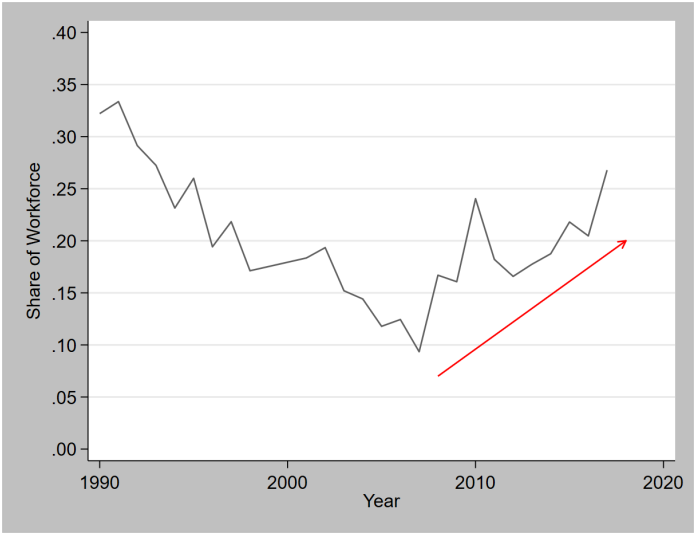
Annual Earnings



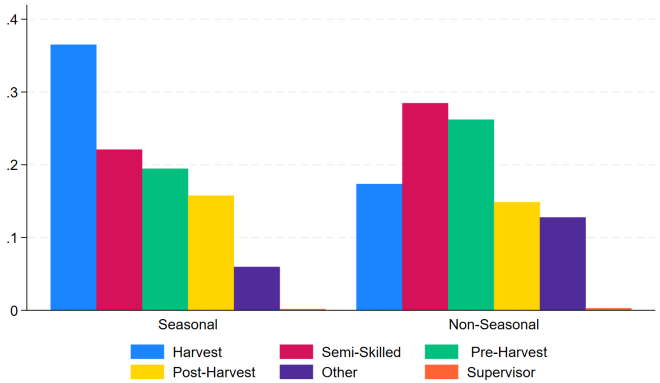
Fewer Workers are Doing Seasonal Farm Work



Share of Seasonal Workers Doing Nonfarm Work is Rising



Job Tasks for Seasonal and Nonseasonal Farmworkers



Game Plan

- Determine demographic factors that are linked to working off the farm
- Identify trends in demographics
- Forecast share of workers who will work off the farm T years from now
- Determine whether non-farm work is associated with higher annual earnings
- Examine heterogeneity among seasonal and nonseasonal workers

Empirical Specification

$$Y_{irt} = \gamma_0 + \mathbf{X'_{irt}}\mathbf{\Pi} + \phi_{rt} + \nu_{irt}, \tag{1}$$

- $Y_{irt} \in \{NF_{irt}, \ln Earn_{irt}\}$ = {Worked Off Farm, (Log) Annual Earnings}
- $x^k \in \mathbf{X_{irt}}$ includes the following explanatory variables:
  - age, gender, marital status, legal status, years of schooling, migrant status, nonfarm network, nonfarm work experience, English proficiency, and farm work bonus
- $\pi^k \in \mathbf{\Pi}$ = coefficients of interest
- ϕ_{rt} = region by year fixed effects
- ν_{irt} = error term

