Chapter 3

Decoupled and Coupled Payments Alter Household Labor Allocation

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U.S. agriculture is one of the most productive industries in the U.S. economy and one of the most productive agricultural systems worldwide. Labor used in U.S. agriculture, both hired and family labor, has declined in absolute terms since 1948 (Ahearn et al., 1988). The long-term trend of less farm labor (in favor of other production inputs) has enabled farm operators and other household members to allocate more of their time to off-farm jobs. Off-farm income has dominated cash earnings of most farm families for over three decades and for those farm families, the pursuit of an off-farm career may supersede the effect of farm policy (including decoupled payments) on farm household decisions. As a result, off-farm labor conditions, as well as onfarm earnings and government payments, influence households' labor supply decisions.

In this chapter, we examine the relationship between farm household labor allocations and the decoupled and coupled commodity payments received by households. We first describe a theoretical model of household labor allocation that incorporates both on- and off-farm labor markets. We use the model to derive predictions about the response of household labor supply to coupled and decoupled payments. We then present descriptive statistics as well as statistical results—that control for factors other than government programs—to analyze farm household labor response to payments.

Theoretical Model of Household Labor Choices

In the standard household labor allocation model, households are assumed to maximize "utility" – the consumption of goods and leisure. Consumption is limited by a household budget constraint based on labor and other sources of income and a fixed amount of time for labor and leisure[16] (see Singh et al., 1986; Huffman, 1991). A key factor linking labor, leisure, and household income is the marginal return from working an additional hour, the market wage rate. The wage rate is also the "opportunity cost" of allocating an hour to leisure rather than to working.

From this model, we can derive the demand for farm household labor in farming, the demand for household leisure time, and the off-farm labor supply of the farm household. The derivations depend on assumptions about the decision process of the household and about the "completeness" of labor markets. Complete labor markets imply that off-farm labor opportunities are available to farm households and that nonfamily farmworkers are available for hire locally.

[16] Individuals must allocate some of their time to maintaining their households. This time is considered as part of leisure, the residual time category.

The model also distinguishes between two types of income: earned labor income and nonlabor income, such as an income transfer or dividends. The household is predicted to respond to them differently. Earned labor income can have two effects on the labor allocation decision. ***A wealth effect*** occurs if an increase in wealth or income causes the household to want to work less and enjoy more leisure. ***A substitution effect*** occurs if the household increases work hours in response to the higher marginal return to labor and reduces leisure in response to its higher opportunity cost. Nonlabor income has only a wealth effect, but no substitution effect, because it does not change returns to labor.

To make this model more useful for applied analysis, it can be extended to incorporate household resource allocations among farm work, off-farm work, and leisure time. And, whereas the household budget is assumed to be fixed in the standard model, a farm household's budget can be viewed as dependent on farm production decisions, i.e., the budget is endogenous. Taylor and Adelman (2003) call this a "farm profit" effect.

Decoupled/Coupled Payments and Total Work Hours

A decoupled payment is an income transfer; its amount does not vary with changes in hours worked onfarm. A coupled payment is labor income that varies with the amount of output, and hence the amount of labor input. So, how would decoupled and coupled payments be expected to alter the allocation of farm households' labor? And if farm households choose more leisure time, would it be at the expense of farm or off-farm work? Following are some model predictions:

- ***Workers will tend to decrease total hours worked in response to decoupled payments.*** If a farm household receives decoupled payments, the impact on labor hours worked is certain because there is no change in the hourly return from work. Household members will prefer to work less and enjoy more leisure as a result of the wealth effect. Conversely, if decoupled payments are removed, hours worked are likely to increase to compensate for reduced wealth.
- ***The effect of coupled payments on total hours worked is ambiguous.*** Increased wage rates can cause a household member to want to work more and consume less leisure because each hour of work now brings a greater return (substitution effect). But it can also cause a household member to want to work less and consume more leisure if it has more income than before (wealth effect). The net effect will be determined by a household's individual preferences and the magnitude of payments. Only by observing the behavior of households can we determine the impact of coupled payments on the allocation of time and labor.
- ***When more leisure time is demanded, farm households will tend to reduce their labor hours in the job with lower marginal returns.*** If a farm household is not involved in off-farm work, fewer hours would be devoted to farming if more leisure time is demanded by

the household as a result of increased income. For multiple-job holders who prefer more leisure time, theory predicts that a household will decrease its work hours at the job with the lower marginal returns. So, if farm work has a higher marginal return, a household desiring more leisure would allocate fewer hours to off-farm work. However, a definitive prediction in such a case depends on assumptions about the household decision process and whether labor markets are complete.

