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Off-Farm Employment: Research and Issues

Introduction

The growth in the proportional contribution of off-farm income to U.S. farms in the past decade has led to interest in off-farm employment, the principal source of off-farm income. This interest is well-founded: off-farm employment by one or more farm family members is not only prevalent in the U.S. but appears to be a permanent phenomenon as well (Simpson and Wilson 1983). The perception that farm families with off-farm work are families in transition either into or out of agriculture, represents the behavior of some but certainly not all farm families working off-farm. The motives for off-farm employment vary by farm--dual employment on-farm and off-farm may ease transitions into or out of agriculture, may be temporary only during years of low net farm returns, or may be a permanent lifestyle, either due to financial need or work preferences among farm household members. Many alternative motives for off-farm work have been suggested. (see, for example, Kada 1980; Fuguitt 1958)

Together these motives have created a large group of farm families in the U.S. that (as household units) combine on-farm and off-farm work. Similar observations can be made for other developed countries. Fuguitt et al. (1977) observe that "part-time farming is prevalent in many countries: in Germany, 55 percent of all farms are part-time farms, producing about one-third of the total farm output; in the UK some 24 percent of farmers, partners and directors of farm businesses are classified as part-time; in Japan over 87 percent in 1974 of farm households had other sources of income and employment. In Norway only one third of the farms were the sole source of income for the farmers working them."[1] Regardless of the criteria used

to define "part-time," dual employment on-farm and off-farm represents a major labor adjustment pattern among farm households in developed countries.

Much research has examined the factors affecting off-farm employment of farm operators (e.g., Sumner 1982; Huffman 1980; Streeter and Saupe 1986) and on the implications of off-farm income for total farm family income (Larson 1976; Findeis 1985; Ahearn 1986). At the micro-level, new interest has focused on the farm household, specifically on farm-household work decisions. The focus has been broadened from the part-time farmer to the part-time farm family, i.e. families in which labor resources are allocated both to on-farm and off-farm work (Huffman and Lange 1982; Rosenfeld 1985). The prevalence of off-farm employment and the large contributions of off-farm labor income to farm household income have created research interest in the implications of these trends for the well-being of farm households (e.g., Carlin and Reinsel 1973; Ahearn, Johnson and Strickland 1985), and the work-related interdependencies between agriculture and rural communities (e.g., Shaffer, Salant, and Saupe 1986; Findeis 1986).

At the same time there is growing recognition that dual employment may affect the organization of the farm operation itself, either because labor resources required for on-farm work are constrained by off-farm employment or because off-farm work creates additional financial resources for the farm-household. Changes in these resources may affect on-farm investment decisions, choice of enterprise mix, and input use. On-farm and off-farm decisions may be joint decisions constrained by the availability of financial resources and by the characteristics of family labor.

At the macro-level, the increased prevalence of off-farm employment can also be observed to have important impacts. Off-farm income has been shown

to affect the distribution of income among farm families (Ahearn, et al. 1985; Findeis and Reddy 1987), the stability of farm family income (Tweeten 1983c), and the structure of agriculture in the U.S. (Carlin and Ghelfi 1979). Despite low or even negative net farm returns, many small and modest-sized farms have continued in operation, principally supported by off-farm income. This has been particularly true in the late 1970's and the 1980's, as off-farm employment and income increased (Cochrane 1987).

Given this perspective, this paper provides a survey of recent research analyzing factors that may affect off-farm labor participation and labor supply decisions among farm operators and spouses in the U.S. and Canada. A comparison of study results is useful because enough studies have been conducted to begin to draw more solid conclusions about what factors affect the prevalence of off-farm work. Researchers planning to conduct surveys on off-farm employment as well as those analyzing the broader implications of off-farm income and employment can benefit from a cross-study comparison. This paper focuses first on what is known and then raises relevant issues about which very little appears certain.

Factors Affecting Off-Farm Labor Participation and Labor Supply

In the past decade, numerous researchers have attempted to explain the off-farm labor decisions of farm household members - farm operators and spouses, farm men and farm women. These studies have generally analyzed factors affecting labor participation decisions using dichotomous dependent variable probability models, have examined factors affecting labor supply decisions using estimated labor supply functions, or both. Many studies (e.g., Sumner 1982; Furtan, Van Kooten, and Thompson 1984; Thompson 1985) have estimated participation, wage, and either hours of work or days of work

labor supply functions using econometric techniques to correct for truncated or censored sample bias (Heckman 1974; Tobin 1958).

