Is ARC-CO acting as a Safety Net Program? Evidence from Iowa

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THE AGRICULTURAL Act of 2014, referred to as the 2014 Farm Bill, is the legislative backbone of federal farm income support programs and agricultural disaster assistance programs. These programs, combined with federal crop insurance, are what is typically referred to as the farm safety net. As the debate has begun for the next version of the Farm Bill, policy discussions have centered on improving the effectiveness of the safety net. However, in previous Farm Bills, there had been a concerted effort to utilize decoupled agricultural support to ensure that US farm programs would meet World Trade Organization (WTO) standards. The commodity programs in the 1996 and 2002 Farm Bills were led by the direct payment programs—essentially fixed decoupled payments that flowed to agricultural producers, regardless of the agricultural economy. In the 2008 and 2014 Farm Bills, commodity programs were modified to react to conditions in the agricultural economy. Congress must determine how to balance decoupled agricultural programs, which are less responsive to the agricultural economy but more accepted in the WTO, against safety net agricultural programs, which are more responsive but also seen as more trade distorting.

Current commodity programs include the Price Loss Coverage (PLC) and the Agricultural Risk Coverage (ARC) programs. PLC provides payments when low prices occur and it can be considered a price safety net program. The ARC program at the Individual Level (ARC-IC) provides coverage against low income for an operation, and it can also be considered a farm revenue safety net program. The ARC program at the County Level (ARC-CO) is based on area revenue, decoupled from farm yields and prices. ARC-CO can be considered a revenue safety net program, but given the decoupling from farm yields and prices, its effectiveness is an open question. In fact, ARC-CO can be characterized as a lottery of government payments with probability of payment less than one, equal prizes per base acre within each county, and great variability in prizes across county lines. However, ARC-CO is a very popular program. Base acres enrolled in ARC-CO account for 75 percent of total program base acres in the nation. Furthermore, 92 and 96 percent of corn and soybean base acres are enrolled in the ARC-CO program. The accumulated ARC-CO payments for corn and soybean base acres in 2015 and 2016 amount to nearly $9.2 billion, and represent 89 percent of all ARC-CO payments for all covered commodities, and 71 percent of all ARC-CO and PLC payments in the nation over the same period. Many farmers, in essence, traded the direct payment program for ARC-CO. Did their trade result in a better safety net for agriculture? Plastina and Hart (2018) explore this question by analyzing the distribution of ARC-CO payments across different groups of mid-sized commercial Iowa farms with different income levels, profit levels, as well as liquidity and solvency levels. We summarize the evidence pointing towards a disconnection between ARC-CO payments and farm incomes and profits reported in Plastina and Hart (2018).

As the debate has begun for the next version of the Farm Bill, policy discussions have centered on improving the effectiveness of the safety net.

The database contains nearly 700 observations of mid-sized commercial farms actively managed from 55 of Iowa's 99 counties, and all agricultural districts in Iowa, and covers the production and financial aspects of the farms. Each point in the database is a farm-year combination and accounts for ARC-CO payments made in 2015 and 2016 (corresponding, respectively, to crop years 2014/15 and 2015/16).

ARC-CO Payments by Crop Income

Table 1 shows the descriptive statistics of ARC-CO payments per acre by crop income (accrued) per acre in the previous year for all farm-year combinations (those that received or did not receive payments). Per acre incomes and payments are examined to remove the effect of farm size from the analysis. The median payment for all categories was zero, and the average payments tended to increase with the level of crop income in the previous year. This is counterintuitive for a safety net program, as one would likely expect lower incomes to be paired with higher program payments. A pairwise comparison of average ARC-CO payments for all farm-year combinations (those that received or did not receive payments) across groups of farms using Tukey's Studentized Range (HSD) tests at the five percent confidence level, which indicates that: (*a*) farms with the

Table 1. ARC-CO Corn and Soybean Payments per Operated Crop Acre by Crop Income per Acre in Previous Year for All Farm-year Combinations

