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Abstract

Decoupled payments are lump-sum income transfers to farm operators that do not depend on current production, factor use, or commodity prices. Such payments are not currently constrained by global trade rules, but many countries argue that they distort production and trade and that their use should be limited. This report examines the U.S. experience with decoupled payments in its Production Flexibility Contracts program under the Federal Agriculture Improvement and Reform (FAIR) Act of 1996. The payments have improved the well-being of recipient farm households, enabling them to comfortably increase spending, savings, investments, and leisure but with minimal distortion of U.S. agricultural production and trade. However, farm operators may retain as little as 40 percent of program benefits due to higher land rents. While commercial farms received the largest share of decoupled payments, they rent in over two-thirds of their program acres, which suggests that a sizable portion of their program benefits may be passed through to nonfarming landowners.

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Editors

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Mitchell Morehart
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Terry Roe
Agapi Somwaru
Monte Vandeveer
Paul Westcott
C. Edwin Young

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Summary

Decoupled payments are lump-sum income transfers to farm operators that do not depend on current production, factor use, or commodity prices and for which eligibility is based on fixed, historical criteria. Such payments are not presently constrained by global trade rules, but many countries argue that they distort production and trade and that their use should be limited. Further constraints on domestic support, which includes decoupled payments, are being discussed in the Doha Development Agenda, the new multilateral round of trade negotiations.

This report examines the U.S. experience with decoupled payments in its Production Flexibility Contracts (PFC) program under the Federal Agriculture Improvement and Reform (FAIR) Act of 1996. PFCs were fixed, annual payments to farm operators based on qualified acres historically enrolled in commodity programs. The payments totaled about $36 billion from 1996 to 2002. Decoupled payments are being continued in the 2002 U.S. Farm Security and Rural Investment Act.

U.S. decoupled payments improved the well-being of participating households, enabling them to increase their consumption, savings, investment, and leisure, but with minimal distortion of U.S. agricultural production or trade. However, farm operators in aggregate may have retained as little as 40 percent of program benefits, with the remainder passed through to landowners. The low retention rate is due to rising rental costs on the large share of rented acres in the PFC program. While commercial farms received the largest share of decoupled payments, they rented in over two-thirds of their program acres and therefore had the highest potential rate of pass-through of program benefits to nonfarming landowners.

The potential for payments to lead to more investment in agriculture is a key concern of U.S. trade partners. This study finds that participating farm households exercise considerable choice in the allocation of their savings across their investment portfolios. Decoupled payments do not change the level or variability of market returns and therefore provide no incentives for additional farm investment. Although payments can alleviate credit constraints and reduce borrowing costs, allowing some farmers to increase farm investment, this report found no evidence at the aggregate level of increased onfarm investment stemming from decoupled payments.

The study includes a simulation of a permanent program of decoupled payments and finds that decoupled PFC payments would have a negligible impact on agricultural investment and production in the long run; however, household consumption and off-farm investment would increase. Payments increase land asset values by about 8 percent. If payments are assumed to be fully invested in agriculture, which could occur if all farmers are credit constrained or recipients' investment portfolios are limited to agriculture, the payments would increase aggregate onfarm investment by less than two-tenths of 1 percent and increase aggregate agricultural production by a maximum of one-tenth percent in the long run.

The analysis draws primarily on the most recent Agricultural Resource Management Survey (ARMS) data on households that received PFC payments to describe and analyze patterns of land ownership and rental, consumption, savings, investment, and onfarm and off-farm employment.

Decoupled Payments

Household Income Transfers in Contemporary U.S. Agriculture

Introduction

Domestic agricultural subsidies were brought under the discipline of global trade rules for the first time in the Uruguay Round of the General Agreement on Tariffs and Trade (GATT), which concluded in 1993. In order to reduce the spillover of domestic support onto world markets, GATT members agreed to limit expenditures on domestic agricultural subsidies, with some important exemptions (table 1). One is decoupled income support to producers. This support is defined in the Uruguay Round Agreement on Agriculture (URAA) as payments that are financed by the government (taxpayers) rather than by consumers, are not related to current production, factor use, or prices, and for which eligibility criteria are defined by a fixed, historical base period. (See box on URAA criteria for exemption of domestic support from expenditure limits.) The exemption of decoupled payments provides members of the World Trade Organization (WTO)—the successor organization to the GATT—with the flexibility to transfer income to their agricultural producers, but in a manner presumed to have minimal potential to distort production and trade.

Global agricultural trade negotiations resumed in March 2000 in Geneva. They have since been subsumed into the full round of trade negotiations launched in Qatar in November 2001 by the WTO. The new round, called the Doha Development Agenda, will continue the global agricultural policy reform process begun in the Uruguay Round. The negotiations are expected to address further constraints on domestic support and may include discussion of the criteria under which some policies should continue to be exempt from expenditure limits.

The United States adopted decoupled payments, called Production Flexibility Contracts (PFCs), in the Federal Agricultural Improvement and Reform (FAIR) Act of 1996. PFCs were considered to be a minimally distorting means to transfer income to U.S. agricultural producers. The United States will continue to use decoupled payments, now called "direct payments," in the 2002 Farm Security and Rural Investment (FSRI) Act. Decoupled payments are also used by Mexico, which introduced fixed, annual payments to eligible producers in its PROCAMPO program, initiated in 1993. Recent policy reforms in Japan and the proposed reforms in the European Union increase the market orientation of their farm sectors, although subsidies in these countries continue to be linked to current production or prices and are therefore not decoupled.

For decades, economists have proposed decoupling support to agriculture as a way to facilitate agricultural reform (Beard and Swinbank). Decoupled support is advocated because it does not distort relative prices and therefore does not attract additional resources into the sector. In addition, payments that do not fluctuate with production or prices avoid the production distortions arising when programs act like insurance policies against low prices (Hennessy).

However, many countries have taken the position that, based on the experience with the URAA, the implementation of a minimally distorting payment has proven to be impossible. There are many conditions under which lump-sum payments can lead to production impacts. This outcome depends on certain assumptions about farmer tolerance for risk, farmer expectations about future payments, and the efficiency of factor—land, labor, and capital—markets (e.g., Tielu and Roberts; European Commission; OECD). Some countries argue that these market conditions exist and lump-sum payments therefore increase aggregate production. Consequently, they argue for lump-sum payments to face similar expenditure limits as traditional, distorting, commodity-based farm subsidies.

This report examines the U.S. experience with decoupled payments in its PFC program during 1996-2002 from the perspective of trade policy. It asks whether the decoupled payments have distorted U.S. agricultural production and therefore trade. Using data on farm households that participated in the PFC program, we analyze the effects of decoupled payments by looking at how the payments increased the income and wealth of participants and change farm household consumption, saving, investment, and work. These decisions can result in changes in the supply of resources to agriculture and in aggregate agricultural production.

Table 1—Treatment of domestic agricultural support in the Uruguay Round Agreement on Agriculture

Category	General criteria	General examples of policies	Examples of U.S. programs
Exempt domestic support (green box)	Measures must be financed by the government rather than consumers and must not provide price support to producers Specific criteria are defined for general government services, public stockholding, domestic food aid, decoupled income support, and other programs	Direct payments to farmers that do not depend on current production decisions or prices; disaster assistance; and government programs on research, extension, and pest and disease control	Production Flexibility Contracts
Exempt direct payments under production-limiting programs (blue box)	Production-limiting programs must be based on fixed area or yields, or cover 85 percent or less of the base level of production or head of livestock	Direct payments to producers, linked to production of specific crops, but which impose offsetting limits on output	U.S. deficiency payments program with set-asides under 1990 farm legislation
Nonexempt support (amber box)	Market price support, nonexempt direct payments and any other subsidies not specifically exempted are subject to reduction commitments	Market price supports, and output and input subsidies	Marketing loan benefits, Market Loss Assistance payments (1998-2002)

Note: Exempt domestic support, exempt direct payments, and nonexempt support are the categories of support in the WTO Agreement on Agriculture and correspond to the popular names of green, blue, and amber boxes, respectively.
Source: Uruguay Round Agreement on Agriculture, WTO.

Rules From the Uruguay Round Agreement on Agriculture on the Exemption of Domestic Support From Expenditure Limits

The Uruguay Round Agreement on Agriculture specifies criteria that green-box domestic support must meet in order to be exempted from expenditure limits. These criteria address program design and implementation. Many types of domestic support are exempted in addition to decoupled payments, including extension services, pest and disease control, stock holding for domestic food security, domestic food aid, disaster relief, and environmental programs. All exempted domestic support must meet the same *general criteria*:

- Support must be provided through a publicly funded government program.
- The support may not have the effect of providing price support to producers.

Different *specific criteria* exist for each type of program exempted from domestic support limits, reflecting their broadly differing objectives. For example, environmental payments must require specific production methods or use of inputs related to well-defined environmental goals and may only compensate for additional costs of compliance, in addition to meeting the general criteria for exemption. For decoupled income support to be exempt, the following specific criteria must be met:

- Eligibility must be defined by some clearly defined criteria in a fixed base period.
- The amount of the payment must not be related to the type or volume of production, prices, or factor employment in any year after the base period.
- No production shall be required in order to receive the payment.

Source: Uruguay Round Agreement on Agriculture, Annex 2, WTO.

Decoupled Payments as Income Transfers: Conceptual Framework of the Study

This section presents the conceptual framework of the analysis, explaining how income transfer payments in general change household income, wealth, risk attitudes, and expectations, and lead to changes in household consumption, saving, investment, and work. We also describe our methodology for analyzing the impacts on households and U.S. agricultural production.

Decoupled Payments: Fundamentally Different From Coupled Payments

Decoupled payments are fundamentally different from the traditional, "coupled" commodity programs that have historically provided most income support to U.S. agricultural producers. Decoupled payments are fixed income transfers that do not subsidize production activities, inputs, or practices. They are "lump-sum" transfers because no production decision or change in market price can alter the size of the payment due to eligible producers. This program design effectively cuts the link between payments, production, and prices, and makes the payments a direct transfer of income to the farm household. In contrast, coupled subsidies directly affect production decisions by changing the prices received by the producer for commodities or the prices of inputs, either of which change the marginal returns from production. Price signals attract resources into subsidized sectors and lead to higher levels of production and lower world prices. Some types of coupled programs also impose supply controls, which raise commodity prices for consumers. (See box, "Increased Market Orientation of World Agriculture.")

Income Transfers and Income and Wealth Effects

Income transfers are not unique to agriculture. Many U.S. programs are designed to redistribute income and wealth to specific recipients. Most of these are targeted to household socioeconomic characteristics, such as poverty, unemployment, and old age. Research on social welfare programs has addressed several issues of relevance for the U.S. decoupled farm program. Foremost, it has focused attention on the ways that changes in income and wealth affect household consumption, savings, and work effort (Atkinson and Stiglitz; Myles; Danziger et al.).

Transfer payments are one component of household income, which can also include farm and nonfarm wages, interest and dividends, and gifts and bequests (fig. 1). Similar to other sources of income, a household makes decisions about the expenditure of its government benefit on consumption or savings, taking into account its tax liabilities. In general, these expenditure decisions can be understood within a lifetime planning framework, with households choosing to consume the payment now or to save and invest it to pay for future consumption. The consumption and savings tradeoff is influenced by the characteristics of the household such as age, its subjective preferences (such as risk attitudes), and the expected yield on investments.

A transfer payment immediately increases a household's ability to both consume and save. Market expectations about the size and the duration of future income transfers are reflected in the household's asset values, and consequently its wealth. Higher wealth also influences current consumption and savings. It increases the household's propensity to consume current income by reducing its need for savings to finance future consumption. Consumption includes both goods and leisure. Government transfer payments in effect make leisure, like other goods, more affordable. They increase the value of leisure relative to the marginal value of additional wage earnings and in theory lead to a reduction in hours worked.

A household's savings represent its plan to pay for consumption in the future. In the lifecycle framework, a household typically consumes a large share of its income in its early years, when income is still low. Households have a higher savings rate in midlife, when earnings typically peak (although the level of consumption can be highest in these years as well). The savings rate declines in later years when incomes fall and hours of work are reduced. In addition, when a household's income has high year-to-year variability, it has an incentive to accumulate precautionary savings for short-term consumption smoothing, allowing it to maintain some threshold consumption when income is low. A household typically allocates its savings across an investment asset portfolio, and its savings rate is sensitive to the expected (risk- and tax-adjusted) rate of return on its investments.

Changes in income and wealth can also change a household's tolerance for risk. Farmers' risk aversion is sometimes argued to affect production decisions, and wealth-induced increases in risk tolerance are argued to influence production levels, input use, or crop mix. Instead, from a household's perspective, changes in risk tolerance due to an income transfer are

Increased Market Orientation of World Agriculture

Many countries in addition to the United States have reformed their farm subsidies in an effort to increase the market orientation of their agricultural sectors. In recent years, countries have introduced a wide variety of domestic programs that have lessened the degree of producers' price insulation. Only subsidies that do not depend on current prices, factor use, or production can be considered fully decoupled from farm production decisions. Most countries have achieved a greater degree of market orientation but their subsidies still depend on either current price or current production.