The recent proliferation of studies examining factors affecting participation in off-farm work allows a comparison of the determinants of off-farm work decisions. Table 1 includes a sample of studies based on data for farm families sampled in the U.S. or Canada. This sample is by no means inclusive of all relevant studies[2], but provides a sample for comparison to elucidate what is presently understood.

The factors affecting off-farm labor participation and off-farm labor supply can be broadly grouped into five sets: (Leistritz et al. 1986): (1) individual characteristics, (2) family characteristics, (3) financial characteristics of the farm family, (4) characteristics of the farm operation, and (5) area or location characteristics. Each of the studies in Table 1 incorporates exogenous variables reflecting most if not all of these broad groups of characteristics potentially influencing off-farm labor decisions. These characteristics are examined below for models of off-farm labor participation for farm men, farm women, or both. Similar comparisons are made for off-farm labor supply models in the Appendix.

Individual Characteristics

Previous studies have considered the characteristics of the farm operator or spouse that affect either the individual's willingness to work off-farm or the returns to on-farm or off-farm work. The variables often incorporated in off-farm labor participation or labor supply models include the individual's age, education, and work experience. An age-squared variable has also typically been included in the model specifications to capture a life-cycle effect. Work experience has been represented by

TABLE 1. DESCRIPTION OF SAMPLE STUDIES

Study	Data Year	Location of Population Sampled
Huffman (1980)	1964	Counties in Iowa, North Carolina and Oklahoma
Sumner (1982)	1971	Illinois
Simpson and Kapitany (1983)	1977	Saskatchewan
Reddy and Findeis (1987)	1978	Total U.S.
Reddy and Findeis (1987)	1984	Total U.S.
Furtan, Van Kooten, and Thompson (1984)	1980	Saskatchewan
Thompson (1985)	1981	Saskatchewan
Buttel, Hall, Larson, and Kloppenburg (1982)	1981	New York State
Leistritz, Vreugdenhil, Ekstrom and Leholm (1985)	1985	North Dakota
Streeter and Saupe (1986)	1981	Northeast Mississippi and six counties in Tennessee
Rosenfeld (1985)	1980	Total U.S.
Sander (1983)	1980	Total U.S.

either on-farm or off-farm work experience, or both. Many studies have incorporated an on-farm work experience variable in the decision models for farm men, and at least one study (i.e., Thompson 1985) incorporated off-farm experience variables for farm men. Among the models estimated for farm women, off-farm work experience is often incorporated whereas on-farm experience is not.

Tables 2 and 3 indicate the direction and statistical significance of the individual's characteristics that influence participation in the off-farm labor market for farm men and women. For farm men, advancing age is shown to be positively related and then negatively related to participation in off-farm work, reflecting a life-cycle effect or, alternatively, reflecting the prevalence of dual employment among young farmers and full-time farming among older farmers. Studies that have included both an age and age-squared variable have consistently shown positive signs for the age variable and negative signs for the age-squared variable, although in some cases the estimates were not significant. Where age was incorporated without inclusion of an age-squared variable, advancing age was shown to negatively effect the likelihood of off-farm work (e.g., Leistritz et al. 1985).

Education consistently has been observed to have a positive influence on off-farm employment participation, with one exception: Simpson and Kapitany (1983) found that among older farm operators (operators 54 years or older), the education estimate was negative. However, the estimate was insignificant.

Despite positive signs on the education estimates in the participation equations, there has been some debate over the effects of education on off-

TABLE 2. OFF-FARM LABOR PARTICIPATION AMONG FARM MEN - INDIVIDUAL CHARACTERISTICS[a/]

Study	Data Year	Age	Age Squared	Education	Work Experience	
					On-Farm	Off-Farm
Huffman	1964	(+)	(-)	**(+)**	N	N
Sumner	1971	**(+)**	**(-)**	(+)[c/]	**(-)**	N
Simpson and Kapitany	1977	Sample stratified into age-related groups.		**(+/+/-)**[d/]	(+/-/-)[d/]	N
Reddy and Findeis	1978	**(+)**	**(-)**	**(+)**	N	N
Furtan, Van Kooten and Thompson	1980	N	N	(+)	**(-)**	N
Thompson	1981	N	N	(+)	N	$(EXP)_2$ (+) (EXP) **(-)**
Buttel, Hall, Larson, and Kloppenburg	1981	SR:(-/-/-)[b/] LR:(-/-/-)	N	SR:(+) LR:(+)	SR:(+) LR:(-)	N
Reddy and Findeis	1984	(+)	(-)	**(+)**	N	N
Leistritz, Vreugdenhil, Ekstrom and Leholm	1985	**(-)**	N	(+)	N	N

[a/] The signs in bold represent statistically significant estimates at the levels selected by the researchers, or at the 5 percent level otherwise. N = not included as an exogenous variable.

