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The US Safety Net, Crop Profitability, and a Floor on Cost of Production

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Since 1980, the US crop safety net has been countercyclical to aggregate net return for the 9 crops that USDA (US Department of Agriculture) reports cost of production (hereafter, COP). Payments have risen (declined) as aggregate market return fell below (rose above) aggregate COP for the 9 crops. The safety net thus creates a floor under aggregate cost of producing these crops, explaining why cash land rents have not declined despite the large decline in crop prices and returns since 2012.

Background

Measuring the farm safety net's impact on crop profitability is not straightforward. Many commodity programs, including ARC (Agriculture Risk Coverage) and PLC (Price Loss Coverage), pay on past, not current, acres planted to a program crop. Moreover, a farm does not have to plant the crop receiving a payment. Payment is thus to a farm, not a crop. However, past and current acres planted to program crops overlap notably. Using data from USDA FSA (Farm Service Agency) (2020c) and USDA NASS (National Agricultural Statistical Service) (2020), during the 2014 Farm Bill 85% of all acres planted to program crops were planted on historical base acres, 86% of base acres planted to a crop were planted to a program crop, and 98% of base acres and 98% of acres planted to program crops were 1 of the 9 COP crops. Even if the COP crop receiving a farm payment was not planted, one of the other 8 COP

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crops was most likely planted by the farm receiving the payment. Farm safety net payments are thus available to cover cost of producing COP crops as a group, implying the safety net's impact on profitability can be examined for the 9 COP crops as a group.

Overview of Data and Procedures

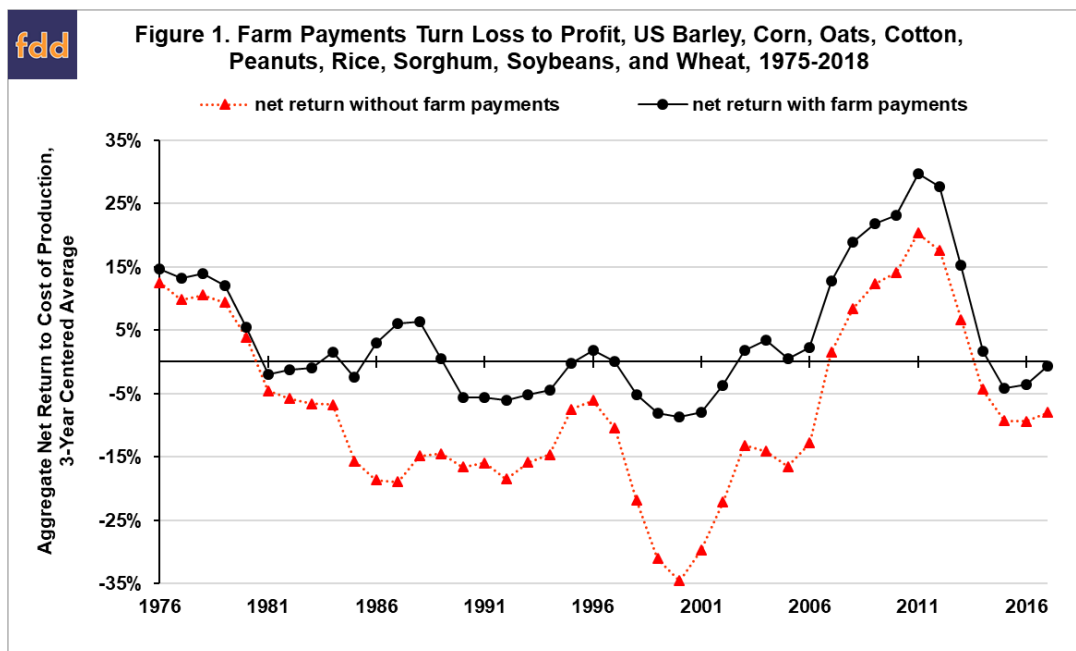
Since 1975, USDA ERS (Economic Research Service) has compiled COP for these 9 program crops: barley, corn, cotton, oats, peanuts, rice, sorghum, soybeans, and wheat. Returns are also computed using market price at harvest and yield. Total cost and market net return per planted acre for a crop are multiplied by US acres planted to the crop for the year. These values, along with safety net payments, are summed for the 9 COP crops for each year. A 3-year centered average of the ratio of aggregate net return, with and without safety net payments, to aggregate COP is calculated. For example, the ratio for 2017 is the average of the ratios for 2016, 2017, and 2018. This average dampens year-to-year variability while taking into account that farm payments may occur the next year. The appendix has more discussion of the data and procedures.