Domestic subsidies are compared here according to their links or "coupling" to current prices or production. Subsidies fully decoupled from price are fixed payments made irrespective of market price conditions. Payments fully decoupled from price, such as EU compensatory payments, are still essentially coupled if current production is required in order to receive benefits. Japan has moved to partially de-link its support from current prices by basing subsidy levels on recent moving averages of market prices. Payments fully coupled to price, such as the U.S. counter-cyclical payments, insulate producers from price signals because payments increase when prices fall and vice versa. U.S. counter-cyclical payments are decoupled from current production, but most countries typically require some current production for households to receive price subsidies.

Some coupled programs allow planting flexibility—farmers can choose crop mixes and their program participation. Farmers' resource allocation therefore becomes, to some extent, a "tilling for benefits" decision. When fully coupled price subsidies are combined with rigid crop mix requirements, as in the 1990 Act deficiency payments, there is no room at all for market price signals or program benefits to allocate resources. U.S. farmers' base production had to be planted to the same crop for which they had base acres, or farmers would forego benefits. The "normal flex acres" (15 percent of base) in the 1990 Act were not eligible for deficiency payments, but loan benefits remained available if the acres were planted in a program crop. The "optional flex acres" (an additional 10 percent of base) in the 1990 Act also allowed farmers to plant any crop. Deficiency payments were foregone if this acreage was switched to an alternative crop, although producers did not lose this acreage from their base.

"Decoupling" can be defined in terms of the actual impact of the program on production levels or the way a subsidy program is implemented. Implementation rules offer a neutral way to compare farm programs, and they are the basis for WTO criteria on exemption from expenditure limits. Actual production impacts can vary by country for reasons that are not related to program design but are instead related to local market conditions. Market conditions can cause even fully decoupled payments to have supply impacts, but these conditions are outside the control of policymakers. In Mexico, for instance, the PROCAMPO payments have significantly affected agricultural investment because they have enabled credit-constrained farmers to invest onfarm (Sadoulet, de Janvry, and Davis). Although this increased investment can lead to production impacts, Mexico notifies the payments as "green box" compliant to the WTO because of the program's implementation rules.

The description of programs' links to production and prices in the table is based on a stylized representation of complex programs. Programs often have multiple components with different links to production or prices. For example, components of U.S. 1990 Act deficiency payments had different eligibility rules, and only some appear in the table.

Increased market orientation of domestic support: Subsidies' links to current prices and production

	Links to production			
Links to prices	Full planting flexibility, including idling	Full planting flexibility, excluding idling	Planting flexibility within program crops	Limited or no planting flexibility
Payment not linked to current price	U.S. PFC and U.S. 2002 Act direct payments	Mexican PROCAMPO	EU compensatory and set-aside payments, Japan payments for mountain and hilly areas, Japan area payments for other crops grown on riceland and for manufactured milk	
Payment linked to recent trends in market price			Japan income stabilization programs, Japan vegetable and milk price stabilization programs	
Payment linked to current price	U.S. counter-cyclicals, U.S. Market Loss Assistance	Canadian NISA	EU intervention prices, U.S marketing loan benefits, Japan deficiency payment for beef calves, soybeans, and hogs	U.S. 1990 Act deficiency payments—optional flex and nonflex acres

likely to affect all of its decisions about consumption, savings, and work effort, and its allocation of savings across its investment portfolio, not just its decisions about farm production.

The income and wealth effects of transfer payments on households can lead to second-round effects when payments redistribute income among households with different preferences. These preferences can influence the level and composition of aggregate demand and supply, savings, and investment and the rate of economic growth. Farm payments, for example, increase the savings of a population with a propensity to invest on farm compared with most taxpayers. Also, changes in farmers' liquidity may ease conditions under which credit is supplied to the sector. In addition, distortion to the general economy can result from the taxation required to finance the income transfer and to the costs of program administration.[1]

Despite the similarities between decoupled farm subsidies and some of the major U.S. income transfer programs, the programs also differ in important ways. PFCs target current farm operators instead of general socioeconomic characteristics and so by design have a link to a production sector of the economy. PFCs also transfer financial resources to households that on average have incomes that are comparable to those of the general population, and they increase the net worth of those households. In 2001, the average income of households receiving PFC payments was $59,620, slightly higher than the average U.S. household income of $58,208 (DeNavas-Walt and Cleveland). Farm households, despite having similar incomes, have much greater wealth (Mishra et al.). The net worth of participant farm households averaged $660,450 in 1999, compared with $282,500 for all U.S. households in 1998—or less than half that of farm households receiving PFCs (Kennickell et al., 2000).

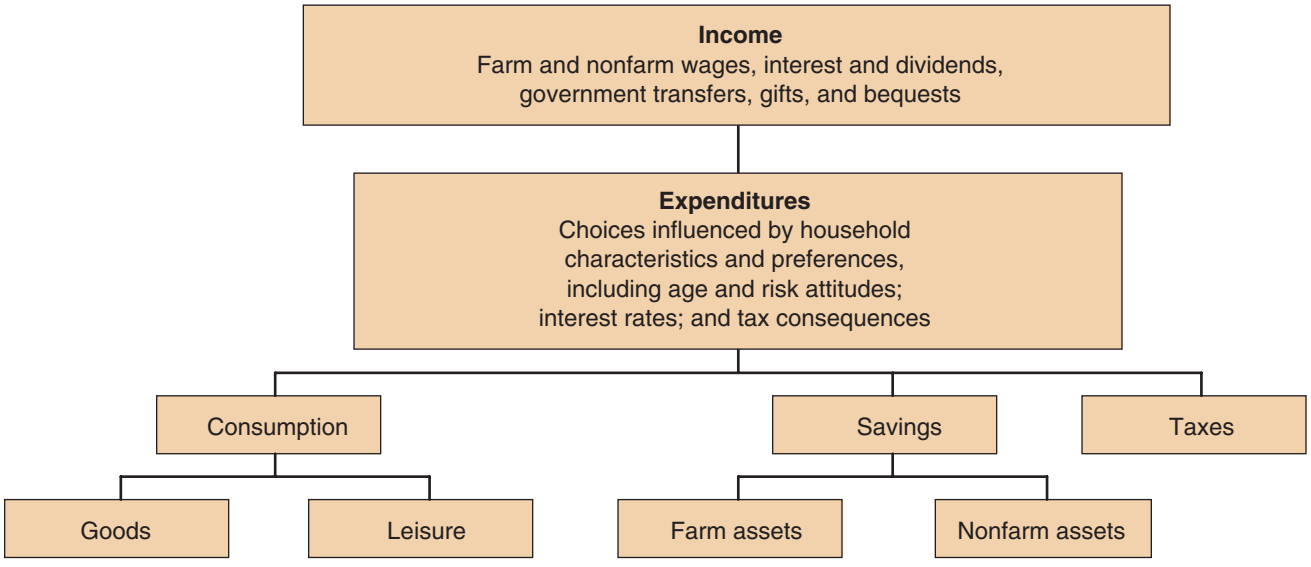
Decoupled subsidies also differ from many other U.S. income transfer programs because eligibility for PFC payments is transferable. Payments are linked to the operation of base acres, and payment rights can be acquired through buying or renting base acreage. Participants in base-acre purchase and rental markets are in effect bidding on expected benefits from the payments associated with that acreage, and changes in the asset value of base acres are reflected in the wealth of participants.

Market Distortions

Some of the arguments made about the production effects of decoupled payments are based on the existence of "market failures," which are inefficiencies, rigidities, or incomplete information in capital, insurance, and labor markets in agriculture. Market failures make it more likely that a farm household receiving

[1]For a recent perspective on the optimal taxation problem and farm subsidies, see Moschini and Sckokai's analysis of the taxation problem for small and large open economies. Coady and Harris analyzed the welfare costs associated with funding Mexico's PROGRESA cash transfer program.

Figure 1
The flow of household income and expenditures



lump sums will allocate the additional liquidity to its farm business rather than allocate the payments across all economic activities.

One distortion, for example, occurs when credit-constrained farmers lack access to capital at competitive rates and conditions, perhaps because banks have insufficient information about the actual credit risk posed by an individual. This can leave some producers unable to invest in profitable farm production activities. Increased access to capital from decoupled payments might allow such farmers to increase farm investment and expand agricultural production (Sadoulet et al.; Rude). Likewise, rural labor market rigidities may influence how a recipient household allocates its labor and leisure as its income and wealth increase (Vercammen). For example, if work schedules in onfarm or off-farm jobs are rigid, farm households wanting to cut total labor hours may find it feasible to do so only by eliminating one job entirely rather than reducing hours worked.

Although not addressed in this report, taxes related to income, capital gains, social security, and bequests can also affect production by influencing household response to the income transfer. In the United States, Federal income, self-employment, and estate and gift taxes are the most important taxes affecting farmers (Durst and Monke). Historically, U.S. tax policies provided incentives for farmers' investment in depreciable capital. Reforms in 1986 significantly reduced these incentives by lengthening the depreciation periods and eliminating investment tax credits, but the Taxpayer Relief Act of 1997 again increased incentives to invest in farm capital. The 2001 tax reform gradually reduces Federal income taxes over a 10-year period and suspends the estate tax. While the 2001 reform was not specifically aimed at farmers, they will benefit from one or more of its provisions (Monke and Durst).

These market imperfections may be correlated with the scale of farming operations. In addition to domestic concerns about farm structure—the role of large and small farms in agriculture—economies of scale could also affect the efficiency of the sector. If all farms or only small farms are affected by credit constraints, decoupled payments may have no effect on structure. But if only large farms are credit constrained, then payments may give them the necessary liquidity to achieve further consolidation. Whether payments have allowed recipients to achieve scale economies is not known.

Methodology

We analyze the effects of decoupled payments on agricultural production and trade by looking at ways that the payments can provide an incentive to increase farm production. Production is affected when the payments that increase the income and wealth of participants change farm households' consumption, saving, investment, and hours worked. These household decisions can change the resources supplied to agriculture and lead to changes in aggregate agricultural production and trade.

Knowledge about U.S. farm households has been substantially increased by Farm Costs and Returns Surveys (FCRS) and, since 1996, by the annual Farm Business and Farm Operator Household Data survey, a component of the Agricultural Resource Management Survey (ARMS). ARMS is USDA's primary vehicle for data collection on a broad range of issues about agricultural resource use and costs, farm financial conditions, and the characteristics of farm operators and their households. ARMS captures the diversity in U.S. farm households, and includes both program participant and nonparticipant farms. (See box, "Diversity in U.S. Agriculture.") Many of the survey questions asked of farm households change annually. Therefore, the survey results described in this report are frequently identified as being based on a specific year of ARMS data.

This report synthesizes the findings of three analytical approaches. First, we analyze ARMS data to describe recipients' characteristics and financial situations, including patterns of land ownership and rental, consumption, saving, investments, and onfarm and off-farm labor force participation. These parameters are then used to describe the household allocation of income such as decoupled payments, and the distribution of PFC benefits. Second, we use cross-section data from ARMS to empirically estimate the impacts of decoupled payments on farm households' on- and off-farm labor supply and leisure hours.

Third, to estimate the impact of the decoupled payments on agricultural production, we simulate the program using a dynamic, intertemporal computable general equilibrium (CGE) model.[2] This type of economywide model provides a consistent framework that integrates U.S. farm household decisions on consumption, savings, and investment, with agricultural production. The model also incorporates one of the "distorted market" scenarios, that of farm households restricted to investing only in

[2]See appendix for a description of the model.

agriculture, and compares the impact of decoupled payments on production relative to when households allocate savings across diversified investment portfolios.

Our approach has some data and methodological limitations. Foremost, our descriptive analysis assumes that farm households allocate their decoupled payments in the same way they allocate their total income. But their overall propensity to consume is likely an average of different propensities to consume from various income sources (Thaler). These other sources may include wages and retained business earnings from farm and nonfarm businesses, pensions, interest, as well as government payments. Carriker et al. find that farm families have higher propensities to consume from their relatively predictable government payments and off-farm incomes than from their more volatile farm income, presumably because the former reduce the need for precautionary savings. In addition, households' allocation of an additional dollar of income, or their marginal propensities to save, invest, and work, may differ from their overall average allocation of income and hours.

ARMS data provide a rich cross-section survey of the farm sector, including program participation data. Panel surveys, by tracking households over time, can show more directly (compared with cross-section surveys such as ARMS) how individuals adjust to economic shocks, including policy shocks. However, cross-section data have important advantages over panel data. First, cross-section data can be used to show the largely stable lifecycle patterns of consumption, income, and wealth as described in this report. Second, cross-section surveys such as ARMS excel at presenting a balanced representation of contemporary agriculture, while panel surveys must take special care to remain balanced as their survey population declines. Third, no panel currently matches ARMS for breadth and depth of farm business and farm household detail.

Finally, the CGE simulation provides a stylized analysis of the impacts of the PFC payments. In particular, there is a single aggregate agricultural sector in the model.

Diversity in U.S. Agriculture (Participant and Nonparticipant Farms)

Participation in government programs is not universal within the U.S. agricultural sector because not all farms have historically produced feed grains, wheat, rice, or cotton. In fact, in 2001, only about 21 percent of the 2.1 million U.S. farms operated acreage either currently or formerly devoted to these crops. U.S. farms differ widely in what they produce, their size, technologies, resources, and business arrangements. One way to show this diversity is by looking at three classes of farms (see table).