Full Sample: Factors Associated with Off-Farm Work

	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.005***	-0.004***	-0.004***	-0.004***	-0.005***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Female	-0.055***	-0.057***	-0.056***	-0.053***	-0.111***	-0.024**
	(0.009)	(0.009)	(0.009)	(0.009)	(0.014)	(0.012)
Married	-0.003	-0.003	0.002	0.001	0.018*	-0.016
	(0.009)	(0.008)	(0.008)	(0.007)	(0.010)	(0.010)
Undocumented	-0.051***	-0.050***	-0.040***	-0.042***	-0.094***	-0.012
	(0.009)	(0.009)	(0.009)	(0.009)	(0.012)	(0.012)
Years of School	0.008***	0.008***	0.005***	0.006***	0.002*	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Works for an FLC	-0.039***	-0.043***	-0.016	-0.020*	-0.083***	-0.007
	(0.010)	(0.010)	(0.010)	(0.010)	(0.013)	(0.012)
Migrant Worker	0.159***	0.151***	0.128***	0.129***	0.159***	0.107***
	(0.014)	(0.013)	(0.014)	(0.013)	(0.032)	(0.015)
No. of People in Off-Farm Network	0.029***	0.032***	0.027***	0.027***	0.022***	0.029***
	(0.005)	(0.005)	(0.005)	(0.004)	(0.006)	(0.008)
Years of Nonfarm Work Experience	0.021***	0.020***	0.019***	0.018***	0.016***	0.017***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Speaks Some English	0.012	0.008	0.021***	0.020***	0.010	0.026**
	(0.008)	(0.008)	(0.008)	(0.007)	(0.009)	(0.011)
Farm Employer Pays a Bonus	-0.058***	-0.058***	-0.067***	-0.067***	-0.077***	-0.049***
	(0.010)	(0.010)	(0.009)	(0.008)	(0.010)	(0.011)
N	41,289	41,289	41,289	41,289	17,450	17,324
Year Fixed Effects	–	X	X	X	X	X
Region Fixed Effects	–	–	X	X	X	X
Region-by-Year Fixed Effects	–	–	–	X	X	X

Explanation of Coefficients

- Factors associated with increased likelihood of working off the farm
  - Youth
  - Male
  - Legal status
  - Education
  - Migrant status
  - Off farm networks
  - Off-farm work experience
  - Speak some English

Comparison Example

- A person who is
  - Documented
  - Male
  - 30 year old
  - High school education
  - 2 people in off-farm network
  - 10 years of non-farm work experience
- 29 pp more likely to work off farm than...
  - Undocumented
  - Female
  - 40 year old female
  - 8th grade education
  - No off-farm network or experience

Nonseasonal Workers: Factors Associated with Off-Farm Work

	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.005***	-0.004***	-0.004***	-0.004***	-0.005***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Female	-0.055***	-0.057***	-0.056***	-0.053***	-0.111***	-0.024**
	(0.009)	(0.009)	(0.009)	(0.009)	(0.014)	(0.012)
Married	-0.003	-0.003	0.002	0.001	0.018*	-0.016
	(0.009)	(0.008)	(0.008)	(0.007)	(0.010)	(0.010)
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	(0.009)	(0.009)	(0.009)	(0.009)	(0.012)	(0.012)
Years of School	0.008***	0.008***	0.005***	0.006***	0.002*	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Works for an FLC	-0.039***	-0.043***	-0.016	-0.020*	-0.083***	-0.007
	(0.010)	(0.010)	(0.010)	(0.010)	(0.013)	(0.012)
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N	41,289	41,289	41,289	41,289	17,450	17,324
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Seasonal Workers: Factors Associated with Off-Farm Work

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Age	-0.005***	-0.004***	-0.004***	-0.004***	-0.005***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Female	-0.055***	-0.057***	-0.056***	-0.053***	-0.111***	-0.024**
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Years of School	0.008***	0.008***	0.005***	0.006***	0.002*	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Works for an FLC	-0.039***	-0.043***	-0.016	-0.020*	-0.083***	-0.007
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Region Fixed Effects	–	–	X	X	X	X
Region-by-Year Fixed Effects	–	–	–	X	X	X

Forecasting Analysis

$$x_{rt}^k = \omega_1^k x_{rt-1}^k + \omega_2^k x_{rt-2}^k + \omega_3^k \times t + \phi_r + \delta_{rt}, \tag{2}$$

- Aggregate data at the region-year level
- Run region-year level panel regressions for each explanatory variable x^k
- Quantify long-run trends for each explanatory variable $\Omega^k = \frac{\omega_3^k}{(1-\omega_1^k-\omega_2^k)}$
- We forecast the share of workers who will work off the farm in T years using:
- $T \times \sum_{k=1}^{K} \Omega^k \times \pi^k$

Nonfarm Work Regional Forecasts

Table 1: Forecasts for the Share of Farmworkers Who Will Engage in Nonfarm Work

	Predicted Share Working Off-Farm		
Region	2022	2027	2032
U.S.	20%	21%	22%
Lake	31%	33%	35%
Florida	20%	20%	20%
Pacific Coast	6%	3%	1%
California	7%	8%	9%

Note: Baseline figures for FY 2022 are taken from the NAWS.

