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Why Have Some Farmers Opposed Futures Markets?

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CENTER FOR THE STUDY OF THE ECONOMY AND THE STATE
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WHY HAVE SOME FARMERS OPPOSED FUTURES MARKETS?

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Working Paper No. 42

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ABSTRACT

The explanation of why some farmers opposed futures markets throughout the nineteen twenties and thirties has eluded economists. This paper advances a self-interest explanation for this opposition. It shows that political opposition to futures markets was greater in the grain-producing states than in other states. The opposition in the grain-producing states was not evenly distributed but was concentrated in Minnesota, North Dakota, South Dakota, Montana and a few other states. The line elevator companies were prominent in these states and not others and used futures prices to facilitate a buying cartel. Futures prices were used as reference prices to derive a common buying price to offer the producer in each local market. The political opposition to futures by farmers was designed to eliminate futures prices and to raise the cost of operating a buyers cartel. Two self-interest hypotheses - the cartel and the private information hypothesis - are tested. Supporting evidence is found for the cartel hypothesis and to a lesser extent for the private information hypothesis. Profit per bushel and gross margins are higher in the northwest states while political opposition to futures is greater in those states where farmers had more private information.

INTRODUCTION

Farmers have not always looked kindly on futures exchanges. Not many economists are familiar with farmer opposition but those that are consider it a conundrum. Farmer opposition throughout the last quarter of the 19th century and the first quarter or so of this century seems inexplicable. Some consider it irrational. Farmers should benefit either directly or indirectly from futures trading. Although few farmers used futures to hedge, middlemen, the buyers of farm products, have long used futures to hedge their purchases from farmers. Grain elevators frequently hedge their wheat purchases from the farmer. Prohibiting the use of futures would force these elevators to use less efficient hedging substitutes and would thereby reduce the derived demand for the wheat. Prohibiting the use of futures would have the same qualitative effect on the farmer as prohibiting the paving of rural roads.

This paper reconsiders the role of self-interest in explaining why farmers opposed futures markets. It detects opposition to futures markets through the political market, by Senate votes supporting legislation opposing futures markets. Three votes on bills to ban or to tax futures taken in the twenties and thirties are examined, first by region and then by state. The votes trace out an interesting pattern. Political opposition was not uniformly distributed across the farm states. Rather, opposition to futures markets was concentrated in the West North Central region, the grain producing region of the country. But even in this region political opposition was not evenly distributed but was greater in the northwest states, Montana, North Dakota, South Dakota, Minnesota and a few other states. This geographical pattern of political opposition is peculiar and needs to be explained.

Section 1 of the paper looks at voting evidence. Though the opposition to futures markets was greater in the grain-producing states, this opposition

was not hard and fast but was malleable and diminished when farmer self-interest was affected. A good example of this was the critical vote on the Black Amendment. This amendment was considered by Congress in 1931 and, if passed, would have harmed wheat farmers by prohibiting the use of futures by a government agency as part of a federal wheat price stabilization program during the 1930-31 season. Senators from these wheat producing states ignored their long-standing opposition to futures transactions and supported the use of futures by the price stabilization agency. The votes cast by senators from the Northwest states on the Black Amendment show how quickly farmer opposition to futures markets melts when the price of that opposition increases. The most plausible explanation for this turn about is that grain farmers felt the price stabilization program would have been harmed if the use of futures had been banned. One of two conclusions may be drawn from the votes on the Black Amendment. One can conclude that farmers were mildly opposed to futures markets as long as their self-interests were not unduly affected or that their long-term opposition to futures could have a self-interest motivation just as their opposition to the Black Amendment did.

Section II presents a self-interest explanation for the opposition to futures by farmers in the Northwest states. The self-interest theory explains why the opposition to futures was concentrated in selected wheat producing states of the northwest and not elsewhere. The essence of the argument is that the market structure of the elevator market was different in the northwest states. Only in these grain-producing states were elevators owned in substantial numbers by line elevator companies. These companies owned a large number of elevators scattered throughout the northwest states. In other states the elevators were largely owned individually. In an interesting twist, the line companies used the futures price as a reference price to

derive a common suggested buying price policy in each local market and to facilitate a buying cartel. Some supporting qualitative evidence consistent with the cartel theory is reviewed. Section III tests the cartel theory and another alternative, the private information theory. Evidence consistent with the cartel theory is 1) profit per bushel was higher for line elevators than independents and cooperative elevators and 2) the gross margin was higher for elevators in the northwest states than elsewhere. Political opposition to futures is found to be greater in those states where farmers had private information. The paper ends with a summary.

I. Legislative Proposals to Tax or Prohibit Futures, Limit Speculation and to Raise Farm Prices

Throughout the late twenties and the thirties the Senate voted on proposals; 1) to change the tax on or to ban the use of futures and 2) to prohibit the use of futures by the Federal Farm Board. The state and regional pattern of votes on these different proposals will identify the sources of regional and state support for each type of legislation.

The two types of legislative proposals are:

1. Bills or Amendments to Tax or Ban Futures:

Three bills or amendments were introduced in 1927, 1928 and 1938 and considered by the Senate. These proposals would have either banned or changed the tax on futures transactions.¹ The Senate defeated each proposal. These three proposals were selected because they focused exclusively on futures transactions. Political support for the taxation of futures is measured by the percent of votes favoring higher taxes or a ban. A brief description of these proposals is given in Appendix A.

2. Black Amendment to Prohibit the Use of Futures by the Federal Farm Board:

With the onset of the Depression the Federal Farm Board, which had been formed after the passage of the Agricultural Marketing Act in 1929, attempted to stabilize wheat prices. It established minimum wheat prices for the 1930-1931 season by buying wheat in both the spot and futures markets. Upon learning that the Federal Farm Board was employing futures in its price support program, Senator Black of Alabama asked the Senate in 1931 to prohibit the Federal Farm Board from using futures markets as part of its stabilization program.

Table 1 shows the percentage of votes in each census region that supported the three proposals to tax or to ban futures (column 1), and the Black Amendment to ban the use of futures by the Federal Farm Board (column 3). Columns 2 and 4 show each region's percentage relative to the percentage for the West North Central region. The greatest opposition to futures came from the West North Central region, the grain producing center of the country. Considerable though less support for these proposals came from the West South Central region another region with a populist tradition. The commercial and industrial regions of the country mustered the strongest opposition to any restrictions on commercial transactions. The pattern of votes on the Black Amendment contrast to those on the futures proposals. The West North Central region had championed a ban or a tax on futures but showed great timidity in prohibiting the Federal Farm Board from using futures. It is clear that the vote on the Black Amendment did not conform to the usual regional pattern of votes on anti-futures legislation.²