Commercial farms are those farms with more than $250,000 in annual sales. These farms made up about 10 percent of all U.S. farms in 2001, but 72 percent of the total agricultural output because their farms tend to be larger, with an average of 750 acres harvested. Household incomes are greatest for this group, averaging $130,887. Intermediate farms have sales of less than $250,000 but are operated by someone for whom farming is the main occupation. This group made up 31 percent of all farms and 22 percent of the agricultural output in 2001, harvesting 189 acres on average. Household incomes, at $40,272, were less than a third of households with commercial farms. The remaining 59 percent of "rural-residence" farms are smaller, harvesting an average of only 33 acres of cropland in 2001. Incomes of rural-residence farms averaged $69,423.

Characteristics of farm diversity

Farm class	Share of all farms	Share of production	Average household income from all sources	Average acres in production	Share of farm type that received PFC payments	Average PFC payment
	----------*Percent*----------		*Dollars*	*Number*	*Percent*	*Dollars*
Commercial	10	72	130,887	750	45	25,957
Intermediate	31	22	40,272	189	34	6,713
Rural-residence	59	6	69,423	33	11	2,259
Total	100	100	64,465	149	21	9,176

Note: PFC payment averaged only over participant farms.
Source: ARMS, 2001.

Implementation of the U.S. Production Flexibility Contract Program

In this section, we describe the goals and operation of the U.S. PFC program. We also discuss some of the implications of its program design for the creation of wealth and the distribution of payment benefits within and outside the agricultural sector.

Program Goals

Decoupled payments were introduced in the United States with the 1996 FAIR Act. The payments, called Production Flexibility Contract payments, were fixed, annual lump-sum installments totaling about $36 billion over 1996-2002. PFCs have also been called Agricultural Market Transition Assistance (AMTA) payments. PFC payments accounted for an average of 9 percent of net farm income over 1996-2001.

The decoupling of U.S. farm support was complementary to the market liberalization principles developed in the Uruguay Round, but the motivation for the FAIR Act was due almost entirely to domestic considerations (Young and Westcott; Orden et al.; Tweeten and Zulauf). These included the large Federal budget deficit, a growing dissatisfaction with the restrictive program rules linked to supply management (completing a trend since 1985 toward increased planting flexibility), and producer demands for more flexibility to respond to world market conditions. In addition, favorable commodity market conditions in 1996 helped to reduce farmers' opposition to the planned reduction in government payments in the FAIR Act.

Implementation of the decoupled program was relatively straightforward. Operators of base acres were given predetermined lump-sum payments. Base acres were fields previously enrolled in supply management programs for wheat, rice, corn, barley, oats, sorghum, and cotton. Payment amounts varied according to field-specific historical crop production and per acre yields.

The contracts allowed almost full planting flexibility, but some restrictions were placed on land use. Most important, the land could not be put to a nonagricultural use, such as a residential or industrial use. However, the land could be fallowed, converted from cropland to pasture or forest, or planted to any crop (except for fruits and vegetables unless it was used that way in the past). Participants also had to comply with conservation and wetland provisions. Payments were made directly to operators of program acres, including tenants, not to landowners.

In the case of share-crop tenancy arrangements, payments were split between tenants and landowners on the basis of the tenancy agreement. Program eligibility was transferable with the sale or lease of base acres.

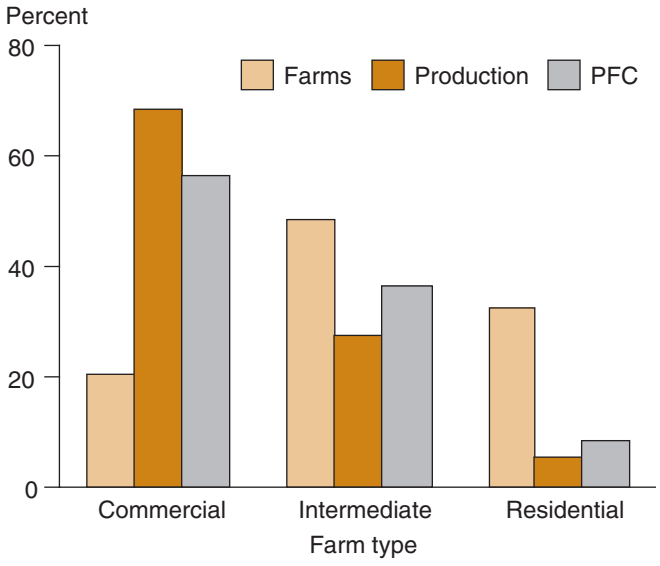
Nearly all eligible producers signed up their qualified acreage, with over 211 million acres, or 99 percent of eligible acreage, enrolled in the program. Eligible acreage was about half of the total 434 million cropped acres at the time.

By design, the lump-sum amount given to producers was not related to current production. However, because the lump sum was based on past production levels, there was a strong correlation between farm size and payment levels (fig. 2). For example, the largest farms (classified as "commercial" farms in the USDA farm typology, with over $250,000 in sales) made up only 20 percent of all recipients, but due to large acreage, they received over half the payments in 2001. At the other end of the spectrum, "residential farms" make up about a third of the recipients but because of their small acreage, they received only 8 percent of the payments. Intermediate farms, on the other hand, were more proportionately represented, making up 48 percent of the recipients and receiving 36 percent of the payments.

In 1996 and 1997, decoupled PFC payments made up nearly all the direct government support to producers (some operators received conservation payments and

Figure 2

Commercial farms are fewer but account for over half of PFC payments and two-thirds of production on recipient farms in 2001



Source: ARMS, 2001.

payments for minor commodities). Over the life of the FAIR Act, however, the decline in world commodity prices led to increased use of marketing loans which compensate producers for low prices, and the provision of additional, ad hoc government support to agriculture. These reduced the role of decoupled payments and resulted in subsidies linked to current commodity prices and/or production levels having a larger share in total payments to agriculture (fig. 3).

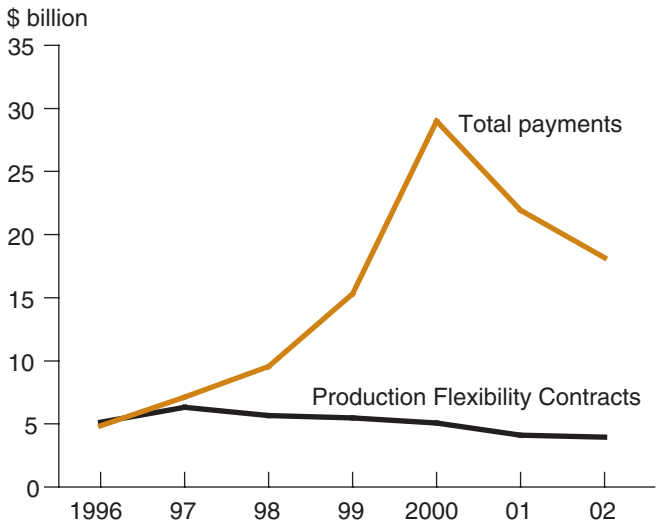
Decoupled Payments Continued in the 2002 FSRI Act

In the 2002 FSRI Act, decoupled subsidies, now called "direct payments" will total about $5 billion annually, including the addition of oilseeds and peanuts to the program. Other payments to farmers will include counter-cyclical payments and marketing loan benefits. For direct payments, the FSRI allows farmers to elect to update their acres from the 1981-85 planting history used in the FAIR Act to a more recent (1998-2001) planting history or keep their existing bases. Yields associated with direct payments are kept unchanged, except for oilseeds and peanuts.

Market for Base Acres and Decoupled Payments

Land markets have a unique role in determining the value and distribution of decoupled payments within U.S. agriculture because, by design, payments are made to operators of base acres enrolled in the program. Land prices reflect expectations about current and future returns from agricultural production, government payments (including future government payments), and the value of land in alternative uses (for example, residential or commercial use). Land rental prices reflect only the expected returns over the rental period, and in the case of farmland, this will include its value in agricultural production plus the value of government payments. Land rents also reflect transaction costs for landlords and tenants incurred in negotiating leases.

Figure 3
PFC payments account for one-third of payments to farmers over the FAIR Act



Source: *Agricultural Outlook,* Nov. 2002.

Both coupled and decoupled subsidies are capitalized into land values and rents, but the pathways are different. A coupled subsidy, such as a per unit commodity price support, motivates commodity production in order to qualify for and to maximize benefits. The subsidy augments market returns from the sale of a commodity, which in turn increases returns to the labor, capital, and land employed in its production. In the short run, labor and capital can be attracted into the sector by the increase in wages or capital returns. In contrast, land is in comparatively limited supply and is difficult to substitute for, so its price is bid up the most. Land therefore typically captures much of the benefit of a production subsidy, although returns to all inputs to production are likely to increase somewhat. At the same time, expanded production may lead to falling market prices and to rising costs of intermediate inputs. Lower commodity prices benefit consumers, although they increase subsidy costs for taxpayers in a market price support program. Increased intermediate input prices tend to reduce the net value of the subsidy to producers.

Unlike coupled subsidies, decoupled payments are predetermined lump-sum payments. Since they do not change commodity or input prices or require current production, they do not create incentives to alter production to acquire or maximize the subsidy. They consequently do not interfere with how markets determine prices and do not affect variable input costs or market returns to farm land, labor, or capital. Buyers and renters can acquire the right to the fixed, known stream of decoupled payments simply by owning or renting program acres. In theory, the payments can be almost fully capitalized into land values, adjusting for administrative costs of the program and the buyer's subjective discount rate on future benefits. Note, however, that land capitalization of decoupled payments means that tenant-operators may not benefit from the payments (see box, "Payment Eligibility: Alternatives to Base Acres").

Some contend that land capitalization reduces the competitiveness of U.S. producers by inflating the cost of land for new entrants and others renting or buying. However, their receipt of the payments compensates

for higher land costs. Renters and new buyers who receive PFCs are largely no worse off than if the programs did not exist at all, as long as their subsidy expectations continue to be met.

Land Rentals Reduce Benefits of Decoupled Payments for U.S. Farm Operators

About 60 percent of the acreage enrolled in the PFC program was rented in 1996. This rental rate was significantly higher than rental rates for all farmland (42 percent), which includes base acres as well as other cropland, wetlands, woodlands, and range land. Land rental arrangements can extend over several years or be as short as a single crop year, so that rents are presumably more reflective of short-term expectations about commodity prices and government payments than the sale price of land.

Tenants who operate rented base acres can lose the benefit of decoupled payments if landowners raise the rent or alter the terms of the share rental agreement. This potential pass-through of program benefits to landlords can dilute the payments' benefits to producers. The active rental market in program acres suggests that a sizable portion of PFC payments may have been passed through to nonoperator landowners. Between 1998 and 2001, the price of renting cropland rose despite an overall decline in commodity prices and overall receipts from crop sales.[3] Over the 1996-2001 period, the cost of buying cropland also increased (fig. 4). An explanation for the increased costs of renting or owning cropland, despite declining market returns, is that renters and buyers are bidding for rights to government payments. In competitive land markets, the value of the known stream of future decoupled payments can be fully captured by those who own base acres.

The cropland rental and value statistics may actually understate the relative rate of increase in base acre rents because they are based on all cropland, including land that was not receiving government payments.

Perfect pass-through of program benefits means that 100 percent of the payment is passed through to landowners through increased rental rates. Assuming perfect pass-through, the share of acres that is rented is therefore the same as the share of the total PFC program expenditure that is passed through to landlords. If pass-through of rents has been perfect, tenants may have passed through to landlords up to 60 percent, or $3.084 billion of the $5.1 billion spent on PFCs in 1996 (table 2).

All sizes of farms rent in some base acres, but pass-through is potentially greatest on commercial farms, which receive most of the payments. Large farms rent up to two-thirds of the base acreage that they operate, and therefore may pass through a larger share of their payments to landlords than smaller farms. In fact, if pass-through is perfect, commercial farms (with sales greater than $250,000) may ultimately receive the same level of payment benefit as smaller farms.

[3]National-level cash rent estimates go back only to 1998, so they are not shown in figure 4. Cash rents rose during 1996-2001 in many States, including the Corn Belt States of Ohio, Indiana, Illinois, Iowa, and Missouri (USDA, NASS, "Agricultural Cash Rents, 2001, Summary").

Payment Eligibility: Alternatives to Base Acres

A payment that avoids being bid into the price of land may be desirable to some, but all payments involve some tradeoff between maintaining their linkage to farming and being divorced from production decisions. Eligibility for decoupled payments could be attached to inputs or characteristics other than land. For example, as an alternative to base acres, a stipend could be paid to individuals who operated farms in some fixed base period. Allowing these producers to move into other occupations, including retirement, if it would benefit them economically would be important for minimizing production distortions because it would allow them the flexibility to maximize their returns. Without this mobility, the payments would be coupled. The payments would be fully capitalized if the rights to the stipend were transferable.

In 1996, Mexico considered transforming its PROCAMPO payments, an annual income transfer paid to farmers, into a fully transferable, long-term bond in response to a rural credit crisis. Mexican farmers could sell the PROCAMPO bond in financial markets for cash or use it to provide collateral for loans. The program was not implemented, partly because of concern about the political viability of the program in the long term. If the transfer of bond ownership were allowed, PROCAMPO benefits might have become payable to nonfarmer bond holders, weakening the rationale of the payments as a farm support program. The European Commission is considering a program similar to the Mexican bond proposal (Swinbank and Tangermann; Kelch, Hasha, and Normile).