[b/] Buttel, et al. used age categories: age to 35, 35-44, and 54 and over. The categories entered as dummy variables. The signs on each are relative to the reference group.

[c/] Sumner also included farm and nonfarm training. Both variables had positive coefficients.

[d/] Simpson and Kapitany disaggregated their sample into (1) entrants into farming, (2) experienced farmers, and (3) older farmers. Education positively affected off-farm labor participation among entrants, but declined in importance with increasing on-farm experience.

TABLE 3. OFF-FARM LABOR PARTICIPATION AMONG FARM WOMEN - INDIVIDUAL CHARACTERISTICS[a/]

Study	Data Year	Age	Age Squared	Education	Work Experience Off-Farm
Reddy and Findeis	1978	(-)	(-)	(+)	N
Furtan, Van Kooten and Thompson	1980	N	N	**(+)**	(+)
Rosenfeld	1980	**(+)**	N	**(+)**	N
Thompson	1981	N	N	**(+)**	$(EXP)_2$ (+) (EXP) (-)
Buttel, Hall, Larson and Kloppenburg	1981	SR:(+/+/-)[b/] LR:(-/+/-)	N	SR:(+) LR:(+)	N
Reddy and Findeis	1984	(+)	**(-)**	**(+)**	N
Leistritz, Vreugdenhil, Ekstrom and Leholm	1985	**(-)**	N	(+)	N

[a/] The signs in bold represent statistically significant estimates at the levels selected by the researchers, or at the 5 percent level otherwise. N = not included as an exogenous variable.

[b/] Refer to footnote b/ in Table 2.

farm labor supply, partially because the education estimate has been positive but insignificant in several studies. Some researchers have argued that education improves both on-farm and off-farm labor productivity, resulting in both a higher imputed on-farm wage and a higher off-farm wage (Sander 1983). Thus, education may not influence off-farm labor supply to the extent that might initially be expected. It has been argued that the lack of a statistically significant relationship between education and off-farm work reflects this confounding influence of education on farmers' on-farm and off-farm productivities (see, for example, Sander 1983).

Like education, work experience is also believed to influence the wage that is paid or imputed for work. Among farm men, on-farm work experience significantly contributes to lower rates of participation in off-farm work (see Table 2). The relationship between experience in off-farm work and participation in off-farm work was positive but insignificant in Thompson (1985). This influence was shown to decline with age.

Among farm women, the effects of age on off-farm work participation are less clear (see Table 3). However, education consistently has been shown to have significant, positive effects on participation of farm women in the off-farm labor force. In general, these impacts have not only been positive but large as well. Additional education increases the earning capacity of farm women and may qualify them for certain skilled jobs in rural areas. These include jobs as teachers and nurses, two occupations that have been cited as typical for farm women with off-farm employment. Off-farm work experience also has been shown to be correlated with greater participation in off-farm work, but this result would be anticipated. Among both farm men and women working off-farm there are significant numbers that have worked at

off-farm jobs for many years. This observation supports the current contention that many part-time farms are not transitional.

Family Characteristics

Clearly, the individual's human capital affects the extent to which the individual will participate in off-farm work. In addition, characteristics of the farm family itself may influence off-farm labor participation and supply decisions. Family characteristics were included in all of the participation and labor supply models examined here, for both farm men and farm women. These usually include: (1) characteristics affecting the spouse's off-farm work participation or the spouse's earning capacity, and (2) the presence or number of dependent children. Relevant characteristics of the spouse have included the spouse's education, wage, off-farm income, on-farm work time, and whether or not the spouse is employed off-farm. In the models estimated for farm women, the spouse's on-farm work experience was considered in several studies (see, for example, Buttel et al. 1982 and Furtan et al. 1984).

