

AIDS Model Estimates of Food Demand and the Decline in Farm Value Shares

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Introduction

There are two main reasons given for the decline in the farm value shares. One claim is that the growth in consumer income, income disparity and trends in household characteristics have driven the demand for food marketing services and has led to efficient resource adjustment, consolidation and concentration in the US food system. According to this view income, income disparity and the changing characteristics of the consumer are largely responsible for the decline in the farmer's share of the consumer food dollar (Kinsey and Senauer; US Senate). Another claim is that consolidation and concentration in the US food system facilitates the exercise of market power. Market power could imply that food prices would be higher and farm prices would be lower than the prices realized in competitive markets. According to this view, market power in the US food sector is largely responsible for declining farm value shares (US Senate). Distinguishing between these claims could help formulate food and agricultural policies that benefit consumers, food producers and farmers.

Objective

This study attempts to find empirical support for one or both of the above reasons for declining food budget shares. Estimates of a deflated-income AIDS model of food demand are compared to estimates of the corresponding nominal-income AIDS model with respect to their implications for declining farm value shares.

Methodology

I apply two sets of market AIDS model estimates to food at home expenditure data obtained from the Consumer Expenditure Survey from 1980-2008. Each set of estimates provide predictions on expenditure-based and farm-quantity-based budget shares for food at home. The first set of estimates pertains to the nominal AIDS model and the second set pertains to the deflated AIDS. The nominal AIDS maintains that characteristics are uniformly distributed across households and constant over time. The deflated AIDS allows characteristics to vary across households and change over time.

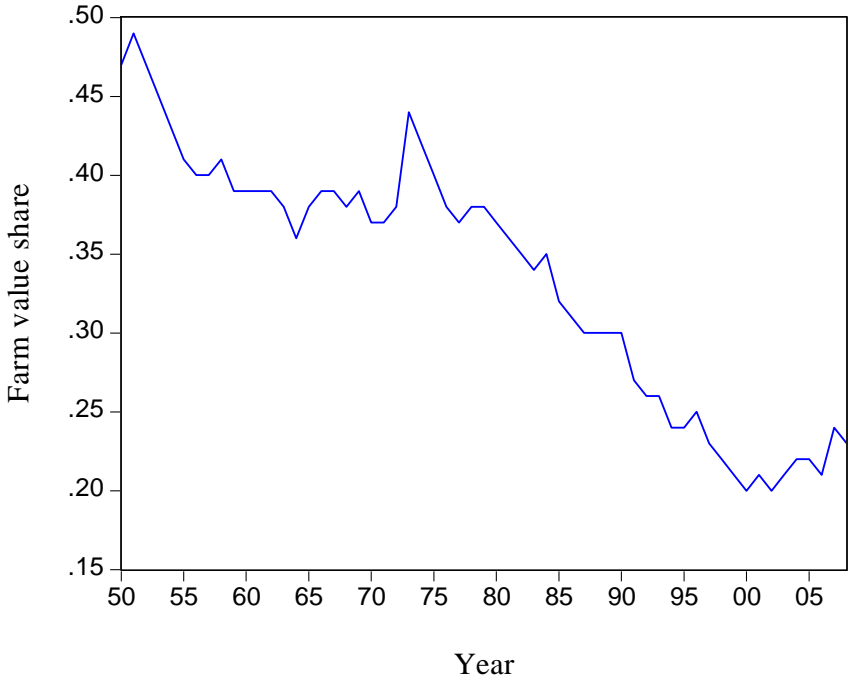
AIDS model estimates that support the claim that income, income disparity and household characteristics are largely responsible for the long run decline in farm value shares would exhibit

- A positive income elasticity of food marketing services

Estimates that support the claim that market power is largely responsible for the general decline in farm value shares would be characterized by