Land Values and Expectations

Some argue that expectations can effectively "couple" income transfers to current production decisions by creating expectations about future benefits. It is useful to distinguish between expectations about changes in the level of support and expectations about changes in the rules of eligibility.

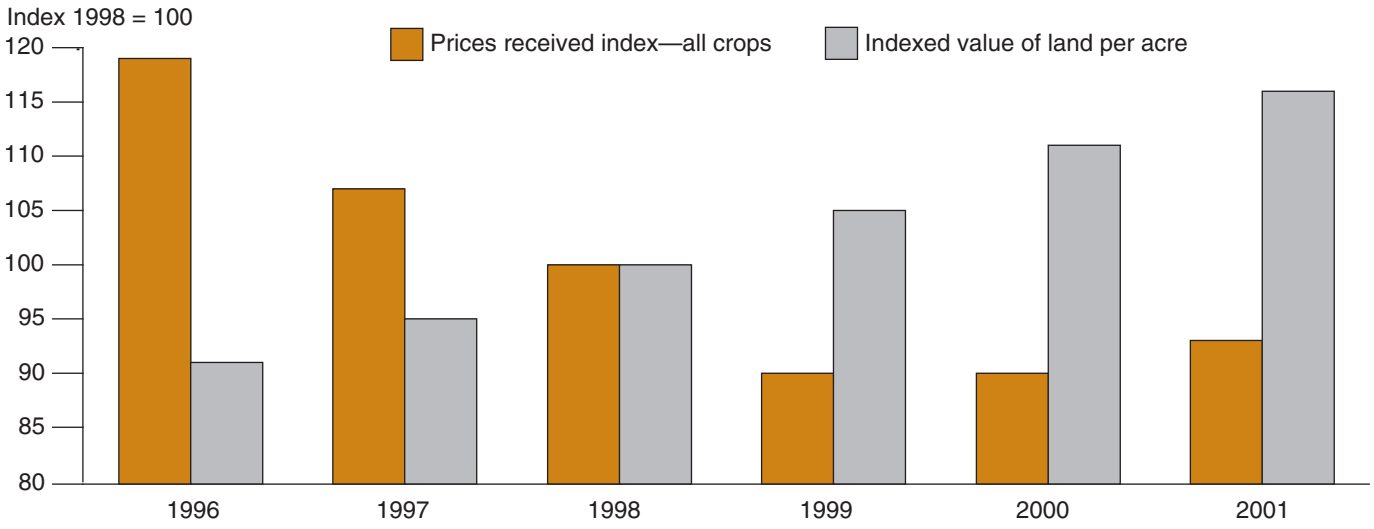
Expectations of changes in payment rates or levels will change expected wealth in a lump-sum fashion. The current price of land reflects anticipated changes in payment levels and therefore in the value of land assets and the wealth level of current owners. These expectations will then affect primarily household consumption, savings, and work decisions.

Expectations about changes in the terms of payment eligibility can distort current production. For example, beliefs that future payments will depend on a constant crop mix create incentives to keep current base acres in production of program crops rather than to take advantage of the planting flexibility allowed by the program. It should be noted, however, that farmers who took advantage of planting flexibility in the 1996 FAIR Act were not subject to any loss of their base acres in the 2002 FSRI update. More likely are expectations that lead farmers to expand current acreage in program crops beyond their existing base acres in order to "build base" in anticipation of future base updating opportunities.

Expectations about program benefits are no doubt a factor in farm production decisions, but it would be difficult

Figure 4

Crop prices trended down and flattened over 1996-2001, but the cost of buying cropland went up over the same period



Source: USDA, *Agricultural Statistics*, 2001.

Table 2—Potential pass-through of PFCs from tenants to landlords: Largest farms may pass through most of their program benefits to landlords

Farm size/ value of production	PFC payments received, 1996	Share of operated base acres that are owned, 1996	PFC payments retained	PFC payments passed through
	$ Million	*--------Percent--------*	*----------$ Million----------*	
$9,999 or less	30	80	24	6
$10,000-$49,999	314	62	195	119
$50,000-$99,999	373	55	205	168
$100,000-$249,999	1,379	42	580	799
$250,000-$499,999	1,699	33	562	1,137
$500,000-$999,999	683	37	251	433
$1,000,000 or more	622	32	200	423
All farms	5,100	41	2,016	3,084

Note: Aggregate retention and pass-through data differ slightly from the aggregate rental rate due to different payment rates by class of farm.
Source: ARMS, 1996.

to determine whether these effects are significant or even measurable, and they are likely smaller than farmers' expectations about market prices. Also, base building benefits are arguably more heavily discounted without consistent and predictable regulations for annual base updating. As with the 1996 Act, annual updates are not allowed in the 2002 Act, and base acreage and yield selections are one-time occurrences. Furthermore, the large share of rented acres in program base acres would require coordination between tenants seeking to maximize their current market returns and landlords seeking to maximize program benefits, and would presumably be reflected in lower rents to tenants.

Who Owns U.S. Farmland?

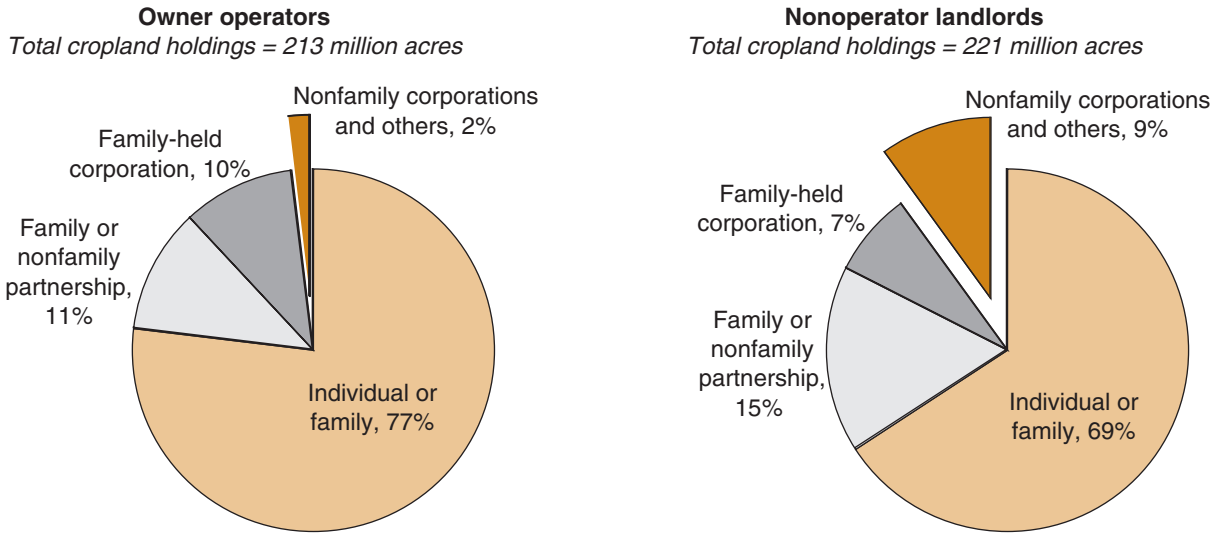
Since the ultimate beneficiaries of decoupled government payments are likely those who own base acres rather than those who rent them, there is a natural interest in knowing more about who these owners are. Those who rent out land include active farmers who choose to rent out to another active farmer. To be considered an active farmer, the farming operation must generate, or have the potential to generate, sales (not including rental income) of at least $1,000 per year. Owners can also be "nonoperator landlords" who take neither a management interest in the operation of the land they own nor derive any income from any other farming operation.

Our knowledge about ownership of base acres is incomplete because many landowners are not operators and therefore are not included in USDA surveys. ARMS data identify ownership and rental of base acres only for active farmers. The 1999 AELOS, or Agricultural Economics and Land Ownership Survey (USDA, NASS), is an exception because it identifies characteristics of both active-farmer and nonoperator landlords, but does not distinguish their land ownership according to its status in farm programs. Accordingly, our discussion of landowner characteristics is drawn from AELOS, and therefore relates to aggregate U.S. cropland, rather than program acres.

According to AELOS, 35 percent of rented acres are rented from one active farmer to another, while farmers rent the other 65 percent from nonfarming landlords. AELOS data on nonoperator landlords' residency show that many have links to the farm sector, in that they are retired farmers, widowed spouses, or heirs. Nonfarming landlords are usually local, with 85 percent living within 50 miles of the land they are renting out, and 29 percent living on the farm itself. Moreover, the average age of nonoperator landlords is 63 years, 10 years older than the average age of operators. These descriptive data suggest that cropland rental arrangements are serving the needs of both tenants (often large farms) wishing to increase the acreage they control and landlords (often older farmers themselves or other local individuals or families) who prefer to rent out cropland than farm it themselves.

A variety of ownership arrangements exists for land rented out to active farmers. Individuals or some type of family organization (either joint ownership, partnership, or corporation) own most rented farmland. Nonfamily partnerships, corporations, or some other type of organization own a small share of rented farmland (fig. 5).

Figure 5
Most landowners (both owner operators and nonoperators) are sole proprietor individuals or families



Source: AELOS, 1999, tables 76 and 78.

Effects of Decoupled Payments on Household Consumption, Savings, and Investment

Participating Farm Households Have Low Rates of Consumption Out of Income

Households allocate their income to consumption, savings, and taxes. Consumption includes household spending on food and household supplies, rent and mortgage, nonfarm transportation, and medical expenses. ARMS data for 2001 show that, on average, farm households receiving decoupled payments had relatively low consumption expenditure shares, consuming less and likely saving more out of their income than do nonfarm households. PFC participants consumed $26,884 out of pre-tax household income of nearly $59,620. In comparison, all U.S. consumer units[4] consumed $39,518 out of pre-tax incomes of $47,507 (Bureau of Labor Statistics).

ARMS data on the consumption and income of participating farm households also show the important effect of the life cycle on household consumption decisions (fig. 6). On average, farmers of all ages are net savers. Older and younger households consume more of their income, while middle-aged households (in their peak earning years) consume a smaller share. Note that the lifecycle framework does not predict identical consumption levels across all ages; rather, it predicts differences in the share of income consumed versus saved.

[4]The "consumer unit" is based on the BLS definition of financial dependency within a household and therefore absolute consumption and income is not comparable to the household consumption and income estimates from the U.S. Census Bureau and USDA. Rather, compare the shares of income allocated toward consumption.

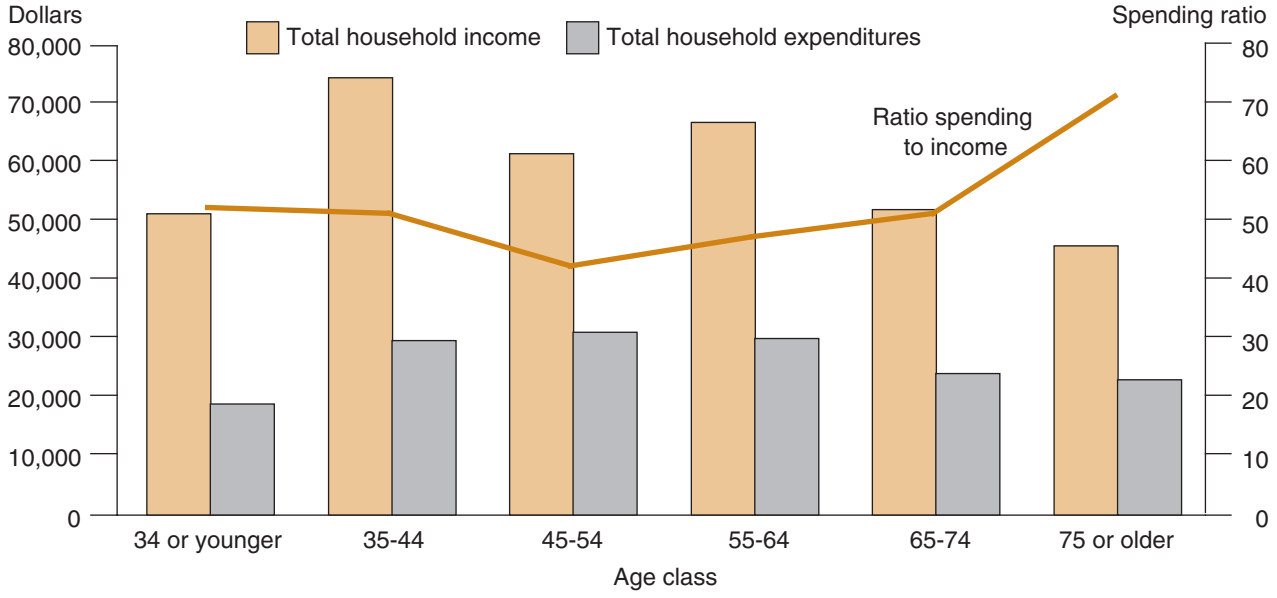
Decoupled Payments Increase Household Consumption Expenditures

In theory, income transfers can be expected to increase spending by making consumption more affordable. They raise lifetime income and reduce the rate of saving required to pay for future consumption, especially if the payments are perceived to be permanent.