Table 1: Votes on Bills to Tax or Ban Futures
and on the Black Amendment

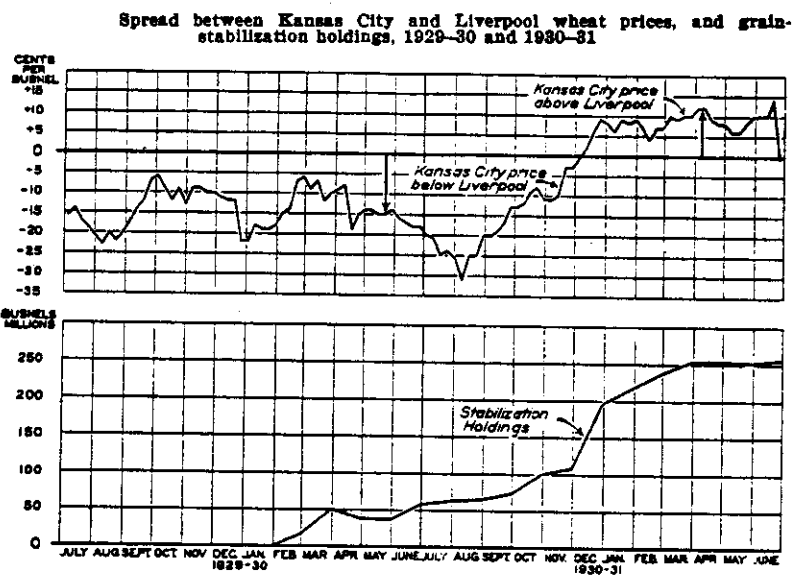
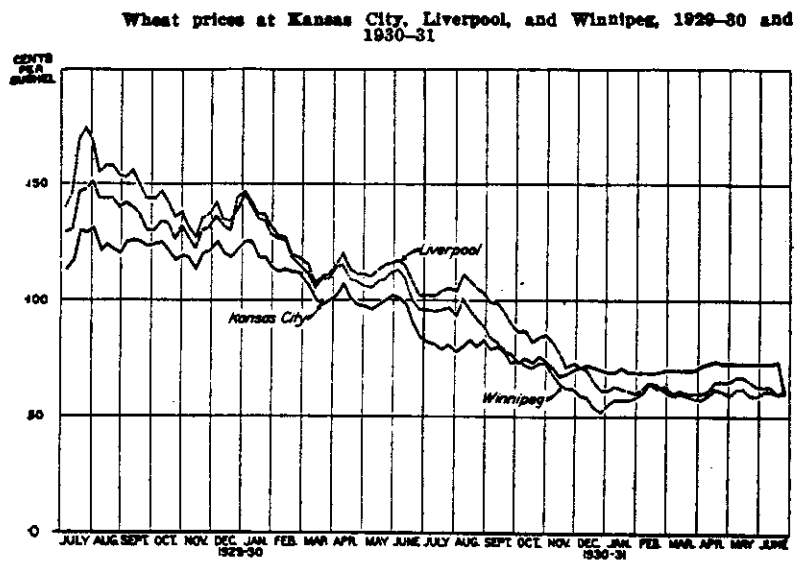
Percent of Votes Supporting				
Region	Tax on Futures		Black Amendment	
	Percent	Region Percent Relative to West North Central	Percent	Region Percent Relative to West North Central
	(1)	(2)	(3)	(4)
1. United States	44	.66	33	1.32
2. New England	10	.15	11	.44
3. Middle Atlantic	00	.00	00	.00
4. East North Central	33	.49	30	1.20
5. West North Central	67	1.00	25	1.00
6. South Atlantic	34	.51	44	1.76
7. East South Central	20	.30	63	2.52
8. West South Central	55	.82	75	3.00
9. Mountain	30	.45	27	1.08
10. Pacific	46	.69	17	.68

If the prairie states had opposed futures markets because of a general opposition to speculation and gambling, there should have been broad-based support from the West North Central states for the Black Amendment. The actual vote suggests not. What special factors could explain this anomaly?

A. The Farm Board and Opposition to the Black Amendment

Senators from the West North Central region had good reason to oppose the Black Amendment. The Federal Farm Board was not equipped to deal with nor did it comprehend the severity of the Depression. During the first year of the Depression the Federal Farm Board assumed the decline in demand for agricultural crops was temporary and agricultural prices would stabilize and then rise. It issued several predictions about the future course of farm prices, all of which proved fatally optimistic. It began intervening in the wheat and cotton markets in the 1929-1930 season. On November 15, 1930 the Board decided to defend a minimum price for wheat for the remainder of the 1930-1931 season. It began buying wheat at the announced price in the spot market and in the futures market with the expectation of taking delivery. The price set by the Board proved to be a generous one because the futures prices in Minneapolis and Kansas City which had been below the Liverpool futures price, soon rose above the Liverpool price. The lower panel of figure 1 shows the time path of the difference between the Kansas City futures price and the Liverpool futures price from July, 1929 to July, 1931. Not surprisingly, stabilization holdings grew rapidly as the price differential shifted in favor of Kansas City (U.S. Federal Farm Board, pp. 37-48). The Stanford Food Institute estimated that possibly 40% of the 1930 crop was sold at higher prices because of the stabilization program.³ There

Figure 1



As stabilization wheat holdings increased, our markets rose in relation to world markets and during the last part of the season were much higher than they would otherwise have been.

is less evidence that domestic cotton prices were affected by the stabilization program though substantial quantities of cotton were purchased by the Cotton Stabilization Corporation. Domestic and world cotton prices moved down together throughout this period.

The Federal Farm Board bought and sold futures as part of its program to maintain minimum wheat prices and to assure the credit soundness of cooperatives and banks. The Board never offered a clear statement of why it engaged in both spot and futures transactions. It could have announced and supported a cash price throughout the 1930-1931 season. If this policy was believed, farmers and elevators would have little reason to rush the sale of wheat to the Board. On the other hand, the Board had already made numerous contradictory shifts in policy. So the Board may have felt it necessary to pre-commit to its price policy by publicly announcing it was buying futures with the expectation of accepting delivery. In this way the market would know that if the Board changed its policy and allowed its prices to fall, the Board would have suffered substantial losses.

With this information at hand the votes cast by the senators from the West North Central region are perhaps less of an anomaly. The grain producing region, particularly the northwest states, had been handsomely rewarded by the Federal Farm Board's policy of supporting wheat prices. The producers of hard spring wheat appeared to have received special consideration by the Farm Board. Unlike the futures prices on the other exchanges the prices for hard spring wheat on the Minneapolis exchange were stabilized earlier and at a pegged price which was above the minimum price reached in November, 1930. Consequently, they would have been foolhardy to oppose the policy of a government agency that had treated them so kindly. The votes cast on the Black Amendment by the West North Central region appear

to be consistent with farmer self-interest. This episode suggests that either farmer opposition to futures was not firmly held and would change whenever farmer self-interest was involved or that the opposition to futures may also have furthered the self-interest of some farmers.

II. A Self-Interest Theory of Farmer Opposition to Futures Market

While opposition to futures markets was greater in the West North Central region than in other regions, it was not uniformly distributed over space but was concentrated in the northwest states. Table 2 shows the percentage of votes favoring a tax on futures and the Black Amendment, for each of the 14 grain producing states. Support for a tax on futures was greater throughout the northwest states, Nebraska and Wisconsin and lower in the older grain producing states where futures were used less often for hedging purposes and where the commercial line elevators were relatively unimportant. In contrast the northwest states and Nebraska were uniformly opposed to the Black Amendment. Any theory of the political opposition to futures cannot ignore this evidence.