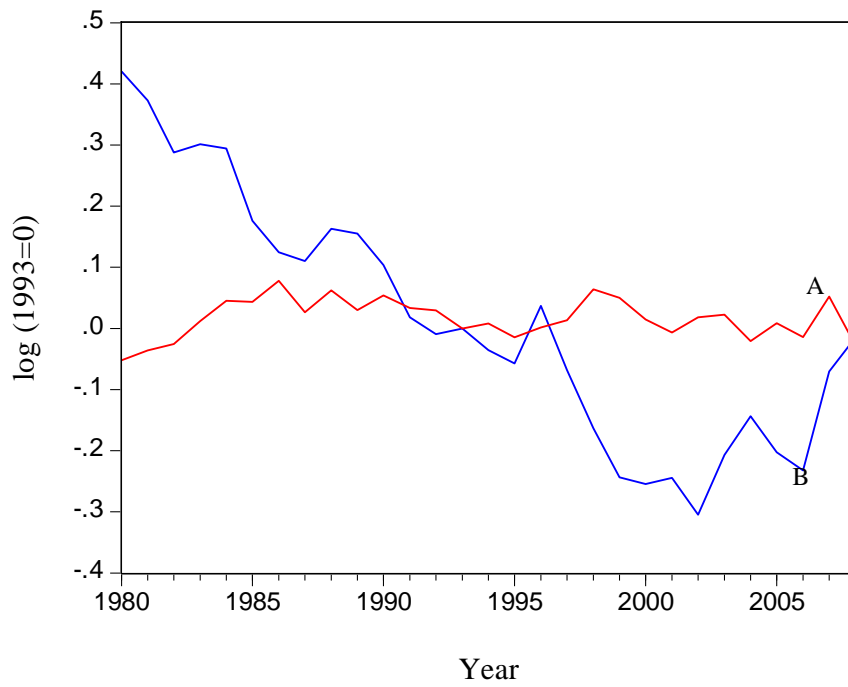
- A negative income elasticity of food marketing services

Figure 1. Farm value share since 1950



Source: ERS, market basket index of farm value share

Figure 2. Farm value shares equal the product of the farm-to-food price ratio and the farm-to-expenditure-based budget share ratio



A= farm-to-expenditure-based budget share ratio

B = farm-to-food price ratio

Two Key Equations

Income Elasticity of Farm Value Share =

- Income Elasticity of Market Clearing Farm Price
- Income Elasticity of Market Clearing Retail Price
- Income Elasticity of Food Marketing Services

Income Elasticity of Food Marketing Services =

- Income Elasticity of Food Demand
- Income Elasticity of Farm Quantity

Table 1. Deflated and Nominal AIDS model estimates of income elasticities

		Income elasticity of:		
		Consumer Demand	Food Marketing Services	Farm Value Share
Beef				
	Deflated AIDS	2.537	1.667	-1.231
	Nominal AIDS	-1.006	-1.839	2.276
Pork				
	Deflated AIDS	1.617	0.674	-0.127
	Nominal AIDS	-0.238	-1.158	1.705
Poultry				
	Deflated AIDS	0.888	0.083	0.268
	Nominal AIDS	0.422	-0.364	0.715
Dairy				
	Deflated AIDS	2.039	1.384	-1.266
	Nominal AIDS	-0.171	-0.818	0.937
Fruit&Veg				
	Deflated AIDS	1.616	1.380	-1.317
	Nominal AIDS	-0.088	-0.358	0.421
Food at Home				
	Deflated AIDS ^a	1.832	1.227	-0.997
	Nominal AIDS ^a	-0.245	-0.837	1.067

^a The estimates are expenditure-share-weighted averages (evaluated at the sample mean) of industry income elasticities. The income elasticities of farm-value shares incorporate the estimates of the demand shift elasticities of farm and retail prices and the income elasticities of demand used to construct the demand shift variables. The estimates are reported in Tables 3 and Appendix Table 1 of Wohlgenant and Haidacher (1989).

Implications

When applied to Consumer Food Expenditure data, the deflated AIDS model estimates yield imply positive income elasticities of food demand and positive income elasticities of food marketing services. In theory the deflated AIDS accounts for trends in the distribution of income and in the demographics across households. Thus the deflated AIDS model estimates imply that by accounting for these trends, rising household incomes have raised the demand for food marketing services in at-home-farm-based foods and have contributed to the observed decline in farm value shares. In contrast the nominal AIDS model estimates yield negative income elasticities of food demand and food marketing services. This suggests that as incomes have risen consumers demand less marketing services in at home foods which would have contributed to increasing rather than the observed decreasing farm value shares. Therefore the nominal model estimates provide empirical support for the view that market power and captive supplies have been largely responsible for declining farm value shares. Further research along the lines of Lewbel (1991) could be implemented prior to demand system estimation in an attempt to determine which model is supported by the data.

References

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