Crop income in previous year	N	Mean	Median	Min	Max	Std
a) <$600	157	$1.84	$0	$0	$62.38	$8.28
b) $600 to $700	209	$5.29	$0	$0	$68.80	$14.82
c) $700 to $800	143	$7.30	$0	$0	$65.93	$16.61
d) >$800	93	$9.16	$0	$0	$87.77	$22.44
e) N/A	82	$2.29	$0	$0	$71.93	$11.94
All	684	$5.08	$0	$0	$87.77	$15.21

Table 2. ARC-CO Corn and Soybean Payments per Operated Crop Acre by Crop Income per Acre in Previous Year For Farm-year Combinations That Received Payments in 2015 and 2016

Crop income in previous year	N	Mean	Median	Min	Max	Std
a) <$600	12	$24.08	$23.87	$0.61	$62.38	$19.72
b) $600 to $700	33	$33.49	$37.42	$0.55	$68.80	$21.30
c) $700 to $800	28	$37.26	$40.57	<$0.01	$65.93	$17.10
d) >$800	16	$53.22	$59.00	$1.76	$87.77	$24.26
e) N/A	3	$62.52	$65.57	$50.07	$71.93	$11.24
All	92	$37.79	$43.30	<$0.01	$87.77	$22.06

largest crop income per acre (>$800) received significantly higher ARC-CO payments per acre than farms with up to $600 in crop income per acre—$9.16 vs. $1.84, respectively; (*b*) farms with crop income between $700 and $800 per acre received significantly higher ARC-CO payments per acre than farms with up to $600 in crop income per acre—$7.30 vs. $1.84, respectively. All other pairwise comparisons across groups of farms with known crop incomes in the previous years are not statistically significant.

Table 2 shows the descriptive statistics of ARC-CO payments by crop income (accrued) in the previous year only for those farm-year combinations that received payments. A similar pattern to that in Table 1 is observed, as average payments tend to increase with the level of crop income in the previous year. A pairwise comparison of average ARC-CO corn and soybean payments per acre across farms grouped by crop income in the previous year using HSD tests at the five percent confidence level indicates that: (*a*) the average payment for the group of farms with more than $800 in crop income per acre, $53.22, is significantly larger than the average payment received by farms with crop income up to $600 per acre, $24.08, and farms with crop income between $600 and $700 per acre, $33.49; (*b*) average payments for the three groups of farms with up to $800 in crop income per acre ($24.08, $33.49, and $37.26) are not significantly different among themselves.

Since ARC-CO payments tend to increase with crop incomes in the previous year, the ARC-CO program seems to fail at protecting farmers against low incomes. In fact, operators with higher incomes are the ones who tend to capture the higher payments under ARC-CO.

ARC-CO Payments by Crop Profits

Crop profits are calculated by subtracting accrued operating expenses and economic depreciation (on machinery and equipment and buildings and improvements) from crop income (accrual). Profits equal the net farm income that is used to compensate unpaid family labor, plus returns to equity and management. As with crop incomes, the crop profits are examined on a per acre basis to remove farm size effects.

Table 3 shows the descriptive statistics of ARC-CO payments by crop profits in the previous year for all farm-year combinations. The median payment for all categories was zero. A pairwise comparison of average ARC-CO payments for all farm-year combinations across groups of farms using HSD tests at the five percent confidence level indicates that: (*a*) the average payment for the group of farms with crop profits larger than $150 per acre, $12.67, is significantly larger than the corresponding averages for the four groups of farms with profits up to $100 per acre—$3.08, $5.39, $4.43, $and $3.60; (*b*) the average payment for the group of farms with crop profits between $100 and $150 per acre is significantly larger than the corresponding average for the group of farms with crop losses of up to $50 per acre—$11.19 vs. $3.08, respectively. All other pairwise comparisons across groups of farms with known crop profits in the previous years are not statistically significant. Once again, the results are generally the opposite of what one would expect from a safety net program. Those farmers with the lowest crop profits (or largest crop losses) tended to receive less from ARC-CO than farmers with better profitability.