If elevator services are competitively priced, farmer interests are best served and land rents maximized when the cost of marketing the crop is minimized. Farmers would then have no interest in banning the use of futures by elevators. They would be harmed by banning the use of futures and thereby by raising the cost of marketing the crop. Therefore, farmer support for such a ban would be rational if 1) the elevator market was not competitively organized and if 2) the line companies used futures prices to facilitate a buying cartel.

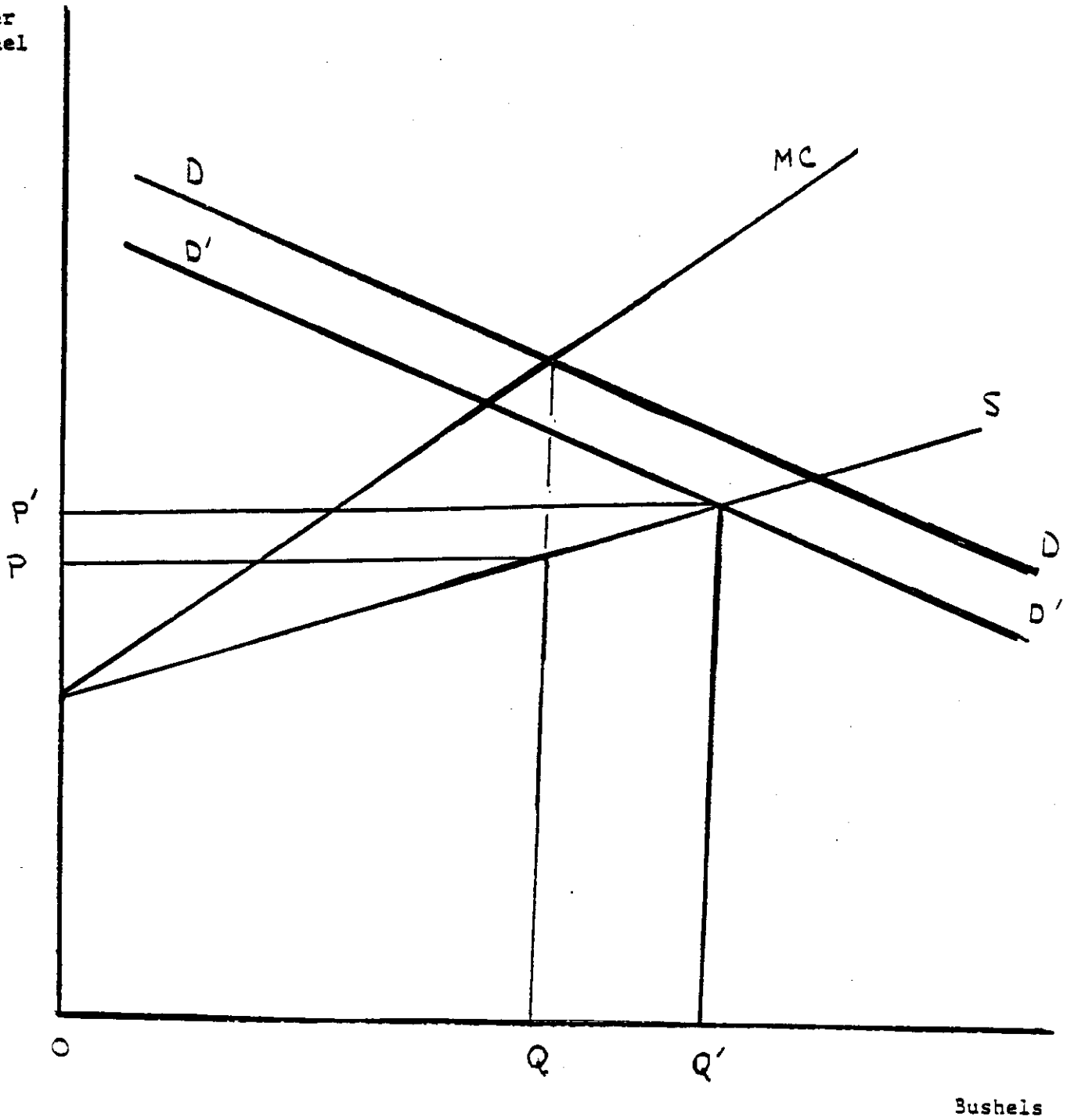
Table 2: Votes on Bills to Tax Futures and the Black Amendment -
Grain Producing States

States	Percent of Votes Supporting Tax on Futures	Percent of Votes Supporting Black Amendment
I. Northwest States		
a. Minnesota	60	00
b. North Dakota	100	00
c. South Dakota	100	00
d. Montana	80	00
Mean	85	00
II. Other States West of Mississippi		
a. Nebraska	100	00
b. Kansas	60	50
c. Iowa	33	100
d. Oklahoma	60	50
e. Missouri	00	100
Mean	51	60
III. States East of Mississippi		
a. Wisconsin	100	100
b. Illinois	00	00
c. Indiana	00	00
d. Michigan	33	50
e. Ohio	20	00
Mean	31	30

Granting these assumptions for the moment, consider how wheat farmers could have benefited if futures had been banned. The second assumption implies a ban would raise the cost of collusion, increase competition among elevators (either at a single station or between stations) and would raise the price received by the farmer. The reduction or elimination of the monopsony power benefits the farmer. On the other hand, a ban on the use of futures would reduce the derived demand for the local grain crop. The elevators would no longer be able to use futures to hedge and would have to turn to less efficient hedging techniques. So a ban could harm farmers by reducing the derived demand for the crop. (This assumes the supply of wheat is not infinitely elastic.) These two effects of a ban are shown in Figure 2 where DD represents the derived demand for wheat by a local monopsonist(s). The supply curve of local wheat is SS and MC is the marginal cost of wheat to the monopsonist. The elevator purchases OQ bushels of wheat at a price of P. Suppose a prohibitive tax is imposed on futures. By assumption the tax raises the cost of collusion (as described more fully below) and the hedging costs of the elevator. The derived demand for the local wheat crop declines to D'D' because the elevators now use less efficient hedging methods. For purposes of illustration the price received by farmers rises to P' and OQ' bushels are purchased because the cartel is assumed to collapse. Obviously, the argument only requires the buying cartel is sufficiently less effective than before so that the quantity purchased increases. Land rents will rise if the number of bushels bought by the now competing elevators increases. Farmers could be harmed if the inefficiency effect dominates the monopsony effect. Assuming the self-interest argument explains the votes cast by senators from the northwest, it implies that monopsony effect dominated the inefficiency effect because the northwest states were the strongest opponents of futures.

FIGURE 2

\$ Per
Bushel



A. Economic Characteristics of Local Elevator Markets

The local elevator markets in the northwest states did differ from those in other grain producing states. Table 3 summarizes selected characteristics of these markets by state. The number of elevators per station was relatively small. There were more elevators per station in the northwest states. This was probably due to the larger size of farm. The distance between stations was also longer in the northwest states and the railroad network was less dense in the northwest states than elsewhere. Hence, there were fewer alternative sources of distribution available to farmers in the northwest. Finally, commercial line elevators accounted for a larger share of all elevators in the northwest states than elsewhere. The economic and structural characteristics of elevator markets were more conducive to monopsony in the northwest states than elsewhere.

