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Economic Viability of Investing in Alternative Part-Time Cow-Calf Farms in the Northeastern United States

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Cow-calf enterprises in the Northeastern United States are generally small and often the only agricultural enterprise of families with large off-farm incomes. In this paper, the economic viability of cow-calf enterprises to these investors is considered using a representative farm/economic engineering approach. Investments in farm real estate that is characterized by limited capability soil resources are found to yield negative labor and management incomes but to be economically viable when change in net worth and present value of family after-tax income are considered.

The cow-calf industry in the Northeastern United States is characterized by small farms. New York State's 82,841 beef brood cows are on 10,014 farms (Bureau of the Census). Most of these farms are part-time with the operator holding an off-farm job and with total labor input less than one worker-equivalent (Smith 1977 and 1978). A beef cow-calf operation is attractive to part-time farmers due to relatively low labor requirements. Previous studies have found part-time cow-calf farms to be profitable only when feeder calf prices are unusually high (Christensen and Stinson, Burdette and Waters, and Knoblauch, et al.). Each of these studies measured profitability only by return to the operator's labor and management.

The objective of this paper is to consider economic viability of a part-time cow-calf farm form the perspective of a typical investor. As indicated above, the typical investor already holds an off-farm job usually with a major income tax liability. This investor is usually seeking a place to live away from the city, has family labor available, and has economic motives that are reflected by after-tax available cash and increase in net worth.

The investment viability to this individual and his/her family requires consideration of labor and management income, change in net worth, and the present value of family after-tax income (farm and off-farm income) compared to off-farm after tax income without a cow-calf investment. In addition, family cash flow in the early years of the investment are analyzed to be certain the investment is financially feasible.

The economic engineering approach is used. A representative farm with soil resources, buildings, and labor supply characteristic of part-time cow-calf farms is specified. Four alternative management systems are evaluated using investments, inflows and outflows for 10 years.

Costs and prices during 1980 were judged to represent relative levels expected over a 10 year time horizon. For calculation of annual profitability, 1980 prices are used to reflect real prices and, therefore, a real interest rate also is used. For the calculation of the remainder of the measures of economic viability, inflation is explicitly considered. Income tax calculations use the provisions of the Economic Act of 1981.

Representative Farm Characteristics

In 1979, a 60 acre parcel of land at the Cornell University Animal Science Teaching and Research Center was cleared and improved to be used in demonstrating and evaluating cow-calf management systems. The soil resource,

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mostly the soil mapping unit Mardin, and the slope, mostly 15-25 percent, is representative of most part-time cow-calf farms. Data from two studies using this resource were used extensively in defining the representative farm and the management systems considered in this study (Abdalla, Seaney and Fox).

The representative farm contains 150 acres that have been out of production for several years. This is typical for soil resource with a comparative advantage for cow-calf production and a price within reach for a nonfarm investor. Both the marginality of the soil and the need for improvements, including brush removal and clipping and building renovation, are reflected in the characteristics of the representative farm (Table 1). Only hay crops can be raised on this soil resource. Explicit separation of the farm business and the family residence is important as IRS carefully scrutinizes part-time farm businesses with large nonfarm incomes.

Management of the livestock is above average as these investors are typically well educated and very businesslike with good management necessary for survival. A 90 percent weaned calf crop, a 12 month calving interval, and a 15 percent culling rate are specified (Fox). Feed requirements (Nowak, *et al.*) and weaning weights are representative of British bred cattle.

Input and output prices during 1980 are considered to reflect relative prices for the 10 year investment time horizon (Table 2). Historically, real interest rates have averaged three percent. Projecting an average inflation rate of 10 percent, 13 percent nominal interest rate is used for cash flow and balance sheet calculations.

Four management systems typical of those available to part-time investors are considered. The systems represent alternative land use intensity and level of capital inputs (Table 3). The management systems are:

Table 1. Representative Farm Characteristics

Investment in Land and Buildings				
150 total acres				
	Mortgage	Down payment		
Farm Share	$53,500	$16,050		
Home	21,500	6,450		
	$75,000	$22,500		
Mortgage: 25 years term, 11% interest				
Itemization of Farm Real Estate Costs		Acres	$/Acre	Investment
Hay/pasture		70	450	$31,500
Pasture only		60	150	15,000
Support land		20	100	2,000
Farm buildings				5,000
	Total	150		$53,500
Brush Removal and Clipping				
Cash Costs			$1,980	
Unpaid labor[a]			930	
Total			$2,910	
Building Renovation				
Get building			$ 500	
Concrete for renovation			500	
Handling facilities			500	
Drinking system			300	
Cash costs			$1,800	
Unpaid labor[a]			440	
Total			$2,240	

[a] Unpaid labor only considered in change in net worth analysis.

