Long Run Impact of Rural Household Income on Family Living Expenses

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SAEA 2018, Jacksonville, FL
February 2 - 6, 2018

KANSAS STATE
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Introduction

Farm family income has dropped drastically for the past two years (USDA-ERS 2017)

This latest volatility in the farm household income is expected to have effect on the farm household living expenses.

Meeting basic family's need is an important indicator of economic stability and family well-being (Allegretto 2006).

Introduction

How long does it takes the change in the farm household family income to reflect on the family living expenses?

Does the changes in income have immediate effect farm household living expenses or takes several years to reflect?.

Historically, farm household are disadvantaged compare to their nonfarm household counterpart (Mishra and Sandretto (Mishra and Paudel, 2011)

The variation in the farm income is mostly due to fluctuation in the commodity prices, farm output and business cycle (Mishra and Sandretto, Firch; Schultz; Cochrane, 1953; Tweeten, 1979)

Bryant (1990) indicated that current consumption does not only depend on current income but can be financed out of loan against future income.

Campbell and Mankiw (1990 , 1991) study confirmed that aggregate consumption responds to both the present changes income and permanent income.

Similar to our work is the Lavi (2003). He studied the impact of current income on the changes in consumption in Israel.

Flavin (1981) introduce an econometric model to estimate the excess sensitivity of consumption to current income.

Data

Kansas Farm Management Association (KFMA) database

Individual data aggregated (1993 – 2015)

- **Farmer's expenses on all items during the farm year**

- **Net farm income.**

Table 1: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Family Living Expenses	23	55,433	8,712	46,433	71,099
Net Farm Income	23	77,894	45,538	10,402	170,390
U.S Household Pa Capita Consumption	23	30,605	3,663	23,862	35,683

Figure 1: Plot of the log values of the FLE, NFI, and HFCE
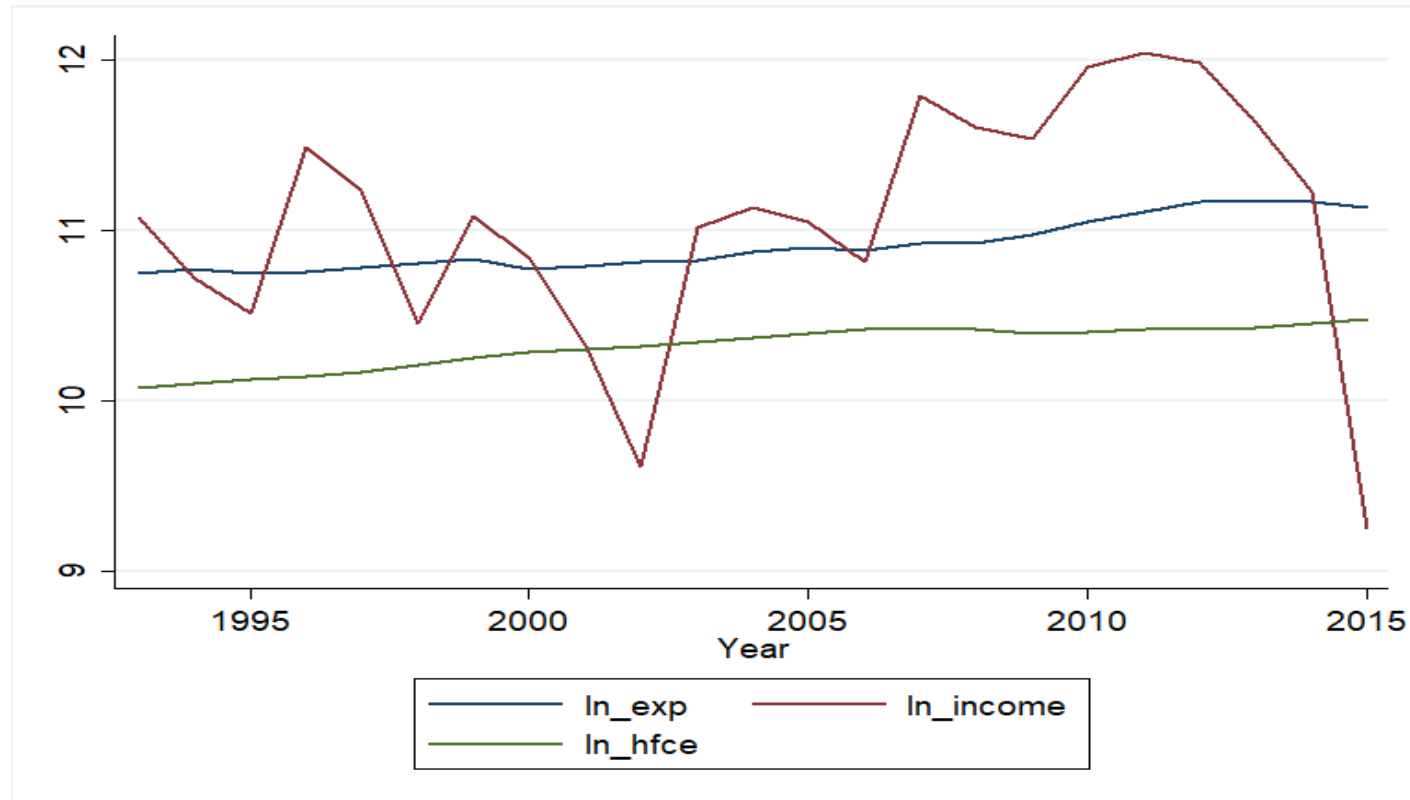
Econometric Model