The influence of children on decisions to work off-farm was often considered, for farm men as well as farm women. The variables representing the effects of children have measured either the number of children or reflected the presence of children by incorporation of a binary (dummy) variable. In many cases, children were grouped into age categories to account for child care needs (e.g., <6 years), to account for added household expenses (older children) or in anticipation of college education expenses (older children).

The direction of influence and statistical significance of family characteristics on off-farm labor participation among farm men and women are

shown in Tables 4 and 5, respectively. The number and ages of children appear to be relevant variables for farm women. For farm men, the signs of the estimates indicating the influence of children on participation in off-farm work were generally positive but not statistically significant. Large family sizes, however, influence the quantity of labor supplied off-farm (see Appendix Table A2). Large family sizes appear to induce farm men to supply more hours to off-farm work. There may be several reasons for this result. First, larger families may require the additional income that off-farm employment can provide. Thus, some farm men may devote more hours to off-farm work to supplement their incomes to provide for larger families. Or, in larger families, child labor may be substituted for operator labor particularly as children get older, allowing the farm operator to work off-farm.

For farm women, the opposite appears to be true: farm women are less likely to work off-farm if children are present. Most off-farm labor participation and labor supply models for farm women have included variables reflecting the presence or number of children, often grouped by age, and in the majority of studies the estimates have been negative and statistically significant. As shown in Table 5, all of the studies sampled here included a "children" variable and in most cases the estimates were statistically significant, particularly when the influence of preschool children was measured.

The participation models examined here also generally included at least one variable representing the characteristics of the individual's spouse - his or her level of educational attainment, experience in farming, wage, or participation in off-farm employment. The influences of the characteristics

TABLE 4. OFF-FARM LABOR PARTICIPATION AMONG FARM MEN - FAMILY CHARACTERISTICS[a/]

Study	Data Year	Characteristics of Spouse			Presence or Number of Children
		Education	Wage	Employed Off-Farm	
Huffman	1964	**(+)**	**(-)**	N	< 5 years (-)
Sumner	1971	(-)	N	N	All ages (+)
Simpson and Kapitany	1977	(-/-/-)[b/]	N	N	N
Reddy and Findeis	1978	N	N	**(+)**	N
Furtan, Van Kooten, and Thompson	1980	**(-)**	N	N	All ages (+)
Thompson	1981	N	N	N	13-18 years (+)
Buttel, Hall, Larson, and Kloppenburg	1981	SR:(+) LR:(+)	SR:(+) LR:(+)	N	SR:(-/-)[c/] LR:(+/-)[c/]
Reddy and Findeis	1984	N	N	**(+)**	N
Leistritz, Vreugdenhil, Ekstrom and Leholm	1985	N	N	**(+)**	N

[a/] The signs in bold represent statistically significant estimates at the levels selected by the researchers, or at the 5 percent level otherwise. N = not included as an exogenous variable.

[b/] Refer to footnote d/ in Table 2.

[c/] Buttel et al. incorporated two "children" variables: < 6 years, and > 16 years.

TABLE 5. OFF-FARM LABOR PARTICIPATION AMONG FARM WOMEN - FAMILY CHARACTERISTICS[a/]

Study	Data Year	Characteristics of Spouse				Presence or Number of Children
		Education	Wage	Farm Work Experience	Employed Off-farm	
Reddy and Findeis	1978	N	N	N	**(+)**	< 6 years **(-)**
Furtan, Van Kooten and Thompson	1980	**(+)**	N	**(-)**	N	< 6 years (-)
Rosenfeld	1980	N	N	N	N	< 6 years **(-)** 6-17 years **(-)**
Thompson	1981	N	N	N	N	< 6 years **(-)** 6-12 years **(-)** 13-18 years **(-)**
Buttel, Hall, Larson and Kloppenburg	1981	SR:(-) LR:(-)	SR:(+) LR:(+)	SR:(-) LR:(-)	N	SR:(-/+)[b/] LR:(-/+)
Reddy and Findeis	1984	N	N	N	**(+)**	< 6 years **(-)**
Leistritz, Vreugdenhil, Ekstrom and Leholm	1985	N	N	N	**(+)**	5-18 years **(-)**

[a/] The signs in bold represent statistically significant estimates at the levels selected by the researchers, or at the 5 percent level otherwise. N = not included as an exogenous variable.