There is circumstantial evidence of cartel behavior. Prior to 1905, pooling agreements among elevators and with explicit penalties were in force.⁴ After 1905, pooling arrangements continued but without the penalty provisions. Extensive correspondence between line companies about buying prices was reported in the FTC Report. When there was excessive competition at a station, the elevator of one line company was purchased or closed and the owners of the closed elevator company was compensated either directly or by payments by the remaining elevators on a lease basis.⁵

The line companies developed early in the northwest states and located their elevators at stations where there were fewer competitors. The distribution of the number of elevators per station is available for North Dakota in 1905 and for South Dakota in 1909 and 1927. Table 4 shows the distribution of stations by number of elevators where only line elevators

Table 3: Characteristics of Local Elevator Markets by State

State	Average Number of Elevators Per Station	Average Distance Between Nearest Elevator	Railroad Mileage per 100 Miles of Territory (1916)	Market Share of Commercial Line Elevators
I. Northwest States				
a. Minnesota	2.62	9.68	11.37	46
b. North Dakota	3.28	10.81	7.52	54
c. South Dakota	3.30	11.23	5.57	43
d. Montana	2.38	13.63	3.32	50
Mean	2.90	11.34	6.95	48.3
II. Other States West of the Mississippi				
a. Nebraska	2.50	9.98	8.03	49
b. Kansas	2.50	10.36	11.51	9
c. Iowa	1.97	8.64	17.70	29
d. Oklahoma	2.69	11.70	9.29	21
e. Missouri	1.71	10.94	11.98	11
Mean	2.27	10.32	11.70	23.8
III. States East of the Mississippi				
a. Wisconsin	2.10	9.85	13.89	14
b. Illinois	1.91	6.85	21.63	30
c. Indiana	1.86	7.81	20.63	32
d. Michigan	2.04	9.61	15.46	27
e. Ohio	1.94	7.10	22.28	22
Mean	1.97	8.24	18.78	25.0

Source: United States Federal Trade Commission,
Report on the Grain Trade, (1920), Vol. 1, p. 38, Appendix Table 2.

Table 4: Distributions of the Number of Elevators Per Station

South Dakota (Chicago and Northwestern Railroad)				
Number of Elevators at Station	1909		1927	
	Number of Stations with only Line Elevators	Number of Stations with Independents and/or Farmers Elevators ¹⁾	Number of Stations with only Line Elevators	Number of Stations with Independents and/or Farmers Elevators ¹⁾
1	7	1	16	13
2	11	7	4	23
3	6	10	0	15
4	6	6	0	11
5	1	6	0	3
≥6	0	9	0	1
	<u>31</u>	<u>36</u>	<u>20</u>	<u>66</u>

North Dakota (Great Northern Railroad)				
1905				
1	24	5	Not available	
2	23	9		
3	22	8		
4	6	20		
≥5	13	37		
	<u>88</u>	<u>79</u>		

North Dakota (Northern Pacific Railroad)				
1905				
1	37	8	Not available	
2	32	11		
3	13	18		
4	6	13		
≥5	1	14		
	<u>88</u>	<u>64</u>		

1) Includes stations with at least one farmer and/or independent elevator and with one or more line elevator. Also includes a few stations with just farmer or independent elevators.

Source:

1. Annual Report of the Board of Railroad Commissions, State of South Dakota
2. Annual Reports of the Commissioners of Railroads, State of North Dakota

operated at the station. At the beginning of the 20th century the line elevators were predominantly located at stations where there was only one or two elevators. The independents and farmer elevators tended to locate at competitive stations with a larger number of elevators. Hence, the independents and farmer elevators located in larger markets. Unfortunately, comparisons across time can only be made for South Dakota. The entry of farmer or competitive elevators is vividly reflected in the 1927 data. Though the average number of elevators per station declined between 1916 and 1927, there are fewer stations with only line elevators. It is still true that the line elevators are disproportionately concentrated at stations with only one or perhaps two line elevators.

There were large differences in the size of line companies. Among the elevator companies whose correspondence and records were studied in great detail by the FTC, the average of the number of elevators per company varied from a high 151 to a low of 10.⁶ The problem of coordinating prices between stations is reduced but not completely solved by having line rather than independent single unit companies. There remains the problem of coordinating buying prices among the line companies as well as among the independents. In a market with daily changes in terminal prices, a buying cartel could not succeed by simply posting a fixed buying price. A fixed buying price would be inflexible and would be quickly disregarded during times of rapid change in the cash or futures prices. A mechanism would be needed that would allow for daily price changes and yet facilitate price agreements among the line companies.

B. The Grain Bulletin and Methods of Price Quotation

With the development of futures exchanges in Minneapolis and Duluth in 1881, the line elevators became the primary buyers of wheat in the northwest. The line companies began issuing price lists to their buyers in the country. Mr. Durant operated a price reporting service that was subsidized by 18 large line elevator companies. The service supplied information about buying prices to the operators of the elevators of line companies. Around 1907, the Durant price reporting service became the dominant service in the northwest and began sending The Grain Bulletin Card daily to subscribers. The Grain Bulletin supplied daily price information to most of the elevators in the northwest.⁷

Unlike the price reporting services based in Kansas City, The Grain Bulletin did not supply the elevators with terminal spot prices or with "to arrive" prices, the price for wheat delivered in 20 or 30 days. Rather The Grain Bulletin sent a daily card to each subscriber with a suggested buying price for wheat of each grade. The buying price would be derived after subtracting the freight from the station to the terminal market and a "normal" margin for the elevator from the "to arrive" or futures price. The FTC report presented a detailed illustration where the "to arrive" and then the futures price were used by Mr. Durant as reference prices. The daily closing Minneapolis "to arrive" and futures price for No. 1 dark northern spring wheat are reported from July 15-October 26, 1920.⁸ Between July 15-31 Mr. Durant calculated the card price by subtracting freight and 10 cents off the "to arrive" price. After futures prices declined relative to the spot prices, Mr. Durant switched to the futures price as a reference price from August 2-26. As the market stabilized, he switched back to the "to arrive" price between August 27- October 26.

