

Unintended Consequences: The 1980 Soviet Grain Embargo and Land Values in US Agriculture

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In this paper, I analyze the domestic ramifications of the 1980 Soviet grain embargo. Using data from the United States Census of Agriculture for the years 1978 and 1982, I attempt to empirically quantify the effect of the embargo on land values in US agriculture. My findings suggest a negative domestic effect, in which the embargo led to a relative decline in land values for US counties specializing in grain production prior to the embargo.

Introduction:

In December of 1979, the Soviet Union invaded Afghanistan in an effort to gain control over the political direction of the country and ensure the survival of a friendly socialist regime on its border.¹ This move was met with condemnation from the United States and its European allies, who were working to contain the spread of Soviet influence during the Cold War. In response, the Carter administration enacted economic sanctions and trade embargoes against the Soviet Union, including a grain embargo on corn, soybean, and wheat exports from the United States. The grain embargo was an attempt to wield economic influence over the Soviets based on the United States' "food power;" it was the first time that the United States limited food exports to the Soviet Union "in pursuit of a noncommercial, foreign policy objective."² The embargo stopped all grain exports to the Soviet Union in excess of the 8 million tons required by prior agreements, leaving a 17 million ton drop from expected US grain imports. Many expected the embargo to successfully check the Soviets; poor weather had hurt the grain harvest within the Soviet Union, and the country was planning to import record amounts of grain in 1980—35 million tons, 25 million of which were supposed to come from the United States.³ However, as a foreign policy tool, the embargo was much less effective than expected. The embargo reduced shipments from the US but did not successfully reduce the availability of grain for the Soviet Union worldwide. The United States never obtained official guarantees from other countries to limit exports to the Soviet Union.⁴ Consequently, the Soviets imported grain from other countries, and, at least partially, made up for the loss in Soviet grain imports left by the US embargo.

While most foreign policy experts would agree that the embargo's effect on the total Soviet grain supply was much less severe than expected, the domestic consequences of the embargo are more uncertain. Immediately after the embargo took effect, the US Department of Agriculture implemented measures to mitigate any negative ramifications the embargo might have for US farmers.⁵ In his announcement of the embargo, President Carter said he was "determined to minimize any adverse impact on the American farmer from this action" and that "the undelivered grain [would] be removed from the market through storage and price support programs and

¹ <https://history.state.gov/milestones/1977-1980/soviet-invasion-afghanistan>

² Paarlberg.

³ Ibid.

⁴ Luttrell, 3.

⁵ <http://www.heritage.org/trade/report/the-soviet-grain-embargo>

through purchases at market prices.”⁶ Price data for the period show that, while prices for corn, soybeans, and wheat fell in the few days following the embargo announcement, prices quickly recovered to pre-embargo levels.⁷ Some point to these data and argue that the Department of Agriculture’s efforts effectively protected farmers and businesses from any serious negative shocks of the embargo. However, this argument ignores longer-term shifts in demand for US corn, soybeans, and wheat caused by the embargo. During the embargo, the Soviet Union began to source grain elsewhere. It is possible that the Soviets continued that practice well after the embargo ended if the United States appeared to be an “unreliable supplier.”

The 1980 Soviet grain embargo may have been damaging for the US farm sector; however, evaluating its domestic consequences is a complex task. The issue is that the embargo coincided with a broader farm crisis in the 1980s. According to Gary Clyde Hufbauer (2007), the embargo may have “imposed a welfare loss” on US farm sector; however, that effect is difficult to quantify. He notes that farm income plummeted in the 1980s but that it is hard to disentangle how much of that decline was due to the embargo and how much was due to other factors.⁸ According to a much-contested USDA report released in 1986, the embargo did not cause the farm crisis.⁹ Instead, the report claims that factors such as a rising US dollar, global recession, and high real interest rates led to the decline in US farm income and land values. High interest rates certainly presented a problem for land values, considering higher rates make it more difficult to service debt on land purchases. Rising interest rates also make investment in farmland less attractive as other financial assets provide a relatively larger return. While high interest rates among other factors were certainly damaging to the US farm sector, Hufbauer (2007) still notes that, due to the embargo, US farmers “lost a significant share of the Soviet market” and that “these lost sales to the Soviet Union probably imposed a welfare loss to US farmers through their effect on prices and stunted trade opportunities.”