Safety Net Payments and Profitability

The 3-year centered ratio of aggregate net return for the 9 COP crops from the market at harvest (hereafter, market net return) is negative for 30 of 42 observations, including the 26 observations from 1981 to 2006 (see Figure 1). Average loss is -15% for the 30 negative observations. The largest loss is -35% (2000). Adding safety net payments to market net return changes the story. Observations with a loss drop to 18. The longest run of losses is 6 years (1990-1995). The average loss is -2%, and largest loss is -9% (2000). Note, USDA uses an economic measure of cost. Thus, it includes a wage payment to unpaid farm labor and a rent payment to owned land.

Across all years, safety net payments transform a -7% per year average aggregate market loss into a +4% per year average profit for the COP crops. And, farm payments are measured conservatively. Most *ad hoc* and emergency payments are not included since they cannot be identified by commodity.

Market net return was positive for 12 of the 42 observations, divided between two periods of prosperity: 1976-1980 and 2007-2013. Average market net return was 9% and 12%, respectively. Adding in farm payments resulted in much higher profits of 21% in the second period vs. 12% in the first period. In the 1970s, most farm programs were countercyclical; thus, payments were small. In contrast, during 2007-2013, the 9 COP crops received \$4.8 billion per year in fixed, non-countercyclical payments.



2018 Payments – Average in Size

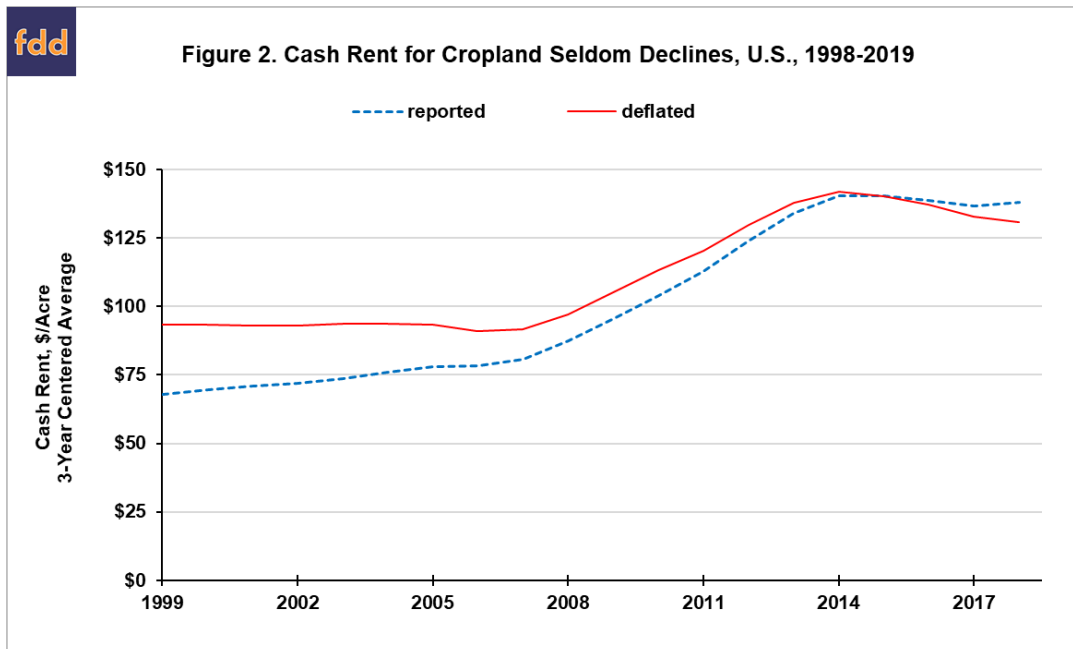
Safety net payments for the 2018 COP crops totaled \$13.6 billion, composed of \$3.0 billion in ARC and PLC payments, \$2.3 billion in net crop insurance payments, and \$8.1 billion in MFP (Market Facilitation Program) payments. The latter offset losses from trade disruptions that followed the US imposition of tariffs on imports from targeted countries (American Farm Bureau). They turn a market net return loss for the 9 COP crops of -8% into a +2% profit. The 10 percentage point (pp) increase is slightly less than the average 13 pp average increase for years when a market loss occurs. On the other hand, farm payments turned a market loss into a profit in only 8 years prior to 2018.