Consistent with theory, ARMS data show that across most of the farm household income distribution, farm households that received PFCs in 2001 consumed more than nonparticipating farm households of similar income levels (fig. 7).[5] Among the lowest income farm households, recipients' median consumption expenditure (regionally adjusted to reflect cost-of-living differences) exceeded nonrecipients' by about $2,500. Differences tended to be greatest in the middle of the income distribution. There was no difference in spending at the highest income quintile, presumably because the payments

[5]This increase in consumption expenditure shown by ARMS is also consistent with the views expressed by farm managers in a panel convened by Johnston and Schertz in 1997. The managers reported that payments were being used for a variety of purposes, but there were no indications that recipients were saving them to offset periods of low income or for a possible end to subsidies in 2003.

Figure 6
Household life cycle influences participants' spending habits



Source: ARMS, 2001.

had proportionately smaller impacts on household income and wealth.

Consumption expenditure patterns across income levels also suggest that decoupled payments may substitute for precautionary saving for farm households. While some spending can be expected to adjust as income varies, a certain level of household spending would be maintained to preserve continuity in accustomed living standards, perhaps by drawing down precautionary savings or borrowing. The gap in spending between participants and nonparticipants in most income quintiles may include use of the payments to sustain consumption levels during temporary downswings in income.

Farm Households Invest On- and Off-Farm

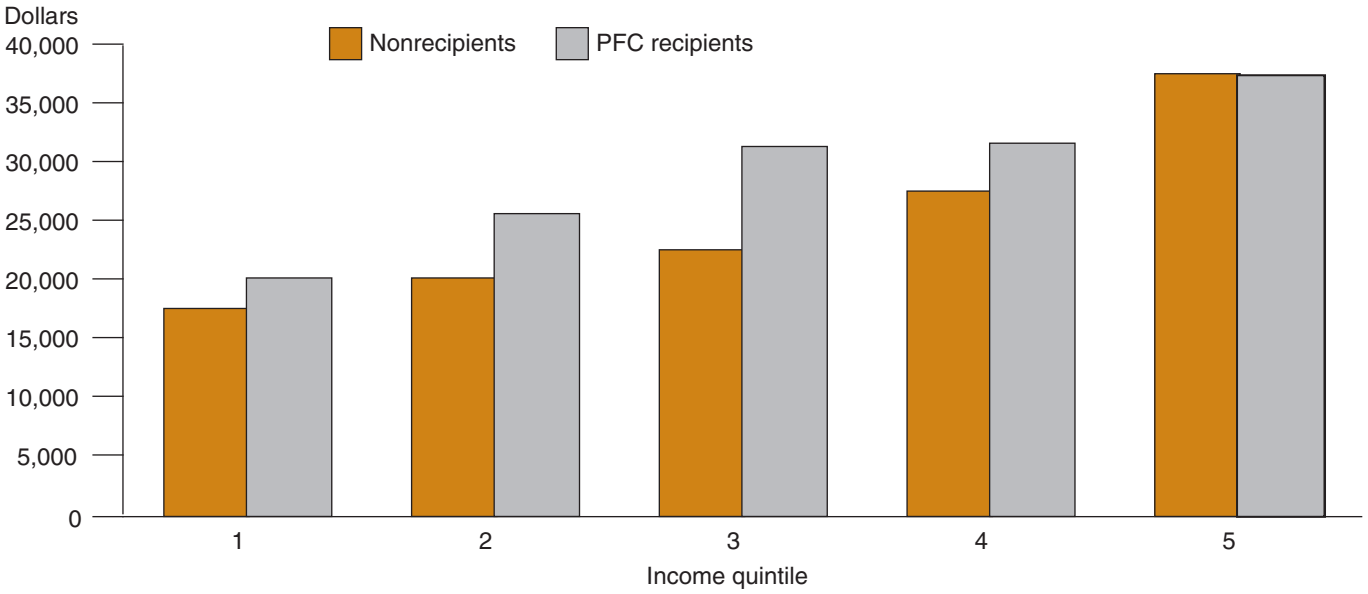
Farmer decisions to save a portion of their decoupled payment can increase the supply of investment capital to the farm business. However, the decision of how much to save out of income is closely tied to the decision on where to invest savings.

Households allocate their savings to investment asset portfolios that consist of one or more assets. Portfolio diversification is a means for a household to maximize the total expected returns on its investments by balancing the risk and expected return that characterize each asset. Farmers, like other investors, can be expected to follow an economic criterion of equalizing risk and tax-adjusted rates of return across investments. An asset offering a higher rate of return, adjusted for risk and taxes, than that earned by the existing asset portfolio presents an opportunity to increase overall profits by reallocating investments across the portfolio until all assets have the same return.

ARMS asset portfolio data for 1999 show that farm households receiving PFCs exercise considerable choice in investing their savings. Participating households had an average asset portfolio of $768,710, while total debt averaged $108,679. (The difference is the average net worth of farm households, equal to $660,031.) Most (about 70 percent) of the portfolio consisted of farm assets, including land (the largest asset on average), buildings, machinery, and inventories (fig. 8). Nonfarm assets include the dwelling in which the producer's family lives. Participants' asset portfolios also have a significant (and growing) presence of nonfarm assets that include stocks and bonds, retirement assets, and liquid assets such as savings accounts and certificates of deposit. Nonfarm assets made up an average of about 30 percent of recipient households' investment portfolios in 1999.

PFC recipients' farm operations account for a large share of their existing stock of investment, but surveys indicate that farm households' investment choice at the margin, with any additional funds saved, would differ

Figure 7
Across most of the income distribution, participants had higher spending than nonparticipants



Note: Quintiles are constructed by dividing total income (farm and nonfarm) of all U.S. farm households into five equal-sized groups, with quintile 1 containing the lowest income households and quintile 5 containing the highest income households.
Source: ARMS, 2001.

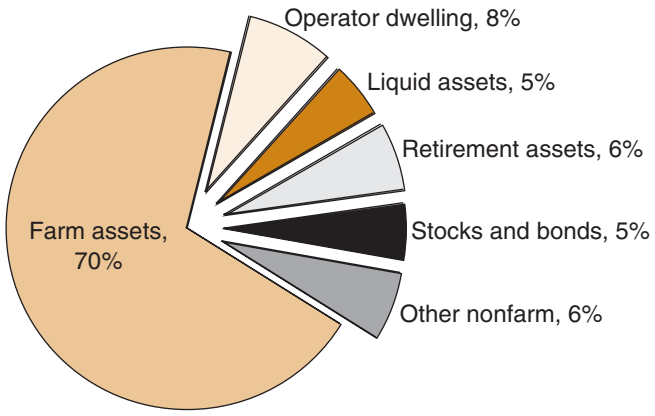
from current portfolio shares. The 1988 FCRS asked U.S. farm households how they would spend a one-time $25,000 windfall. At that time, farm households would have willingly allocated more savings out of additional income to off-farm investments. Farmers reported that 55 percent of the $25,000 would have been saved, with most of the amount going to investments that were not part of the farm operation.

There are reasons to expect that farm households may be unlikely to allocate PFCs toward additional investments to their farm business. Foremost, decoupled payments do not increase prices or market returns on investment in farming so do not increase demand for farm investment. It is also likely that in the case of a household's onfarm assets, the rate of return on its investment is sensitive to the quantity invested, and the scope for profitable new investments may be limited. In contrast, nonfarm investment markets, particularly financial markets, are much larger and households are less likely to be concerned that additional allocations to nonfarm investments will diminish marginal returns.

How Decoupled Payments Can Increase Onfarm Investment

Because a decoupled payment does not directly change the price of agricultural commodities, it does not change the rate of return earned by agricultural assets or labor. Thus, it provides no price incentives for a reallocation of existing investment. Beneficiaries that desire to invest a portion of their payments can allocate it to the portfolio asset that best meets their economic objectives, drawing on the full range of onfarm and off-farm investment opportunities that exist for PFC recipients.

Figure 8
Farm households with PFCs allocate savings across an investment portfolio



Note: Average assets = $768,710.
Source: ARMS, 1999.

In some cases, producers may have objectives that extend beyond equalizing rates of return across a portfolio. Producers receiving PFC payments may invest in additional capital for their farm operations not because the investment will bring a high return but because it will allow them to offset a portion of current income, an option allowable with some restrictions under the U.S. tax code. Producers in this case are following the portfolio rule as above but are now equalizing the after-tax rate of return to assets. Payment recipients may also choose to pursue unprofitable farming practices, at least in the short term, because the additional cash flow allows them to ignore market price signals. These producers may derive some nonpecuniary return from farming, have unwarranted and optimistic price expectations, or their investments outside the existing portfolio may carry high transaction costs.

Farm investment can also increase if the supply of credit increases. Lenders may perceive recipients as being more credit worthy as a result of PFCs because the payments increase collateral values for land owners and increase repayment capacity, reducing lenders' exposure to risk of loan defaults. This could lead financial institutions to lend capital at a lower interest rate or alternatively to lend more capital than otherwise at the existing interest rate. Note, however, that household credit supply for consumer purchases would also increase.

So far, our discussion of investment portfolios has described how producers react to efficient capital markets. However, capital markets may have imperfections, such as incomplete information of lenders about borrowers, causing some producers to be credit constrained. At the prevailing interest rate, farmers are unable to take advantage of profitable farm investment opportunities. Under these conditions, PFC payments enable increased onfarm investment.

No Evidence of Aggregate Investment Effects in U.S. Agriculture

As a practical matter, it is difficult to measure the above effects of PFC payments on recipients' farm investment because many of the investment demand and supply effects we describe occur simultaneously. We can, however, compare the farm and nonfarm portfolios of PFC recipients with those of farm households not receiving a PFC payment. This allows us to determine whether the scenarios where lump-sum payments would lead to increased agricultural investment appear to be reflected in aggregate behavior. The rationale for controlling for program participation status is not because the groups are similar to each other—there are

basic differences in farms producing program crops versus other farms—but because the capital market conditions in which these farms operate are similar. If capital market imperfections exist and are significant, then it would be expected that PFC participant farm households would be unlikely to hold nonfarm assets in their portfolios. However, figure 9 shows that the nonfarm assets held by participating and nonparticipating farm households are similar.

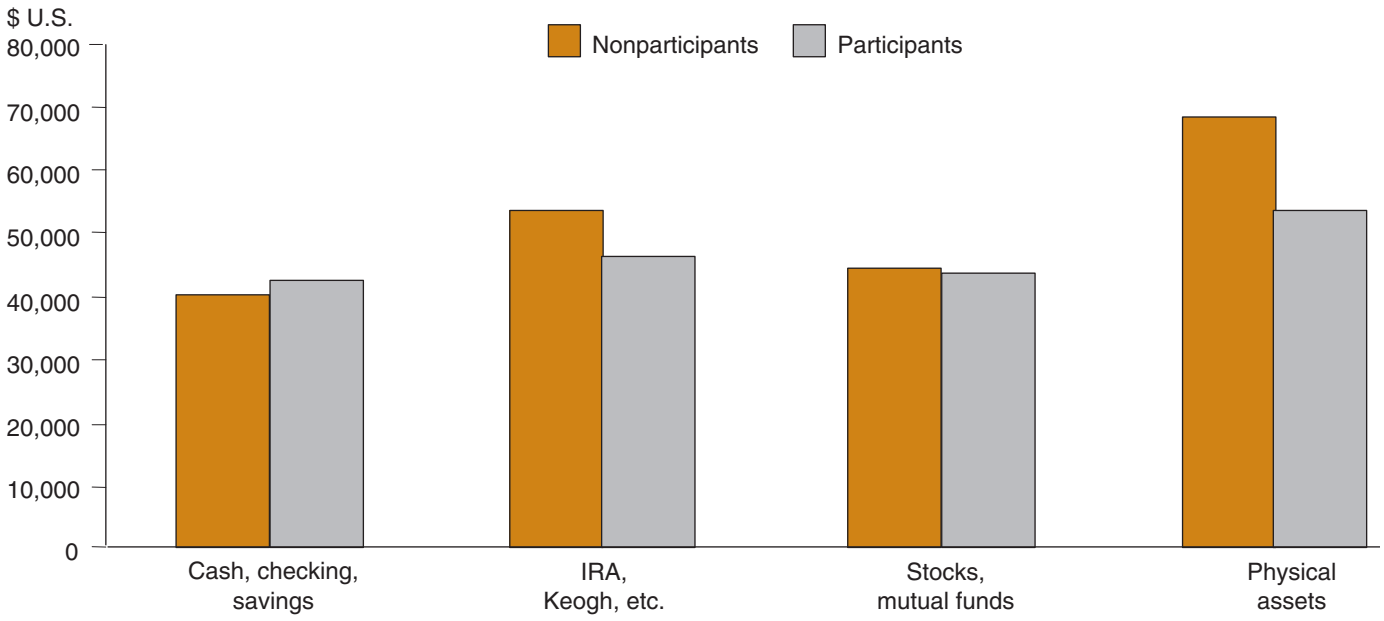
Another way to test for credit constraints among program participants is to compare investment in farm equipment per acre across high- and low-cost participating farm operations. Costs of production can be expected to correlate with the presence of credit constraints since lenders consider production costs in their lending decisions. If credit constraints are significant, it would be expected that high-cost operations might have been forced over time to invest less in machinery and equipment compared with low-cost operations. ARMS data show no significant differences in capital stocks among high- and low-cost operations receiving PFC payments (fig. 10). Investment in machinery and equipment per acre of land farmed was virtually the same for low-cost operations ($146) as it was for high-cost operations ($149), and their land values were also comparable.