Table 4 shows the descriptive statistics of ARC-CO payments by crop profits in the previous year only for those farm-year combinations that received payments. A pairwise comparison of average ARC-CO corn and soybean payments across farms grouped by crop profits fails to find significant differences using HSD tests

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numbers for 2018 are encouraging. Table 4 displays USDA's projections and, as with production, the numbers are higher across the board. Both pork and beef enjoyed roughly 10 percent export growth in 2017. Beef is expected to gain another four percent in 2018, while pork is projected to grow five percent during the year. Broiler and turkey exports are expected to grow as well.

Thus, the underlying agricultural story for 2018 may be due to the global demand for meat. Currently, the surge in meat consumption globally has improved livestock market returns and led to significant increases in production. That is, in turn, providing support for the crop markets, at a time when those markets need a usage boost. Combined, the projections indicate a slight improvement in the US agricultural economy, but the emphasis is on the word "slight." Price improvement is a hard thing to come by when records continue to be set on the production side.■

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more firms into agriculture and further boost productivity. Studies have found that land productivity dramatically increases after transfers (e.g., by 60 percent according to Jin and Klaus' 2009 estimate). Overall, we believe the recent developments in China's land policy are pushing both crop and animal production toward larger scales.

Key Policies Governing Land Use and Conversion in China

- **The "Redline" of farmland** is the lowest limit of arable land in 2020, about 300 million acres, set by the Chinese government in 2006.
- **Permanent basic cropland** is the 255 million acres of designated high cropland that is subjected to stricter protection from conversion to urban use.
- **The "Increase-decrease linkage" policy** (started in 2006) allows local governments to convert certain amounts of arable land to urban uses if they create an equal or larger amount of arable land from rural construction land (e.g. farmhouses).
- **The "Grain for green"** (started in 1999) policy returns marginal farmland in ecologically sensitive areas to forestry.

Data Sources and References:

Brown, Sara. 2017. "China's High-rise Hog Hotel." Agweb.com. https://www.agweb.com/article/chinas-high-rise-hog-hotel-naa-sara-brown/

China Agricultural Development Report 2016 (Chinese)

China Statistical Yearbook. 2007. (Chinese) http://www.stats.gov.cn/tjsj/ndsj/2017/indexch.htm

Chinaidr.com. 2018. "The Current Upscale Operations in Chinese Agriculture and Future Development." (Chinese) http://www.chinaidr.com/tradenews/2018-01/117465.html

Chongqing Municipal Government. 2016. The Methods to Administrate Land Tickets. (Chinese)

Food and Agriculture Organization of the United Nations (FAO). 2018. Land Use Data http://www.fao.org/faostat/en/#data/RL

Ministry of Agriculture (MOA). 2018. "Current Rural Operation and Management." http://www.jgs.moa.gov.cn/txjsxxh/201801/t20180105_6134218.htm

Southern Weekend. 2010. "Forcing Farmer into High-rise Buildings may be Unconstitutional." http://www.infzm.com/content/52105

State Council. 2004. "State Council's Decision to Deepen Reform and to Apply Stricter Land Management." http://www.gov.cn/zwgk/2005-08/12/content_22138.htm

United Nations Population Division. 2017. "World Population Prospects 2017." *https://esa.un.org/unpd/wpp/Download/Standard/Population/*

United States Department of Agriculture Foreign Agriculture Service. 2017. "China: Livestock and Products Semi-annual." https://www.fas.usda.gov/data/china-livestock-and-products-semi-annual-2

Zhang, W. and M. Li. 2018. "Navigating the Chinese Agricultural Economy through the Lens of Iowa." Ag Decision Maker, February 2018. ■

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at the five percent confidence level. This slightly modifies the previous pattern, as once ARC-CO payments are triggered, they are roughly shared equally across the profit spectrum. In terms of crop profitability, the ARC-CO payments act more like decoupled payments in those counties where payments are triggered, and less like a safety net for all farms.