2019 Payments – High, but Not Highest

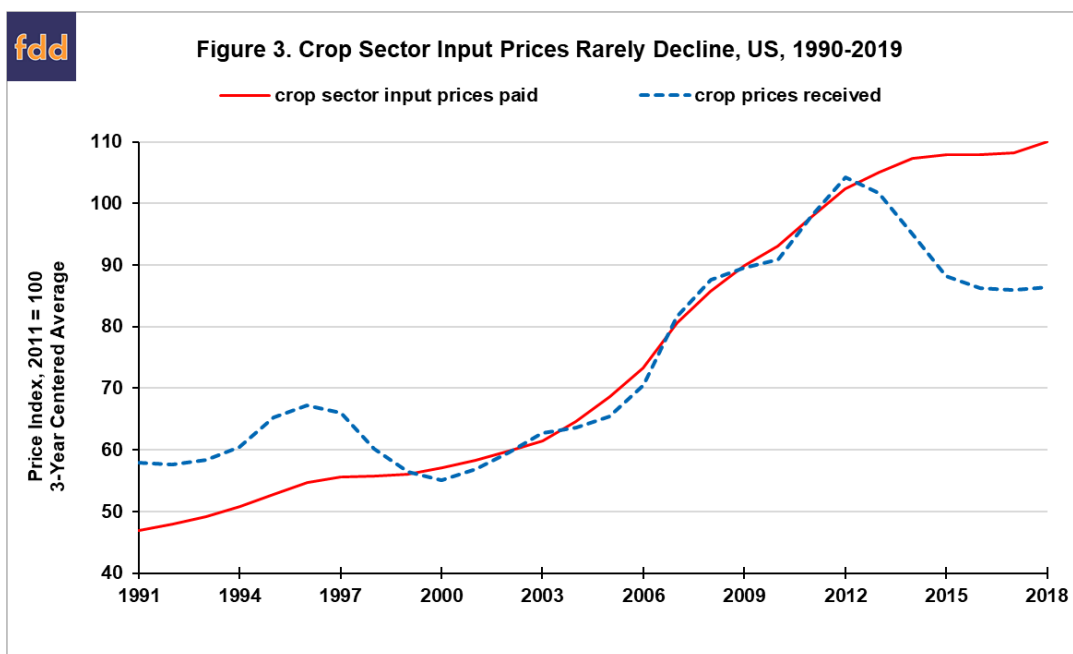
Safety net payments for 2019 are not final, but a reasonable estimate of \$25.8 billion can be made. USDA Farmers.gov is currently reporting for non-specialty crops MFP payments of \$13.6 billion and an estimate of \$3.7 billion in CFAP (Coronavirus Food Assistance Program) payments. Most of these payments will go to the 9 COP crops. These crops have also received \$5.4 billion in net insurance payments (USDA RMA) and are estimated to receive \$3.0 billion in ARC / PLC payments (Congressional Budget Office). ARC / PLC payments are expected to be higher due to COVID-19 price declines. Aggregate COP and market net return loss for the 2019 COP crops total \$128.7 and -\$14.6 billion, respectively (USDA ERS). The estimated safety net payments turn the market loss into an \$11.1 billion profit ($-\$14.6 + \25.8). Relative to COP, market loss of -11% ($-\$14.6 / \128.7) becomes a +9% profit ($+\$11.1 / \128.7). The 20 pp increase is the eighth largest. The largest is 30 pp in 1987. The +9% profit is the third highest among years with a market loss. It is exceeded only by 13% in 1987 and 11% in 1988. It is also interesting to note that net crop insurance plus ARC / PLC payments would have reduced the loss to -5% ($(-\$14.6 + \$5.4 + \$3.0) / \128.7). This loss is within the historical range of net returns with safety net payments, although it is toward the low end (see Figure 1).

Floor on Land Rent and Cost of Production

Strong evidence exists that crop safety net payments impact cash land rents (Kirwan and Roberts, and the literature reviewed therein). Because the COP crops are 80% of US principal crop acres (USDA NASS, 2020) and are profitable as a group after farm payments are included, it is not surprising that average US cash rent for cropland has rarely declined since this data became available in 1998 (USDA NASS, 2020) (see Figure 2). Using a 3-year centered average to be consistent with Figure 1, cash rent rose even in 1999-2002 when market net return was -20% or lower each year. Cash rent has declined from its high of \$140/acre in 2014 and 2015, but by less than -2%. Figure 2 also contains cash rent deflated by the Gross Domestic Product Deflator. Base year, or the year equal to 100, for the GDP deflator is 2015. Inflation's impact on Figure 2 is generally marginal as it has been low since the late 1990s. The post-2013 decline is larger after adjusting for inflation, -7.7% vs. -1.7%. Note, US average cash rent for cropland is the focus of this discussion. Differences will exist by state. Also, other factors have supported land rents, including increasing productivity and low and generally declining interest rates since the late 1990s.