Often, economists assume that households first make optimal farm production decisions and then decisions about consumption. Where increased nonlabor income results in increased leisure, the assumption of making farm decisions first dictates that farm households will work less at their off-farm job in lieu of reducing farm work. However, it can alternatively be assumed that households first allocate their labor to off-farm work and subsequently allocate their remaining time to farm production (or make decisions simultaneously). Hence, the differing assumptions can result in differing theoretical predictions about which labor hours are reduced – farm, off-farm, or both. Because the effect of government payments on leisure time is uncertain, the use of data to study actual decisions made by recipients is essential.

Although the theoretical model predicts an adjustment away from labor hours with a lower marginal return, data on farm and off-farm labor returns, relative to hours worked, do not support the expectation that farm households closely align their labor allocation with their farm returns. All U.S. farm households receiving payments allocated, on average, 60 percent of their work hours to farming but derived only 20 percent of their income from the farm (table 3-1). Only on very large farms (which represent 5 percent of all farms) does the share of work hours on the farm correspond closely to the share of earned income from farm sources. Obviously, considerations in addition to net farm income enter into the time allocation decisions of farm households. The allocation of family labor varies considerably by the life-cycle of the family and farm type. Other factors include capital gains

Table 3-1—Share of hours worked in farming (by operator and spouse combined) and share of earned household income from farming for participating farms, by farm type, 2000

Farm type	Participating farms' share of:			Farming share of the household's:	
	Operator households	Value of production	Government payments	Earned income[1]	Work hours
			Percent		
Limited-resource	2	--[a]	--[a]	--[b]	61
Retirement	8	1	1	--[b]	76
Residential	31	6	9	--[b]	29
Farm occupation-low sales	28	10	14	--[b]	70
Farm occupation-high sales	18	21	27	38	77
Large	8	23	26	64	80
Very large	5	40	22	82	83
All family farms	100	100	100	20	59

[a] = Less than 1 percent.
[b] Negative farm income and positive total income (from both farm and earned off-farm sources).
Source: Agricultural Resource Management Survey, 2000.

returns, tax management, farm succession planning, psychological rewards, and expectations about future program eligibility (see box, "Factors Other Than Current Income Affecting Farm Labor Choices"). Similarly in considering off-farm work, health insurance benefits are often a factor in a worker's off-farm employment choices (Jensen and Salant, 1986).

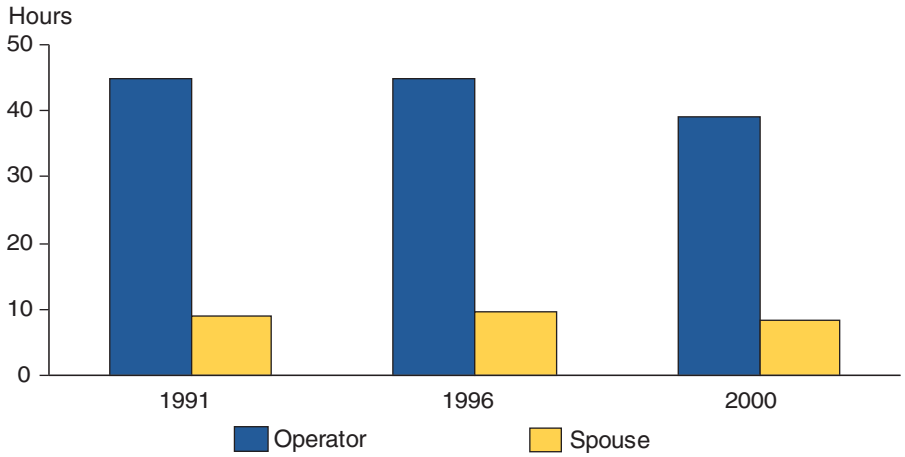
Do Farm Households Adjust Labor in Response to Government Payments?