In addition, if there were credit constraints, decoupled payments would allow program participants to replace machinery and equipment more often than nonparticipants. Although the composition of physical assets was different for program participants versus nonparticipants and participants' per acre stock of investment in machinery and equipment was higher ($144 versus $106), the rate of replacement as indicated by the ratio of new purchases to existing stock was similar, 11 percent. Replacement rates can influence production because newer equipment tends to embody technological changes that enhance productivity. Because replacement rates were similar, the PFC payments did not appear to stimulate added investment in machinery and equipment.

The U.S. farm sector is composed of farms with different debt loads and debt-carrying capacity. Some are likely to be credit-constrained farms so that at least some proportion of U.S. producers will respond to PFCs by increasing their farm investments. However, ARMS data show that most participating U.S. farms are likely to be financially stable and therefore an inability to take on more debt does not seem to be a concern in aggregate. In 2001, about 60 percent held debt that represented less than 40 percent of their debt repayment capacity, while only about one-fifth of farms carried debt representing 80 percent or more of their capacity (fig. 11). Because this measure excludes nonfarm sources of income or assets, it is likely a low estimate of debt capacity since the calculation includes only cash-flow from the farm business.

Figure 9

The portfolio of nonfarm assets is similar between commodity program participants and nonparticipants



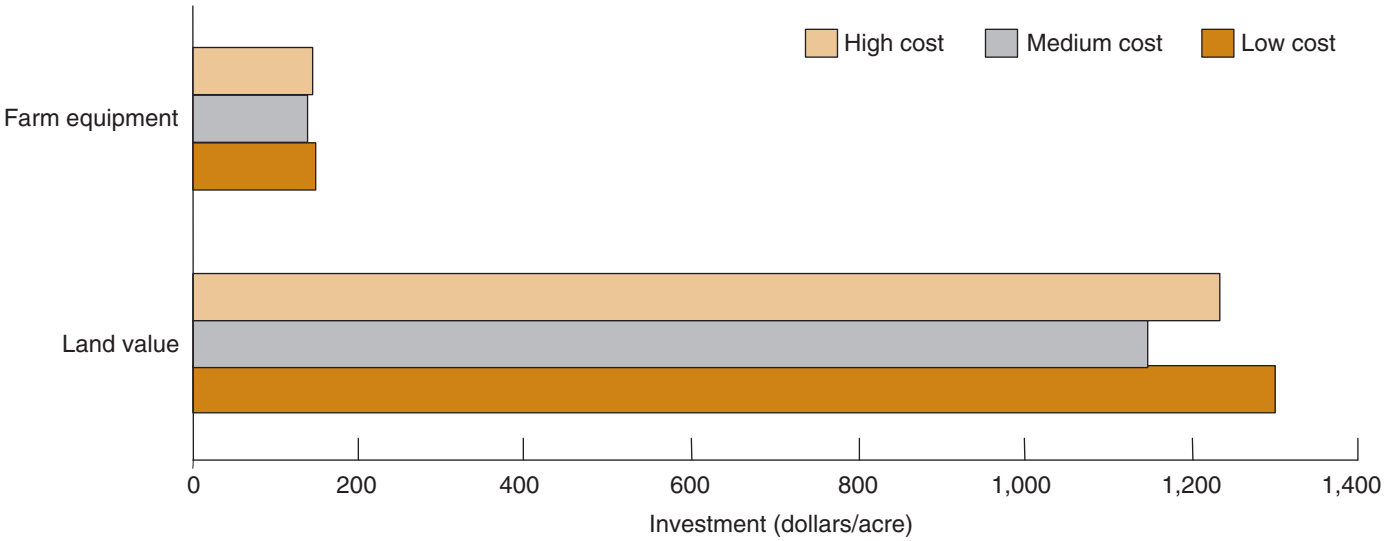
Source: ARMS, 1999.

Decoupled Payments, Credit Constraints, and Farm Structure

The effects of government payments on the structure of U.S. agriculture—the number of small or family farms relative to large, commercial farms—has been part of the public debate over farm subsidies. The effect of decoupled payments in preserving smaller farms cannot be predicted on the basis of economic theory. On the one hand, payments could provide high-cost producers with the liquidity they need to remain in operation. This would slow consolidation since about two-thirds of PFC-recipient farms in the United States are high- or medium-cost intermediate or rural residence farms. On the other hand, the payments could provide low-cost

Figure 10

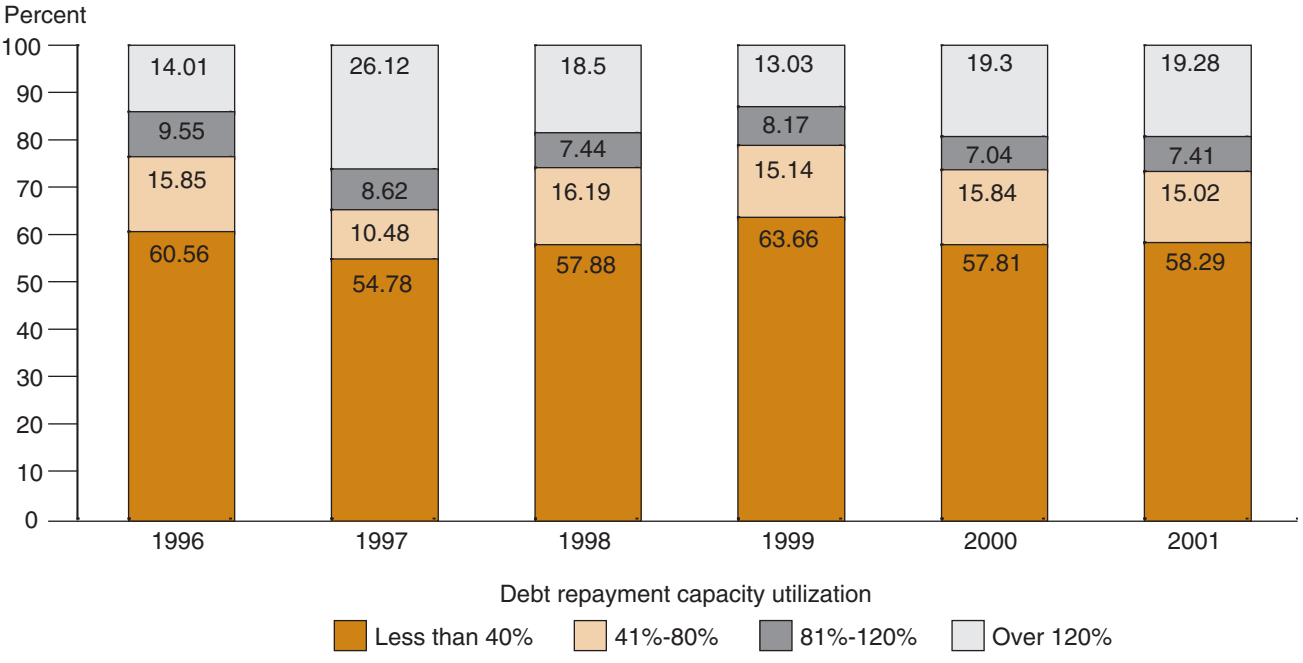
Among participants, there is no evidence of capital constraint (investment per acre) related to cost of production



Source: ARMS, 1999.

Figure 11

Distribution of PFC recipient farms by debt repayment capacity utilization



Source: ARMS, 1996-2001.

producers with the liquidity to buy out high-cost producers and, at the same time, maximize the value of the land assets that high-cost producers offer for sale. Large, commercial farms tend to be low- to medium-cost producers, and these farms account for about two-thirds of production (table 3).

Recent data on U.S. farm structure show no distinctive changes in farm sizes associated with the introduction of decoupled payments (Hoppe and Korb). The trend toward larger farm sizes, most evident in livestock enterprises that typically receive very limited payments, has been continuous since 1935. The largest increase in sales between 1982 and 1997 occurred in very large farms with sales of $1-$5 million. These farms are mostly associated with production of crops such as horticulture. Farms specializing in cash grain production account for only 10 percent of all farms in this sales class. Additionally, the share of farms operating more than 500 acres increased in the past 10 years, but this has been the case since the 1940s, with no evident break since the introduction of decoupled payments.

Risk Attitudes Influence Investment Decisions

Risk is a fundamental component of agricultural business. There are many sources of risk, including price and yield risk, risks associated with changes in government policy, and personal injury or health risks. The 1996 ARMS indicates that risk in general is a concern for most producers, although marked differences exist in producer perceptions of the primary sources of risk for their business. Producers of program crops, including wheat, corn, soybeans, tobacco, and cotton, are concerned more about yield and price variability than other categories of risk, while producers of vegetables, greenhouse crops, cattle, and poultry are most concerned about changes in laws and regulations. Across all farms, producers are most concerned about changes in laws and regulations (institutional risk), variability in crop yields or livestock output (production risk), and uncertainty in commodity prices (Harwood et al.).

The debate on decoupled payments has focused on the potential for the increase in income and wealth of participants to increase the level of risk they are willing to assume, which might result in higher levels of agricultural production. Various case studies that measured farmers' attitudes toward risk in specific enterprises have generally found that farmers are risk averse and that risk tolerance increases as their wealth increases (Chavas and Holt, 1990, 1996; Saha et al.; Pope and Just). Using relationships between wealth and acreage planted estimated by Chavas and Holt (1990), Westcott and Young report that increased wealth from decoupled PFC payments may have increased total agricultural land use in the United States by 225,000-725,000 acres (less than 0.3 percent annually).

Despite the prominence of risk aversion in the debate on decoupled payments, the link between changes in risk tolerance and production is not yet well understood. ARMS data on participating farms shows that many producers use market mechanisms, such as forward contracts and hedging, to directly manage their risk exposure, suggesting that risk aversion is not solely addressed directly through production decisions. In fact, ARMS data show that use of these market mechanisms increases with the level of wealth, which seems to further weaken the link between the decoupled payment and production via risk. Furthermore, the diversification observed in the investment portfolios held by participating farms suggest that changes in risk attitudes can be expected to be evidenced throughout their portfolios, as holdings are readjusted to maintain equalized, risk-adjusted rates of return. Much more needs to be learned about the relationship between wealth and risk attitudes and the household's risk management strategies before we can draw firm conclusions about the risk effect of decoupled payments on production.

Table 3—Distribution of PFC-participating farms by cost level

Cost level	Commercial		Intermediate		Rural-residence	
	Population	Production	Population	Production	Population	Production
	Percent					
High cost	2	3	18	5	20	2
Medium cost	9	24	21	13	8	2
Low cost	9	42	9	9	4	1

Note: Population and production shares each sum to 100 across farm types and cost.
Source: ARMS, 2001.

Decoupled Payments and Farm Labor

Farm labor market effects have not been as prominent as investment and risk effects in the public debate over agricultural income transfers; however, they also contribute to understanding whether PFC payments affect production. Increased income and wealth increase a household's ability to "consume" leisure and reduce work hours, working against the objectives of some income transfer programs if they discourage labor force participation.[6] Changes in the labor and leisure choices of farm households due to decoupled payments can potentially reduce farm labor supply and aggregate farm output, an outcome that would tend to support world commodity prices. On the other hand, farmers are sometimes perceived to be pursuing a vocation or a lifestyle choice, and it might be argued that it would be unlikely for them to change their onfarm hours as their wealth increases. They may even increase onfarm work if it were considered to have leisure attributes.

Decoupled Payments and Recipients' Farm Labor Supply

One-third of farm households receiving PFC payments work entirely on farm, but most participating households work in varying amounts both on- and off-farm (fig. 12).

[6]Leisure is a difficult concept to measure. Nonwork hours are often aggregated into a single category called "leisure" that in fact typically includes many activities that are not purely recreational, such as self-maintenance and, particularly for women, household chores and childcare. Some labor economists use instead the terms "nonmarket activities" or "nonmarket time."

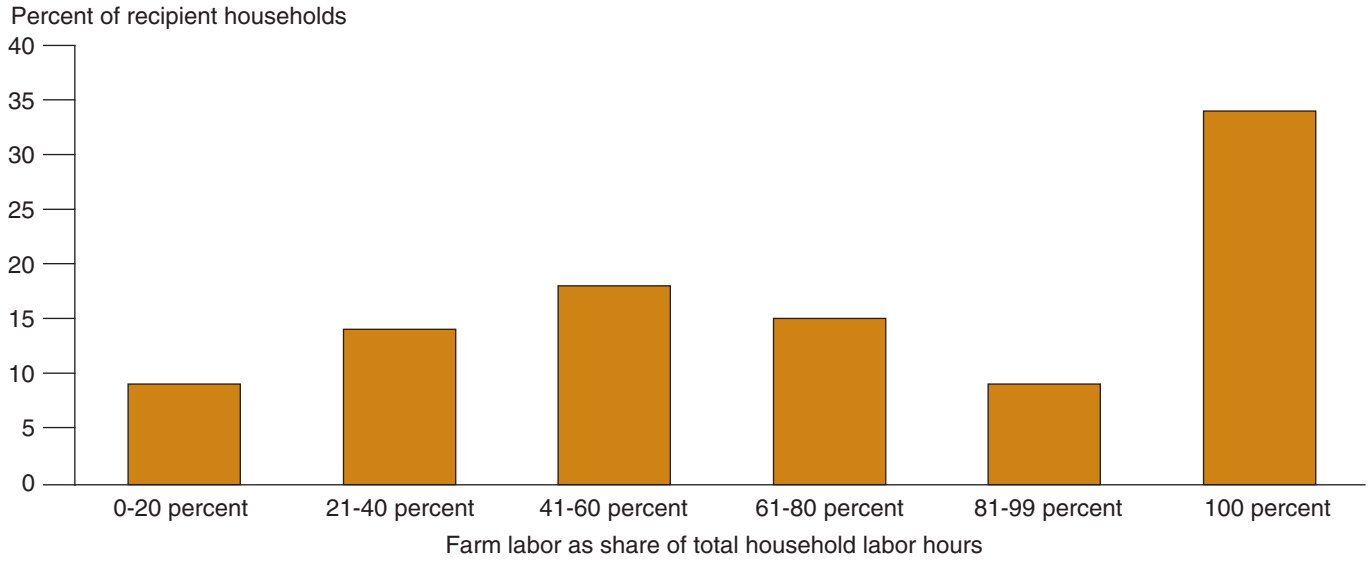
Any adjustments in their leisure hours will reflect attempts to optimally allocate total labor hours across the two job markets.[7] This is a "tripartite" household labor supply decision—the allocation of hours among leisure and onfarm and off-farm work. Any increase in hours of leisure by an operator or spouse leads to compensating changes in hours worked in onfarm and/or off-farm work.