[b/] Refer to footnote c/ in Table 4.

of the individual's spouse on the individual's own decision to work off-farm are generally unclear. The only effects that are consistent (in direction) across the studies in Tables 4 and 5 are (1) employment of the spouse off-farm and (2) the amount of on-farm work experience of the farm spouse in the participation equations for farm women. For both farm men and women, participation in off-farm work by the spouse increases the individual's participation in off-farm work (Leistritz et al. 1985; Reddy and Findeis 1987). Similarly, participation in off-farm work among farm women decreases with increases in the on-farm work experience of the spouse (Furtan et al. 1984 and Buttel et al. 1982).

In general it can be concluded that the presence of children, particularly young children, influences whether farm women work off-farm. Young children appear to significantly constrain off-farm labor participation. In contrast, the effects of the spouse's characteristics on the individual's participation in off-farm work are uncertain. While some research has focused on understanding intrafamily work decisions and other factors influencing these decisions (e.g., Huffman and Lange 1982), much remains to be learned.

Financial and Farm Characteristics

Off-farm employment decisions are also likely to be influenced by the financial position of the farm family and the characteristics of the farm operation itself. Most studies have included some measure (or measures) of family income from sources other than from the individual's off-farm employment. These variables reflect the financial status of the household, excluding the individual's off-farm income. Many studies (e.g., Reddy and Findeis 1987; Buttel et al. 1982) have included net farm income and income

from other sources, e.g., interest, dividends, rent, and other nonlabor income payments. Huffman (1980) incorporated "realized" and "unrealized" household income, while Thompson (1985) included a composite measure of gross farm income, other asset income, and off-farm income from the spouse's labor.

Since off-farm employment is most prevalent among families operating small and modest-sized farms, it is not surprising to find that net farm income and off-farm work are inversely related, both for farm men and farm women (Tables 6 and 7). The studies surveyed here show that as income from sources other than off-farm employment increases, participation in off-farm work decreases (Tables 6 and 7). Conversely, families with off-farm work were more likely to have lower incomes from other income sources. However, farm operators with off-farm employment were shown by Huffman (1980) to have higher realized household income levels. Similar observations for families living on farms in the U.S. were made by Findeis and Reddy (1987).

Other characteristics of the farm operation have been incorporated in models of off-farm labor participation or labor supply, but (as was not the case for the variables previously discussed) there has been wide variation in the variables used to represent these characteristics. Some studies have included binary variables for the farm's principal enterprise (e.g., dairy, livestock, crops); others have included variables that serve to capture either the effects of farm size or the degree of capitalization. These variables have included, for example, measures of capital value (Simpson and Kapitany 1983), a machinery value/land value ratio (Thompson 1985), the debt-to-asset ratio (Leistritz et al. 1985), and a variable indicating whether the farm operation was a partnership or corporation (Simpson and

TABLE 6. OFF-FARM LABOR PARTICIPATION AMONG FARM MEN - INCOME AND FARM CHARACTERISTICS[a/]

Study	Data Year	Income	Farm Characteristics	
			Primary Enterprise	Other Variables
Huffman	1964	Realized household income **(+)** Unrealized household income **(-)**	N	Variance of sales **(+)** Farm output ($\ell n \hat{Q}$) **(-)**
Sumner	1971	Other income **(-)**	Dairy **(-)** Swine **(-)** $(Swine)^2$ **(+)**	Other enterprise mixes (corn, soybeans)
Simpson and Kapitany	1977	N	N	Capital value **(-/-/-)** Partnership or corporation **(-/+/+)**
Reddy and Findeis	1978	Net farm income **(-)** Other income **(-)**	N	N
Furtan, Van Kooten and Thompson	1980	N	Livestock **(-)**	N
Thompson	1981	Gross farm, other assets, and woman's labor income **(-)**	Livestock **(-)**	Machinery/land value ratio **(+)**
Buttel, Hall, Larson, and Kloppenburg	1981	Net farm income SR:**(-)** LR:**(-)**	Dairy or vegetables SR:**(+)**	N
Reddy and Findeis	1984	Net farm income **(-)** Other income **(-)**	N	N
Leistritz, Vreugdenhil, Ekstrom and Leholm	1985	N	Beef **(+)** Dairy **(-)**	Acres operated **(-)** Debt-to-asset ratio **(+)**

[a/] The signs in bold represent statistically significant estimates at the levels selected by the researchers, or at the 5 percent level otherwise. N = not included as an exogenous variable.