Having reviewed some commonly held theories regarding income and labor, we now examine farm household responses to coupled and decoupled payments. USDA's Agricultural Resource Management Survey tracked labor supply responses to coupled payments as well as PFC payments during the 1990s. These data can be used to demonstrate the impact of government payments on labor hours on and off the farm during periods (1991, 1996, and 2000) when different types of policies were in place (see Westcott and Young, chapter 1).[17] This descriptive analysis is supplemented by three separate statistical analyses that isolate the effects of coupled and PFC payments on labor allocations.

- ***Households' onfarm hours changed little during the 1990s.*** The level of payments, as well as how they were distributed, varied in many ways across the time period, but farm operators and spouses receiving commodity payments maintained consistent farm work schedules during 1991-2000. ARMS data show very little difference for either operators or spouses in farm time allocations between 1991 and 2000 (fig. 3-1).

Descriptive analysis is a first step in determining the impacts of payments on labor allocations, but more advanced statistical analysis can control for other variables that may affect these decisions. Using 2001 data, El-Osta et al. (2004) analyzed the separate effects of three payments (PFC, disaster, and coupled loan deficiency payments) on farm, off-farm, and total hours

Figure 3-1
Average farm hours worked per week by program commodity participants



Note: Differences across years are not statistically significant
Source: 1991 Farm Costs and Returns Survey; 1996 and 2000 Agricultural Resource Management Survey.

[17] Total payments in 1991 were about the same level as in 1996 ($8.2 billion). In 1996, the $5.9 billion in PFC payments were comparable to $5.9 billion in coupled payments in 1991, and conservation payments were relatively constant across the years. By 1999 and 2000, PFC payments and conservation payments were about the same as in 1996, but loan deficiency payments and emergency assistance resulted in total payments of just above $20 billion.

Factors Other Than Current Income Affecting Farm Labor Choices

Capital gains. Some farmers may own and operate their farms in anticipation of capital gains from increasing land values. Other farmers may be largely retired but maintain the farm to minimize capital gains taxes from selling or transferring the farm prior to death (Harrington, 1983; Davenport et al., 1982).

Current income tax management. Farm losses can be used to offset income tax liability on nonfarm income. This tax advantage could outweigh the incentive to leave farming for farms that have net income losses (Davenport et al., 1982).

Farm succession. Farmers intending to pass the farm onto future generations may place a value on this option in addition to current-year returns. Farmers surveyed in 1988 were twice as likely to state they intend to bequeath their farm as to sell it (Whittaker and Ahearn, 1991).

Psychological rewards. Farmers likely get satisfaction from farming beyond monetary returns. This presumed psychological dividend is often offered as an explanation for why farmers choose to stay on the farm despite low, and even negative, profits.

Expectations that current farm operation may affect future program eligibility. Farmland owners may expect that future rules of eligibility to receive payments may be conditional on how they operate their farms in the current period. Some farmers may perceive that producing traditional program commodities, even if the payments are decoupled from current year production decisions, may maintain or increase their eligibility for future payments. A 2002 ARMS survey of farmers at the close of the FAIR Act found a great deal of diversity in their expectations about government support under a future farm bill.

Farmer expectations at the end of the FAIR Act about prices and government support under a future farm bill.

Survey question	Share responding[1]
Do you expect to receive about the same level of government support for this operation during the next 4 years?	Percent
Yes	41
Expect more	9
Expect less	25
Unsure	25
Do you expect government support regardless of price developments during the next 4 years?	
Yes	65
No	35
During the next 4 years, do you expect the general trend in the prices of the commodities you produce to be—	
About the same	65
Decline	16
Increase	19

[1] Excludes respondents who refused. Refusals varied from 2-6 percent of respondents.

worked for a sample of operators who received all three types of payments.[18] Moreover, they provided two treatments for payments, one that treated the decision to participate in programs as endogenous and the other as exogenous. All government payments combined had a positive impact on the hours that operators worked on the farm. When payments were modeled separately, PFC payments still had a weakly significant and small positive impact on operator's farm hours worked. For the average recipient who received just over $9,000 per year in 2001, the estimates suggest they might increase total work hours by about 1 workweek per year.

In another study using pooled 1998-2000 data, Dewbre and Mishra (2002) found that PFC payments did not have a statistically significant impact on farm hours worked for those payment recipients who allocated hours to both farm and off-farm work. Their analysis is not directly comparable to El-Osta et al. in research design. Dewbre and Mishra rexcluded retirement and residential/lifestyle farms and controlled only for farm size and receipt of other nonlabor income. (Dewbre and Mishra did not report an analysis of the impact of PFC payments on farm labor for the group that did not work off the farm.)