Except for this illustration no other information is available about when or how frequently the futures price was used as a reference price. The records of The Grain Bulletin have apparently been discarded. What is known is that futures prices were used at times and a prohibition on the use of futures would have impaired the usefulness and the accuracy of the buying price information supplied to elevator operators by The Grain Bulletin.⁹

If futures markets had been banned, suggested buying prices would have to be based on the "to arrive" price, an imperfect substitute. It should also be recognized that the "to arrive" market was not as extensively developed in the northwest since most of the grain was shipped to Duluth or Minneapolis on consignment. The "to arrive" price was typically an offer to buy for a period of 20 or 30 days and therefore could change by different amounts than did the September or December future. The Minneapolis "to arrive" market was a thinner market. Moreover, the availability of futures prices undoubtedly improved the functioning of the "to arrive" market. Adequate data do not exist to determine just how less effective the buying cartels would have been in the absence of futures prices.¹⁰

The cartel agreements among the line elevators appear to have become increasingly less effective over time with the development of the railroad network, the expansion of the farmer elevator movement during the twentieth century and still later with the use of motor transportation. Each of these changes raised the cost of collusion. In the northwest states attempts were made to weaken the local buyer cartels. Laws were passed in Minnesota (1917), North Dakota (1913), South Dakota (1913) and Montana (1913) to prohibit any multi-unit elevator company from offering different prices to farmers (adjusting for freight and with exceptions for "meeting competition") between

stations. This most favored nation requirement reflects the political strength of farmers, and was directed against the line elevators and restricted the line elevator companies from offering discriminatory buying prices between stations.¹¹

The farmer elevator movement developed more extensively in the northwest states than in most other grain producing states. Forward integration by farmers would be expected precisely in local markets where there is monopsony. Only scattered information is available about the growth of cooperative elevators. Table 5 shows the market share of line independent, farmer, and mill elevators in Minnesota for selected years from 1915 to 1928. Between 1915 and 1919 line elevator market share dropped (futures were banned during World War I). Between 1919 and 1928 the market share of the line elevators is fairly stable while the mill elevator share declines as the independents and the farmer elevators grow. The growth of the cooperatives undoubtedly reduced the effectiveness of the local buying cartels by the late twenties. On the other hand, the growth of cooperatives may be a means for some farmers to share in the profits from the monopsony power in local markets. An unanswered question is why political opposition persisted if monopsony power did in fact decline. Political opposition to futures has declined appreciably over time. In sharp contrast to the opposition to futures markets in the twenties and thirties by the West North Central region, was the absence of any political support by the North Central region in 1982 for an administration proposal to tax futures [Pashigian]. Eighty-six percent of the votes cast by senators from the West North Central region in 1982 opposed the proposed tax. This

Table 5: Market Shares of Elevators and of Bushels
of Wheat by Type of Elevator, Minnesota

		Number of Elevators				Bushels (million)					
Year		Line	Ind.	Farmer	Mill	Total	Line	Ind.	Farmer	Mill	Total
1915	N	633	329	247	205	1414	37.1	25.1	37.6	10.0	109.8
	S	44.7	23.3	17.5	14.5		33.8	22.8	34.2	9.1	
1919	N	537	404	390	274	1605	41.2	33.1	64.7	27.6	166.7
	S	33.5	25.2	24.3	17.0		24.8	19.9	38.9	16.4	
1922	N	523	388	447	152	1510	27.7	22.9	56.6	2.6	109.7
	S	34.6	25.7	29.6	10.1		25.2	20.8	51.6	2.4	
1925	N	451	396	399	135	1381	36.4	34.5	69.8	8.6	149.3
	S	32.6	28.7	28.9	9.8		24.4	23.1	46.7	5.8	
1928	N	429	404	370	111	1314	17.7	19.0	38.3	3.3	78.3
	S	32.6	30.8	28.2	8.4		22.6	24.3	48.9	4.2	

N denotes the number of elevators.
S denotes the percentage of market.

Source: Annual Report of the Chief Inspector of Grain to the Minnesota Railroad
and Warehouse Commission, selected years.

kind of opposition to a tax on futures by the East North Central region would have been unheard of in the twenties. So, political opposition to futures markets as reflected in Senate votes has declined over time and it is likely this decline in political opposition is in part due to a secular decline in monopsony power in local elevator markets.

III. Tests of the Cartel and the Private Information Hypotheses

Two testable implications of the cartel hypothesis theory are: (1) the profits of elevators will be higher and (2) prices received by farmers will be lower where the local elevator(s) had monopsony power. Profit and price data are used to determine if the profits of line elevators were higher.¹²

A. Profit Per Bushel and the Gross Margin of Line Elevators

Accounting profit per bushel by type of elevator, as reported in the FTC study of The Grain Trade, is higher for line than for the other types of elevators. In a separate test the gross margin of the country elevator, the difference between the price received and the price paid by country elevators, is found to be higher for elevators located in the northwest states than for elevators located in other states.

The FTC sampled elevators and used profit and loss statements to estimate profit per bushel by type of elevator.¹³ The results reported by the FTC are shown in Table 6. Profit per bushel after adjusting for profits and losses on hedges and for patronage dividends paid by patronage cooperatives was higher for line elevators than for independents or

Table 6

Accounting Profits Per Bushel
by Type of Elevator

Year	Line	Independent	Cooperative
1913-14	\$ 4.52	\$2.64	\$1.78
1914-15	6.09	3.27	2.06
1915-16	4.14	3.63	2.29
1916-17	9.64	5.64	4.17
1917-18	(na)	6.34	4.71
1919-20	12.31	6.55	5.71

Average Number of Bushels of Grain Sold
by Type of Elevator

1913-14	57,028	110,389	185,212
1914-15	50,650	103,113	210,997
1915-16	71,673	102,459	165,544
1916-17	35,919	102,275	144,962
1917-18	(na)	89,675	137,537
1919-20	30,516	98,153	125,852

Percentage Change from
1913-14 to 1919-20

-46%

-11%

-32%

Source: U.S. Federal Trade Commission. Report on the Grain Trade, Vol. IV,
pp. 18,32.

cooperatives. The commercial line elevators shipped fewer bushels of grain per year throughout the period than did the cooperative or the independent elevators (see lower panel of Table 6). So, it could be argued that the higher accounting profit per bushel for line elevators is a result of the smaller volume of line elevators. This explanation is probably not too important because the percentage decline in bushels shipped from 1913 to 1920 was greater for line elevators as a group than for the independents or the cooperatives. Demand apparently declined or supply of grain available for purchase decreased more over this period for the line elevators than for the other types of elevators and this would be expected to reduce the profit per bushel by more for line elevators.¹⁴ Even so, profit per bushel was still higher than that of the independent and cooperative elevators. This evidence suggests the line elevators were more profitable.

Because the line elevators were largely represented in the northwest states, this evidence suggests that elevators in the northwest states had on average higher profit margins than elevators located in other states. Even though these results are supportive of the monopsony hypothesis, they may be discounted because of the well-known limitations of accounting data. It is for this reason that another independent data source was used to determine if comparable results could be replicated.

The second test relies on the prices paid and received by country elevators. The gross margin, the difference between the cash selling price at the terminal market and the price paid to the producer plus transport cost to the terminal market, of elevators located in the northwest states (or of elevators shipping grain to the Minneapolis terminal market) is higher on average than the gross margin of elevators located elsewhere (or shipping to

other terminal markets). The data were collected for use by the Joint Commission, a congressional investigative committee, are available by type of grain for 1912-13, 1915-16, and 1920-21 seasons and are reported for elevators at 69 separate elevator locations scattered throughout the midwestern and the northwest states (U.S. Congress).

The Joint Commission obtained the buying prices for wheat, corn, barley and oats at the country elevators, the closing same-day cash price at the terminal market where the grain was shipped and freight per bushel from the elevator to the terminal market. These price quotations were used to calculate a "gross margin" for the country elevator by subtracting the sum of the buying price and freight from elevator to terminal from the cash price at the terminal. This was done for the crop years of 1912-13, 1915-16, and 1920-21. If the line elevators had monopsony power, the gross margins of the elevators located in the northwest states where most of the line elevators were located, would be higher than the gross margins of elevators located in other midwestern states where the independents and some of the cooperatives were located and where monopsony power is assumed to be lower.