Conclusions

Using farm-level data from Iowa, we found no support to the hypotheses that ARC-CO payments would be larger for farms with lower incomes or lower profits. On the contrary, we found support that ARC-CO payments tend to be larger for farms with higher crop incomes and profits in the previous year. In summary, ARC-CO payments, instead of acting as a safety net for Iowa farmers, can be more accurately characterized as decoupled support for farms located in counties where payments are triggered, but without the consistency of previous programs, such as the direct payment program. In the end, farmers traded the certainty of the direct payment program for a lottery of government payments with probability of payment less than one, equal prizes per base acre within each county and great variability in prizes across county lines.

Table 3. ARC-CO Corn and Soybean Payments per Operated Crop Acre by Profits in Corn and Soybean Enterprises in Previous Year for All Farm-year Combinations

Crop Profits in previous year	N	Mean	Median	Min	Max	Std
a) <-$50	162	$3.08	$0	$0	$87.77	$12.07
b) -$50 to $0	116	$5.39	$0	$0	$87.14	$16.15
c) $0 to $50	130	$4.43	$0	$0	$62.38	$14.06
d) $50 to $100	88	$3.60	$0	$0	$59.72	$11.00
e)$100 to $150	48	$11.19	$0	$0	$74.79	$22.37
f) >$150	58	$12.67	$0	$0	$67.04	$21.66
g) N/A	82	$2.29	$0	$0	$71.93	$11.94
All	684	$5.08	$0	$0	$87.77	$15.21

Table 4. ARC-CO Corn and Soybean Payments per Operated Crop Acre by Level of Profit in Corn and Soybean Enterprises in Previous Year for Farm-year Combinations That Received Payments in 2015 and 2016

Crop Profits in previous year	N	Mean	Median	Min	Max	Std
a) <-$50	14	$35.66	$37.63	$3.08	$87.77	$23.53
b) -$50 to $0	16	$39.07	$38.99	$2.15	$87.14	$24.39
c) $0 to $50	13	$44.30	$45.02	$6.04	$62.38	$14.60
d) $50 to $100	13	$24.34	$22.38	$0.55	$59.72	$18.17
e) $100 to $150	13	$41.33	$46.27	<$0.01	$74.79	$24.73
f) >$150	20	$36.76	$41.26	$1.29	$67.04	$21.81
g) N/A	3	$62.52	$65.57	$50.07	$71.93	$11.24
All	92	$37.79	$43.30	<$0.01	$87.77	$22.06

Acknowledgements

The authors greatly appreciate the ongoing collaboration between the Iowa Farm Business Association and Iowa State University Extension and Outreach. The views expressed are those of the authors and should not be attributed to Iowa State University or the Iowa Farm Business Association. This study was partly funded in part by the Hatch/Multi-State Project IOW05521 and Hatch/NIFA Project Number 1010309.

Reference

Plastina, A., and C. Hart. 2018. "Is ARC-CO acting as a Safety Net Program? Evidence from Iowa." *Choices* (forthcoming). ■

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Hungria, Mariangela, Rubens José Campo, and I. de C. Mendes. 2001. "Fixação Biológica do Nitrogênio na Cultura da Soja." Embrapa Soja; Brasília, DF: Embrapa Cerrados.

Junior, Valdemar João Wesz. 2011. "Dinâmicas e Estratégias das Agroindústrias de Soja no Brasil". Vol. 4. Editora E-papers.

Levin, Jonathan. 2003. "Relational Incentive Contracts." *The American Economic Review* 93(3): 835–57.

Rezende, Christiane Leles. 2008. "Pacta Sunt Servanda? Quebra Dos Contratos de Soja Verde." Ph.D. Dissertation, Universidade de São Paulo.

Silva, Felipe Prince. 2012. "Financiamento da Cadeia de Gãos no Brasil: O Papel das Tradings e Fornecedores de Insumos."■