The ARDL model:

$$FLE_t = f(FLE_{t-i}, NFI_{t-i}, HFCE_{t-i})$$

$$FLE_t = \sum_{i=1}^{a} FLE_{t-i} + \sum_{j=1}^{b} NFI_{t-j} + \sum_{k=1}^{c} HFCE_{t-k} + \epsilon_t$$

Where $a, b, and\ c$ are the optimally determined lags

Results and Discussions

Table : Autoregressive Distributed Lag Model

FLE	Coefficient	Standard Error	P-Value
FLE			
L1.	0.567	0.316	0.132
L2.	0.264	0.326	0.455
L3.	0.612	0.333	0.125
L4.	-0.672	0.455	0.199
NFI			
L0.	0.009	0.020	0.647
L1.	-0.044	0.022	0.090
L2.	0.014	0.014	0.363
L3.	-0.018	0.015	0.298
HFCE			
L0.	-0.881	0.952	0.397
L1.	0.115	1.277	0.932
L2.	-0.688	1.477	0.661
L3.	-0.575	1.594	0.733
L4.	1.934	0.811	0.063
Constant	4.007	2.197	0.128

Note: We use BIC to determine the optimum lags

Results and Discussions

Table : Autoregressive Distributed Lag Model - Error Correction

	No Trend **D.ln_FLE**	*With Trend* **D.ln_FLE**
ADJ		
L.ln_FLE	-0.229	-4.328*
	(-1.39)	(-3.02)
Long Run		
Ln_NFI	-0.169	0.0171*
	(-0.72)	(2.86)
ln_HFCE	-0.410	-1.231***
	(-0.45)	(-17.59)
	(1.82)	(-3.02)
Number of obs	19	19
R-squared	0.888	0.957
Adj R-squared	0.597	0.806
Log likelihood	58.68	67.75

t statistics in parentheses

"* $p<0.05$ ** $p<0.01$ *** $p<0.001$"

Results and Discussions

Table : ARDL Bounds tests for cointegration

| | No Trend | | | | Trend | | |
| | | 0.05 Bound C.V | | | | 0.05 Bound C.V | |
	Stat	[I_0]	[I_1]		Stat	[I_0]	[I_1]
F-Stat	1.229	3.79	4.85		3.285	4.87	5.85
t-Stat	-1.388	-2.86	-3.53		-3.025	-3.41	-3.95

C.V Critical Value

Results and Discussions

Table : Unit root test

	FAMILY LIVING EXPENSES			NET FARM INCOME			U.S HOUSEHOLD CONSUMPTION		
	ADF	PPERRON		ADF	PPERRON		ADF	PPERRON	
	Z(t)	Z(t)	Z(rho)	Z(t)	Z(t)	Z(rho)	Z(t)	Z(t)	Z(rho)
	0.044	-0.089	-0.104	-1.872	-10.088	-1.901	-2.526	-1.442	-2.094
C.V									
1%	-3.750	-17.200	-3.750	-3.750	-17.200	-3.750	-3.750	-17.200	-3.750
5%	-3.000	-12.500	-3.000	-3.000	-12.500	-3.000	-3.000	-12.500	-3.000
10%	-2.630	-10.200	-2.630	-2.630	-10.200	-2.630	-2.630	-10.200	-2.630
MAP Z(t)	**0.962**	**0.951**		**0.345**	**0.331**		**0.109**	**0.247**	

MAP Z(t)   MacKinnon approximate p-value for Z(t)

