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Counter-Cyclical Payments Under the 2002 Farm Act: Production Effects Likely to be Limited

By Paul C. Westcott

The Farm Security and Rural Investment Act of 2002 (2002 Farm Act) introduced counter-cyclical payments (CCPs) to the array of income-support programs for agricultural commodities in the United States. CCPs are available for specified crops when market prices are below levels set forth in the legislation. This program represents a more systematic approach to providing counter-cyclical benefits to the sector than the ad hoc market loss assistance payments that were provided to producers in 1998-2001 (Westcott, Young, & Price, 2002).

CCPs add to payments from other farm commodity programs, such as direct payments and marketing loan benefits (loan deficiency payments and marketing loan gains), as well as payments from conservation programs such as the Conservation Reserve Program. Besides direct government payments, other support to the sector includes crop insurance premium subsidies and price supports for selected commodities, such as dairy and sugar.

An important issue in assessing CCPs is whether they influence production decisions of farmers, and thereby distort commodity markets. Such concerns are important for a number of reasons. First, any changes in production brought on by these payments would affect prices, domestic uses, and exports of the crops, as well as reduce overall economic efficiency in the agricultural sector by altering the use of land and other resources. Second, from a domestic policy perspective, programs that affect production and prices are also less efficient than direct transfer payments in supporting farm sector income, an important goal of agricultural programs. Third, the design and effects of agricultural programs are of interest internationally in continuing trade negotiations and under existing trade agreements of the World Trade Organization.

Economists often frame the question of potential distortionary aspects of farm programs in terms of how coupled or decoupled a program may be. Farm programs can be considered to be coupled or decoupled depending on (a) whether the program benefit depends on the level of production, and (b) whether production is affected by the program benefit. An answer of "yes" to both means the program is fully coupled, while an answer of "no" to both means the program is fully decoupled. While such a classification provides a useful frame of reference for describing different farm programs, in practice, there is a wide continuum between these end points, both in terms of program features and potential effects. Additionally, effects of specific farm programs can vary across time periods and locations, depending on factors such as market conditions and sector structure.

So where do CCPs fit compared with other farm commodity programs in the 2002 Farm Act? Marketing loans are fully coupled since they are available on all production and their link to market prices means they affect production decisions of farmers. Direct payments are mostly decoupled, since they are paid on a fixed, historically-based quantity rather than on current production and are not dependent on market prices or other factors that would affect production. Direct payments may still have some influence on production, reflecting general wealth effects, changes in risk attitudes, and providing liquidity to farmers, so these payments may not be fully decoupled.

CCPs fall in between these two programs, having some properties similar to mostly decoupled direct payments and other properties similar to fully coupled marketing loans. Like direct payments, CCPs do not depend on current production since they are paid on a fixed, historically-based quantity. However, similar to marketing loans,

CCPs are linked to market prices so there may be some influence on current production decisions of farmers, which would potentially make CCPs at least partially or somewhat coupled.

Income Support Properties of CCPs

How are CCPs calculated? The 2002 Farm Act established target prices for wheat, feed grains, upland cotton, rice, soybeans, minor oilseeds, and peanuts, as well as fixed direct payment rates for these crops. When the higher of the commodity loan rate or the season average price plus the direct payment rate is below the target price, a counter-cyclical payment is made at a rate equal to that difference. Equivalently, CCPs are made when the higher of the loan rate or the season average price is below the target price minus the direct payment rate.

For example, the legislative definition of the CCP payment rate can be expressed for corn as follows:

$$\text{CCP payment rate}_{corn} = (\text{Target price})_{corn} - [(\text{Higher of season average price or loan rate})_{corn} + (\text{Direct payment rate})_{corn}]$$

or equivalently, by rearranging terms:

$$\text{CCP payment rate}_{corn} = (\text{Target price})_{corn} - (\text{Direct payment rate})_{corn} - (\text{Higher of season average price or loan rate})_{corn}$$

Corn program provisions for 2004 illustrate some properties of CCPs. Program provisions for corn include a loan rate of $1.95 a bushel, a target price of $2.63 a bushel, and a direct payment rate of $0.28 a bushel. These provisions may at first give the appearance that CCPs provide benefits for any season average price below the $2.63 target price. However, the direct payment rate of $0.28 is netted out before CCPs are made, which results in CCPs providing benefits for season average prices below $2.35 for corn, which can be referred to as the "effective target price."