Table 2. Product Prices and Input Costs

Prices		
Livestock	Live-weight $/lb.	$/hd.
Feeder steer	.75	337.50
Feeder heifer	.65	260.00
Cull cow	.45	495.00
Cull bull	.55	990.00
Crops Sold		
Hay (ton)		50.00

Costs		
Feeds		$
Hay (ton)		60.00
Dry shell corn (ton)		125.00
Soybean oil meal 48 (ton)		300.00
Dical (cwt.)		25.00
Limestone (cwt.)		5.00
Trace mineral salt (cwt.)		7.50
Fertilizer and Lime		
K_2O	$.14/lb.	11.20/A
P_2O_5	.28/lb.	56/A
Lime	$28/ton	98/A
Seed		
Brome	$1.33/lb.	7.65/A
Birdsfoot trefoil	$4.66/lb.	23.30/A
Fence		
80 rod roll barbed wire		30.00
Locust post (ea.)		1.50
Labor		
Operator labor		6.00/hr.
Hired labor		4.60.hr.
Unpaid family labor		500/mo.
Interest		
Real		3%
Nominal		13%

Table 3. Characteristics of the Four Cow-Calf Management Systems

	Management System			
Item	I	II	III	IV
No. Cow/Calf Units	20	19	32	40
Hay	Purchased	Unimproved	Improved	Improved
Acres	0	70	70	70
Pasture	Unimproved	Unimproved	Unimproved	Improved
Acres	130	60	60	60
Hay Yield (tons/acre)	—	1.0	2.0	2.0
Protein Content Hay (%)	12	8	12	12
Investment in Machinery ($)	6,000	12,800	18,800	18,800
Investment in Building Renovation & Fence ($)	4,385	5,004	5,004	5,004
Hours of Hired Labor	0	122	244	244
Month of Unpaid Family Labor	4.8	7.2	9.6	12.0
Loans for Cattle and Equipment				
Year 1 ($)	16,000	21,000	9,000	40,000
Year 2 ($)	3,000	2,000	12,700	24,000

I. Native grasses on all 130 crop acres are grazed with no supplemental fertilization applied. Hay and concentrate are purchased for the 20 cow-calf units;
II. Like system I, there is no supplemental fertilization; however, one cutting of native grass is harvested on 70 acres. Nineteen cow-calf units exhaust the forage production capacity of this system;
III. Hay acreage (70 acres) is limited, fertilized, and seeded with tillage custom hired. Fifteen of the 32 cow-calf units are stocked in year one;
IV. Hay and pasture acreage is limed, seeded, and fertilized. No animals are purchased until the second year when 40 cow-calf units are purchased.

Moving from I to IV, each system is more capital intensive but also has greater forage production. All investments in machinery are for used machinery which can be purchased inexpensively to harvest the small quantity of hay produced. Details of the machinery complements; crop enterprise inputs, costs and production; livestock investments; and production practices for each management system are in Nowak, *et al.*

Results of Analysis

Cow-calf systems are not profitable when evaluated using farm profitability measures used for full-time commercial farms. Labor and management income is always negative and net cash farm income is often negative (Table 4). Using traditional farm profitability measures, System II is the most profitable while System IV is the least profitable.

Traditional income measures are not necessarily indicative of the economic viability for an individual considering investing in a part-time cow-calf operation. Impacts on the family after-tax cash flow and growth of family net

Table 4. Profitability of Four Cow-Calf Management Systems[a]

