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DO DIRECT PAYMENTS DISTORT AGRICULTURAL PRODUCTION? A COUNTY-LEVEL ANALYSIS

Erik J. O'Donoghue
Economic Research Service, USDA
eodonoghue@ers.usda.gov

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INTRODUCTION TO THE WORK

Since the introduction of Production Flexibility Contract (PFC) payments in the 1996 Farm Act, U.S. farmers have received roughly \$5 billion in direct payments each year based on historic acreage and yields of selected field crops. These payments, which occur independent of current production and market conditions, were designed so as not to influence farmers' planting decisions. However, such payments could influence production by providing farmers with better access to capital markets, changing their risk preferences, their expectations about future payments, or by altering land values or labor markets. If these secondary effects alter farmers' production decisions and thus commodity markets, direct payments could affect the welfare of producers and consumers, both domestic and international.

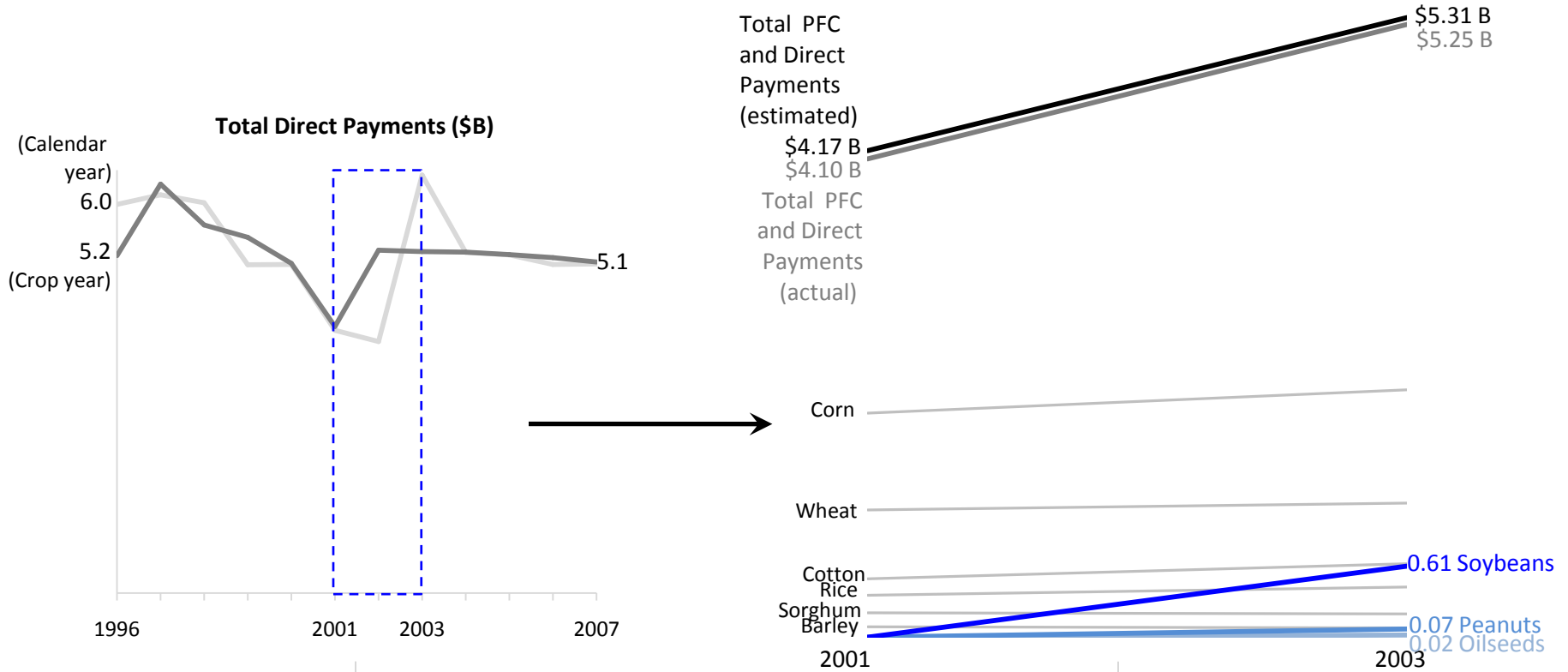
BACKGROUND

In examining the impact of government payments on farmers' behavior, researchers have focused on changes in acreage, typically finding limited effects of the payments on acreage supply response. However, these studies have tended to rely on cross-sectional data, which make it difficult to impute causality and control for unobservable heterogeneity and any potential omitted variables. O'Donoghue and Whitaker (2010) created an event study allowing them to control for these issues and found that direct payments appeared to cause dramatic changes in the number of acres planted on individual farms.

But do direct payments affect aggregate acreage and outcomes? O'Donoghue and Whitaker's use of a balanced panel dataset could not account for entry or exit. If aggregate outcomes such as output levels remain unaffected by direct payments, then individual producers may be changing their behavior in offsetting ways, thereby negating the effect of payments on overall consumer or producer welfare. This poster delineates an event study to explore whether direct payments alter the number of planted acres at the county level, allowing for entry and exit of farms.

METHODS

An identifiable, exogenous change in direct payments is necessary to understand whether the payments have a causal impact on acreage supply. With the passage of the 2002 Farm Act, Congress updated the PFC program by increasing direct payment rates, allowing oilseed and peanut farmers to enter the program, and giving farmers the option to update their program acreage to reflect more recent cropping practices.



PFC payments began in 1996 and were designed to decrease (eventually to 0) over time. However, in 2002, Congress extended (and modified) the program, creating direct payments and injecting new funds into the program. The dark gray line shows when the farmers “earned,” although not necessarily collected, their payments. The light gray line shows when farmers received their payments.

