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The Illinois Institute for Rural Affairs (IIRA) works to improve the quality of life for rural residents by partnering with public and private agencies on local development and enhancement efforts.



**Western Illinois
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Farmers Involvement in Educational Activities: Insights from the American Time Use Survey (ATUS) and Consumer Expenditure Survey (CES) Microdata Sets

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Abstract

This paper explores time spent by self-employed farmers on work and work-related educational activities. Data analysis reveals that farming is primarily learned by experience and discovery; farmers spend little or no time on formal education and training. Policy efforts aimed at stimulating continuing learning among farmers should focus on developing their critical thinking and reflection skills.

Introduction

The term “continuing education” suggests further development of knowledge in a work area and subsequent progress in work outcomes². In farming, knowledge development occurs through practice or experience, reflection, peer review, and other sources³. In an earlier paper, I highlighted variations in the stock of human capital among farmers of different race⁴. In this paper, the focus is

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² Expressed as a syllogism,
knowledge (in the work area) leads to better work performance;
continuing education provides knowledge;
∴ continuing education leads to better work performance.

³ See my research on “new and beginning farmers” for empirical support for the proposition that a larger proportion of experienced farmers will be economically successful than new and beginning farmers; http://www.iira.org/wp-content/uploads/2022/07/New-and-beginning-farmers-in-Illinois-RB4_15.pdf.

⁴ ACS data were used to gain insights into the educational level of farmers in Illinois; see <http://www.iira.org/wp-content/uploads/2022/05/RB410-Illinois-Farm-Ownership-by-race-and-farm-productivity.pdf>.

on continuing education at the individual, farmer level⁵; the following questions are addressed:

- (i) What is the average number of hours that farmers spend in a day on work and work-related educational activities?
- (ii) Does time spent learning differ by demographics such as race and gender?
- (iii) How strong is the association between educational activities and farm income? Is the covariation contingent on race and gender?

Conceptual Model

Individual learning could differ in style; for example, one could engage in trial-and-error learning, or vicarious learning. Learning from participation in educational programs is a form of vicarious learning and its outcome includes learning how to overcome traditional obstacles when managing ventures⁶, farms in our study. Figure 1 shows the influence of continuing education on one's knowledge; information is processed or acquired, retained, retrieved, and utilized in work⁷.

⁵ Collective or group learning is not of interest; collective learning is often found in organizations where problem solving is a team activity. See, Nelson, R. and Winter, S. (1977). In search of a useful theory of innovation. *Research Policy*, **6**, 36–76.

⁶ Manz, C. C., & Sims Jr, H. P. (1981). Vicarious learning: The influence of modeling on organizational behavior. *Academy of Management Review*, **6**(1), 105-113.

⁷ Knowledge is defined as the use of 'principles' to address issues; a principle is a statement of causal relationship between two or more phenomena.

Figure 1: Flow Chart of Events: Vicarious Learning

Time	Event	Theoretical Construct
0	Subject's prior state of knowledge	Knowledge stock, pre-learning
1	Experience learning; for example, enroll in a continuing education program	Knowledge acquisition
2		
.	Subject's new state of knowledge	
.		
.		
n	Subject's altered state of knowledge	Knowledge retention
n+1	Subject uses knowledge (principles) to address issues at work	Knowledge utilization

Methodology

Two microdata sets, ATUS and CES, were used to address the research questions⁸. The ATUS has information about time spent on educating oneself at work; this variable was extracted for all self-employed respondents and fused⁹ with the CES data which contain

spending information on education; Table 1 lists the salient variables and definitions. The resulting 'fused data' (Figure 2) were analyzed using exploratory data analysis procedures, crosstabulations, and variance analysis¹⁰.

⁸ Information about ATUS can be obtained from <https://www.bls.gov/tus/overview.htm>; details about CES can be gleaned from <https://www.bls.gov/cex/>.