	Management System			
	I	II	III	IV
Year 1				
Net cash farm income	$−2,212	$ 194	$−12,538	$−24,366
Labor & mgmt. income	−5,160	−4,580	−18,132	−29,756
Year 2				
Net cash farm income	−10	1,573	2,744	3,855
Labor & mgmt. income	−4,118	−3,356	−3,394	−2,722
Year 3				
Net cash farm income	965	2,458	5,049	6,121
Labor & mgmt. income	−3,098	−2,930	−1,035	−584
Year 4				
Net cash farm income	−10	1,483	2,744	4,436
Labor & mgmt. income	−4,028	−3,362	−3,288	−2,183
Years 5–10				
Receipts				
Feeder calves	$ 4,598	$ 4,368	$ 7,356	$ 9,195
Cull cattle	1,980	1,906	2,871	12,660
Total Farm Receipts	$ 6,578	$ 6,274	$ 10,227	$ 12,660
Expenses				
Purchased feed	$ 3,661	$ 542	$ 610	$ 763
Other operating	2,488	3,760	7,684	10,547
Net Cash Farm Income	478	1,971	1,932	1,350
Fixed Noncash Expenses[b]	3,891	4,715	5,847	6,169
Labor & mgmt. income	−3,413	−2,754	−3,915	−4,809

[a] 1980 price levels and a three percent real interest rate.
[b] Depreciation (cost recovery) on building and fence, machinery and cattle, interest on investment and unpaid family labor.

worth are critical measures of performance. To assess the after-tax cash flow impact, investment tax shield is calculated as the present value of the difference between after-tax income with and without the cow-calf investment. Taxable off-farm incomes of $25,000, $45,000, and $65,000 are analyzed. Four personal exemptions are specified with one family per farm. Regulations in the Economic Recovery Act of 1981 are used and investment credit is only carried forward. This cash flow analysis is completed using nominal prices by inflating all costs and returns. A nominal interest rate is then used.

Net present value of the tax shield for the ten years is positive for all four management systems when off-farm taxable income is $65,000 (Table 5). It is positive for Management Systems II and III at $45,000 off-farm taxable income and for System II with $25,000 (Table 5). Net worth increases from $86,000 to $116,000 over the ten yearss with larger increases in the more intensive systems, especially Management System IV.

The net present value of investment cash flow is the sum of the discounted cash flow from the farm business for the 10 operating years and discounted after-tax liquidation in year 11. The tax shield is considered as a cash receipt since it is a direct result of the farm business. The liquidation values are after capital gains taxes are subtracted (Table 5). Positive net present values are attained except for Management System IV with $25,000 off-farm taxable income. Inclusion of after-tax liquidation income increases the relative ranking of System IV. These results illustrate that a part-time cow-calf investment can provide a reasonable return when income tax and capital accumulation considerations are included in the analysis.

Management System I is inferior to System II in all measures of economic viability. This low ranking results from only limited utilization of the land resource. System I can, therefore, be discarded in our consideration of economic viability. If capital limitations only allowed System I to be implemented, the switch to another system should be made as rapidly as financially feasible.

For $25,000 and $45,000 off-farm incomes, Management System II is superior to all other systems by all criteria except change is net worth. At these income levels, the capital intensity and resulting severe cash flow constraints in early years make Systems III and IV unacceptable to most investors. System II is, therefore, most economically viable to investors with off-farm taxable incomes of $45,000 or less. Even with System II, additional preinvestment savings or short-term debt capital may be required to cover the negative cash flows in early investment years.

Systems III and IV become viable as non-

Table 5. Comparison of Four Cow-Calf Management Systems on Family Financial Status

	Management System			
	I	II	III	IV
Net Present Value of Tax Shield[a]				
$25,000[b]	$−8,051	$ 1,389	$−10,189	$−19,038
$45,000[b]	−16	8,354	5,668	−8,289
$65,000[b]	44,045	51,889	57,713	46,513
Change in Net Worth	86,041	86,759	105,590	116,389
Net Present Value of Investment Cash Flow[c]				
$25,000[b]	10,554	16,477	7,265	−1,935
$45,000[b]	12,350	18,419	17,569	8,998
$65,000[b]	77,839	83,899	85,955	84,601
Average Cash Flow Years 1–4				
$25,000[b]	−3,946	−3,653	−9,675	−11,900
$45,000[b]	−3,115	−2,781	−5,287	−8,020
$65,000[b]	7,007	7,370	5,577	4,740

[a] Net present value of investment tax shield is the discounted differences between after-tax income with and without the cow-calf investment.
[b] Off-farm taxable income.
[c] Net present value of investment cash flow is the discounted cash flows from the farm business and the discounted after tax liquidation gain.

