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Marginal Propensity to Consume for a Sample of Kansas Farms

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Abstract

This paper examined the marginal propensity to consume (MPC) for a sample of Kansas farms. Sensitivity of estimated MPCs to the use of accrual net farm income, net cash farm income, and the inclusion of off-farm income was also examined. Results yielded a range of short-run MPCs from 0.011 to 0.015. Statistical tests suggested that the income coefficients used to compute short-run MPCs were not statistically different.

Introduction

Consumption behavior of a farm family affects firm growth, debt repayment, and response to policy changes. Previous research has found short-run marginal propensities to consume (MPCs) to be less than 0.10 (Langemeier and Patrick, 1990; Carriker et al., 1993; Langemeier and Patrick, 1993). The relatively low estimated MPCs reflect the difference in volatility between farm consumption and net farm income. Due to habit persistence and inertia in farm consumption, net farm income tends to be considerably more variable than farm consumption. The life cycle consumption model is frequently used to study habit persistence (Ando and Modigliani, 1963; Browning and Crossley, 2001). With this model, farm consumption is regressed on lagged consumption, net farm income, and net worth.

Previous literature has typically used accrual net farm income as the income variable in farm consumption models. Anecdotal evidence suggests that farms may respond more strongly to changes in net cash farm income than to changes in accrual net farm income. The primary difference between these two income measures is the inclusion of crop and livestock inventories in the computation of accrual net farm income and the exclusion of these items in the computation of net cash farm income.

The objective of this study was to determine the marginal propensity to consume (MPC) for a sample of Kansas farms. Sensitivity of estimated MPCs to use of accrual net farm income, net cash farm income, and the inclusion of off-farm income was also examined.

Methods

The life-cycle consumption model was used to compute MPCs (Ando and Modigliani, 1963; Browning and Crossley, 2001). Four separate models were estimated. In the first model, farm consumption was regressed on lagged consumption, accrual net farm income before

depreciation, and net worth. In the second model, farm consumption was regressed on lagged consumption, accrual net farm income plus depreciation plus off-farm income, and net worth. In the third model, farm consumption was regressed on lagged consumption, net cash farm income, and net worth. In the fourth model, farm consumption was regressed on lagged consumption, net cash farm income plus off-farm income, and net worth. Statistical tests were conducted to determine whether the net farm income measures were significantly different across models.

Data

The data for this study were obtained from the Kansas Farm Management Association databank (Langemeier, 2003). Farms represented in this databank are members of the Kansas Farm Management Association (KFMA) and generally provide the association with annual data. A sub-sample of the KFMA farms record information on farm consumption. To be included in this study, a farm had to have farm consumption, net farm income, net worth, and off-farm income information for each of the years from 2002 to 2007. The first year of the data, 2002, was used to compute lagged consumption for 2003. Farm consumption included food purchased; household operation, upkeep, and repairs; personal and recreational expenses, educational expenses; child care; clothing; gifts and charitable contributions; medical expenses; health and life insurance premiums; auto expenses; utilities; and interest on personal debt (interest on farm debt is not included in farm consumption expenditures). More information pertaining to KFMA farm consumption, income, and balance sheet data can be found on the following web site:

www.agmanager.info/kfma.

Table 1 presents the summary statistics for the 2003-2007 period for the 121 farms used in this study. Average farm consumption for the sample of farms was \$44,901 which was similar to the five-year average farm consumption, \$44,686, for all of the farms that kept farm

consumption data during the 2003-2007 period. Average value of farm production and net farm income were \$284,325 and \$64,192, respectively. The average value of farm production for the sample of farms was 6 percent lower than the average value of farm production for the entire sample of KFMA farms over the 2003-2007 period. Similarly, average net farm income was 9 percent lower than the average net farm income for the entire sample of KFMA farms. These differences are not surprising given the fact that sole proprietors are more likely to keep farm consumption data than partnerships or corporations. Farms organized as partnerships or corporations tend to be larger farms. Average net cash farm income was \$63,611 and average off-farm income was \$17,880 for the sample of farms. Net cash farm income was computed by subtracting total cash farm expenditures from total cash farm receipts. Total cash farm receipts included crop sales, livestock sales, government payments, crop insurance proceeds, and miscellaneous income items such as patronage dividends. Total cash farm expenditures included cash expenses and livestock purchases. Off-farm income represents wages earned from off-farm employment.