Nonfarm Work Regional Forecasts

Table 2: Forecasts for the Share of Farmworkers Who Will Engage in Nonfarm Work

	Predicted Share Working Off-Farm		
Region	2022	2027	2032
U.S.	20%	21%	22%
Lake	31%	33%	35%
Florida	20%	20%	20%
Pacific Coast	6%	3%	1%
California	7%	8%	9%

Note: Baseline figures for FY 2022 are taken from the NAWS.

Nonfarm Work Regional Forecasts

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

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Florida	20%	20%	20%
Pacific Coast	6%	3%	1%
California	7%	8%	9%

Note: Baseline figures for FY 2022 are taken from the NAWS.

Full Sample: Annual Earnings Results

	(1)	(2)	(3)	(4)	(5)	(6)
Did Nonfarm Work	0.057**	0.084***	0.115***	0.133***	0.037	0.197***
	(0.025)	(0.026)	(0.025)	(0.025)	(0.038)	(0.034)
Age	0.016***	0.011***	0.012***	0.011***	0.008***	0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.376***	-0.385***	-0.385***	-0.381***	-0.298***	-0.345***
	(0.021)	(0.019)	(0.019)	(0.017)	(0.027)	(0.020)
Married	0.192***	0.188***	0.174***	0.167***	0.150***	0.149***
	(0.016)	(0.015)	(0.015)	(0.014)	(0.019)	(0.020)
Undocumented	0.029	-0.068***	-0.074***	-0.078***	-0.156***	-0.034
	(0.019)	(0.019)	(0.019)	(0.016)	(0.018)	(0.021)
Years of School	0.024***	0.015***	0.018***	0.017***	0.018***	0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Works for FLC	-0.123***	-0.116***	-0.161***	-0.139***	-0.072**	-0.073**
	(0.027)	(0.024)	(0.024)	(0.023)	(0.032)	(0.029)
Migrant	-0.407***	-0.302***	-0.285***	-0.283***	-0.313***	-0.127***
	(0.020)	(0.019)	(0.019)	(0.018)	(0.027)	(0.022)
No. of People in Off-Farm Network	0.008	-0.021*	-0.017	-0.016*	-0.006	-0.032**
	(0.010)	(0.011)	(0.011)	(0.009)	(0.007)	(0.014)
Years of Nonfarm Work Experience	0.001	0.002	0.003	0.003**	-0.003	0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Speaks Some English	0.190***	0.196***	0.178***	0.171***	0.105***	0.180***
	(0.014)	(0.013)	(0.012)	(0.012)	(0.014)	(0.016)
Farm Employer Pays a Bonus	0.295***	0.272***	0.294***	0.294***	0.192***	0.231***
	(0.018)	(0.016)	(0.016)	(0.014)	(0.016)	(0.023)
N	46,389	46,389	46,389	46,389	18,145	20,655
Year Fixed Effects	–	X	X	X	X	X
Region Fixed Effects	–	–	X	X	X	X
Region-by-Year Fixed Effects	–	–	–	X	X	X