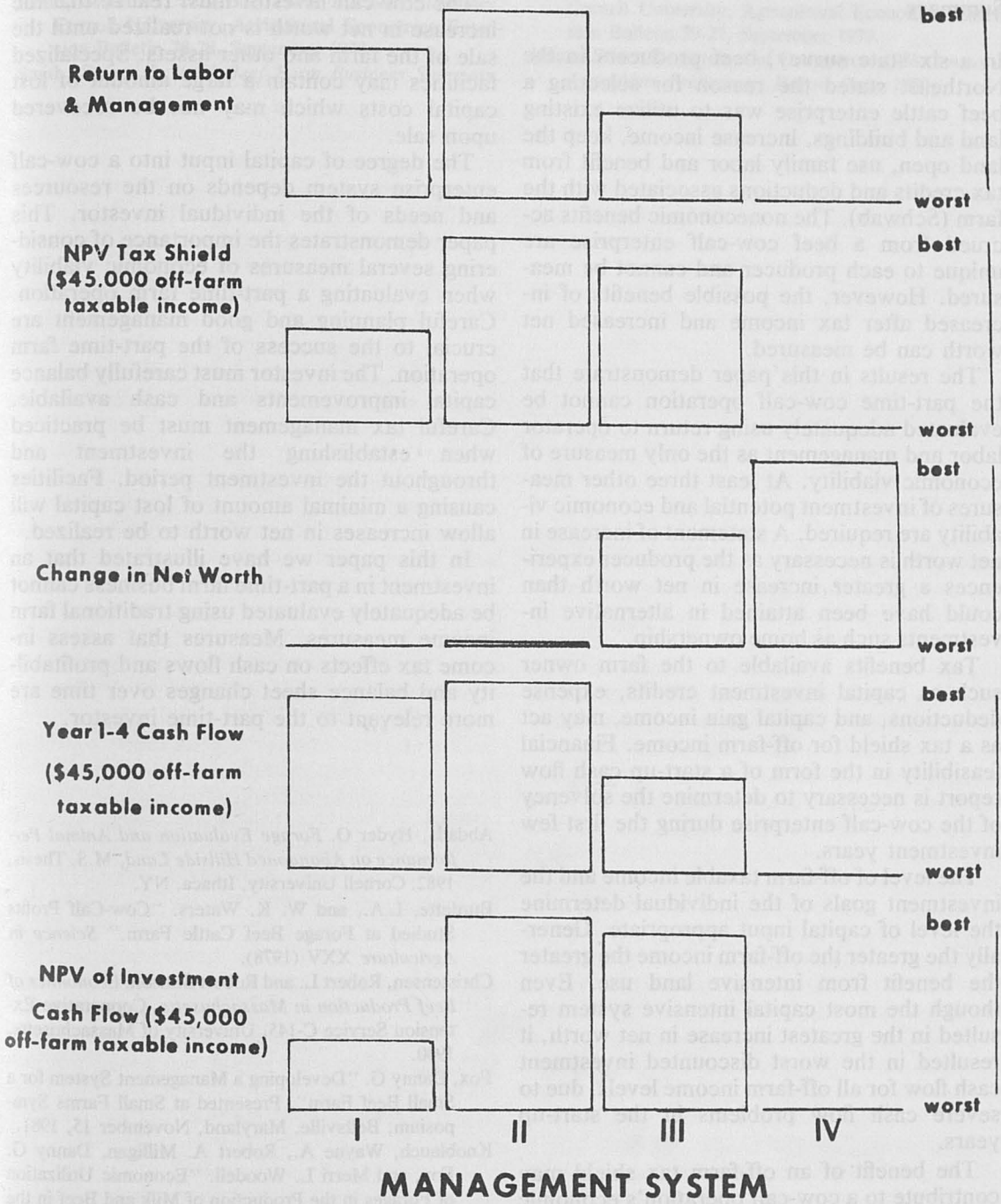

Figure 1. Relative Ranking of Four Management Systems with Alternative Measures of Economic Viability, $45,000 Off-Farm Income.

farm income increases. This trend is illustrated by the results with off-farm taxable income of $65,000 where System III has the largest net present value of tax shield and investment cash flow. Off-farm income at least this large will be required to support the negative cash flows in early years of the investment. Unless income is very large or increase in net worth is extremely important, System III should be selected over System IV.