Changes associated with agricultural legislation around the time of the embargo may have affected the profitability of producing particular crops as well, further complicating the task of isolating the effects of the embargo. The Food and Agriculture Act of 1977 increased price and

⁶ Luttrell, 2.

⁷ Ibid.

⁸ According to the FDIC, real farm income dropped 52.6% to \$22.8 billion in 1980 (https://www.fdic.gov/bank/historical/history/259_290.pdf)

⁹ https://www.joc.com/grain-embargo-dispute-rages_19861221.html

income supports for farmers. The Agricultural Adjustment Act of 1980 further increased the level of income protection available to farmers participating in commodity programs authorized by the 1977 bill.¹⁰ Additionally, The Agriculture and Food Act of 1981 modified commodity programs and set target prices through 1985.¹¹ In 1984, amendments to the 1981 bill introduced paid land diversion for feed grains, upland cotton, and rice.¹² While these pieces of legislation certainly affected the farm sector, it is not clear that their provisions drastically changed the profitability of grain farming during or after the embargo.

This paper seeks to empirically explore the effect of the 1980 grain embargo on domestic land values. While the embargo only lasted 16 months before President Ronald Reagan repealed it, I posit that longer-term effects of the embargo on international demand for US crops could have depressed land values in the United States. To my knowledge, there exists no empirical work on the effect of the embargo on US land values. However, a better understanding of the domestic consequences of the embargo is important as government officials should take into account the domestic consequences of an embargo before deciding to use one as a foreign policy tool. This paper builds upon a body of literature investigating the political efficacy of the grain embargo. Tomaro (1987) suggests that the United States lost footing in the international wheat market during the embargo. He analyzes the trading activities of other countries that supplied wheat to the Soviet Union before and after the time of the embargo to determine, just like Hufbauer (2007), that the US lost ground relative to other major suppliers in the Soviet market. Luttrell (1980) claims that the embargo led to inefficiencies in the grain market, in which countries other than the Soviet Union increased imports of US grain and then sold more grain to the Soviet Union in order to fill the void left by the loss in US imports. Luttrell argues that this market loophole increased costs to both the Soviet Union and US farmers, but he offers no figures quantifying that negative effect on US farmers.

Using county-level agriculture data from over 3,000 US counties in 1978 and 1982, I compare changes in agricultural land values for counties with high and low proportions of harvested cropland planted in grain in 1978 to estimate the 1980 grain embargo's effect on land values in the United States. This approach should offer a clearer picture of the embargo's domestic

¹⁰ <http://www.presidency.ucsb.edu/ws/index.php?pid=33155>

¹¹ Womach, 13.

¹² Ibid.

ramifications in order to better inform similar policy decisions in the future. Results of my main specification suggest the embargo had a negative effect on agricultural land values in counties with more grain harvested in 1978. I also run a regression with a host of non-grain crop controls in order to compare the differential effect of the embargo on land values in parts of the country planting grain vs non-grain crops. Again, with the exception of two unexpected outcomes for cotton and sorghum, results suggest that the embargo led to a relative decline in land values for cropland planted in corn, soybeans, and wheat as opposed to non-grain crops.

Theoretical Framework:

The 1980 grain embargo on the Soviet Union may have depressed the value of cropland devoted to grain in the US. Even if the US government's efforts to mitigate the immediate negative effects of the embargo were largely successful, longer-term consequences of the embargo may have depressed land values. When President Carter imposed the embargo, the Soviet Union moved to sourcing the embargoed crops from nations other than the United States, including Argentina, Canada, and Australia.¹³ In 1986, American Soybean Association economist Tommy Eshleman asserted that the 1980 embargo, along with other export controls in the decade, led to lost markets and likely a label for the US as an "unreliable supplier" of soybeans. Tomaro's (1987) work analyzing the international wheat market supports this argument, showing that the US share of Soviet wheat imports dropped in the years after the embargo. This shift in Soviet preferences away from US grain and toward that of other countries likely led to a decrease in total demand for US grain, lowering the profitability of grain production in the US and subsequently depressing land values in counties with a comparative advantage in producing grain prior to the embargo.

