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# An Examination of the Market Structure of the U.S. Produce Industry

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Recent literature, largely from the U.S. Department of Agriculture Economic Research Service, indicates that substantial changes have occurred in the produce industry in recent years. With the rise of retail mass merchandisers and increased concentration in the retail food industry, the procurement power of these large firms reportedly has also increased. With direct buying and contracting, market intermediaries such as brokers and wholesalers allegedly are being bypassed. As a result, these market intermediaries ostensibly are also consolidating, becoming fewer and larger with increased emphasis on servicing the food-service industry. However, the findings of this study indicate that there is no convincing evidence that the market structure of the U.S. produce industry has markedly changed since the early 1980s. While supermarket concentration has increased noticeably, the same cannot be said for produce market intermediaries such as brokers and wholesalers.

Marketing channels for fresh fruits and vegetables in the United States are distinctly different from those for other agricultural commodities. The primary marketing channel is composed of three major echelons: shipping-point markets, wholesale terminal markets, and retail markets. Shipping-point markets are located where the fruits and vegetables are grown. Firms in these markets include grower-packers or packer-shippers, brokers, wholesalers, and integrated wholesaler-retailers. Produce moves from the shipping points to export markets, wholesale terminal markets, and integrated wholesale-retail destinations. At terminal markets, wholesalers take possession of the fruits and vegetables, commonly repackage them under their own labels, and distribute to retail food stores and the food-service sector, which includes entities such as restaurants, hotels, and institutions. Examples of institutions are schools, hospitals, prisons, and the military. Merchant wholesalers and brokers/commission agents are the major players in terminal markets. The retail market includes food stores, restaurants, and direct fruit and vegetable markets (Calvin et al. 2001; Kaufman et al. 2000).

In recent years, the produce marketing channel has purportedly become increasingly vertically integrated. Vertical integration refers to control over upstream suppliers or downstream procurers. This control can occur through ownership or contracts. In the case of fruit and vegetable markets, the industry is becoming more backward or upstream coordi-

nated. Large supermarket chains in many cases have bypassed brokers and wholesalers, dealing directly with grower-packers often under contract (Calvin et al. 2001; Handy et al. 2000; Kaufman et al. 2000; Richards and Patterson 2003; Sexton, Zhang, and Chalfant 2003).

Calvin et al. (2001) reported on the evolution of market channels from growers to retail buyers. The growth of mass merchandisers was linked to the decline in sales of produce to conventional retailers. Glaser, Thompson, and Handy (2001) studied the effects of retail consolidation along with changing customer preferences on shipper-wholesaler relations. Furthermore, there has been some empirical work on market channel performance. Richards and Patterson (2003) studied the produce buying power exercised by larger retailers. They found that retailers are able to wield both buying and selling market power to some degree. Sexton, Zhang, and Chalfant (2003) studied the extent to which retailers are able to exercise oligopsony power in the procurement of fresh produce.

There has also been research conducted on the use of contracts to increase vertical integration. MacDonald and Korb (2006) looked at the different types of contracts used to organize the production and use of agricultural commodities. Marketing contracts are the major type of contract used in the fruit and vegetable industry. Over half of fruit production and almost one-third of vegetable production are produced under this type of contract. The actual use of contracts for produce did not increase between 1994 and 2003.

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increased concentration in the retail food industry, the procurement power of these large firms reportedly has also increased. After 1996 many retailers merged, leading to an increased percentage of sales by the top eight retailers—from 1987 to 2002 the increase was from 27 to 45.6 percent (Calvin et al. 2001; U.S. Department of Commerce, Bureau of the Census 2005b). With direct buying and contracting, market intermediaries such as brokers and wholesalers reportedly are increasingly being bypassed. As a result, these market intermediaries ostensibly are also consolidating, becoming fewer and larger with increased emphasis on servicing the food-service industry.

If produce market intermediaries are adversely impacted by increasing oligopsony power of retail supermarkets, the evidence should manifest in financial time-series data representative of the impacted firms. Thus a test of the adverse economic impact of oligopsony on upstream firms in the produce industry is possible through an analysis of the financial and census data representative of the impacted firms over the relevant period. This study determines whether produce wholesalers and brokers have been adversely impacted by the increase in mass merchandisers and retailers in the food industry.

The next section is devoted to the financial results. Then census data are used to ascertain changes in market structure by type of wholesale firm over time. Lastly, conclusions are provided.

## Financial Results

The test results are mixed. Overall, there seems to be little support for the hypothesis that produce intermediaries in recent years have suffered financial stress because of increased procurement pressures from mass merchandisers. Due to page limitations the financial analysis is not included here. See Epperson (2009) for the financials.