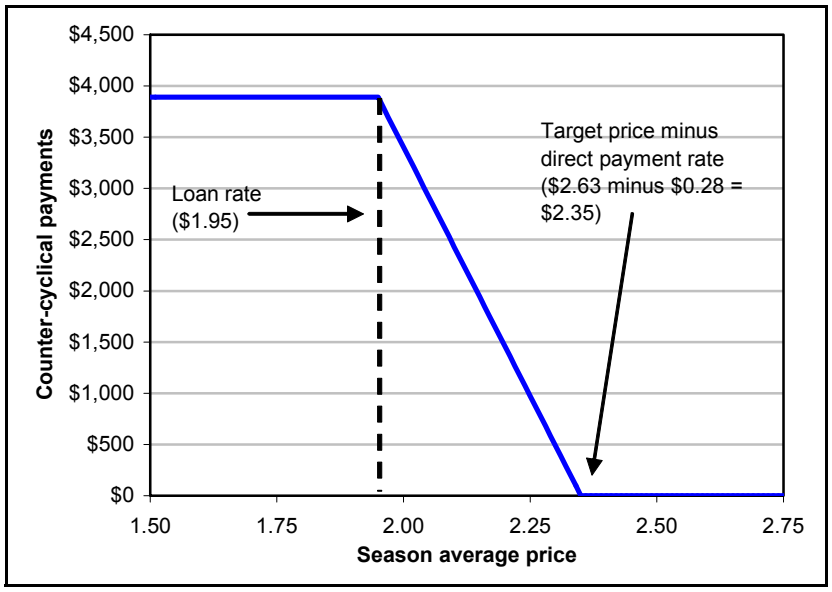

Figure 1. Counter-cyclical payments for corn base acres under the 2002 Farm Act, 2004 program provisions.
Assumes 100 acres corn base and 114.4 bushels/acre counter-cyclical payment yield.

With these program provisions, Figure 1 shows that no counter-cyclical payments are made for corn if the season average price is at or above the $2.35 per bushel "effective target price." CCPs increase as the season average price declines from $2.35 to the $1.95 loan rate. CCPs are then fixed and at their maximum level for season average prices at or below the $1.95 loan rate.

This dependence of CCPs on season average prices means that these payments may or may not relate directly to the market price an individual farmer receives. Further, CCPs are not affected by a farmer's current production. They are paid on a constant, pre-determined quantity for a farm, equal to 85% of a fixed acreage base times a fixed CCP payment yield. Farmers retain nearly full planting flexibility and may receive CCPs for the base acreage crop regardless of whether that crop (or any crop) is planted on those acres.

CCPs May Reduce Price-Related Revenue Risks

It can be argued that CCPs are essentially decoupled from an individual farmer's planting decisions since they are paid on a fixed quantity for a farm rather than on current output. The expected marginal revenue of a farmer's additional output is the expected market price (augmented by marketing loan benefits when prices are relatively low), so counter-cyclical payments do not directly affect production through expected net returns.

However, because counter-cyclical payments are linked to market prices, they may influence production decisions indirectly by reducing revenue risk associated with price variability in some situations.

Revenue Sources Under the 2002 Farm Act: CCPs Relation to Other Income-Support Provisions

Counter-cyclical payments interact with market receipts and other income-support provisions of the 2002 Farm Act to shape farmers' revenues. Consider a farmer with 100 acres of corn base who has chosen to plant corn on those base acres. Combining both coupled and decoupled payments with market receipts at different price levels indicates less variability in total revenues than in revenues from only the marketplace (Figure 2).