Taking a broader perspective, since 1990 when data starts, the 3-year centered average of the index of all crop input prices paid by US farms has declined only once, in 2016 by -0.03% (see Figure 3). In contrast, the 3-year centered average of the index of crop prices received by US farms has declined in 10 of the 27 observations. Largest decline was -9% in 1996, followed by -7% in both 2014 and 2015. Since 2012, crop prices have declined -17% while crop input prices have risen +7%.



Concluding Observations

Since at least 1980, US crop safety net payments have been countercyclical to aggregate net return from the market from producing the 9 COP crops as a group. Safety net payments rose (declined) as aggregate market return declined below (rose above) aggregate cost of production.

The countercyclical-to-net-return feature of the crop safety net has held across major changes in policy (Coppess; and Orden, Paarlberg, and Roe). It is unclear if this feature is the outcome of a long-standing policy objective to avoid a 1980 style financial crisis or is the cumulative long-run consequence of repetitive short-run reactions to political pressure to forestall large current or looming farm losses.

Impact of 2018 safety net payments on the aggregate profitability of the 9 program crops for which USDA compiles cost of production is about average in magnitude. Impact of 2019 farm payments on profitability is estimated to be among the highest but not the highest since 1980.

US farmers as a group appear to understand that the countercyclical-to-net-return feature of the farm safety net creates a floor under cost of production. In particular, they did not bid more for cash rents during the 2007-2013 period of prosperity than has been sustained by net income from the market plus crop safety net payments since the prosperity ended.

The floor on cost of production means the US crop sector cannot adjust to competitive market pressures by reducing cost of production.

Other adjustment mechanisms exist (Orden, Paarlberg, and Roe; and Gardner). An important one has been increasing productivity. Another one has been growing demand faster than supply.

What is not obvious is if either of these mechanisms will be effective in the current situation. Yields are increasing faster in major competitors than in the US (Paulson, et al.). This is commonly attributed to the rapid diffusion of agricultural technology by companies who have a global reach. Ethanol, more broadly biofuel, demand has been growing slowly since 2010 (Zulauf).

If the two mechanisms are no longer feasible and other adjustment mechanisms fail to emerge, not being able to adjust cost downward may constrain the US farm sector to a future of declining market share. Stated differently, is the plunge since 1996 in US share of world corn, soybean, and wheat exports from 72% to 35%, 70% to 37%, and 33% to 14%, respectively (Zulauf, et al.), “a canary in the coal mine?”

A potential policy dilemma may loom. Is a cut in safety net assistance needed to allow cost of production to decline to improve competitiveness of US agriculture?

References

American Farm Bureau Federation. 2019. “Mapping the \$8.5 Billion in Trade Assistance: Reviewing MFP Payments by Commodity and State.” *Market Intel*. June 12. Available online: <https://www.fb.org/market-intel/mapping-8.5-billion-in-trade-assistance>

Congressional Budget Office. 2020. CBO's Baseline for Farm Programs as of March 6, 2020 Adjusted for Sequestration. Available online: <https://www.cbo.gov/system/files/2020-03/51317-2020-03-usda.pdf>. March 19.

Coppess, J. 2018. *The Fault Lines of Farm Policy: A Legislative and Political History of the Farm Bill*. University of Nebraska Press: Lincoln and London.

Gardner, B. L. Good, K. 2002. *American Agriculture in the Twentieth Century: How It Flourished and What It Cost*. Harvard University Press.

Kirwan, B. E. and M. J. Roberts. 2016. “Who Really Benefits from Agricultural Subsidies? Evidence from Field-Level Data.” *American Journal of Agricultural Economics* 98(4, July): 1095-1113.

The National Agricultural Law Center. 2020. Copies of all U.S. farm bills. June. Available online: <http://nationalaglawcenter.org/farmbills/>

Orden, D., R. Paarlberg, and T. Roe. 1999. *Policy Reform in American Agriculture: Analysis and Prognosis*. Chicago: University of Chicago Press.

Paulson, N., G. Schnitkey, K. Swanson, J. Coppess and C. Zulauf. "World Market Conditions Suggest Set-Asides Not an Effective Farm Policy for Corn and Soybeans." *farmdoc daily* (10):127, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, July 10, 2020.