It is possible that farmers may have simply switched to growing crops with higher relative demand than corn, soybeans, and wheat after the embargo. As production of the embargoed crops became less profitable, we would expect a certain quantity of producers (farmers) to react to that change and choose to produce a different, more profitable crop. However, the legal environment at the time of the embargo limited, to some extent, farmers' ability to make such changes. From 1933 to 1996, farmers in the US were subject to varying levels of supply controls that limited their ability to plant whichever crops they chose. This policy of supply controls did not change until the Federal Agriculture Improvement and Reform Act or "Freedom to Farm Act" of 1996. This bill

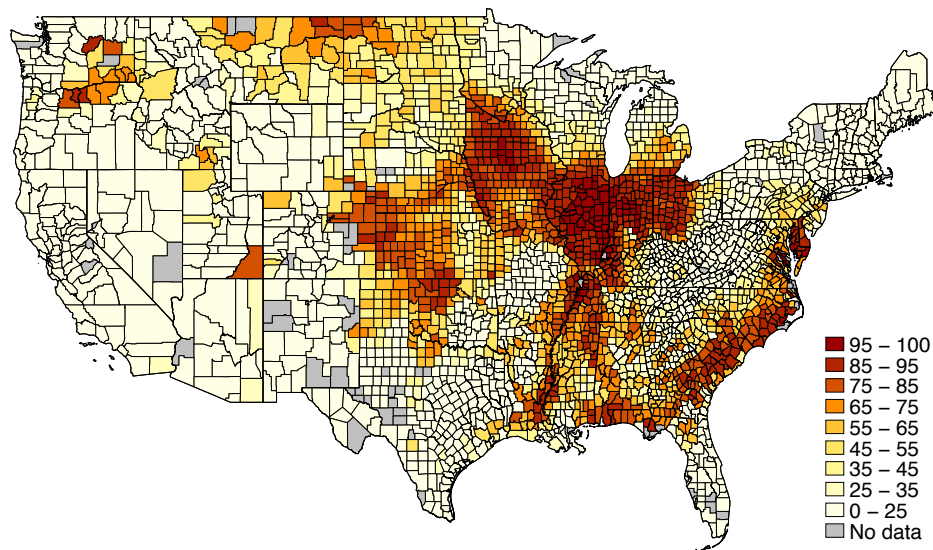
¹³ <https://www.cia.gov/library/readingroom/docs/CIA-RDP08S01350R000200370002-4.pdf>

eliminated “set asides,” offering more flexibility for farmers to plant whichever crops were most profitable for them.¹⁴ The rigidity of supply controls would have made farming profits less resistant to any particular shock, leading to a possible decrease in land values when crop production was not able to adapt to the negative demand shock associated with the 1980 grain embargo.

Data:

I use county-level ICPSR US Census of Agriculture data for the years 1974, 1978, 1982, 1987, and 1992. Variables of interest include the value of land, total acreage of harvested cropland, and acreage of harvested corn, soybeans, and wheat. The main sample encompasses 3,018 counties throughout the United States for the year 1978. Figure 1 shows a map of all counties included in my main specification. Shading denotes the percentage of cropland in each county devoted to corn, soybeans, or wheat in 1978.

Figure 1—Percentage of Cropland Planted in Corn, Soybeans, or Wheat in 1978



I include observations for both 1978 and 1982 in the main regression specification—two years before and after the US imposed the grain embargo on the Soviet Union. To construct the final dataset, I joined individual datasets for the years 1974, 1978, 1982, 1987, and 1992 based on FIPS codes for the counties in each dataset. Essentially, the combined datasets yield panel data for the five years. In the empirical model posed in the next section of the paper, the outcome variable of