Elevators were grouped into three classes by each of two methods of classification. The first method classifies each elevator by the terminal to which the grain was shipped: (1) Minneapolis (MT); (2) Midwest (MWT), which includes Chicago, St. Louis, Kansas City, Omaha and Milwaukee), and (3) Other (OT), which includes New York, Baltimore, Galveston, San Francisco, New Orleans, and Seattle). The second method classifies each elevator by the state the country elevator was located in: (1) Northwest states (NWE), (2) Other Great Plain states (GPE), and (3) Other states (OE). Dummy variables were assigned to each class. For example, one of regression equations is:

$$\begin{aligned}
\text{El-Marg} = & \quad b_0 \quad + (b_1\text{MWT} + b_2\text{OT} + b_3^{15} + b_4^{20}) \quad \text{Wheat} \\
& + (c_0\text{MT} + c_1\text{MWT} + c_2\text{OT} + c_3^{15} + c_4^{20}) \quad \text{Corn} \\
& + (d_0\text{MT} + d_1\text{MWT} + d_2\text{OT} + d_3^{15} + d_4^{20}) \quad \text{Oats} \\
& + (e_0\text{MT} + e_1\text{MWT} + e_2\text{OT} + e_3^{15} + e_4^{20}) \quad \text{Barley}
\end{aligned}$$

where El-Marg represents the elevator's gross margin. The variables inside the brackets are dummy variables representing either the terminal market the grain was shipped to or the year the grain was shipped. The suppressed dummy variables is wheat delivered to the Minneapolis terminal market. The variables are defined more fully in Appendix B.

If the gross margins are higher for grains shipped to the Minneapolis terminal market or for elevators located in the northwest states, then the results of the test based on buying and selling prices would not be inconsistent with results based on the FTC profit data or with the monopsony hypothesis. It is possible that the higher gross margins in the northwest states could be due to higher costs of elevators operating in the northwest states, perhaps because elevator volume was lower. However, in separate tests not reported here, the gross margin was not found to be related to the average capacity of the elevators in the state. This result suggests that the larger gross margins of elevators in the northwest states are probably not due to higher operating costs per bushel for line elevators.

Regression results are presented in Table 7. Columns 1 and 2 show the coefficient estimates and t statistics when all observations (wheat, corn, barley and oats) are pooled and the terminal dummy variables are used. Columns 3 and 4 show similar results when dummy variables are used for the location of country elevators. Finally columns 5 and 6 show the results when

Table 7: Determinants of Elevator Gross Margin

Variable	(1) Coefficient	(2) t	Variable	(3) Coefficient	(4) t
Intercept	7.57	5.7	Intercept	5.88	4.7
MWT Wheat	≈3.79	2.8	GPE Wheat	≈1.79	1.5
OT Wheat	≈3.08	2.1	OTE Wheat	≈.22	.1
Wheat 15	1.47	1.2	Wheat 15	1.47	1.1
Wheat 20	7.78	6.2	Wheat 20	7.78	6.1
MT Corn	≈.51	.3	NWE Corn	.22	.1
MWT Corn	≈4.29	2.6	GPE Corn	≈2.79	1.7
OT Corn	≈6.90	2.5			
Corn 15	5.46	4.1	Corn 15	5.46	4.0
Corn 20	.23	.2	Corn 20	.23	.2
MT Barley	≈1.91	1.1	NWE Barley	.44	.3
MWT Barley	≈.38	.2			
OT Barley	≈7.56	2.8	OTE Barley	≈5.86	2.1
Barley 15	.15	.1	Barley 15	.15	.1
Barley 20	1.60	1.1	Barley 20	1.60	1.1
MT Oats	≈4.47	2.3	NWE Oats	≈3.02	1.6
MWT Oats	≈5.73	3.4	GPE Oats	≈3.38	2.1
OT Oats	≈3.84	2.1			
Oats 15	.82	.6	Oats 15	.82	.6
Oats 20	1.37	1.1	Oats 20	1.37	101
R ² (adj))	.368			.334	
Standard Deviation of Residuals	3.84			3.94	
N	207			207	

Table 7 (continued)

Variable	(5) Coefficient	(6) t
Intercept	2.00	1.6
Wheat 15	1.47	1.1
Wheat 20	7.78	6.1
Corn 12	-1.19	.9
Corn 15	5.41	4.0
Corn 20	.23	.2
Barley 12	.07	.1
Barley 15	.15	.1
Barley 20	1.60	1.1
Oats 12	-2.42	1.9
Oats 15	.82	.6
Oats 20	1.37	1.0
Line Elevator Market Share	.086	3.2
$R^2(\text{adj})$.330	
Standard Deviation of Residuals	3.95	
N	207	

the market share of the commercial line elevators in the state that the elevator is located is substituted for the terminal or elevator dummy variables.

The results indicate the gross margins of country elevators that shipped to the Minneapolis terminal market were larger. In column 1 the coefficients of the elevators that shipped to the Minneapolis market were larger than the coefficients of elevators that shipped to other markets in six of the eight comparisons while the coefficients of the country elevators located in the northwest states were larger than the coefficients of elevators located elsewhere in all five of the comparisons (column 3). Finally, column 5 shows that the gross margin of country elevators was directly related to the market share of commercial line elevators in the state that the elevator was located. In other words, the gross margin increased with the market share of commercial line elevators in the state.

An F test was performed to determine if the difference between the coefficient of the Minneapolis terminal dummy variable and the coefficient of the Midwest terminal dummy variable (or the other terminal dummy variable) is significant. Similar comparison tests were performed for the coefficients of the elevator dummy variables. Eight pairwise tests can be made when the terminal dummy variables were used and five of the eight differences between coefficients were significant at the 5% probability level.¹⁵ When the elevator dummy variables were used, the results were not as strong with two of the five differences significant at the 5% probability level. As mentioned above, in six of the eight cases when the terminal variables were used, the coefficient of the Minneapolis dummy variable was larger. When the elevator dummy variables were used, the coefficient of the northwest elevator variable

was larger in all five cases. While these are not independent tests, they do suggest that margins tended to be larger when the elevator shipped grain to the Minneapolis market or from elevators located in the northwest state.

The results from the profit margin and the gross margin tests lend support to the hypothesis that the line elevators had some monopsony power during the second and the first part of the third decade of this century.

B. Tests of Two Self-Interest Explanations of the Political Support For a Tax on Futures

This section compares the explanatory power of two self-interest hypotheses which might explain political support for a tax on futures. The cartel hypothesis predicts that a tax on futures would be favored in states where the elevators had monopsony power. It was argued that the cost of collusion would be lower in states with line elevators. Hence, greater farmer support for a tax or a ban on futures should occur in states where commercial line elevators had higher market shares.

Private information is sometimes acquired as a joint product of production. Agents who acquire private information will oppose futures markets if the value of their private information is lower when futures markets are functioning. Suppose farmers in some but not all grain states acquire private information about the size (or quality) of the state crop before others and the size of the state crop is correlated with the size of the national crop. Assume further that other agents would invest resources to acquire private information, perhaps of a different kind, if futures markets exist. When futures markets are permitted to operate, more resources will be allocated by other agents toward expanding the amount of information since the existence of a futures market lowers the cost of trading on private

information. Under these assumptions farmers with private information would be opposed to futures markets. If the private information hypothesis is to explain the observed political opposition to futures markets, it is necessary to show that wheat farmers in the states that opposed futures markets possessed more private information than farmers in other states.

