

Staff Report

INTERNATIONAL AND INTERREGIONAL COMPETITION
IN THE U.S. AND FLORIDA CUT FLOWER MARKETS

By

Emilio Pagoulatos

Staff Report 9

August 1980



FLORIDA

AGRICULTURAL MARKET RESEARCH CENTER

FOOD AND RESOURCE ECONOMICS DEPARTMENT

Institute of Food and Agricultural Sciences

University of Florida

Gainesville, Florida 32611

INTERNATIONAL AND INTERREGIONAL COMPETITION
IN THE U.S. AND FLORIDA CUT FLOWER MARKETS

By

Emilio Pagoulatos

Staff Report 9

August 1980

Staff papers are circulated without formal review
by the Food and Resource Economics Department.
Content is the sole responsibility of the author.

Food and Resource Economics Department
Institute of Food and Agricultural Sciences
University of Florida, Gainesville, Florida 32611

The Florida Agricultural Market Research Center is
a service of
the Food and Resource Economics Department
of the
Institute of Food and Agricultural Sciences

The purpose of this Center is to provide timely, applied research on current and emerging marketing problems affecting Florida's agricultural and marine industries. The Center seeks to provide research and information to production, marketing, and processing firms, groups and organizations concerned with improving and expanding markets for Florida agricultural and marine products.

The Center is staffed by a basic group of economists trained in agriculture and marketing. In addition, cooperating personnel from other IFAS units provide a wide range of expertise which can be applied as determined by the requirements of individual projects.

TABLE OF CONTENTS

	Page
LIST OF TABLES	iii
INTRODUCTION	1
The Empirical Model	5
Statistical Results	10
CONCLUSIONS	13
REFERENCES	15

LIST OF TABLES

Table		Page
1	U.S. sales and apparent consumption of carnations, 1961-1978.	2
2	U.S. sales and apparent consumption of standard chrysanthemums, 1961-1978.	3
3	U.S. sales and apparent consumption of pompon chrysanthemums, 1961-1978.	4
4	Florida and California sales and prices of standard chrysanthemums, 1961-1978.....	6
5	Florida and California sales and prices of pompon chrysanthemums, 1961-1978.....	7
6	Regression results for U.S. cut flower markets, 1962-1978 (t-values in parentheses).....	11
7	Regression results for Florida cut flower markets, 1962-1978 (t-values in parentheses).....	12

INTERNATIONAL AND INTERREGIONAL COMPETITION
IN THE U.S. AND FLORIDA CUT FLOWER MARKETS

By

Emilio Pagoulatos

INTRODUCTION

The U. S. and Florida cut flower industries have undergone considerable change over the past decade. This change has resulted primarily from increased import competition and shifts in the relative importance between different producing regions in the U.S. [6].

The majority of cut flower imports are from Colombia, but smaller amounts are imported from Mexico (carnations) and Guatemala (pompon and standard chrysanthemums). Fresh cut flowers are protected in the U.S. by an ad valorem duty (TSUS item No. 192.20) of 10 percent. Since transportation costs are not part of the dutiable value, even though they are substantially due to the perishable nature of the product, the actual rate of duty is practically less than 10 percent of the landed value. Required quarantine inspections do not appear to constitute nontariff barriers to cut flower trade [10, 11].

As can be seen in Table 1 through 3, imports of carnations, standard and pompon chrysanthemums began in the late sixties and by 1973 accounted

EMILIO PAGOULATOS is an associate professor in the food and resource economics department, University of Florida.

Table 1.--U.S. sales and apparent consumption of carnations, 1961-1978.

Year	U.S. Quantity sold	Imports	Exports	Total supply	Per capita apparent consumption	Wholesale price
	----- Million blooms -----				-- Blooms --	Cents/bloom
1961	332.9	-----	-----	332.9	1.81	7.3
1962	361.8	-----	-----	361.8	1.94	7.3
1963	409.3	-----	-----	409.3	2.16	7.2
1964	422.5	-----	-----	422.5	2.20	7.0
1965	428.5	-----	-----	428.5	2.21	7.4
1966	481.5	-----	-----	481.5	2.45	7.5
1967	499.2	1.6	1.4	499.4	2.51	7.8
1968	570.4	3.0	1.3	572.1	2.85	7.6
1969	613.5	7.0	1.4	619.1	3.05	7.4
1970	619.0	16.4	1.5	633.9	3.09	7.3
1971	589.2	33.2	2.5	619.9	2.99	7.4
1972	584.4	56.2	3.0	637.6	3.05	8.2
1973	616.0	132.2	7.0	741.2	3.52	7.5
1974	501.8	179.9	11.0	770.7	3.64	7.3
1975	561.4	163.3	15.0	709.7	3.32	7.8
1976	517.9	204.2	20.0	702.1	3.26	8.8
1977	501.8	284.6	25.0	761.4	3.51	8.4
1978	466.4	346.2	30.0	782.6	3.58	9.1

Table 2.--U.S. sales and apparent consumption of standard chrysanthemums, 1961-78.