The study examines changes from 2001 to 2003. In the counties examined here, the Act increased direct payments by more than \$1.2 billion, more than 60 percent of which came from the introduction of soybeans and peanuts into the program.

Using county-level data, a panel dataset that straddles the 2002 Farm Act enables this event study to differentiate between pre- and post-Act levels of planted acres and thereby control for unobservable heterogeneity and omitted variables (to the extent that such variables remain unchanged over time). Variables that might change over time (input and output prices, off-farm wage levels, and population density) and could affect the number of planted acres are included as controls. I also included regional fixed effects to account for differences in land quality across growing regions.

Even though Congress passed the Farm Act, making it exogenous, the number of acres eligible for the program could decrease due to farmers exiting agriculture and taking their program-eligible land with them (affecting both the level of payments and the number of acres planted in the county). Thus, the change in direct payment receipts may be, at least partially, endogenous. To control for this possibility, I instrument the change in direct payments with the number of oilseed and peanut acres planted in the county before the 2002 Farm Act using a two-stage least squares approach. The oilseed and peanut acres are likely to be highly correlated with the change in direct payments received in the county, yet are unlikely to affect exit rates within the county.

RESULTS

Across the entire country, direct payments do not affect the total number of acres planted at the county level. The large individual farm effects found by O'Donoghue and Whitaker must cancel out in some fashion. To explore the possibility that farmers in different regions might be subject to different influences not captured in the current model, I ran a set of regressions for five different regions: the Atlantic, Midwest, Plains, South, and West.

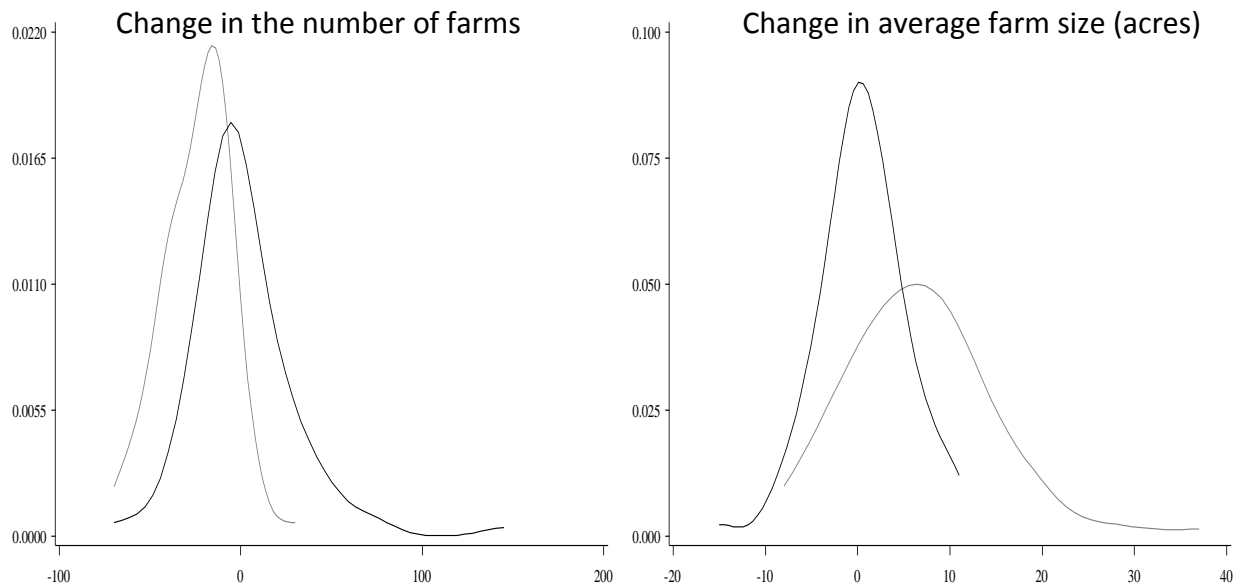
The effect of direct payments on planted acres, by region

Region	Avg. county % Δ in planted acres	Avg. county Δ in # of acres
Atlantic	2.3	1,580
Midwest	-2.9***	-5,400
Plains	6.7***	14,600
South	0.3	180
West	-6.2	-8,200

*** denotes significance at 1% levels

A \$1 increase in direct payments per acre led to an average drop of 2.9 percent of planted acres (or an average decrease of 5,400 acres) in Midwestern counties. These results, when summed up across the Nation, suggest that the changes across all regions led to an increase of less than one percent of total cropland.

Another explanation for direct payments having significant individual but negligible aggregate effects is that they encourage farm consolidation. Those farmers receiving payments (or higher levels of payments) might be able to survive or obtain access to credit more easily, which could allow them to grow and capture economies of scale. Those with lower or no payments might fail and exit. To examine this possibility, I explored the relationship between payments and the number of farms in a county and between payments and average farm size. Due to data restrictions, this analysis was restricted to counties in Iowa, Ohio, and Pennsylvania.



I ranked counties by level of direct payment receipts and removed the middle 25 percent of the observations, leaving me with a high (gray) and a low (black) payments group. I then generated a probability density function for each group – exploring whether payment levels were correlated with changes in farm numbers and farm size. It appears that counties with higher levels of payments lost more farms while increasing their farm size – evidence of consolidation. Subsequent regression analysis, controlling for other variables, bears out these preliminary results.

CONCLUSIONS

At the county level, direct payments appear not to affect the number of planted acres. However, direct payments do appear to alter farm exit rates and farm sizes, thus altering industry structure.

If the number of planted acres is not affected by direct payments at the county level, then it appears unlikely that these payments will directly distort aggregate markets and adversely affect either consumer or producer welfare. If payments do affect industry structure, though, they may have secondary effects. For example, larger farms could take advantage of economies of scale – more efficiently producing greater amounts of output.