Labor Shortages and Dairy Farm Adaptation

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Research Questions

In this paper, we investigate how dairy farmers adapt to labor shortages by:

1. Utilizing farm labor contractors
2. Adopting labor saving technologies
3. Offering housing or transport benefits
4. Increasing wages
5. Reducing milk production

Background and Overview of Data

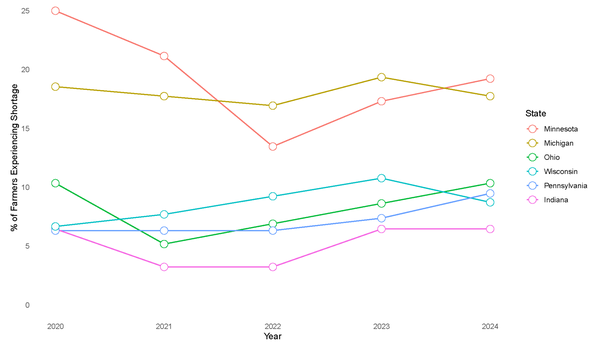
Background

* The agricultural industry as a whole is experiencing a labor shortage
* Dairy farms cannot alleviate this shortage by utilizing migrant labor through the H-2A visa program
* Dairy farms may utilize other adaptation strategies or reduce productivity to adapt to these shortages

Overview of Data

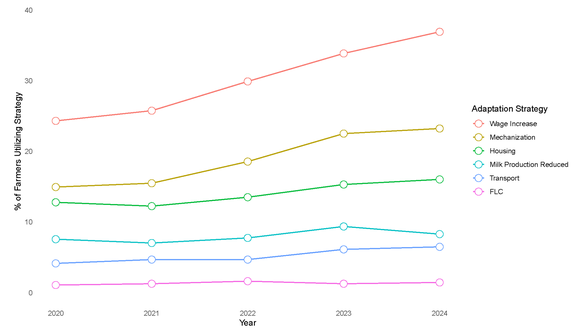
* Data: Dairy Producer Labor Survey
* Sample Period: 2020 - 2024 (Retrospective)
* Geographic Region: Indiana, Michigan, Minnesota, Ohio, Pennsylvania, Wisconsin
* Variables used in analysis:
  * Demographics/Farm Characteristics
  * Reported Labor Shortage
  * Perceived Changes in Milk Production
  * Reported Adaptation Strategies

Reported Labor Shortage by State



Source: Dairy Producer Labor Survey

Adaptation Strategy Utilization by Farmer



Source: Dairy Producer Labor Survey

Methodology

We estimate the following fixed-effects panel regression models:

$$Y_{it} = \beta LS_{it} + \mathbf{\Gamma X} + \phi_i + \phi_t + \varepsilon_{it} \qquad (1)$$

i = farmer
t = year
LS_{it} = dairy farmer labor shortage in year t
$\mathbf{X}$ = vector of demographic/farm characteristics
ϕ_i = farmer fixed effects
ϕ_t = year fixed effects
ε_{it}= error term

Heterogeneity analyses are conducted using equation (1) to investigate how adaptation strategies vary across different demographic groups. We focus on dairy farm income, experience, education, gender, and farm size.

Main Results and Conclusions

Driscoll-Kraay Regressions

* Farmers reported adopting a series of strategies to mitigate the impacts of labor shortages
* Experiencing a labor shortage increases the likelihood of:
  * Adopting labor saving technologies by 5.7 percentage points
  * Increasing wages by 20.6 percentage points
  * Reducing milk production by 29.9 percentage points
* Other adaptation strategies did not show a significant relationship with having reported a labor shortage.

Heterogeneity Analysis

* Farmers whose farms made up less than 75% of their income proportion were more likely to offer wage increases
* Small herds (60 or less head) were the most likely to reduce milk production and increase wages as compared to larger herd sizes

Table 2: Marginal Effects of Labor Shortages on Adaptation Strategies: Driscall-Kray SE

	(1)	(2)	(3)	(4)	(5)
	Adoption of Labor-Saving Technologies				
LS_{it}	0.195***	0.194***	0.181***	0.131***	0.057***
	(0.014)	(0.013)	(0.015)	(0.009)	(0.011)
	Utilization of Farm Labor Contractor				
LS_{it}	0.041***	0.041***	0.039***	0.046***	0.000
	(0.006)	(0.006)	(0.006)	(0.006)	(0.014)
	Provision of Housing for Employees				
LS_{it}	0.178***	0.178***	0.144***	0.065***	-0.037
	(0.005)	(0.005)	(0.004)	(0.002)	(0.027)
	Provision of Transportation for Employees				
LS_{it}	0.073***	0.073***	0.060***	0.055***	0.019
	(0.004)	(0.004)	(0.004)	(0.004)	(0.017)
	Wage Increase				
LS_{it}	0.283***	0.283***	0.246***	0.149***	0.206***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.008)
	Reduction in Milk Production				
LS_{it}	0.354***	0.354***	0.356***	0.345***	0.299***
	(0.015)	(0.015)	(0.016)	(0.019)	(0.012)
N	2620	2620	2620	2620	2620
Controls					
Year Fixed Effects	–	X	X	X	X
State Fixed Effects	–	–	X	X	X
Demographics	–	–	–	X	X
Farmer Fixed Effects	–	–	–	–	X

Standard errors in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$

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