One source of private information available to farmers could be the effect of weather and plant diseases on yields or quality of the crop. Yields may have been more uncertain in the northwest states because weather conditions were more uncertain in this region than in other regions. If so, the value of any private information acquired by farmers in the northwest would be greater if the annual variation in yields in the northwest were more highly correlated with the variations in the national yield. If the wheat yields in the northwest states were more highly correlated with the national yields than were the yields in other states and if farmers in the northwest acquired this information before others, then farmers in the northwest states would have more private information and would have more reason to oppose futures markets.

The private information hypothesis requires some strong assumptions but it has some appeal and can be tested. It would be more plausible if the correlation of state yields with national yields is reasonably stable over time. Then states with high correlations would be expected to consistently support a ban on futures. If the correlation is not stable but changes from one decade to another, then a representative from a state might support a ban in one decade when the correlation is high but not in another when it is low or vote on the basis of some long-run estimate of the correlation between state and national yields. The first scenario seems unlikely however because political positions tend to be stable and do not change quickly in the absence

of changed incentives. If the private information hypothesis is to be considered seriously, the correlation of state yields with national yields should be reasonably stable over time.

Two proxy measures for private information are used: (1) the standard deviation of the wheat yield (bushels) per planted acre measures in part the uncertain effects of weather on wheat yield and (2) the correlation of the wheat yield in each state with the national wheat yield (after deleting the state totals from the national totals) measures the value of the private information. The value of private information acquired by farmers is assumed to be greater the higher is the correlation in yields.

Planted acres are first reported by state in 1919. The correlation coefficient and the standard deviation of the state wheat (winter and spring) yield from 1919-1939 are shown in Table 8. The mean of the standard deviation of the wheat yield is largest for the northwest states and lowest for the other states west of the Mississippi River. On the other hand, the mean of the correlation of state and national yields is about the same for the northwest states as for the other states west of the Mississippi River and is definitely lower for the eastern states. Hence, yields tend to be more highly correlated for states west of the Mississippi River. The correlation coefficient of the state yield with the national yield is not shown for each decade but the correlation coefficient for a state is not stable from one decade to another. The correlation coefficient were far smaller in the twenties than they were in the thirties. The correlation between the state correlation coefficients of yields between 1919-29 and between 1930-39 is only .4. So, the correlation between state and national wheat yields has not

Table 8: Correlation and Standard Deviation of Wheat Yield
(in Bushels) Per Planted Acre, 1919-39

State	Correlation of Wheat Yield With Adjusted National Wheat Yield ^{a)}	Standard Deviation Wheat Yield Per Planted Acre
I. Northwest States		
a. Minnesota	.618	3.25
b. North Dakota	.398	3.78
c. South Dakota	.578	4.29
d. Montana	.322	4.88
Mean	.479	4.05
II. Other States West of the Mississippi		
a. Nebraska	.651	3.79
b. Kansas	.634	3.48
c. Iowa	.585	2.95
d. Oklahoma	.582	3.29
e. Missouri	-.038	2.51
Mean	.483	3.20
III. States East of the Mississippi		
a. Wisconsin	.641	2.87
b. Illinois	-.041	3.12
c. Indiana	.044	3.92
d. Michigan	.315	3.39
e. Ohio	-.086	4.81
Mean	.175	3.62

^{a)} Adjusted National Wheat Yield is calculated after the state production and planted acres are excluded from national totals.

Source: United States Department of Agriculture Agricultural Marketing Service; Wheat, Acreage, Yield Production Statistical Bulletin No. 158, Government Printing Office, Washington, D. C., February 1955.

been very stable over time and this cast some doubt on the validity of the private information hypothesis.¹⁶

The monopsony hypothesis and the private information hypothesis are tested by estimating a small four equation model. The model includes three equations which explain the logit of the market share of line, cooperative and independent elevators in a state, respectively, and a fourth equation which explains the logit of the proportion of a state's votes supporting the tax on futures.¹⁷ The independent variables in the vote equation, which are of primary interest here, include a dummy variable which equals one if either the Chicago, Kansas City or Minneapolis futures exchange is located in the state, the logit of the market share of the line elevators in a state and either the standard deviation or the correlation coefficient of the state wheat yield with the national wheat yield. The independent variables in the other equations were for the most part hedging and finance variables.

The SUR regression results are presented in columns 1-4 of Table 9. Only the regression results for the voting equation are presented. The results show political support for a tax on futures appears to be lower when a major futures exchange was located in the state (column 1). As expected, futures exchanges opposed political attempts to limit futures trading. Political opposition to futures transactions increases as the market share of commercial line elevators increases. This result implies that farmers exercised their political strength in those states where the elevators had monopsony power. The coefficient of the standard deviation of state yields has the wrong sign and is not significant (column 2). On the other hand, the coefficient of the correlation variable is positive and is significant (columns 3 and 4). When the market share of the

Table 9: Effect of Market Share of Line Companies and Production
 Uncertainty on Support for Futures Legislation
 (t statistics in brackets)

Variable	(1)	(2)	(3)	(4)
Constant	4.11 (2.4)	1.97 (.3)	-2.67 (1.5)	-1.18 (.1)
Exchange	-4.56 (2.1)	-4.96 (1.7)	-3.47 (1.5)	-3.68 (1.7)
Logit of Line Companies Market Share	2.94 (2.2)			1.96 (1.8)
Correlation of State With National Yield			10.46 (3.1)	8.65 (2.7)
Standard Deviation of Yield per Planted Acre		-1.118 (.1)		
Weighted Mean Square Error of System	.943	.952	.971	.967
Weighted R^2 of System	.963	.962	.960	.962

commercial line elevators and the correlation of yields are both introduced as separate variables, the coefficient of the correlation coefficient is significant at the 5% probability level while the coefficient of the market share is only significant at the 11% probability level. This suggests that the political opposition to futures was more affected by the farmers' potential loss of private information. However, the explanatory power of the complete system of equations is slightly higher when the first equation is as part of the system. Still another qualification is that the results are sensitive to the period over which the correlation is calculated. If the correlation is calculated from yields in either of the two decades, 1919-29 or 1930-39, the correlation variable is no longer a significant determinant of the vote.

These regression results lend some support to both the monopsony and the private information hypotheses. Though great confidence should not be placed in these results because of the limited number of state observations, the results are not inconsistent with the monopsony hypothesis. There is a suggestion that opposition to futures could have been due to a cause other than the monopsony power held by line elevators. Still, the higher profit per bushel and gross margin of line elevators are not as easily explained by the private information hypothesis as by the cartel hypothesis.