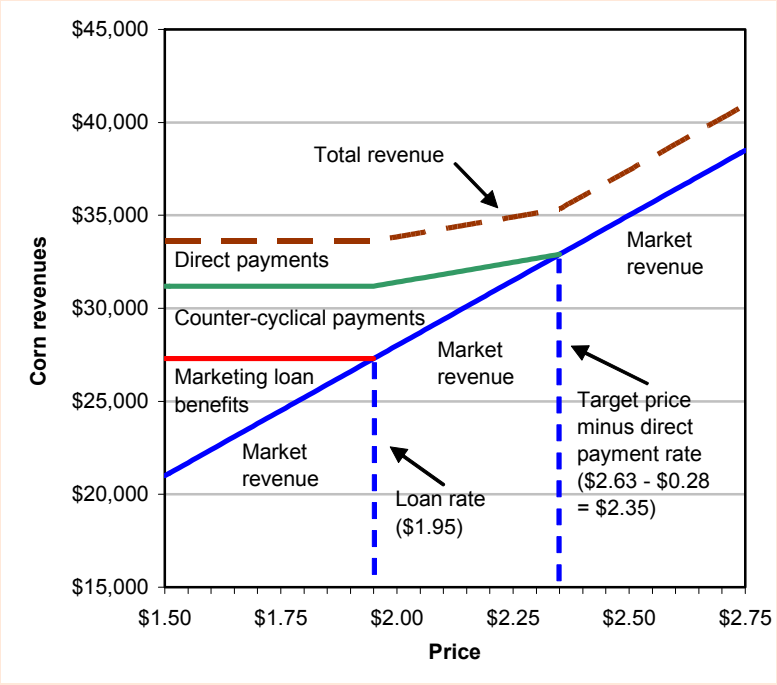

Figure 2. Corn revenues under the 2002 Farm Act.
Assumes 100 acres corn, 100 acres corn base, 140 bushels/acre yield, 102.4 bushels/acre direct payment yield, 114.4 bushels/acre counter-cyclical payment yield.

For 2004 program provisions, marketing loan benefits, through loan deficiency payments and marketing loan gains, add to market revenues for prices below the loan rate of $1.95 a bushel for corn. These benefits keep revenues flat in this price range, since marketing loans are fully coupled and paid on all production of the farmer.

Counter-cyclical payments start when the season average price drops below the $2.35 *effective target price* for corn and widen as that price declines to the loan rate. CCPs are at their maximum level for season average prices at or below the loan rate. In the price range from $1.95 a bushel to $2.35, revenues have some slope, with less than full-income support provided since CCPs are not paid on all production, but are instead paid on 85% of the fixed acreage base times a CCP payment yield, which corresponds to a quantity equivalent to about 70% of production in this example.

Direct payments are constant for all price levels since these benefits are based on a fixed payment rate of $0.28 a bushel for corn, paid on a fixed payment quantity (equivalent to about 62% of production in this example).

The kink points in total revenues in Figure 2 occur at the $1.95 loan rate and the $2.35 *effective target price,* which correspond to where CCPs reach their maximum and where they become zero, respectively.

Effects of CCPs are different at different levels of prices. If farmers expect prices to be below loan rates (as occurred for rice and cotton in 2002/2003), then CCPs are at their maximum levels and become more like "fixed" payments. Research has shown that fixed payments act like general income transfers to farm households and have only small effects on output (Burfisher and Hopkins, 2003, 2004). Alternatively, if price expectations are above the "effective target price," then CCPs are zero. In this situation, there is no income transfer to farmers provided by CCPs, although there would still be some protection against downward movements in prices.

For prices in the middle, (from the loan rate up to the "effective target price"), CCPs are changing and their effects may be changing as well. In this price range where CCPs vary, if the base acreage crop is planted, then changes in producer revenues due to changes in market prices are partly offset by the counter-cyclical payments, thereby reducing revenue risk associated with price variability.