¹⁴ https://aede.osu.edu/sites/aede/files/publication_files/Zulaut%20-%20Freedom%20to%20Farm%20and%20Acreage%20Shifts.pdf

interest is the value of agricultural land in 1982. Variables for the 1974 and 1978 value of land and 1974 and 1978 harvest figures capture pre-1980 characteristics. I use data from 1974 in order to identify any potential pre-trend in land values before 1978. I also use data from 1987 and 1992 to evaluate the long-term effects of the embargo. I generated variables for total harvested embargo crops and harvested embargo crops as a fraction of total cropland based on variables taken directly from the US Census of Agriculture dataset. To generate the total harvested embargo crops variable, I summed the “selected crops harvested” variables for corn, soybeans, and wheat. The variable for harvested embargo crops as a fraction of total cropland is the quotient of total harvested embargo crops over harvested cropland. Table 1 shows summary statistics for the variables of interest. It is important to note the high mean values for harvested corn, soybeans, and wheat as a fraction of total harvested cropland in each county in the sample. These values highlight the fact that these three crops make up a significant portion of the farm economy in the US.

Table 1—Summary Statistics

Variable	Mean (Std. Dev) N	
	1978	1982
Land in farms (acres)	660,844 (3,894,377) N=3,014	640,965 (3,788,558) N=3,017
Value of land and buildings: avg. per acre (dollars)	896 (917) N=3,018	1,114 (1,010) N=3,018
Total cropland (acres)	301,956 (1,675,704) N=2,965	295,051 (1,637,323) N=2,979
Harvested cropland (acres)	209,120 (1,168,697) N=3,018	216,867 (1,211,968) N=2,985
Selected crops harvested: Corn for grain or seed (acres)	45,731 (386,303) N=3,018	45,775 (391,806) N=3,018
Selected crops harvested: Soybeans for beans (acres)	40,065 (303,121) N=3,018	41,933 (310,896) N=3,018
Selected crops harvested: Wheat for grain (acres)	35,230 (307,490) N=3,018	46,114 (357,857) N=3,018
Total harvested embargo crops (acres)	121,026 (781,635) N=3,018	133,822 (843,525) N=3,018
Harvested corn as fraction of total cropland (acres)	0.165 (0.189) N=3,018	0.162 (0.183) N=2,985
Harvested soybeans as fraction of total cropland (acres)	0.168 (0.221) N=3,018	0.174 (0.216) N=2,985
Harvested wheat as fraction of total cropland (acres)	0.095 (0.179) N=3,018	0.142 (0.190) N=2,985
Harvested embargo crops as fraction of total cropland (acres)	0.428 (0.318) N=3,018	0.479 (0.334) N=2,985

Notes: Summary statistics only for observations in main specification. Summary statistics for 1982 corn, soybeans, and wheat as fraction of total cropland include less observations than 1978 due to lower number of observations for harvested cropland variable.

Empirical Model:

In the main empirical model, I use an OLS estimation of the average changes in land value between 1978 and 1982 for counties with a comparative advantage in producing corn, soybeans, and wheat in 1978 relative to counties harvesting other crops in 1978. The outcome variable of interest is the value of land in 1982 in a given county j . I regress the 1982 value of land

($LandValue82_j$) on variables for the acreage of corn, soybeans, and wheat harvested in 1978 as a percentage of total harvested cropland in 1978 ($PCTEmbargoCrops78_j$), the value of land in 1978 ($LandValue78_j$), the value of land in 1974 ($LandValue74_j$), a state fixed effect (δ_{State}), and an error term (\mathcal{E}_j):

$$(1) \ln(LandValue82_j) = \alpha + \beta_1(PCTEmbargoCrops78_j) + \beta_2 \ln(LandValue78_j) + \beta_3 \ln(LandValue74_j) + \delta_{State} + \mathcal{E}_j$$

The coefficient of interest, β_1 , can be interpreted as the percentage difference in land value between a county with all of its cropland planted in embargo crops in 1978 relative to a county with none of its cropland planted in embargo crops in 1978. As mentioned above, due to the embargo on corn, soybeans, and wheat, we would expect a negative association between a higher proportion of cropland planted in embargoed crops in 1978 and the value of land in 1982 for a given county j . Consequently, we would expect β_1 to be negative, indicating lower land values for counties with a higher proportion of cropland in corn, soybeans, and wheat in 1978 relative to counties with a lesser proportion of these crops in 1978.

The key identifying assumption is that counties with different proportions of cropland planted in corn, soybeans, and wheat would have changed similarly if not for the 1980 Soviet grain embargo. While other factors could affect the relative changes in the value of land for counties between 1978 and 1982, this identification assumption should hold after controlling for the 1978 value of land as well as state characteristics. The addition of a control for the 1974 value of land should account for any sort of pre-trend in land values prior to 1978.