CONCLUSIONS

Farmer opposition to futures markets seems like such a difficult subject to understand that most economists are willing to lend a sympathetic ear to any plausible explanation. It has been proposed that farmers have opposed futures markets because they mistakenly believe that futures markets lower producer prices or increase the variance of price fluctuations or because they are philosophically opposed to speculation and gambling. The results of this

paper caution against any quick embrace of these explanations. Not only are the alternatives difficult to test or to verify but they do not face up to the question of why the political opposition was limited to just the grain-producing states. Nor do they explain why the opposition was strongest in the states where the line elevators had higher market shares.

This paper has advanced a self-interest theory of why some farmers opposed futures markets. The message of the paper is that the self-interest hypotheses have not been given a fair chance to explain farmer opposition. For the period covered in this paper, the cartel theory does a fairly good job in explaining farmer opposition. It can explain why the political opposition was greater and why the elevator profit margins and gross margins were higher in the northwest than in other states. Though modest support for the private information hypothesis was also found, it is unclear how the evidence about higher profit margins and gross margins can be explained by the private information hypothesis.

FOOTNOTES

1. The selection of these three votes may appear arbitrary because two other bills had been passed by the House, first in 1921 and then in 1922 with large majorities (no roll call votes were taken in the Senate). The Futures Trading Act was passed in 1921 and then passed as The Grain Futures Act in 1922 after the Supreme Court ruled the proposed tax of 20 cents per bushel was unconstitutional since it used the taxing power to coerce boards of trade in compliance with provisions of the bill. The original version of the Futures Trading Act imposed a 20 cents per bushel tax on futures transactions unless the seller was in physical possession of the commodity and unless such a contract is made by or through a member of a board of trade so designated by the Secretary of Agriculture. The bill was revised several times. In one version all futures transactions were to be taxed except for the first exclusion noted above. However, the final version excluded this provision [Lurie and Hoffman]. Hence, the 1921 and 1922 Acts should not be thought of as a political effort to tax or ban futures transactions but rather as legislation imposing certain reporting requirements on the commodity exchanges. Indeed, it appears that the Grain Futures Act actually would have benefited the exchanges by imposing a tax on transactions made at bucket shops and not on exchanges.
2. The correlation of the percentage of votes supporting the Black Amendment and those supporting the tax on futures is .41.
3. The Stanford Food Institute showed that the stabilization program raised wheat prices in Kansas City and Minneapolis by relatively more than the wheat price in Seattle and St. Louis. Hence, the producers of the hard winter and the hard spring wheats benefited more from the stabilization programs. This is consistent with greater political influence of the wheat producers in the prairie belt. See Stanford Food Research Institute, Wheat Studies, Vol. 8, pp. 153-154.
4. FTC, The Grain Trade, Vol. 1, p. 284.
5. FTC, The Grain Trade, Vol. 1, pp. 288-294.
6. These estimates are based on the average of the maximum and minimum number of elevators for a company from 1912 through 1919, FTC, Vol. 1, p. 243.
7. For discussion of The Grain Bulletin see FTC, The Grain Bulletin, Vol. 3, Chapter 8. In 1912 the Grain Bulletin was being sent to all line elevators and 85% of the independent and cooperative elevators, p. 216.
8. FTC, The Grain Trade, Vol. 3, pp. 213-216.
9. The procedure for quoting buying prices would be modified from time to time. If the elevators at a station were buying at a price different from the suggested card price, they could notify The Grain Bulletin and request a special price be issued. Mr. Durant accommodated all such requests until the passage of state laws prohibiting discrimination after which he only accepted requests for special prices from independents and cooperatives who operated single units.

10. If the cash or "to arrive" prices were highly correlated with the Minneapolis futures price, little would be gained by the farmer by banning the future. In principle the cartel hypothesis implies the correlation between cash and futures prices would be lower on the Minneapolis market than on the Kansas City market. Unfortunately, the reported closing cash and "to arrive" prices in the Minneapolis market are estimated by taking the closing futures market price and adding a premium or subtracting a standard discount. Hence, the daily change in cash price is more highly correlated with the daily change in the futures price in the Minneapolis market than in the Kansas City market. However, this difference appears to be due to the method of estimating the closing cash and "to arrive" price.
11. Though a most favored nation clause could be interpreted as facilitating price collusion, this interpretation is implausible. It was during this period that cooperative elevators were entering the market. The line companies would not have sponsored these state laws, which tied their hands, while not affecting the many single unit cooperative elevators which were then entering the market.
12. Because there are too few observations to adjust for differences in the quality of grain, the price data cannot be used to determine whether farmers received lower prices.
13. Not surprisingly, the accounting data reported by the line elevators are superior and more consistent across elevators than are the data obtained from the accounting records of independents and cooperatives. For example, the line elevators were more likely to report depreciation charges on their books than were the independents or the cooperatives.
14. Though the FTC reported the profit per bushel is higher for line elevators, it found profit on investment was smaller for line elevators. The decline in demand for line elevator services implies the line elevators had excess capacity and this could explain why the rate of return was so low.
15. Only four of the 69 locations involve a shipment of wheat from one of the northwest states. The results for wheat are sensitive to one observation, the shipments of spring wheat from Mansfield, South Dakota to Chicago. The elevator(s) in this town reported very low margins. The 1927 report of the Board of Railroad Commissioners shows three elevators in this town, of which two were cooperative elevators. So, the low margins for this town may have been reported by one or both cooperative elevators and/or by the private elevator competing with the two cooperative elevators.
16. The means of the correlation coefficients are:

	1919-29	1930-39
Northwest states	.240	.445
Other States West of the Mississippi	.320	.585
States East of the Mississippi	.255	.604

17. In several states all the votes cast either supported or opposed the legislative proposals. In these cases the data were adjusted by reducing the proportion to .999 from 1 or by raising the proportion of votes favoring a tax to .001.

APPENDIX A

I. Tax on Futures Bills and Amendments

1. Caraway (Arkansas) Bill (1928): Bill would impose a tax of 50 cents for each \$100 on contracts on grain and cotton exchanges. Defeated by 24-50. Congressional Record, 70th Congress, 1st Session, Volume 69, Part 11, p. 8273.
2. Caraway (Arkansas) Bill (1929): Bill would prevent the sale of cotton and grain in futures markets unless the seller of a contract has on hand or the prospect of owning the actual cotton or grain. Defeated by 27-51. Congressional Record, 70th Congress, 2nd Session, Volume 70, Part 6, p. 3433.
3. (1938): Bill to repeal the three cent federal tax on futures transactions. Passed by 52-30. Congressional Record, 75th Congress, Volume 83, Part 5, p. 5030.

APPENDIX B

Definition of Variables

Table 7:

Variable	Definition
1. MNT = 1	if elevator ships to Minneapolis terminal market
2. MWT = 1	if elevator ships to Midwestern terminal market
3. OT = 1	if elevator ships to any other terminal market
4. NWE = 1	if elevator is located in northwest states
5. GPE = 1	if elevator is located in other Great Plains states
6. OTE = 1	if elevator is located in any other state
7. 12 = 1	if year equals 1912
8. 15 = 1	if year equals 1915
9. 20 = 1	if year equals 1920
10. Wheat = 1	if elevator ships wheat
11. Corn = 1	if elevator ships corn
12. Barley = 1	if elevator ships barley
13. Oats = 1	if elevator ships oats
14. Line Elevator Market Share	= Market share of line elevators in state elevator is located.

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