There may be some potential avenues for CCPs to have production effects because of this reduction in revenue risk. Farmers' production decisions and acreage allocations are based on expected net returns, which reflect expected prices, yields, and production costs. Importantly, expected prices are part of expected net returns.

What are the price-related revenue risks underlying the production decision? If the expected corn price is $2.20 a bushel when a farmer makes production decisions, but the realized price is $2.15, then without CCPs the farmer faces the full reduction in prices (from the expectation) in the realized revenues.

With CCPs, however, the price-related revenue risk is reduced if the base acres crop is planted. The link of CCPs to market prices results in CCPs being negatively correlated, on average, with expected net returns that are used for determining supply response. If the expected price used by a farmer in determining production choices turns out to be incorrect, CCPs provide a partial offset to the change in net returns from the initial expected level. For example, if the expected corn price is $2.20 a bushel, but the realized price is $2.15, the farmer now faces only part of the reduction in prices (from the expected level) since CCPs increase and partially offset the price decline.

Potential Responses by Farmers

CCPs thus provide a new risk management instrument to farmers that addresses some price-related revenue risks. Although some arguments suggest that this program feature could affect production decisions of farmers, there are a number of other considerations that would tend to reduce any potential production effects.

On the one hand, the revenue risk reduction feature of CCPs could influence farmer behavior if there is some value to the farmer of reducing the variability of expected revenues, such as for a risk-averse producer. For these producers, the revenue stabilization consideration would supplement the typical profit maximization incentive underlying planting decisions and may, in some market situations, encourage farmers to plant the program crop for which they have base acreage. If the base acreage crop is planted, the season average market price of the crop produced would be the same price used to determine the counter-cyclical payment, so the reduction in variability of total revenues due to CCPs is most direct.

On the other hand, because prices for different crops tend to move together, CCPs for one crop may provide some reduction to price-related revenue risks associated with the production of other crops. For example, the correlation between national season average prices for corn and soybeans during 1975-2003 was about 72%. This cross-commodity effect suggests that CCPs may provide a general reduction in revenue risks rather than a crop-specific effect. Net returns among alternative crops would remain the primary consideration underlying production choices. In this case, CCPs would not necessarily hold production in the base acres crop and any market distortions in the mix of crops planted due to the revenue risk reduction provided by CCPs would be minimal.

Next, while a number of studies indicate that farmers are risk averse (Chavas and Holt, 1990, 1996, for example), other risk reduction instruments already exist to manage risks. Thus, with revenue risk reduction now provided by CCPs as part of farm programs, farmers may adjust their use of these other farm and nonfarm risk management strategies. Some effects may have impacts on production choices, while others may not. For example, with increased protection against risk, a farmer may switch some land to riskier crops that provide higher mean expected returns, but also higher variability of those returns. Alternatively, farmers may change the mix of other risk management tools used, such as revenue insurance, hedging, and options, without necessarily having production effects.

Additionally, a large portion of output in the U.S. agricultural sector is produced by a small share of large producers. In 1999, for example, 85 percent of the value of U.S. agricultural production was produced by 16% of farms (USDA). Evidence that risk aversion decreases as income rises (Chavas and Holt, 1990, 1996) suggests that risk aversion may also tend to decline as the size of farms increases. Thus, with larger farms that account for most production being less averse to facing risk, this lowers potential production effects of CCPs due to risk reduction. And while smaller farms may be more risk averse in their farm enterprise, off-farm income may reduce the overall level of household income risk.

Finally, to the extent that CCPs protect farmers' revenues against downward movements in prices, other farm programs may already provide some protection against price declines. For example, the commodity loan program with marketing loan provisions already provides income support to farmers that protects revenues against the risk of downside price movements below loan rates.