Pre-trend Falsification Test:

When evaluating the effect of the embargo on land values in US agriculture, it is important to account for any possible pre-trend in land values prior the enactment of the embargo. To check for such a pre-trend, I alter the main regression specification and regress the average land value in 1978 on the average land value in 1974 and the percentage of cropland planted in soybeans and wheat in 1974. I also regress the average land value in 1978 on soybeans, wheat, and a host of non-grain crop controls. While data limitations did not allow for the inclusion of 1974 “corn for grain” data, this test still allows for a sharper interpretation of the main results. Results in Table 2 indicate a significant pre-trend of declining land values prior to 1978 for cropland planted in grain. However, this pre-trend is not limited to grain crops as I also find a pre-trend of declining land

values for land planted in cotton, hay, and peanuts. To account for the pre-trend of declining land values, the main regression specification includes a control for the value of land in 1974.

Table 2—Pre-trend Relationship Between Proportionality of Embargo Crops and Land Values

	Log Land Value, 1978	
	(A) Pooled Embargo Crops Variable	(B) Crops as Fraction of Total Cropland
<i>Harvested Embargo Crops as Fraction of Total Cropland, 1974</i>	-0.210*** (0.035)	-
<i>Soybeans</i>	-	-0.206*** (0.035)
<i>Wheat</i>	-	-0.658*** (0.034)
<i>Cotton</i>	-	-0.635*** (0.057)
<i>Hay</i>	-	-0.720*** (0.009)
<i>Irish Potatoes</i>	-	-0.274 (0.193)
<i>Peanuts</i>	-	-0.494*** (0.071)
<i>Tobacco</i>	-	-0.117 (0.133)
<i>Log Land Value, 1974</i>	0.618*** (0.032)	0.706*** (0.009)
<i>N</i>	3,076	3,038

Notes: Table reports estimates from Equation (1) in the text, for the log value of land and buildings per acre of farmland in 1978. Reported in parentheses are robust standard errors clustered by county. Results weighted by total cropland in each county. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Results:

Main Results:

Results are reported in Table 3. Controlling for the 1974 and 1978 value of land, the coefficient on harvested embargo crops as a fraction of total cropland (Row 1) is negative and statistically significant at the 1 percent level. We can interpret the coefficient on harvested embargo crops as a fraction of total cropland in 1978 as follows: a 10 percent increase in a county's cropland planted in corn, soybeans, and wheat in 1978 is associated with a 1.06 percent drop in the value of its land by 1982. Table 1 shows that the 1982 mean value of land per acre in the sample is \$1,114.

With farms on a scale of tens and even hundreds of acres, this relative drop in land values is significant. This estimate is consistent with the theory that farmers producing more corn, soybeans, and wheat in 1978 would have experienced a decrease in land values relative to those producing other crops at the time.

Table 3—Relationship Between Proportionality of Embargo Crops and Land Values

	Log Land Value, 1982	
	(A) Main Specification: Pooled Embargo Crops	(B) Crops as Fraction of Total Cropland
<i>Harvested Embargo Crops as a Fraction of Total Cropland, 1978</i>	-0.106*** (0.018)	-
<i>Corn</i>	-	-0.177*** (0.041)
<i>Soybeans</i>	-	-0.174*** (0.045)
<i>Wheat</i>	-	-0.153*** (0.037)
<i>Barley</i>	-	0.147* (0.076)
<i>Cotton</i>	-	-0.194*** (0.045)
<i>Hay</i>	-	-0.076* (0.042)
<i>Irish Potatoes</i>	-	-0.160 (0.108)
<i>Oats</i>	-	-0.008 (0.107)
<i>Peanuts</i>	-	-0.068 (0.072)
<i>Rice</i>	-	0.002 (0.072)
<i>Sorghum</i>	-	-0.181*** (0.062)
<i>Sugar Beets</i>	-	0.070 (0.320)
<i>Tobacco</i>	-	-0.122 (0.107)
<i>Log Land Value, 1978</i>	0.670*** (0.028)	0.667*** (0.028)
<i>Log Land Value, 1974</i>	0.270*** (0.025)	0.268*** (0.026)
<i>N</i>	3,018	3,025