As decoupled payments increase household income and hours of leisure, hours worked might be expected to decline onfarm and off-farm. However, it is easy to imagine circumstances that would lead all adjustments to occur in just one of the household's jobs. For example, off-farm labor could be "lumpy" in that it may be difficult to make small adjustments in work hours, perhaps due to seasonality or eligibility for benefits. However, analysis of ARMS data on participants' household labor supply shows wide variation in the share of hours worked per week off-farm, suggesting that off-farm employment is flexible enough to allow for changes in response to an increase in leisure hours due to an income transfer (Ahearn, El-Osta, and Dewbre). Likewise, onfarm work hours might be inflexible, resulting in all adjustment to increased leisure occurring in off-farm work.

Analysis of the leisure and work choices of participating U.S. farmers during 1998-2000, excluding those on

[7]See Findeis for a theoretical treatment of farm households that are linked to off-farm labor markets, in which she shows that an income transfer reduces total work time.

Figure 12
PFC recipient households show diversity in share of total hours worked on farm



Source: ARMS, 2001.

retirement or lifestyle farms, shows that an increase in farm household incomes from decoupled payments was associated with greater use of leisure time (Dewbre and Mishra). Operators and their spouses whose only job was agricultural production reduced their annual agricultural labor by 1.4 hours per $1,000 of PFC payments, while those who worked off-farm as well reduced their agricultural labor by 1 hour per $1,000 of PFC payments (table 4). Because the average PFC payment was about $9,000, the labor market effects found in the Dewbre and Mishra study are extremely small. Furthermore, the substitution of capital for labor in production may also occur and further minimize the negative production impact.

The Life Cycle in Farm Labor and Ownership

Certain caveats apply to the labor market analysis just described. Foremost is that these aggregate farm labor supply effects are composed of differential responses by households with different age structures. U.S. farm households receiving decoupled payments exhibit a strong life-cycle pattern in their hours of work onfarm and their pattern of land ownership. Hours worked per year increase from early adulthood, peaking in early middle age, and declining after the age of 45 (fig. 13). Similar to spending and savings behavior, a household's position in its life cycle is a significant determinant of its labor supply response to changes in income. Other things being equal, the wealth effect on demand for leisure is greater for older workers than for younger workers who face a longer time horizon over which to provide for lifetime consumption out of their current earnings and wealth.

Table 4—Changes in onfarm work due to PFC payments

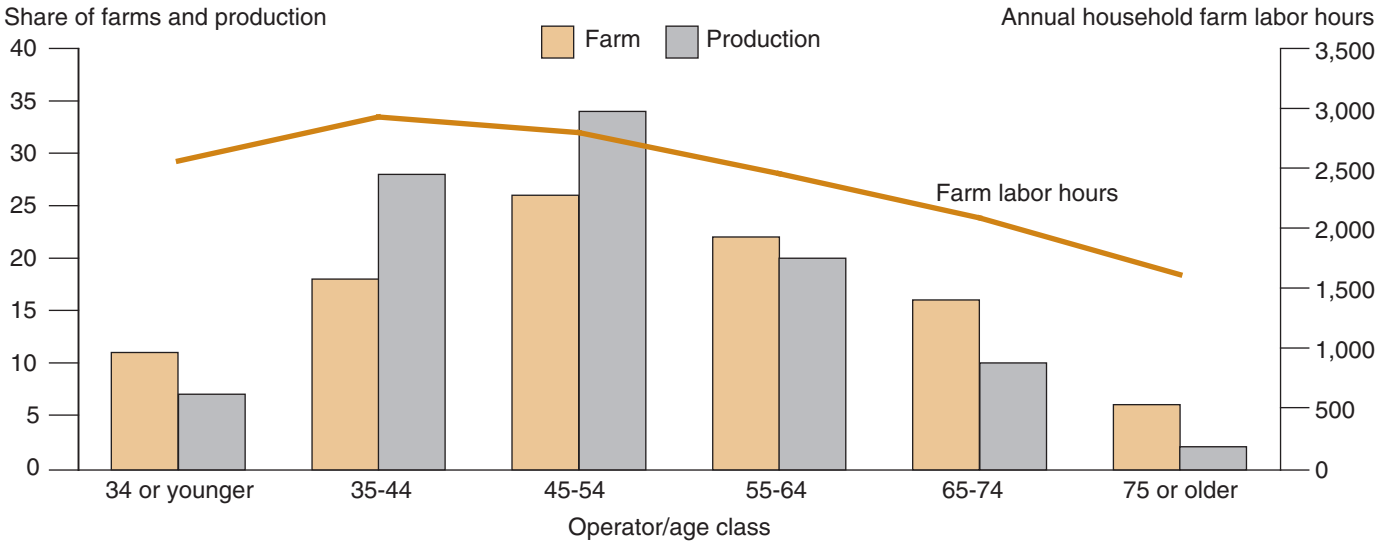
Off-farm work status	Change in onfarm work hours per $1,000 PFC
	Hours
No off-farm work	
Operator	-0.5
Spouse	-.9
Some off-farm work	
Operator	-.4
Spouse	-.6

Source: Dewbre and Mishra, 2002.

In 2001, 43 percent of U.S. farmers receiving decoupled payments were age 55 or older compared with only 8 percent under age 35. Both life cycle considerations and tax treatment create incentives for older recipients to reduce their active involvement in agriculture and increase their leisure. Landowners can capture the full value of decoupled payments either by remaining active operators or by increasing rental rates on the acreage they rent out. Because earned income is taxed more heavily than passive income, and in some cases may reduce benefits from social security, PFCs create incentives for older landowners to reduce their active role in farming (Novak and Duffy).

ARMS data show that, as aging farmers exit active farming, they often rent their land to younger producers. This

Figure 13
The rise and fall of PFC participants' onfarm labor hours, population share, and production over the life cycle



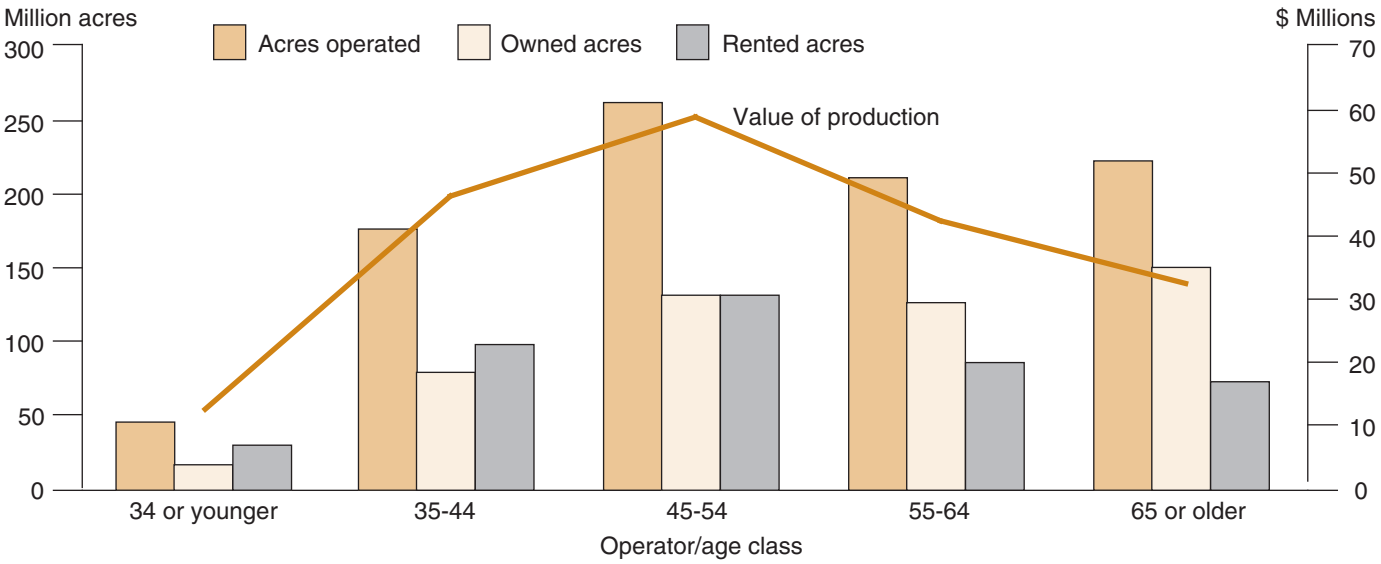
Source: ARMS, 2001.

contributes to the divergent age structure of U.S. land ownership relative to production. The life-cycle pattern evident in figure 14 shows that land rental tracks production more closely than does land ownership. Farmers accumulate assets as they age, and land plays an important role in the asset portfolio. The market for base acres has, in effect, resulted in a large share of U.S. farm production being accounted for by younger tenant-operators who produce for market returns and pass program benefits through to older landlords.

Another important determinant of farm household labor supply is the long-term decline in the labor-intensity of U.S. agriculture. This trend, in which the capital-intensity of U.S. agriculture has increased, provides ample evidence of the ease with which capital can be substituted for exiting farm labor, at least in the long run (fig. 15). Factor substitutability means that, over time, any shortrun effects of decoupled payments on farm labor supply would have impacts of a proportionately smaller scale on output.

Figure 14

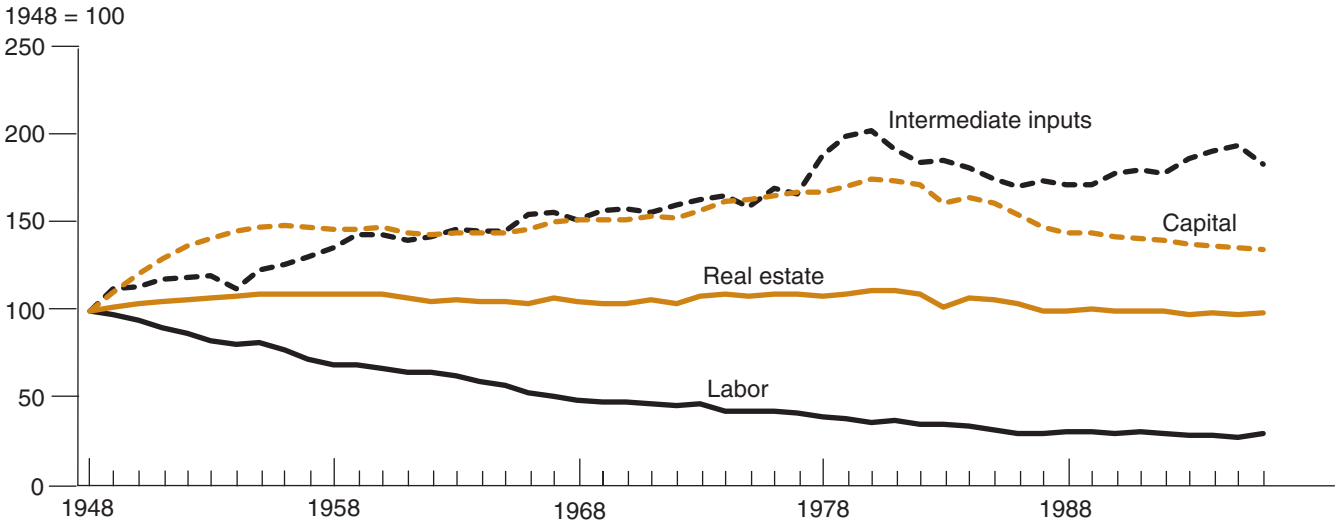
Farmland rental markets transfer production opportunities across generations



Source: AELOS, 1999, tables 2 and 8.

Figure 15

Long-term decline in U.S. labor use in agriculture, 1948-96



Source: Ahearn et al.

Effects of Decoupled Farm Payments on Aggregate Agricultural Supply

This section integrates our findings on the consumption, savings, and investment behaviors of program participant households in a simulation analysis of payment effects on aggregate production. Decoupled payments influence recipient household levels of consumption, savings, investment, and work effort—choices that can change the resources the households make available to farm operations.