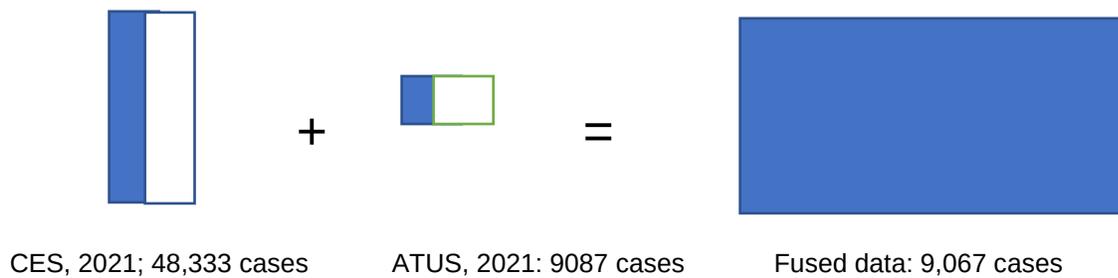
⁹ Demographic variables in the data sets were matched to fuse data.

¹⁰ Sources of variation in the dependent variable, time spent in work-related educational activities, were analyzed using qualitative variable econometric models.

Table 1: Variable Definitions

Variable	Value Labels of Interest
TELF5: Labor force status of the respondent	1 and 2 = Employed
TEIO1COW: Class of worker	6, 7 = Self-employed
TRDTOCC1: Occupation	18 = Farming, fishing, and forestry
TEWHERE: Place of activity	Values range from 1 to 99
TUTIER1CODE: Activity codes	Focus was on educational activities, ATUS codes 6,15, and 18
TUACTDUR: Duration of activity in minutes	Values range from 1 to 9999

Figure 2: Data Fusion: ATUS and CES



Findings

A typical self-employed farmer is a White male, 66 years old, has an associate or vocational degree, and a household income of \$67,500. On average, a self-employed farmer spends 4.07 hours in work and work-related activities including reading and writing and doing research. They don't take any

'class' for degree, certification, or personal interest, for example, a financial planning class, and on average spend a mere \$7 a year on books and journals. However, they do spend almost four hours socializing, spending time with family, visiting with friends, etc., which may contribute to learning about their vocation, farming (Table 2).

Table 2: Self-Employed Farmers: Average Time Spent on Various Activities During a Typical 24-hour Time Period

Category	Includes Items Such As..	Number of Hours Spent in 24 Hours
Personal care	Sleeping, washing, and grooming	8.59
Household activities	Interior cleaning and laundry	3.95
Caring for and helping household members	Physical care of children, reading to children, and playing with children	0.15
Work and work-related activities	Reading and writing, computer use, and doing research	4.07
.		
.		
.		
Socializing	Entertaining family, spending time with friends, and talking with neighbors	3.53

Compared to farmers, self-employed in other industries work more hours and spend 15 minutes a day in educational activities such as taking a class for degree, certificate, licensure, or

personal interest. Farmers spend less time in sports, but more time in religious work (Table 3).