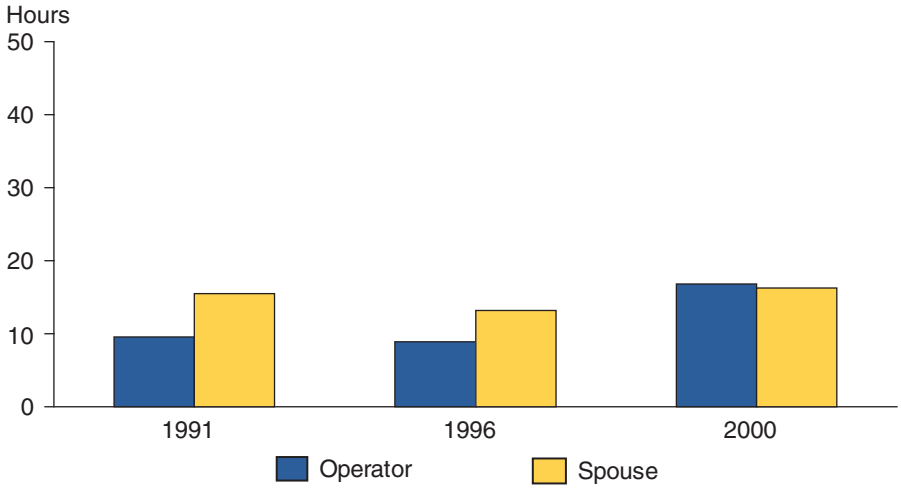
The modest labor response to decoupled payments reported by Dewbre and Mishra is consistent with similar findings in nonfarm labor markets. For example, the labor allocation model has been applied to labor supply decisions of lottery winners. Imbens et al. (2001) found that lottery winners who won an average of $80,000 per year (for 20 consecutive years) reduced their labor supply between 4.1 and 9.3 hours per week (from a base of 37.5 hours per week). However, small lottery winners, receiving annual payments of $15,000 or less, did not significantly alter their supply of labor. While the conditions in which PFC payments are given differ in important ways from lottery winnings, the example illustrates the relatively minor impacts on labor decisions to be expected from small, unconditional income transfers. Since lottery winners reduce work and increase leisure, while PFC recipients increase work on the farm, there are likely benefits of farm work or aspects of farm labor markets that differ from nonfarm.

- ***Work off the farm increased during the 1990s; still, coupled and decoupled payments helped reduce off-farm work hours***. ARMS data show a pronounced increase in off-farm work in the latter half of the 1990s (fig. 3-2). To augment this simple comparison of hours worked in different years, we describe estimates of a labor supply function that controls for dynamic variables that also may affect off-farm work hours, such as local labor conditions.

El-Osta et al. (2004), with an off-farm labor supply model using 2001 data, found that all payments combined—and PFC payments individually—had a negative impact on off-farm work. Ahearn et al. (2002) reached a similar conclusion using a model with operators who participated in government programs during 3 years in the 1990s. Ahearn et al. found no difference in the effect of payments on off-farm labor supply between 1991 and 1996 when coupled payments declined and PFC payments were introduced. Payments had a weaker negative effect on off-farm labor supply in 1999, when payments were a mixture of coupled and PFC payments. The smaller impact in 1999 was due to the significantly greater transfers in that year,

[18] Specifying the sample to be only those farms that received all three types of payments provided the most stringent statistical test. When the analysis was performed with a larger sample for farms that received any of the three categories of payments, the statistical significance of the relationships between payments and hours was even stronger.

Figure 3-2
Average off-farm hours worked per week by program participants



Note: For the operator and spouse, the 1991-96 change was not statistically significant; the 1996-2000 change was statistically significant.
Source: 1991 Farm Costs and Returns Survey; 1996 and 2000 Agricultural Resource Management Surveys.

rather than a difference in the impact of the different payment types. These analyses reinforce previous studies showing that coupled government payments decrease the likelihood of farm operators working off the farm (El-Osta and Ahearn, 1996; Mishra and Goodwin, 1997).