US Department of Agriculture, Economic Research Service. 2020a. Commodity Costs and Returns. June. Available online: <https://www.ers.U.S.da.gov/data-products/commodity-costs-and-returns.aspx>

US Department of Agriculture, Economic Research Service. 2020b. Documentation: USDA Cost of Production Data. June. Available online: <https://www.ers.U.S.da.gov/data-products/commodity-costs-and-returns/documentation/>

US Department of Agriculture, Economic Research Service. 2020c. Farm Income and Wealth Statistics. February. Available online: <https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/>

US Department of Agriculture, Farm Service Agency. 2020a. ARC/PLC Program. June. Available online: https://www.fsa.U.S.da.gov/programs-and-services/arcplc_program/index

US Department of Agriculture, Farm Service Agency. 2020b. Commodity Estimates Books and Reports. June. Available online: <https://www.fsa.U.S.da.gov/about-fsa/budget-and-performance-management/budget/commodity-estimates-book-and-reports/index>

US Department of Agriculture, Farm Service Agency. 2020c. Personal communication. April.

US Department of Agriculture, Farmers.gov. 2020a. Coronavirus Food Assistance Program Cost-Benefit Analysis. May 14. Available online: <https://www.farmers.gov/sites/default/files/documents/CFAP%20CBA%205%2015%202020.pdf>

US Department of Agriculture, Farmers.gov. 2020b. Market Facilitation Program: Payment Report. July 13. Available online: <https://www.farmers.gov/manage/mfp>.

US Department of Agriculture, National Agricultural Statistics Service. 1976-1989. *Agricultural Statistics*. U.S. Government Printing Office. Available online: https://www.nass.usda.gov/Publications/Ag_Statistics/index.php

US Department of Agriculture, National Agricultural Statistics Service. 2020. QuickStats. June. Available online: <http://quickstats.nass.U.S.da.gov/>

US Department of Agriculture, Risk Management Agency. 2020. Summary of Business. June. Available online: <http://www.rma.U.S.da.gov/>

Zulauf, C. "Has Ethanol Increased Total US Corn Use?" *farmdoc daily* (9):219, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, November 20, 2019.

Zulauf, C., N. Paulson, J. Coppess, G. Schnitkey and K. Swanson. "Land Retirement – Part II: US Role in World Crop Markets and Effectiveness of Retiring US Land." *farmdoc daily* (10):120, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, July 1, 2020.

Appendix: Data and Procedures

The *Agriculture and Consumer Protection Act of 1973* authorized collection of cost of production data, in part to adjust support prices. An economic measure of cost is used by USDA. It thus includes a payment to unpaid labor and owned cropland. Economists label this return, opportunity cost. As part of a major change in methodology, cash rent replaced a composite of cash and share rent as owned land's opportunity cost while an opportunity wage rate for farm operators working off the farm replaced the farm labor wage rate as unpaid labor's opportunity cost. These changes were initiated with 1995 peanuts and sorghum and completed with 2005 oats. For a discussion of the methodology changes, see USDA ERS (2020b).

Crop safety net payments include payments by commodity programs and crop insurance, provided they are reported for the COP crops individually or collectively. Such data exists for these commodity programs: Average Crop Revenue Election, Agricultural Risk Coverage, certificate exchange, cotton, cotton ginning, cotton transition, countercyclical, direct, feed grain, loan deficiency, marketing loan, Price Loss Coverage, Production Flexibility Contract, rice, and wheat. Sources are USDA ERS farm income and wealth data (2020c), USDA FSA ARC/PLC Program data (2020a), and USDA FSA Commodity Estimates Books and Reports (2020b).

Crop insurance payments are insurance payments to US farms minus insurance premiums paid by US farms. Insurance data are from USDA *Agricultural Statistics* for crops prior to 1989 and USDA, RMA Summary of Business thereafter.

Post 1974 commodity programs that did not make payments but impacted market prices were annual acreage set asides, nonrecourse loans, marketing quotas, and public stocks. Their price impacts should be reflected in the price at harvest that USDA ERS uses to compute revenue per planted acre in the COP data files.

COP data are compiled by crop year. Crop insurance and FSA data are available by crop year. However, farm income and wealth data are reported by calendar year. This reporting difference is one reason the analysis uses a centered 3 year average.

Most *ad hoc* and emergency payments are not included in the analysis since they are not available by crop. An exception was Oilseed payments for the 1999 and 2000 crops; almost all went to soybeans. *Ad hoc* payments by the Market Loss Program for the 1998-2001 crops, Market Facilitation Program for the 2018 and 2019 crops, and Coronavirus Food Assistance Program for 2019 crops are included. They are available by crop.

Acres are from *Quickstats* (USDA NASS, 2020). Harvested acres were used for oats. Less than a third of the acres planted to oats are currently harvested.