Conclusions

Returning to the question of how coupled or decoupled are CCPs, the reduction of price-related revenue risks provided by counter-cyclical payments in some price ranges suggests that this new income-support program could have some influence on producer behavior by altering agricultural production decisions or changing the use of other risk management strategies. Effects of these payments vary depending on expected market prices. In some price ranges, CCPs may act more like general fixed income transfer payments to the farm household, which are decoupled and have minimal produc-

tion effects. In other price ranges, there may be some avenues for CCPs to have production effects through revenue risk reduction, which could make CCPs partly coupled. While the magnitude of any potential effects is an empirical issue and a topic for further research, there are several mitigating factors which suggest that overall production effects of CCPs through revenue risk reduction are likely to be limited.

Thus, effects of counter-cyclical payments would be expected to be relatively less distortionary than coupled programs (such as marketing loans) with regard to efficiency in the marketplace in the allocation of resources. CCPs would be relatively more effective than coupled programs in terms of efficiency of domestic policy in providing support to farm income, and would be relatively less distortionary with regard to international market signals that could affect global trade.

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The Sweet Smell of Subsidies Revisited

By Doug Young, Elwin Smith, and Anne Smith

For a given region, annual and perennial cropping decisions often depend on relative prices and commodity support policies. Given that the United States and Canada are major traders in agricultural products, relative prices in the two countries should be similar and track over time. Differences in cropping practices along the border might then be attributed to different agricultural policies. A stark difference in land management along a small segment of the border has been used in the popular press as proof that U.S. wheat subsidies have encouraged the conversion of rangeland into annual cropping of wheat to collect government payments (see quote in side box). *Harper's Magazine*, where the quote appeared, with a circulation of over 200,000, is the oldest continuously published monthly magazine in the United States and addresses current political and cultural issues for a sophisticated readership. A satellite photo in the *Harper's* article captured a small section of the border area with parts of Hill County, Montana to the south and southeast Alberta to the north (Figure 1). The Milk River (enhanced in turquoise) snakes across the border (solid white horizontal line) toward the southeast. The false color composite Landsat 7 satellite image shows a solid mosaic of wheat fields south of the border and mostly unbroken grassland to the north. The solid blue-grey areas represent rangeland and other uncultivated land. The rectangular strips are fields in annual cropping. The red strips are green vegetation, primarily spring grains. The yellow and brown rectangles are mature cereals; some have been harvested. The blue-green rectangles are fallow. The cross-hatching overlay on the photo indicates areas where soil or other site factors limit cropping as discussed later. This short segment of the border seemed to provide irrefutable evidence that wheat subsidies in the United States have encouraged more intensive wheat production on marginal lands south of the 49'th parallel.

Why does the Landsat image of a small border region in Figure 1 depict such contrasting land use? Are there other factors beyond imputed policy differences which contribute to the dramatic difference in land use along this small segment of the Canada-U.S. border? Detailed investigation of the small area captured in the image considers two additional aspects, land quality and land ownership.

> "...[the boundary] remained invisible until the 1930's, when [U.S.] federally subsidized wheat made it real. ...Politics created the border; subsequent differences in agricultural policy created the two landscapes...Albertans leave unproductive land in prairie for grazing. But for decades Hill County [Montana] farmers have grown the only major subsidized crop viable here--wheat--on every inch of available land, and here's why: When world market prices fell below a certain mark, the U.S. made up the difference based on historic yield rates of the acreage each farmer enrolled in the subsidy program. Farmers, therefore, had no incentive to diversify or rotate crops..." (Manning, 1996, *Harper's Magazine*).

Land capability class information was superimposed on the Landsat image (Government of Canada, 1968; USDA-NRCS, 2004; USDA-NRCS, 1997). Land capability classes defined as having "severe limitations to cropping" by both countries are crosshatched in a northeast-southwest direction. The limitation along the Milk River is steep slopes and surface rocks. The major limitation to cropping in the remainder of this post-glacial landscape is soil-related. These can include undesirable structure, salinity due to wetness, low moisture holding capacity, restricted rooting, and low permeability. The areas without crosshatching are classified as cultivable provided appropriate conservation practices are imposed.