Production Effects With Efficient Markets

The links between decoupled payments and agricultural production are indirect and depend on household responses to the payment. These indirect links are strengthened when factor market failures or rigidities create incentives or conditions that favor agricultural activities over alternatives. Gardner (1992) argues that the most compelling evidence of efficiency in U.S. agricultural factor markets has been the elimination of the income gap between farm and nonfarm households. The mobility of farm labor through exit or engagement in off-farm employment has contributed to the equalization of farm and nonfarm income. Increased use by farm households of off-farm investment opportunities has helped to equalize rates of return on farm and nonfarm capital assets. The cautious borrowing and lending behavior of farmers and lenders since the 1980's farm credit crisis has also strengthened agricultural capital markets and helped to equilibrate the supply and demand for farm credit (Collender). These views on the efficiency of U.S. agricultural factor markets are consistent with the economic circumstances of PFC recipient households as described by ARMS data.

To estimate the production effects of decoupled payments, we use a dynamic, intertemporal CGE model that simulates the efficient functioning of U.S. agricultural factor markets. The model is used to simulate permanent, annual decoupled payments of $6 billion, approximately the amount of decoupled payments in 1997, the model base year. The simulation finds that the payments have no effects on agricultural production in either the short run or the long run. However, the increase in household asset values leads to a small and permanent increase in farm household consumption levels (0.8 percent higher than in the absence of payments) and a decline in the proportion of income being saved, but with no effects on agricultural investment. (See box, "Production Effects of Coupled Farm Subsidies.)

Production Effects of Coupled Farm Subsidies

The modest production impacts of decoupled payments can be put into perspective by comparing these impacts with the effects of coupled U.S. subsidies. The two largest coupled subsidy programs provided during the FAIR Act were the marketing loan program (coupled to price) and crop insurance premiums (input subsidies).

U.S. marketing loan benefits ranged from around $5 billion to over $8 billion annually in the last several years. When commodity prices are below commodity loan rates, program benefits augment market receipts. Marketing loans in effect provide a per unit revenue floor, and truncate the lower end of the distribution of expected revenues. By reducing variability and increasing mean expected producer revenue, the loan program creates an incentive to produce program crops. The U.S. marketing loan program is estimated to have increased the annual acreage planted to eight major field crops by 2 to 4 million acres (about 1-2 percent) (Westcott and Price).

The U.S. crop insurance program expended about $1.5 billion in 2001, about two-thirds the value of the $4.1 billion in 2001 PFC payments. Premium subsidies are proportional to premiums. Thus, since premiums are higher for riskier crops, the absolute levels of crop subsidy are highest for those crops. As a result, this premium structure encourages the production of riskier crops and production in riskier regions. Crop insurance subsidies are estimated to have added about 960,000 acres (about 0.4 percent) to annual production of eight major field crops, with wheat and cotton expanding the most (Young, Vandeveer, and Schnepf).

Why are supply responses to coupled programs relatively low? For decades, there has been analysis of the low supply response of agriculture, which contributes to large swings in commodity price when demand conditions change. The roles of fixed costs, inelastic factor supply, technological conditions, and the fragmented and competitive structure of the sector in creating low supply response were noted by Johnson in 1950. Climate and land characteristics place physical limits on aggregate supply and crop substitutability. Supply has also been influenced historically by government programs that have interfered with market price signals and constrained planting decisions.

Recent estimates of aggregate and crop supply response, such as Lin et al., show that U.S. crop supply responsiveness to price has increased. The increase in acreage supply response has been especially large with respect to cross-prices, meaning that farmers have become more flexible in changing their crop mix in response to changes in relative prices. Changes in farm programs have been an important factor allowing greater supply response; nonetheless, aggregate supply response remains inelastic.

The payments also lead to a permanent increase of about 8 percent in aggregate U.S. farmland values. Other recent ERS research has estimated that all farm programs, coupled and decoupled payments combined, increased land values for program crops by about 20 percent, or $62 billion (Barnard et al.). Although the two estimates result from different economic models, their results are roughly proportional in magnitude. PFCs accounted for about one-third of farm payments during the FAIR Act, and our simulation includes all farmland. Note that the capitalization of payments into land values does not itself distort cropping patterns, except through a barrier to entry into horticulture, because planting flexibility allows for idling or shifting production to nonprogram crops. However, the higher land values associated with cropland (including idling) likely means that the exit of base acres into nonagricultural uses, such as residential or commercial use, has slowed.

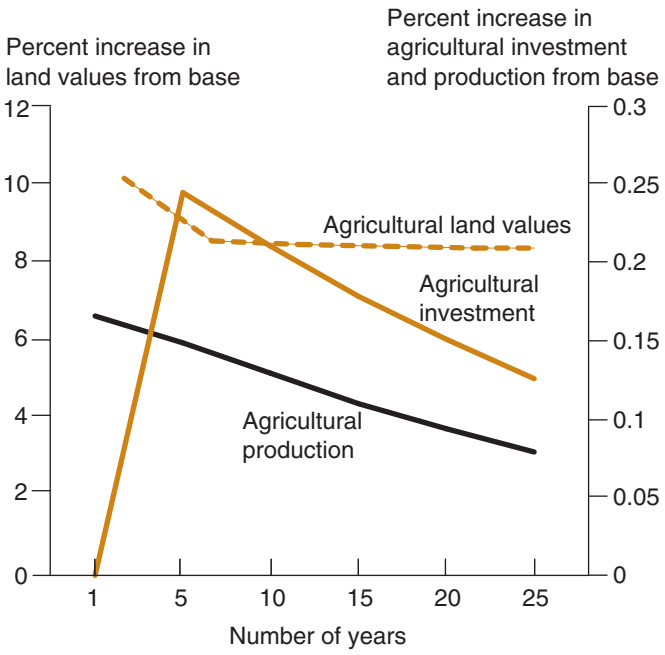
Production Effects With Capital Market Constraints

Overall, the labor and capital markets in which U.S. farm households operate may be efficient, but they are unlikely to operate perfectly or to be perfect for all individual farmers. Inefficiencies in U.S. capital markets, in which some or many farmers are capital constrained and would choose to use the payment to increase onfarm investments, generate the strongest potential link between the payments and production. As a sensitivity experiment, we assume the extreme case in which decoupled payments, net of taxes and consumption, and assuming zero pass-through from tenants to landlords, are fully invested in agriculture. Under this scenario, if all farmers are unable to exercise portfolio choice in allocating their investments, or if they are credit constrained and invest only in agriculture, payments would still have a minimal (0.1-0.2 percent) impact on aggregate production through 15 years, with smaller impacts in subsequent years. If payments are continued indefinitely, the largest effects of the payments would be to increase land values (fig. 16).

Decoupled payments to credit-constrained farmers would increase capital investment in farming by, at most, 0.25 percent in the short run over what would otherwise be invested. Excess investment in agriculture is self-correcting in the long run, since it pushes down returns to agricultural capital. This reduces the farm household's incentive to save and invest and increases current consumption, resulting in a longrun increase in farm investment of about 0.1 percent.

Figure 16

Even if decoupled payments are invested only in agriculture, they would have small and declining effects on investment and output, but lasting effects on land values



Need for Additional Research

Decoupled payments were introduced into the U.S. farm support program relatively recently. These household income transfers represent a significant departure from the commodity programs that traditionally have been used to support income from farming. Because the effects of income transfers are evidenced throughout a household's spending, saving, and work choices, analysis of decoupled payments' impacts on the farm operation must also take into account this broader household context. The research findings in this report represent an initial effort to understand U.S. farm household choices about consumption, savings, investment, and employment in response to changes in income and wealth due to decoupled payments, taking into account the diversity of farm households.

Detailed survey data on farm households' farm and nonfarm activities are now becoming available through ARMS. As a result, the research questions posed in this report are certain to become an active area of agricultural policy research and analysis. Some issues for analysis, in addition to more indepth treatment of the questions addressed in this report, include how wealth effects work in a dynamic setting. For example, how might negative wealth effects work if subsidies are removed and farm asset values decline? Are markets that capitalize future payments also efficient in capitalizing policy reform? What is the time lag associated with payment capitalization, and how does producer uncertainty about policy affect the rate of capitalization? Other research issues include the role of taxes and the nature of transactions within the farm household that lead to observed household behavior.

Conclusions

This examination of the U.S. experience with decoupled payments in the FAIR Act offers some perspectives on such payments for the WTO negotiations on agriculture. It describes a general conceptual framework for analyzing the links between decoupled payments, farm households, and farm production decisions. It examines the impacts of the U.S. PFC payments on recipient households, taking into account that most engage in both farm and nonfarm economic activities. Finally, it identifies areas in which more research is needed if the impacts of income transfers on farm households, farm production, and world markets are to be better understood.

Analysis of farm household survey data in this study indicates that U.S. decoupled payments have increased the level of overall well-being of households that receive PFC payments, where well-being is defined broadly to encompass income, wealth, and consumption as well as how people choose to spend their time. Households that receive payments have higher levels of spending out of income than nonrecipient households with similar income levels and are better able to smooth consumption during periods of low income. The payments have also led to small reductions in households' work hours, including their onfarm labor. PFC recipients were also found to allocate a large share of their investments to assets unrelated to agricultural production. This indicates that nonfarm investments are likely to play an important role in their allocation of savings from PFC payments as well as in their adjustments to any changes in risk attitudes attributable to the payments. In addition, aggregate data on investment by participating households show no evidence of higher rates of onfarm investment or capital replacement compared with nonparticipant households. These findings, together with the results of a simulation of a U.S. decoupled payments program, indicate that the PFC cash payments changed and increased recipients' well-being but in ways that can be expected to have minimal links to farm production levels. The main impact of decoupled payments is likely on land values. These were shown to have increased about 8 percent due to the payments.

An implication of these conclusions for global agricultural negotiations is that market context matters. The case for policy intervention is often based on an actual or perceived distortion in agricultural markets. Some subsidies are designed expressly to effect economic outcomes by offsetting existing distortions. Likewise, the impacts of decoupled programs can be expected to be influenced by their setting. Decoupled payments are more likely to have production impacts when market and institutional conditions, such as farm credit constraints, weak financial systems, and rigid labor markets, create strong links between the payments and a household's farm business decisions. Absent these market failures, payment recipients have only to decide what to do with their income and wealth transfer, allowing their decisions about how to allocate decoupled payments to be largely divorced from their production decisions.

There is little evidence today of market failures in U.S. agricultural factor markets, although they have provided an important rationale for farm policy since the 1930s. They have continued to provide a rationale for government intervention even as the U.S. farm sector has gradually undergone profound change. Efficiencies achieved through the maturation and industrialization of the sector have created competitive markets in farm and nonfarm labor and capital, and led to the economic well-being of agricultural producers being today little different than that of the general population financing the payments. This transformation of the farm economy has important implications for the way in which U.S. farm households are affected by farm programs, in particular, enabling decoupled payments to transfer income and wealth with minimal impacts on production. This allocation of program benefits helps decoupled payments to meet trade policy objectives, but may be less compatible with domestic policy goals of increasing returns to agricultural producers.

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Appendix: Key Features of the Computable General Equilibrium Model

The inter-temporal computable general equilibrium model underlying the results presented in this report is briefly described here. The model depicts an open economy in which agents consume and produce at each instant of time a manufactured good, an agricultural good, and services. The manufacturing and agricultural goods can be traded internationally, and the manufacturing good can also be allocated to capital. There are three factors of production: land, labor and capital. Labor services are not traded internationally and domestic residents own the entire stock of domestic assets. All three sectors employ labor and capital services with production characterized by constant returns to scale technologies. In addition, agriculture employs land.

Households are of two types: urban households that do not own land and other, mostly rural, households that own land. The only feature distinguishing household type is their endowments of labor, and the assets capital and agricultural land. They otherwise have identical preferences although their levels of expenditure and savings are endogenous to the model.

The model is inter-temporal, and traces adjustments over an approximately 50-year time period. To establish the baseline equilibrium time path for the economy, labor and land productivity and population are assumed to grow exogenously over time. Households maximize the discounted value of their utility subject to an inter-temporal budget constraint, stock of assets, and limits on borrowing. If, at an instant of time, returns to capital are relatively high, the household foregoes expenditures to accumulate assets for future consumption, with the magnitude of impact depending on their elasticity of inter-temporal substitution. The household's utility is measured as a geometrically discounted flow of future utility.

The model is calibrated to 1997 data and solved under the assumption of no PFC payments. Then, PFC payments are added to the model. They are presumed to be permanent, annual lump-sum transfers from non-land-owning households to land-owning households, and are assumed to be tied to land ownership. Two versions of the model are used in this report. In one, the arbitrage condition between assets is presumed to hold. From the household's perspective, returns to its savings are maximized when the income from one unit of income invested in capital is equal to the return of a unit of income invested in land. Because preferences of both household types are assumed to be identical and homothetic, the negative effects on urban household consumption are just offset through the positive effects on rural households. In the first experiment, therefore, the only variable with aggregate effects is the price of land.

In the second scenario, or sensitivity experiment, the market for agricultural capital can clear at a rate of return different than the capital employed in the manufacturing and services sectors of the economy. Effectively, this assumes segmented capital markets in which the non-land-owning urban households do not invest in agricultural capital over the period of analysis, and the land-owning households are restricted to investment in agricultural capital. In the agriculture sector, PFC payments initially increase investment in agriculture, but declining returns causes households to increase their consumption relative to savings over time and reduce their agricultural investment.