## Census Evidence

Using the census data it is possible to shed light on the hypothesized decline in the financial condition of produce market intermediaries by comparing the number of establishments based on level of sales over the study period. The U.S. Census of Wholesale Trade (Establishment and Firm Size) compiles economic data for different industries every five

years. The years used in this analysis are 1982, 1987, 1992, 1997, and 2002. Industries are classified by SIC code (5148 represents fresh fruit and vegetable wholesale intermediaries) in 1982, 1987, and 1992. For 1997 and 2002, the data are classified by NAICS code (424480). Census categories of produce wholesalers include merchant wholesalers, who buy and take title to the produce they sell and agents, brokers, electronic marketers, and commission merchants who collect a commission or fee for arranging the sale of produce owned by others. It should be noted that data reporting by level of sales for brokerage establishments/firms were discontinued after the 1997 census. Thus the 2002 census contains data by level of sales for wholesale establishments/firms only. The total number of wholesale and brokerage establishments and corresponding sales continue to be reported (U.S. Department of Commerce, Bureau of the Census, 1985, 1990, 1995, 2000, 2005a).

According to the hypothesis of this study there should be a pattern of fewer and perhaps larger wholesale firms over the study period. Increasing consolidation is supported by Calvin et al. (2001), Cook (2001), Handy et al. (2000), Kaufman et al. (2000), Richards and Patterson (2003), and Sexton, Zhang, and Chalfant (2003).

The number of wholesale and brokerage establishments with lower sales (those under \$5 million) declined 17.3 percent from 1982 to 1997 (Table 1). However, there was a large increase (71.5 percent) in the number of establishments with sales of \$5 million and over. Overall, the number of establishments increased 8.1 percent from 1982 to 1997 and 5.5 percent from 1982 to 2002. Apparently, the effects of inflation aside, smaller firms are growing and merging into larger entities.

Inflation accounts for some of the movement from one sales class to another. This effect is akin to that of income tax bracket creep from inflation. U.S. inflation was 85.3 percent from 1982 to 2002 (U.S. Department of Labor, Bureau of Labor Statistics 2007).

The results for merchant wholesaler establishments are similar to those for all establishments (Table 1). Although the number of smaller firms (those under \$5 million) decreased 13.6 percent, overall the number of establishments increased 14.8 percent from 1982 to 1997 and 13.2 percent from 1982 to 2002.

Table 1. Number of Establishments by Level of Sales and Sales for all Establishments, 1982-2002.

Census year & intermedi- ary type	Sales level (\$1,000)										Total	All <sup>a</sup>	Sales (\$bil) <sup>b</sup>	
	<100	100- 249	250- 499	500-999	1,000- 2,499	2,500- 4,999	5,000- 9,999	10,000- 24,999	>25,000	Total				
1982														
Wholesale	220	354	473	635	999	728	503	308	78	4,298	4,769	19.2		
Broker	60	26	42	75	150	162	133	93	41	782	895	5.9		
Total	280	380	515	710	1,149	890	636	401	119	5,080	5,664	25.1		
1987														
Wholesale	141	294	446	590	967	774	634	434	143	4,423	4,945	20.8		
Broker	17	24	37	69	173	182	156	110	62	830	893	6.0		
Total	158	318	483	659	1,140	958	790	544	205	5,253	5,838	26.8		
1992														
Wholesale	113	208	361	553	986	816	734	563	246	4,580	5,293	22.7		
Broker	9	23	20	47	105	109	127	106	64	610	710	4.8		
Total	122	231	381	600	1,091	925	861	669	310	5,190	6,003	27.4		
1997														
Wholesale	102	246	377	539	921	761	773	642	356	4,717	5,474	25.2		
Broker	13	27	20	42	101	96	80	79	52	510	647	3.7		
Total	115	273	397	581	1,022	857	853	721	408	5,227	6,121	28.8		
2002														
Wholesale	115	255	356	514	880	750	679	652	443	4,644	5,397	27.6		
Broker <sup>c</sup>											580	5.1		
Total											5,977	32.7		

<sup>a</sup> Includes full and partial year establishments.<sup>b</sup> Sales for all establishments by census year are in 1982-84 dollars.<sup>c</sup> Number of establishments not available by level of sales.

Source: U.S. Bureau of the Census of Wholesale Trade (1985, 1990, 1995, 2000, 2005a).

For agents brokers, electronic marketers, and commission merchants the data show a different story (Table 1). The number of establishments declined in every sales category except the highest category, \$25 million and over. For sales categories under \$5 million the decline in the number of establishments was 41.9 percent from 1982 to 1997. The decrease was about half that for sales categories of \$5 million and over. For all brokerage establishments the decline from 1982 was 27.7 percent through 1997 and 35.2 percent through 2002.