The cross-hatched area in Figure 1 shows that land with severe limitations to cropping dominates the Canadian side of the border (Government of Canada, 1968). There are small pockets of cultivable land near the border in Alberta, but most of this land is used as rangeland. The isolation of these cultivable pockets might discourage cropping if all surrounding land is managed for livestock grazing. On the U.S. side of the border, most land is suitable to annual cropping and is indeed cultivated. As

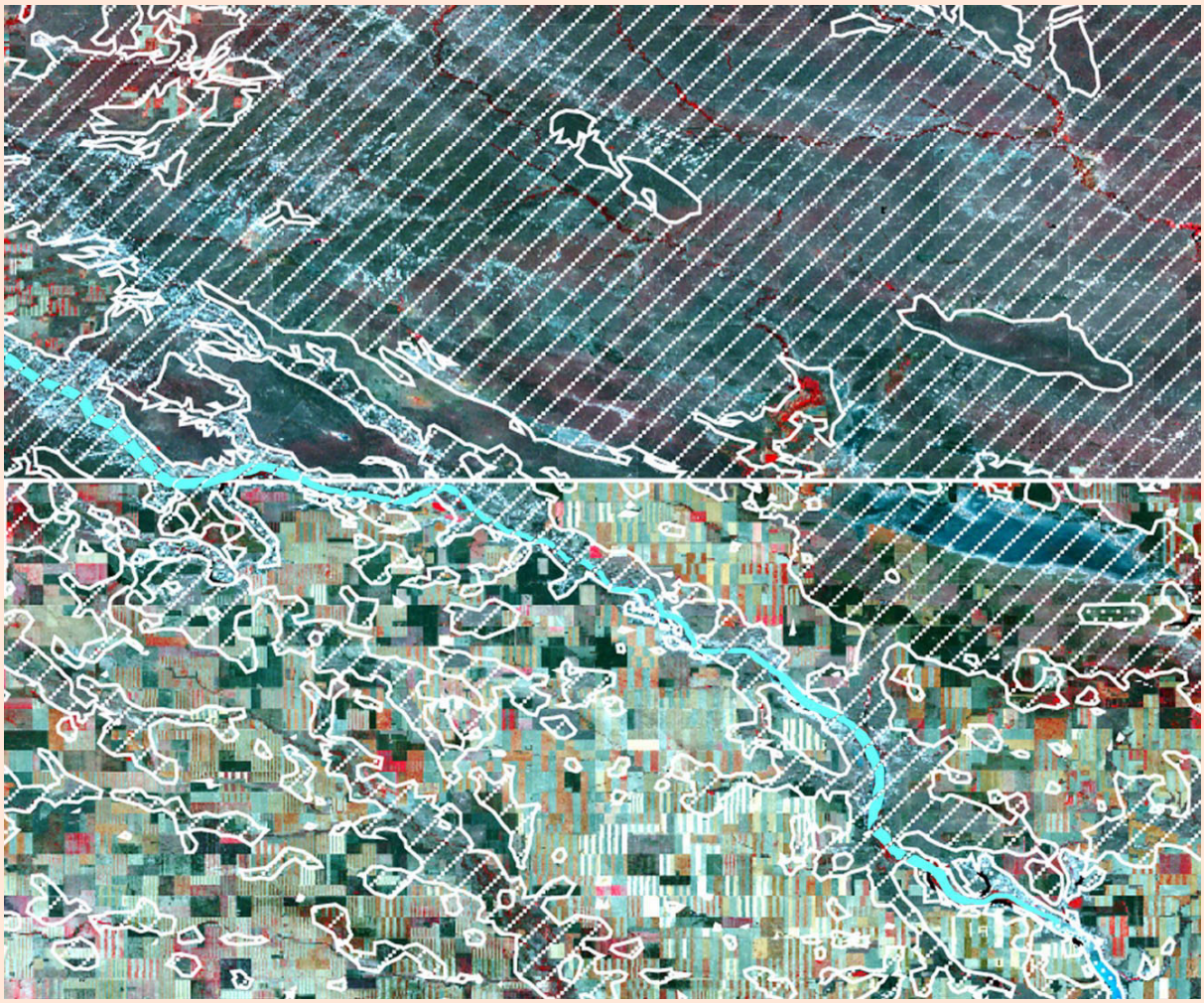

Figure 1. Landsat 7 ETM+ false color composite satellite image of west-central Hill County, Montana and southeastern Alberta. Image acquired July 22, 2000. Red indicates growing vegetation, brown-yellow is mature or harvested cereals, blue-green rectangles are fallow, and large blue-grey areas are rangeland. Land with severe limitations to cropping has white cross-hatching and land without severe limitations is not cross-hatched.

observed in Figure 1, pockets of land with severe limitations to cultivation in Montana occur along the Milk River Canyon, in some strips running from the northwest to the southeast, and in a larger area around Wild Horse Lake, the large lake in the northeast corner of the Montana section adjacent to the border (USDA-NRCS, 2004). While some of the severely restricted land in Montana, especially that along the Milk River Canyon, is not cultivated; Figure 1 shows several pockets of cross-hatched poorer quality land adjacent to cultivable lands that are in crop production. Most of the poor quality land near Wild Horse Lake is also cultivated.

Land quality differences north and south of the border explain some of the general differences in land use observed in this small border region, but land quality is not the defining reason. The razor's edge contrast requires further explanation. There is a key coincidental difference in land ownership along the border in this region caused by differing land ownership and land use policies. North of the 49'th parallel, the province of Alberta owns the majority of the land in this image and these public lands are managed only for leasing to livestock grazers (AAFRD-PLD). Some of the area was cropped in the 1920s, but cultivation was abandoned and families relocated during the 1930s Dust Bowl era. The land eventually reverted to the province and was converted to public grasslands. Gray (1967) provides a vivid description of erosion, land abandonment, and severe social stress in Canada's southern prairies during this era, and of