Table 3: Farmers versus Self-Employed in Other Industries: Time Use

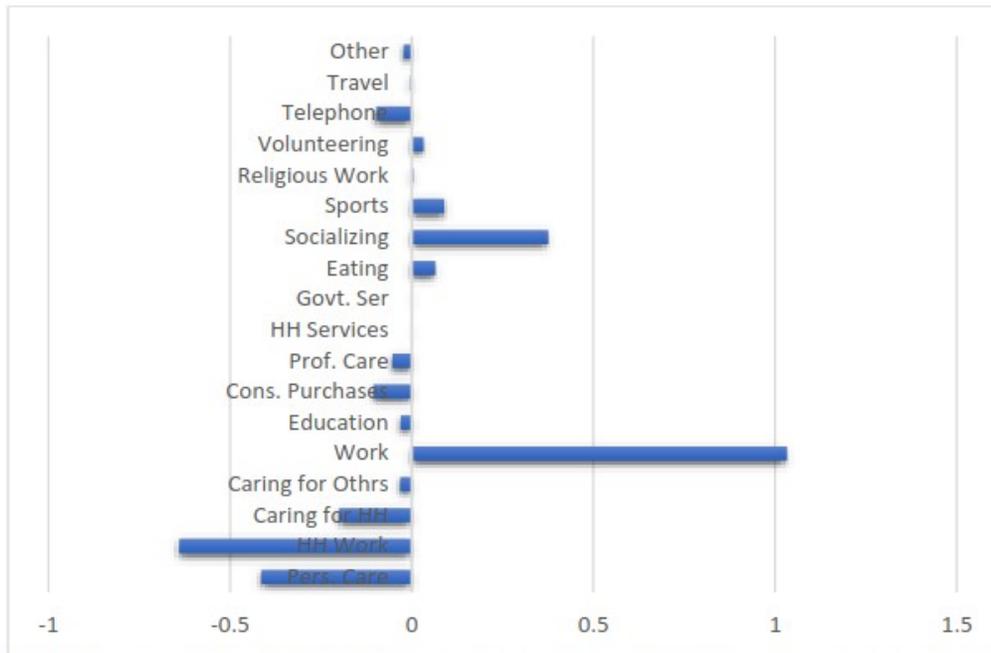
Time-Use Category	Mean Time Use	
	Farmers	Other Self-Employed
Personal Care	8.588916	9.371282556
Household Work	3.946855	2.193175568
Caring for Household Members	0.150705	0.456086675
Caring for Others	0.413851	0.191938742
Work	4.071868	4.289636662
Education	0	0.150470542
Consumer Purchases	0.313382	0.320711468
Professional Care	0	0.080235665
Household Services	0	0.024313896
Government Services	0	0.002770158
Eating	1.382246	1.071110987
Socializing	3.530424	4.035262323
Sports	0.187191	0.334637182
Religious Work	0.141593	0.075839244
Volunteering	0.088958	0.095941748
Telephone	0.074772	0.107304979
Travel	0.986406	1.064313478
Other	0.122834	0.134968128

Note: See Appendix 1 for category definitions.

In general, self-employed men clock more work hours than their female counterparts; men also play sports and

socialize more than females. In contrast, females spend more time caring for the household (Figure 3).

Figure 3: Time Spent on Activities: Gender Differences.
Unit = Mean Time Spent on Activity, Men - Women



Note: Positive value indicates that men spend more time than women on activity; negative values favor women.

A dummy-variable regression was used to statistically estimate the sources of variation in time spent at work and work-related activities; the equation had the following form:

$$Y = \mu + \alpha D_1 + \gamma D_2 + u$$

where, $D_1 = 1$ for whites, 0 for other races and $D_2 = 1$ for males and 0 for females. The estimates were:

$$Y = 4.03 (8.08) - 1.03D_1(-2.06) + .91D_2(2.61); r^2 = 0.474; \text{ figures in parentheses are } t \text{ ratios.}$$