TABLE 7. OFF-FARM LABOR PARTICIPATION AMONG FARM WOMEN - INCOME[a/]

Study	Data Year	Income
Reddy and Findeis	1978	Net farm income (-) Other income (-)
Furtan, Van Kooten and Thompson	1980	N
Rosenfeld	1980	N
Thompson	1981	Gross farm, other assets, and man's income **(-)**
Buttel, Hall, Larson and Kloppenburg	1981	SR:Net farm income (-) LR:Net farm income (-)
Reddy and Findeis	1984	Net farm income **(-)** Other income (-)
Leistritz, Vreugdenhil, Ekstrom and Leholm	1985	Family income [b/] **(-)**

[a/] The signs in bold represent statistically significant estimates at the levels selected by the researchers, or at the 5 percent level otherwise. N = not included as an exogenous variable.

[b/] The family income measure used by Leistritz et al. equalled total farm family income plus unearned income minus family living expenses.

Kapitany 1983).

Farm characteristics have been shown to influence off-farm work participation among farm men (Table 6). Simpson and Kapitany (1983) found that the capital value of the farm negatively affected off-farm work participation. Leistritz et al. (1985), Sander (1983) and others have found that dairy farm operators are less likely to work off-farm and Thompson (1985) showed that the ratio of machinery value to land value was inversely related to off-farm work among Saskatchewan farmers. Other exogenous variables that have been included in off-farm participation and labor supply models to reflect farm characteristics are shown in Table 6 and Appendix Table A3, respectively. Off-farm labor supply models for farm men have variously included: the market value of assets; variables to reflect specific enterprises such as dairy, livestock, and vegetable crops; farm output; and preferences and goals among farm operators with respect to production and farm lifestyles (see Streeter and Saupe 1986). Interestingly, farm characteristics were not included in any of the model specifications examined here for farm women, except Rosenfeld (1985). This was true for the participation models as well as the labor supply models developed for farm women.

The review of farm characteristics generally indicates that (1) the larger the farm (in terms of output or acres operated), the less likely the farm man will work off-farm, and (2) certain labor intensive enterprises such as dairy constrain participation in off-farm work. These relationships are reasonable and generally accepted. However, there is insufficient knowledge regarding how the operation of the farm affects off-farm work, or of equal importance, how off-farm employment among farm family members

affects the operation and organization of the farm. The latter in particular remains an under-researched issue.

Area Characteristics

This survey has also found that very little is understood about another factor having potentially important impacts on off-farm work and the prevalence part-time farmers: the influence of location. The participation of farm family members in off-farm work is affected not only by their willingness and ability to supply off-farm labor but also by the demand for this labor. To capture the influences of access to and availability of off-farm employment opportunities, studies have included various location-related measures. Sander (1983) included a population density variable, Buttel et al. (1982) included a variable to reflect urbanization (distance to a city of 10,000 population or more), and Streeter and Saupe (1986) included a variable measuring miles to off-farm employment. Binary variables have been included to indicate location within a county of specific types - SMSA, urban, adjacent and remote (Leistritz et al. 1985; Reddy and Findeis 1987). These variables have generally performed poorly. It is likely that the effects of regional differences in farming as well as the availability of and access to off-farm employment opportunities was confounded. The level of aggregation of these variables may have also obscured the true micro relationships. As a result, the effects of job availability, access to jobs, and employment growth in a community on off-farm employment remain puzzles to be solved.

The variables discussed here represent the principal variables included in off-farm participation and labor supply models estimated for farm operators and spouses in the U.S. or Canada. Other factors have been

included in individual studies. For example, Huffman (1980) incorporated a variable representing the effects of agricultural extension activities and a variable reflecting race. Sumner (1982) included an assessment of the farm operator's health and Streeter and Saupe (1986) and Jensen and Salant (1986) included fringe benefits from off-farm work, principally health benefits. Some of these factors have been shown to have statistically significant influences on off-farm work decisions.

Implications for Future Research

The studies surveyed here are representative of the empirical analyses characteristic of off-farm employment research. These studies serve an important purpose: they provide a framework for better understanding the descriptive analyses of the phenomena of dual employment and part-time farming (e.g., Kada 1980; OECD 1977). In addition, many of the studies are based on recent farm household surveys that have provided additional information on the characteristics of off-farm employment - which industries provide off-farm jobs, the occupations of individuals working off-farm, the time requirements of off-farm work (e.g., part-day, seasonal), the extent of multiple job-holding off-farm, and other aspects of off-farm work. Kada (1980), Rosenfeld (1985), and Buttel et al. (1982), among others, provide detailed survey-based descriptive analyses of off-farm work.