Nonseasonal Workers: Annual Earnings Results

	(1)	(2)	(3)	(4)	(5)	(6)
Did Nonfarm Work	0.057**	0.084***	0.115***	0.133***	0.037	0.197***
	(0.025)	(0.026)	(0.025)	(0.025)	(0.038)	(0.034)
Age	0.016***	0.011***	0.012***	0.011***	0.008***	0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.376***	-0.385***	-0.385***	-0.381***	-0.298***	-0.345***
	(0.021)	(0.019)	(0.019)	(0.017)	(0.027)	(0.020)
Married	0.192***	0.188***	0.174***	0.167***	0.150***	0.149***
	(0.016)	(0.015)	(0.015)	(0.014)	(0.019)	(0.020)
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Years of School	0.024***	0.015***	0.018***	0.017***	0.018***	0.012***
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Works for FLC	-0.123***	-0.116***	-0.161***	-0.139***	-0.072**	-0.073**
	(0.027)	(0.024)	(0.024)	(0.023)	(0.032)	(0.029)
Migrant	-0.407***	-0.302***	-0.285***	-0.283***	-0.313***	-0.127***
	(0.020)	(0.019)	(0.019)	(0.018)	(0.027)	(0.022)
No. of People in Off-Farm Network	0.008	-0.021*	-0.017	-0.016*	-0.006	-0.032**
	(0.010)	(0.011)	(0.011)	(0.009)	(0.007)	(0.014)
Years of Nonfarm Work Experience	0.001	0.002	0.003	0.003**	-0.003	0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Speaks Some English	0.190***	0.196***	0.178***	0.171***	0.105***	0.180***
	(0.014)	(0.013)	(0.012)	(0.012)	(0.014)	(0.016)
Farm Employer Pays a Bonus	0.295***	0.272***	0.294***	0.294***	0.192***	0.231***
	(0.018)	(0.016)	(0.016)	(0.014)	(0.016)	(0.023)
N	46,389	46,389	46,389	46,389	18,145	20,655
Year Fixed Effects	–	X	X	X	X	X
Region Fixed Effects	–	–	X	X	X	X
Region-by-Year Fixed Effects	–	–	–	X	X	X

Seasonal Workers: Annual Earnings Results

	(1)	(2)	(3)	(4)	(5)	(6)
Did Nonfarm Work	0.057**	0.084***	0.115***	0.133***	0.037	0.197***
	(0.025)	(0.026)	(0.025)	(0.025)	(0.038)	(0.034)
Age	0.016***	0.011***	0.012***	0.011***	0.008***	0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.376***	-0.385***	-0.385***	-0.381***	-0.298***	-0.345***
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	(0.019)	(0.019)	(0.019)	(0.016)	(0.018)	(0.021)
Years of School	0.024***	0.015***	0.018***	0.017***	0.018***	0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Works for FLC	-0.123***	-0.116***	-0.161***	-0.139***	-0.072**	-0.073**
	(0.027)	(0.024)	(0.024)	(0.023)	(0.032)	(0.029)
Migrant	-0.407***	-0.302***	-0.285***	-0.283***	-0.313***	-0.127***
	(0.020)	(0.019)	(0.019)	(0.018)	(0.027)	(0.022)
No. of People in Off-Farm Network	0.008	-0.021*	-0.017	-0.016*	-0.006	-0.032**
	(0.010)	(0.011)	(0.011)	(0.009)	(0.007)	(0.014)
Years of Nonfarm Work Experience	0.001	0.002	0.003	0.003**	-0.003	0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Speaks Some English	0.190***	0.196***	0.178***	0.171***	0.105***	0.180***
	(0.014)	(0.013)	(0.012)	(0.012)	(0.014)	(0.016)
Farm Employer Pays a Bonus	0.295***	0.272***	0.294***	0.294***	0.192***	0.231***
	(0.018)	(0.016)	(0.016)	(0.014)	(0.016)	(0.023)
N	46,389	46,389	46,389	46,389	18,145	20,655
Year Fixed Effects	–	X	X	X	X	X
Region Fixed Effects	–	–	X	X	X	X
Region-by-Year Fixed Effects	–	–	–	X	X	X

Concluding Thoughts

- Upward trend in non-farm work prior to pandemic
- That trend reversed during the pandemic
  - Possibly due to reduced job opportunities in competing sectors
- Younger, educated, documented, males are more likely to work off the farm
- Nonfarm networks and experience off the farm also play a role
- Seasonal workers who work off the farm tend to have higher earnings
- Findings suggests that nonfarm work is serving as an income smoothing strategy
  - For seasonal farmworkers
- Looking for feedback on what else we can do to expand/improve the paper