Notes: Reported in parentheses are robust standard errors clustered by county. Results weighted by total cropland in each county. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Additionally, the results of the second regression suggest that the embargo's negative effect was mostly limited to the embargoed crops; the coefficients on corn, soybeans, and wheat are all large and statistically significant. With the exception of cotton and sorghum, coefficients on a range of other non-grain control crops are either positive or not statistically significant. While it is curious that the coefficients on cotton and sorghum are large and statistically significant, it is possible that there is some confounding variable that differentially affected corn and sorghum at the time. It is also possible that sorghum and cotton are simply grown in similar regions of the country as the embargo crops. I test this possibility using a Spearman rank correlation between cropland planted in the embargo crops and cropland planted in cotton and sorghum. I find a correlation coefficient of 0.33 (statistically significant at the 1 percent level) between the percentage of cropland planted in wheat and percentage of cropland planted in sorghum. I also find a correlation coefficient of 0.18 (statistically significant at the 1 percent level) between the percentage of cropland planted in soybeans and percentage of cropland planted in cotton. While these figures only show a modest correlation between planting patterns for sorghum and wheat as well as cotton and soybeans, they show that there is some overlap between land planted in the embargo crops, cotton, and sorghum. This overlap could at least partly explain the negative coefficients on cotton and sorghum in the main results. Overall, the results suggest that the 1980 grain embargo had a significant negative domestic effect on the value of land planted in grain, even with the Department of Agriculture's immediate efforts to hold up the price of corn, soybeans, and wheat.

Long Term Effect:

Results from the main specification indicate that the 1980 grain embargo had a significant negative effect on land values by 1982. However, 1982 data do not offer a clear picture of the long-term consequences of the embargo. It is possible that 1982 was so soon after the embargo that land prices had not yet incorporated information about decreased demand for US grain. It is also possible that the results from the main specification represent the full extent of the embargo's effect and that the embargo's effect proceeded to diminish over time. To evaluate the long-term consequences of the embargo, I alter Equation (1) by replacing average land value in 1982 with average land value in 1987 and 1992, respectively. Results are shown in Table 4.

Table 4—Long Run Relationship Between Proportionality of Embargo Crops and Land Values

	Log Land Value	
	1987	1992
<i>Harvested Embargo Crops as Fraction of Total Cropland, 1978</i>	-0.353*** (0.022)	-0.363*** (0.021)
<i>Log Land Value, 1978</i>	0.379*** (0.040)	0.410*** (0.037)
<i>Log Land Value, 1974</i>	0.509*** (0.041)	0.584*** (0.038)
<i>N</i>	3,018	3,019

Notes: Table reports estimates from Equation (1) in the text, for the log value of land and buildings per acre of farmland in 1987 and 1992. Reported in parentheses are robust standard errors clustered by county. Results weighted by total cropland in each county. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Results indicate that the long-term effect of the embargo was larger than the effect by 1982. The negative and statistically significant coefficients on the variable for harvested embargo crops as a fraction of total cropland suggest that a 10 percent increase in a county’s cropland planted in grain correlates to an over 3 percent relative decline in land values by 1987 and 1992. While these results support the theory that the embargo had a negative effect on land values, it is important to note that the long run regressions are more susceptible to noise based on factors associated with the downturn in US farming during the 1980s other than the grain embargo.

Conclusion:

In hindsight, the 1980 US grain embargo on the Soviet Union was a questionable political move. Prior research on the subject suggests that the embargo had a much smaller effect on the Soviet grain supply than expected. Further, the results of this paper suggest that the embargo negatively affected land values in the United States, even as the US government tried to artificially support the prices of corn, soybeans, and wheat during the embargo. This analysis suggests that agricultural export embargoes may not be the most effective punitive measure for the US government to employ in the future. At the very least, it suggests that the US should ensure

multilateral agreement from other countries before implementing such a measure. This type of international cooperation would ensure that other exporters did not diminish the political efficacy of the embargo on the target country. In addition, it would help limit market space losses for the United States as an international supplier.

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