The level of sales reflects the same pattern as the number of establishments (Table 1). For all firms real sales increased 30.3 percent from 1982 to 2002. This encompasses a large increase in real wholesale sales (44.1 percent) and a decrease in real brokerage sales of 14.4 percent.

Concentration ratios for wholesale and brokerage firms are presented in Table 2. As can be seen, this is not a concentrated industry. The ratios are quite low, reflecting many firms without substantial market power. Though the concentrations are low, brokerage firms are more concentrated than wholesale firms.

Concentration ratios for produce brokerage firms were discontinued after the 1997 census. However, from 1982 to 1997 the CR4 for produce brokerage firms actually declined 12.9 percent and the CR8 was unchanged for the same period. The CR20 and CR50 increased 10.7 percent and 13.5 percent, respectively, for brokerage firms.

From 1982 to 1997, concentration increases for wholesale firms ranged from 12.2 to 16.7 percent, with the highest increases for CR8 and CR20. However, adding the next census period, 2002, the changes were relatively substantial. From 1982 to 2002 the increases ranged from 29.7 percent to 53.8 percent, with the highest increases for CR20 and CR50.

## Conclusions

There is no convincing evidence that the market structure of the U.S. produce industry has markedly changed over the study period. While supermarket concentration has increased noticeably, the same cannot be said for produce market intermediaries such as brokers and wholesalers. Increased vertical integration between retailers and packer-shippers via contracts (marketing and production), obviat-

ing the need for market intermediaries, has not occurred. There has not been an increase in produce contracting over the study period. Purported increased monopsony power by retailers should have manifested in weakening financials for market intermediaries over the study period. However, the financial analyses did not reveal clear evidence to this end.

The census data allowed another view, where the produce market intermediaries could be largely delineated in two segments: brokerage versus wholesale firms. Both segments of this intermediary industry were not found to be concentrated, though the brokerage component was shown to be more concentrated than that of wholesalers. Overall, the number of establishments and real sales increased while market concentration increased mildly over the study period. However, when looking at brokerage firms specifically, the number of establishments and real sales declined.

It would appear that the wholesale component has been doing well servicing smaller retail food companies and the ever-burgeoning food-service sector as the away-from-home market has continued to grow. Though the census data suggest that the produce brokerage business has experienced a mild decline in recent years, it is entirely plausible, because of produce market experience, that many of the produce wholesale firm entrants in recent years are former brokerage firms.

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Table 2. Sales and Concentration Ratios by Largest Firms, 1982-2002.

Census year & intermediary type	Level of sales (\$ mil.) and concentration ratios			
	CR4 (4 largest firms)	CR8 (8 largest firms)	CR20 (20 largest firms)	CR50 (50 largest firms)
1982				
Wholesaler				
Broker	1,362.4 (7.4)	1,888.1 (10.2)	2,685.4 (14.5)	3,999.7 (21.6)
All	834.2 (14.7)	1,144.8 (20.2)	1,748.1 (30.8)	2,640.9 (46.6)
1987	1,410.8 (5.8)	2,364.5 (9.8)	3,434.3 (14.2)	5,049.9 (20.9)
Wholesaler				
Broker	2,100.1(8.9)	2,602.0 (11.0)	3,643.0 (15.4)	D (D)
All	1,070.2 (15.6)	1,472.8 (21.5)	2,196.3 (32.1)	3,282.4 (48.0)
1992	2,566.4 (8.4)	3,206.0(10.5)	4,516.5 (14.8)	6,563.3 (21.6)
Wholesaler				
Broker	2,549.6 (8.0)	3,809.9 (12.0)	5,389.8 (17.0)	7,808.7 (24.6)
All	1,069.3 (15.9)	D (D)	2,257.1 (33.5)	3,334.5 (49.6)
1997	2,763.4 (7.2)	4,345.1 (11.3)	6,055.2 (15.7)	8,854.0 (23.0)
Wholesaler				
Broker	3,868.3 (8.3)	5,502.9 (11.9)	7,827.6 (16.9)	11,241.9 (24.3)
2002 <sup>a</sup>	760.1 (12.8)	1,199.3 (20.2)	2,018.0 (34.1)	3,133.1 (52.9)
Wholesaler	4,768.0 (9.6)	6,857.7(13.8)	11,081.5 (22.3)	15,447.2 (31.1)

<sup>a</sup> Not available for produce brokers.

Note: Numbers in parentheses indicate market share or sales as percentage of industry sales.  
Source: U.S. Bureau of the Census of Wholesale Trade (1985, 1990, 1995, 2000, 2005a).

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