C.V   Critical Value

Results and Discussions

Table : Granger Causality test

Equation	Excluded	Chi-2	DF	Prob>chi2
Family living Expenses	Net Farm Income	2.7297	2	0.255
Family living Expenses	U.S. Consumption	9.3944	2	0.009
Family living Expenses	ALL	11.599	4	0.021
Net Farm Income	Family living Expenses	1.2466	2	0.536
Net Farm Income	U.S. Consumption	0.49151	2	0.782
Net Farm Income	ALL	1.5676	4	0.815
U.S. Consumption	Family living Expenses	1.2391	2	0.538
U.S. Consumption	Net Farm Income	3.5522	2	0.169
U.S. Consumption	ALL	5.0938	4	0.278

Results and Discussions

Table : Orthogonal IRF
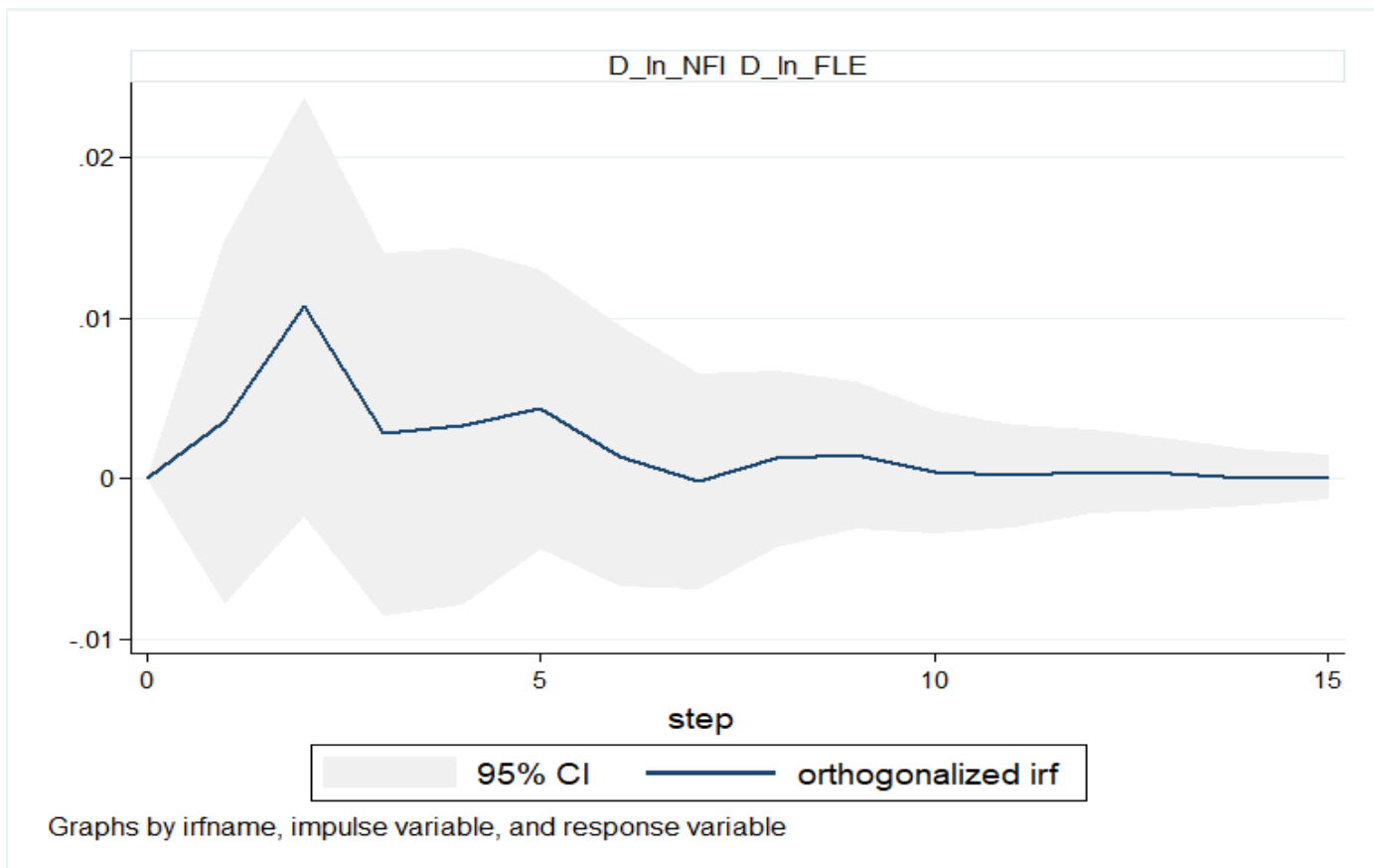
Conclusion

Family living expenses is influenced by a present and a year back of net farm income.

With no deterministic trend: No long run relationship

With deterministic trend: There is an existent of long run relationship

$$FLE_{t-1} = 0.017NFI_t - 1.231HFCE_t$$