Farm consumption was substantially less variable than the income measures and net worth. The coefficient of variation for farm consumption was 0.36 while the coefficient of variation for the income measures ranged from 1.08 for net farm income plus depreciation to 1.33 for net cash income.

Results

Table 2 presents the regression results for the four consumption models. As in previous studies, lagged consumption or habit persistence had an important impact on farm consumption. Given the fact that farm consumption was considerably less variable than the net farm income

sources, this result was expected. Net worth was not significant in any of the consumption models.

The coefficient on the net farm income variable was significant in each of the four consumption models. Statistical tests indicated that the coefficients on the net farm income variable for each consumption model were not significantly different. Thus, as far as the MPC computations are concerned, it does not matter whether accrual or cash net farm income is used or whether off-farm income is included or excluded.

The short-run MPCs are represented by the coefficient on the net income variables. Using these coefficients, the short-run MPC ranged 0.011 to 0.015. The short-run MPCs can be used to examine the impact of an increase in income on farm consumption. Specifically, each \$1 increase in net income results in an expected change in farm consumption between \$0.011 and \$0.015.

Long-run MPCs can be approximated by dividing the income coefficient in each model by one minus the coefficient on lagged consumption. For example, for model 1, the long-run MPC would be computed by dividing 0.012 by 0.220. The resulting long-run MPC for Model 1 would be 0.055. Using the coefficients for all four models, the long-run MPCs ranged from 0.051 to 0.065.

Summary and Implications

The objective of this study was to determine the marginal propensity to consume for a sample of Kansas farms. Farm consumption was considerably less variable than net income or net worth. The short-run MPCs ranged from 0.011 to 0.015.

The low estimated MPCs have important implications for firm behavior and policy analysis. In terms of firm behavior, the low MPCs suggest that money will be available in good

years for other uses of funds such as asset purchases and debt repayment. Conversely, during years with relatively low net farm incomes, asset purchases and debt repayment may have to be foregone, and the firm may need to draw down savings or inventories to maintain farm consumption levels. In terms of policy analysis, models that assume farm consumption is constant over time are not as ad hoc as they may seem.

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Table 1. Summary Statistics for a Sample of Kansas Farms.

Variable	Average	Standard Deviation	CV
Consumption	44,901	16,250	0.36
Lagged Consumption	43,269	16,018	0.37
Value of Farm Production	284,325	204,025	0.72
Net Farm Income	64,192	84,975	1.32
Net Farm Income plus Depreciation (IBD)	86,234	93,178	1.08
Net Cash Farm Income (NCI)	63,611	84,868	1.33
Off-Farm Income (OffInc)	17,880	19,602	1.10
Net Worth	564,201	461,812	0.82

Source: Kansas Farm Management Association 2007 Databank.

Table 2. Regression Results for Four Consumption Models.

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	10,755*** (1,237)	10,710*** (1,232)	10,628*** (1,235)	10,552*** (1,231)
Lagged Consumption	0.780*** (0.027)	0.770*** (0.027)	0.784*** (0.026)	0.775*** (0.027)
IBD	0.012** (0.005)			
IBD plus OffInc		0.015*** (0.005)		
NCI			0.011** (0.005)	
NCI plus OffInc				0.015*** (0.005)
Net Worth	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
R ²	0.615	0.617	0.615	0.617

Notes:

One asterisk denotes significance at the 10 percent level, two asterisks denote significance at the 5 percent level, and three asterisks denote significance at the 1 percent level.

IBD = accrual net farm income plus depreciation

NCI = net cash farm income

OffInc = off-farm income