Given the consistency across studies, we conclude that the statistically significant increases in off-farm work of farm operators from 1996 to 2000 may have been even greater had payments not been so high. This conclusion holds for both coupled and decoupled payments.[19]

- ***Operators of large farms providing the bulk of output continue to work more than 40 hours per week on their farm.*** Of those farms that receive payments, more than 80 percent of production comes from the largest 30 percent of farms. Almost all of the operators of these farms are only employed on their farms. For example, in 2000, operators of the largest farms worked about 60 hours per week on their farms, and very little, on average, off their farms. This is consistent with the labor allocations of large farms in years prior to the 1996 Act.

Conclusions

The impact of decoupled payments—versus coupled payments—on farm labor and agricultural supply, compared to a scenario with no program payments, is much more complex than can be portrayed by the simple, shortrun models of labor allocation presented here. Still, we found that both decoupled and coupled payments help to decrease off-farm work hours. We also found that the introduction of lump-sum payments after the 1996 Farm Act seems to have encouraged farm households to devote slightly more hours to farm work.

The labor allocations of farm families are intertwined with their goals and decisions about managing farming operations now and into the future. If

[19] This is consistent with Dewbre and Mishra (2002) who found, for households that worked on and off farm, PFC payments did not affect their farm hours but did reduce the total hours they worked. That is, PFC payments likely induced farm households to work less off their farm in the late 1990s than they would have otherwise.

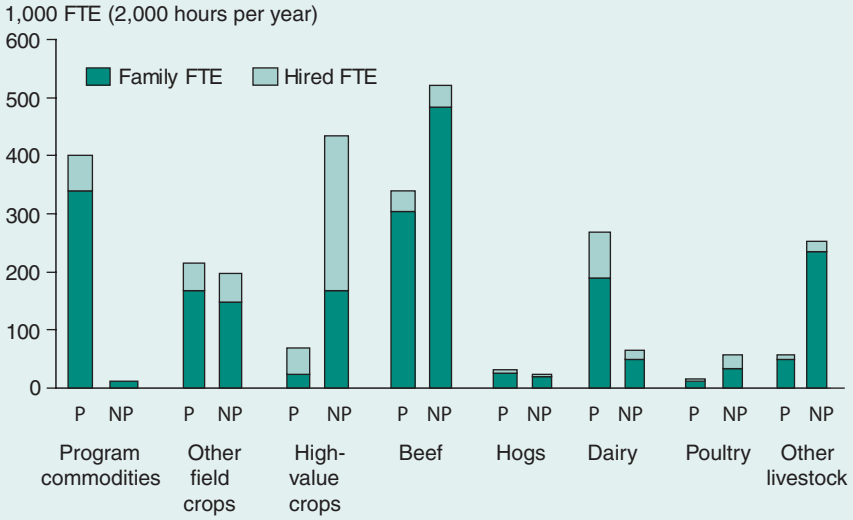
farm families adjust their work little or not at all in response to decoupled payments, it may be due to considerations such as expectations about future program eligibility. In addition, farm families may be limited in how they apportion their labor: farm work is highly seasonal and off-farm jobs are often inflexible in their time requirements. Life-cycle considerations influence labor choices, too. Perhaps most important, large commercial farms provide the bulk of U.S. output. The introduction of decoupled payments did little to alter the allocation of labor on these farms, where operators typically devote 60 hours per week (full-time) to farm work.

What is the impact on overall farm production? The potential effects of labor shifts on supply depend in part on the amount of labor used in production, and this varies across farm sectors (see box, "Family and Hired Labor on Farms Receiving Government Payments"). Also, if decoupled payments led to changes in hours worked by farm households, hired labor could adjust to maintain production levels—if rural labor markets are functioning well. Other material inputs may also substitute for labor, offsetting any impacts on production levels from changes in household work hours. Production effects, therefore, can be expected to be proportionately smaller than any changes in labor inputs in response to coupled or decoupled payments.

Family and Hired Labor on Farms Receiving Government Payments

Farm operators and their families supply, in aggregate, about two-thirds of the labor hours worked on U.S. farms, but labor shares vary considerably by participation in government programs and commodity specialization.

Family and hired labor FTE by specialization and program participation, 2000



P = Payments NP = No Payments
Note: Farm specialization = commodity accounting for at least 50 percent of the farm's value of production.