The review of off-farm participation and labor supply models presented here indicates that while there are important similarities among the model estimates, there are also important gaps in the research that deserve further research attention. Given the prevalence of part-time farming in the U.S. and other developed countries, one important research issue that remains to be addressed is the question of how off-farm work affects the

organization and management of the farm operation. That is, if the farm operator or farm spouse, or both, work off-farm either part-time or full-time, what effects do these decisions have on enterprise choice and input use. Off-farm employment may well affect on-farm investment decisions, land use patterns, and the extent to which part-time farmers are able to provide "specialty" crops so often attributed to the proliferation of part-time farms. Off-farm employment also may have important effects on input use, especially hired labor. The modeling of off-farm labor and farm production decisions has been limited to a two-stage or separable decision process. As a result, key substitutions and complementarities may be missing in our analyses. Farm production and off-farm labor decisions must be intricately linked.

Second, little appears to be understood about intrahousehold time allocations and the effects that the characteristics and employment of one spouse have on the employment decisions of the other spouse. While many women on part-time farms may be engaged in farm work or may work both on-farm and off-farm, these considerations have not been incorporated into the research surveyed here. Only the effects of children on the off-farm work of farm women are clear. Both theoretical and empirical models which explicitly recognize the joint nature of these decisions should be developed. Further research should provide insights into farm family decision-making.

Finally, much of the empirical research on off-farm employment has focused on the characteristics of the farm and farm family itself. In many farming regions, families may be willing to supply time to off-farm work but may be constrained not only by the time requirements of the farm operation

but also by the lack of off-farm work opportunities. The location variables used in the studies surveyed here are crude measures of the degree of off-farm job availability and access. Future research should attempt to determine the extent to which off-farm employment is affected by the availability of jobs consistent with the skill levels and on-farm time commitments of farm family members.

Research should also examine the impacts of economic development (rural and urban) on the types of jobs held by farm family members and on the prevalence of part-time farms. Strong local economies may enhance or inhibit the opportunities for off-farm employment. The same labor markets that provide sources of off-farm employment may constrain the availability of hired labor. Farmers faced with such a constraint must adjust both off-farm and on-farm plans accordingly. The link between farm production, off-farm employment and local labor markets becomes an important factor. A complete analysis requires data and expertise in the areas of production, consumption, and rural development.

The "diversification" of farm families into off-farm work has raised a new set of research and policy issues. These issues require that we take an integrated approach that more explicitly considers farm-nonfarm interactions, both in terms of research and in terms of designing policies for aiding farm families. It is clear that much remains to be learned and much work remains to be done.

Footnotes

1. Referenced in Rosenfeld, 1985.
2. Other studies analyzing off-farm labor participation and labor supply decisions include: Lopez (1984); Jensen and Salant (1986); Singh (1983); Napier and Carter (1983); among others.

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APPENDIX - TABLE A1. OFF-FARM LABOR SUPPLY OF FARM MEN - WAGE AND INDIVIDUAL CHARACTERISTICS[a/]

Study	Data Year	Wage	Age	Age Squared	Education	Work Experience	
						On-Farm	Off-Farm
Huffman	1964	**(+)**	**(+)**	**(-)**	**(+)**	N	N
Sumner	1971	**(+)**	(+)	(-)	(+)	**(-)**	N
Sander	1980	N[b/]	**(-/+)**[b/]	N	**(+/+)**	N	N
Furtan, Van Kooten, and Thompson	1980	(+)	N	N	N	**(-)**	N
Thompson	1981	**(+)**[c/]	N	N	(+)	N	N
Buttel, Hall, Larson, and Kloppenburg	1981	SR:(+) LR:(+)	SR:(+/+/-) LR:(-/-/-)	N	N	SR:(-) LR:(-)	N
Streeter and Saupe	1981	**(+)**	**(+)**	**(-)**	N	N	N

[a/] The signs in bold represent statistically significant estimates at the levels selected by the researchers, or at the 5 percent level otherwise. N = not included as an exogenous variable.