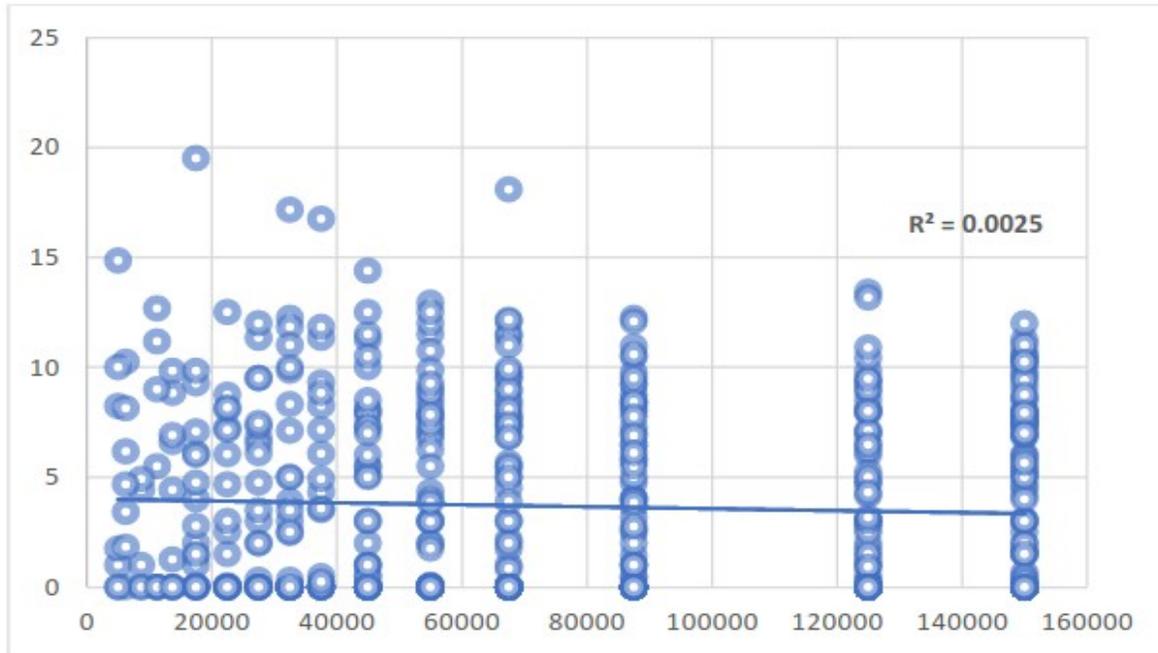
The estimates suggest that white farmers spend less time at work and work-related activities compared to farmers of other races.

It is plausible that one's household income determines how much time one spends on work activities; the introduction of the concomitant variable, family income, to the regression equation results in the estimated equation:

$$Y = 4.35 (7.73) - 1.0D_1(-2.01) + .92D_2(2.66) - .000045(-1.22)$$

The results show that one's family income is unrelated to one's time spent on work and work-related activities (Figure 4). In summary, white farmers and females of all races spend less time on work activities.

Figure 4: Zero Order Correlation Between Family Income and Time Spent at Work and Work-Related Activities



Summary and Conclusion

This paper explores time spent by self-employed farmers on work-related educational activities. Literature and research suggest that advances in one’s profession or work is related to learning, both on-the-job learning and vicarious learning such as reading books and articles on the subject.

Data were sourced from the 2021 ATUS and CES microdata sets. Results of data analysis suggest that:

- (i) Farmers don’t take any ‘class’ for degree, certification, or personal interest; for example, a financial planning class, and on average spend a mere \$7 a year on books and journals;

- (ii) They spend almost four hours socializing, spending time with family, visiting with friends, etc., which may contribute to learning about their vocation;
- (iii) White farmers and females of all races spend less time on work activities; and
- (iv) Family income is unrelated to time spent on work and work-related activities.

The findings suggest that farming is primarily learned by experience and discovery. Educational policy efforts aimed at stimulating continuing learning among farmers should focus on developing their critical thinking and reflection skills.

Appendix 1: ATUS Time-Use Categories

- 1 Personal Care
- 2 Household Activities
- 3 Caring For & Helping Household Members
- 4 Caring For & Helping Non-Household Members
- 5 Work & Work-Related Activities
- 6 Education
- 7 Consumer Purchases
- 8 Professional & Personal Care Services
- 9 Household Services
- 10 Government Services & Civic Obligations
- 11 Eating & Drinking
- 12 Socializing, Relaxing, and Leisure
- 13 Sports, Exercise, and Recreation
- 14 Religious and Spiritual Activities
- 15 Volunteer Activities
- 16 Telephone Calls
- 18 Traveling
- 50 Data Codes