the government's vigorous responses, including conversion of abandoned cropland to community grazing lands.

Hill County, Montana, in contrast, has more land suitable for cultivation and private farmers have owned and farmed most areas since it was settled in the early 20'th century. Most of this land was settled under the Homestead Acts which granted farmers title to public land if they satisfied specified development conditions (Malone, Roeder, & Lang, 1996). As on the Canadian side of the border, settlers in Hill County and other areas of Montana suffered intense economic hardship due to declining prices which followed World War I and, especially, the recurring severe droughts of the 1930s. In many cases, land vacated by financially stressed farmers was held by counties for a period due to tax delinquency, or by banks due to foreclosure. However, on the Montana side of the border most land vacated by farmers due to natural and economic forces returned to the marketplace; however, some land was placed in the National Grasslands Program during the 1930s. Most of the National Grasslands were eventually sold to farmers (Knight, 1991). The resale policies of counties, banks, and the National Grasslands Program, and the generally better quality land on the U.S. side, contributed to its return to private ownership. Consequently, the razor's edge difference in land use along the international border emphasized by Manning (1996) is primarily due to national differences in land ownership and land use policies, rather than wheat support policies. Continuing land ownership and land use policies maintain the status quo.

National farm commodity support programs are important, but they are not the sole determinants of land use. Land quality differences and historical policies influencing land ownership and use can play a dominant role. Certainly, some marginal areas have likely converted to and remained in grain production--rather than grazing--in the North American plains due to commodity subsidies, subsidized crop insurance, and transportation subsidies. However, generalizations about policy-induced cropping diversity cannot be inferred from a snapshot of one small segment of the landscape. Coincidental differences in natural fertility, topography, and institutional policies influencing ownership and use can sometimes explain visually dramatic differences in land use.

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