[b/] Sander estimated off-farm hours of work functions for the entire sample and for families in which the operator was at most 45 years of age. The signs of the coefficients refer to these equations, respectively.

[c/] Thompson estimated several alternative labor supply models. When the sign is in bold, this indicates that the estimates in at least some of the alternative models were statistically significant.

APPENDIX - TABLE A2. OFF-FARM LABOR SUPPLY OF FARM MEN - FAMILY CHARACTERISTICS[a/]

Study	Data Year	Characteristics of Spouse				Presence or Number of Children
		Education	Wage	Off-Farm Income of Spouse	On-Farm Work of Spouse	
Huffman	1964	(+)	(-)	N	N	< 5 years **(+)**
Sumner	1971	**(-)**	N	N	N	(+)
Sander	1980	N	N	N	(+/+)[b/]	N
Furtan, Van Kooten and Thompson	1980	N	(-)	N	N	**(+)**
Thompson	1981	N	N	N	N	13-18 years (+)
Buttel, Hall, Larson, and Kloppenburg	1981	SR:(+) LR:(+)	SR:(+) LR:(+)	N	N	SR:(+/+)[c/] LR:(-/+)
Streeter and Saupe	1981	N	N	(+)	N	N

[a/]The signs in bold represent statistically significant estimates at the levels selected by the researchers, or at the 5 percent level otherwise. N = not included as an exogenous variable.

[b/]Refer to footnote b/ in Appendix Table A1.

[c/]Buttel et al. incorporated two "children" variables: < 6 years, and > 16 years.

APPENDIX - TABLE A3. OFF-FARM LABOR SUPPLY OF FARM MEN - INCOME AND FARM CHARACTERISTICS[a/]

Study	Data Year	Income	Farm Characteristics: Primary Enterprise	Farm Characteristics: Other Variables
Huffman	1964	Other realized household income (+) Unrealized household income (-)	N	Variance of sales (+) Farm output ($\ell n \hat{Q}$) (-)
Sumner	1971	Other income (-)	Dairy (-) Swine (-) $(Swine)^2$ (+)	Other enterprise mixes (corn, soybeans)
Sander	1980	Net farm income (-/-)[b/]	Dairy (-/-)	N
Furtan, Van Kooten, and Thompson	1980	Net worth (-)	Livestock (-)	N
Thompson	1981	Income of farm woman (-)	Livestock (-)[c/]	Machinery/land value ratio (+)[c/]
Buttel, Hall, Larson and Kloppenburg	1981	SR:Net farm income (-) LR:Net farm income (-)	SR:Dairy or vegetables (-)	N
Streeter and Saupe	1981	Unearned income (-) $(Unearned\ income)^2$ (+)	Percent of revenue from beef (+)	Predicted total revenue (Model 1) (-) Market value of assets (Model 2) (-) Goals: Increased production (-) Farming lifestyle (-)

[a/] The signs in bold represent statistically significant estimates at the levels selected by the researchers, or at the 5 percent level otherwise. N = not included as an exogenous variable.

[b/] Refer to footnote b/ in Appendix Table A1.

[c/] Refer to footnote c/ in Appendix Table A1.

APPENDIX - TABLE A4. OFF-FARM LABOR SUPPLY OF FARM WOMEN - INDIVIDUAL, FAMILY AND INCOME CHARACTERISTICS[a/]

Study	Data Year	Wage	Age	Education	Children	Income
Sander	1980	N[b/]	(-/+)[b/]	**(+/+)**	**(-/-)**	Net farm income **(-/-)**
Furtan, Van Kooten and Thompson	1980	**(+)**	**(-)**	N	**< 6 years (-)**	Net worth **(-)**
Buttel, Hall, Larson and Kloppenburg	1981	**(+)**	SR:**(-/-/+)** LR:**(+/-/+)**	N	SR:**(-/-)** LR:**(-/-)**	Net farm income **(+)**
Thompson	1981	**(+)**	N	N	**< 6 years (-)** **6-12 years (-)** **13-18 years (-)**	Income of farm man **(-)**

[a/] The signs in bold represent statistically significant estimates at the levels selected by the researchers, or at the 5 percent level otherwise. N = not included as an exogenous variable.

[b/] Sander estimated off-farm hours functions for the entire sample and for families in which the operator was at most 45 years of age. The signs of the coefficients refer to these equations, respectively.