Summary

In a six state survey, beef producers in the Northeast stated the reason for selecting a beef cattle enterprise was to utilize existing land and buildings, increase income, keep the land open, use family labor and benefit from tax credits and deductions associated with the farm (Schwab). The noneconomic benefits accrued from a beef cow-calf enterprise are unique to each producer and cannot be measured. However, the possible benefits of increased after tax income and increased net worth can be measured.

The results in this paper demonstrate that the part-time cow-calf operation cannot be evaluated adequately using return to operator labor and management as the only measure of economic viability. At least three other measures of investment potential and economic viability are required. A statement of increase in net worth is necessary as the producer experiences a greater increase in net worth than could have been attained in alternative investments such as home ownership.

Tax benefits available to the farm owner such as capital investment credits, expense deductions, and capital gain income, may act as a tax shield for off-farm income. Financial feasibility in the form of a start-up cash flow report is necessary to determine the solvency of the cow-calf enterprise during the first few investment years.

The level of off-farm taxable income and the investment goals of the individual determine the level of capital input appropriate. Generally the greater the off-farm income the greater the benefit from intensive land use. Even though the most capital intensive system resulted in the greatest increase in net worth, it resulted in the worst discounted investment cash flow for all off-farm income levels, due to severe cash flow problems in the start-up years.

The benefit of an off-farm tax shield may contribute to a cow-calf operation's economic viability but cannot overcome severe cash flow problems. The difference between the operator's after tax income with and without the farm, was favorable to the farm when the management system with the greatest net cash income was considered. The producer relying on the tax shield effects of the cow-calf enterprise must plan for later investment years when tax credits have been exhausted and some assets are fully depreciated.

The cow-calf investor must realize that the increase in net worth is not realized until the sale of the farm and other assets. Specialized facilities may contain a large amount of lost capital costs which may not be recovered upon sale.

The degree of capital input into a cow-calf enterprise system depends on the resources and needs of the individual investor. This paper demonstrates the importance of considering several measures of economic viability when evaluating a part-time farm operation. Careful planning and good management are crucial to the success of the part-time farm operation. The investor must carefully balance capital improvements and cash available. Careful tax management must be practiced when establishing the investment and throughout the investment period. Facilities causing a minimal amount of lost capital will allow increases in net worth to be realized.

In this paper we have illustrated that an investment in a part-time farm business cannot be adequately evaluated using traditional farm income measures. Measures that assess income tax effects on cash flows and profitability and balance sheet changes over time are more relevant to the part-time investor.

Abdalla, Hyder O. *Forage Evaluation and Animal Performance on Abandoned Hillside Land,* M.S. Thesis, 1982, Cornell University, Ithaca, NY.

Burdette, L.A., and W. K. Waters. "Cow-Calf Profits Studied at Forage Beef Cattle Farm." *Science in Agriculture* XXV (1978).

Christensen, Robert L. and Robert Stinson. *Economics of Beef Production in Massachusetts.* Cooperative Extension Service C-145, University of Massachusetts, 1980.

Fox, Danny G. "Developing a Management System for a Small Beef Farm", Presented at Small Farms Symposium, Beltsville, Maryland, November 15, 1981.

Knoblauch, Wayne A., Robert A. Milligan, Danny G. Fox, and Merri L. Woodell. "Economic Utilization of Forages in the Production of Milk and Beef in the Northeast United States." *Journal of Dairy Science.* 64(1981):2059–2070.

Nowak, C. J., R. A. Milligan, W. A. Knoblauch, and D. G. Fox, "The Economic Viability of Part-Time Cow-Calf Operations in the Northeast." A.E. Research 83-15, June 1983.

Schwab, G. and E. Gerst. *A Description of Beef Cow-Calf Producers in six States—Their Enterprise, Motivation and Sources of Information,* Cornell University Beef Production Manual Fact Sheet 001, 1976.

Seaney, Robert and Dan Fox, Unpublished Data, 1981.

Smith, Stuart F., *1977 Beef Farm Business Summary*. Cornell University, Agricultural Economics Extension Bulletin 78-28, September 1978.

Smith, Stuart F., *1978 Beef Farm Business Summary*. Cornell University, Agricultural Economics Extension Bulletin 79-27, September 1979.

United States Department of Commerce. *1978 Census of Agriculture Preliminary Report*, June 1980.