Year	U.S. Quantity sold	Imports	Exports	Total supply	Per capita apparent consumption	Wholesale price
	----- Million blooms -----				-- Blooms --	Cents/bloom
1961	95.0	-----	-----	95.0	.52	17.0
1962	102.2	-----	-----	102.2	.55	15.9
1963	118.7	-----	-----	118.7	.63	16.6
1964	111.1	-----	-----	111.1	.58	17.1
1965	119.2	-----	-----	119.2	.61	17.3
1966	133.7	-----	-----	133.7	.68	17.4
1967	133.3	.8	.2	133.9	.67	18.3
1968	130.9	1.4	.2	132.1	.66	20.2
1969	136.8	2.0	.2	138.6	.68	19.6
1970	147.0	4.3	.2	151.1	.74	18.3
1971	144.7	11.3	.2	155.8	.75	19.0
1972	137.1	15.9	.3	152.7	.73	21.2
1973	138.2	23.4	.3	161.3	.77	21.6
1974	144.0	25.9	.4	169.5	.80	20.5
1975	135.2	17.4	.4	152.2	.71	21.6
1976	140.4	12.6	.4	152.6	.71	20.9
1977	111.7	19.0	.5	130.2	.60	25.6
1978	124.5	18.4	.5	142.4	.65	25.7

Table 3.--U.S. sales and apparent consumption of pompon chrysanthemums, 1961-78.

Year	U.S. quantity sold	Imports	Exports	Total supply	Per capita apparent consumption	Wholesale price
----- Million blooms -----					-- Blooms --	Cents/bloom
1961	21.2	-----	-----	21.2	.115	.95
1962	21.8	-----	-----	21.8	.117	.95
1963	25.0	-----	-----	25.0	.132	.97
1964	24.2	-----	-----	24.2	.126	.75
1965	26.1	-----	-----	26.1	.134	.76
1966	28.4	-----	-----	28.4	.144	.78
1967	27.6	.2	.5	27.3	.137	.80
1968	30.5	.4	.6	30.3	.151	.84
1969	32.9	.6	.7	32.8	.162	.83
1970	32.4	.8	.6	32.6	.159	.82
1971	34.5	1.8	.8	35.5	.171	.85
1972	33.6	3.6	.8	36.4	.174	.89
1973	36.1	6.0	.9	41.2	.196	.91
1974	37.9	9.2	.8	46.3	.218	.82
1975	35.7	10.8	.8	45.7	.214	.88
1976	35.6	16.4	.8	51.2	.238	.96
1977	35.9	20.1	.8	55.2	.254	.99
1978	37.9	25.4	.8	62.5	.286	1.03

for approximately 15 percent of total U.S. sales. Imports of standard chrysanthemums peaked in 1974, and by 1978 constituted about 13 percent of the U.S. market. Imports of carnations and pompon chrysanthemums, however, have steadily increased in recent years, resulting in a 43 and 40 percent share, respectively, of the U.S. market in 1978.

The domestic commercial cut flower industry has also experienced rapid change during the decade of the 1970's. While Florida produces negligible quantities of carnations, production of this flower has been increasingly concentrated in California and Colorado [4, 8, 9]. As can be observed from Table 4 and 5, Florida production of pompon and standard chrysanthemums peaked in 1969, well before the rapid surge of imports. In contrast, California has experienced a steady increase in chrysanthemum production, and beginning with 1971 has overtaken Florida as the largest producing state in pompon chrysanthemums. One reason for these trends is that several large Florida growers went out of business during the 1970 national recession. In addition to the possible impact of increasing import competition, Florida appears to have been disadvantaged by a shorter harvest season (November to May) as compared to California where production continues throughout the year.

In what follows, an econometric model will be specified and estimated for the purpose of analyzing the effects of foreign competition on the U.S. and Florida cut flower industry. In addition, the model will also account for the standard and pompon chrysanthemum industries.

The Empirical Model

In this section the specification for the supply and demand characteristics the U.S. and Florida cut flower markets is outlined. The U.S.

Table 4.--Florida and California sales and prices of standard chrysanthemums, 1961-78.

Year	Quantity sold		Wholesale price	
	Florida	California	Florida	California
	----- Million blooms -----		----- Cents/bloom -----	
1961	3.7	38.7	14.6	12.0
1962	4.5	43.4	15.7	11.0
1963	5.1	52.7	16.4	11.3
1964	6.6	46.4	14.1	11.8
1965	6.0	50.9	15.9	12.2
1966	9.3	61.7	15.6	12.2
1967	9.1	61.7	17.6	13.0
1968	10.2	62.4	17.7	15.5
1969	10.0	70.7	18.8	14.1
1970	9.3	81.5	20.1	13.0
1971	9.2	80.5	19.4	14.1
1972	7.4	75.1	22.1	15.4
1973	5.1	82.4	27.5	16.4
1974	4.5	88.7	26.5	14.9
1975	4.0	93.3	28.3	17.1
1976	5.5	99.3	25.0	15.5
1977	5.0	72.4	29.0	20.2
1978	5.7	90.2	26.0	20.3

Table 5.--Florida and California sales and prices of pompon chrysanthemums, 1961-78.

Year	Quantity sold		Wholesale price	
	Florida	California	Florida	California
	----- Million bunches -----		----- Dollars/bunch -----	
1961	8.4	3.3	.70	.50
1962	8.8	3.5	.71	.49
1963	10.4	4.2	.74	.52
1964	9.4	4.8	.68	.48
1965	10.2	5.4	.68	.54
1966	11.8	6.1	.70	.59
1967	11.4	5.8	.77	.60
1968	12.5	7.8	.77	.67
1969	13.4	9.6	.74	.67
1970	11.8	10.0	.74	.66
1971	11.9	12.6	.85	.67
1972	12.4	12.0	.85	.75
1973	13.1	13.2	.90	.73
1974	11.4	17.4	.80	.62
1975	10.6	17.6	.96	.66
1976	10.5	18.5	.96	.82
1977	9.0	21.4	1.10	.81
1978	8.7	23.7	1.09	.89

market for carnations, standard and pompon chrysanthemums will be represented by a supply and demand equation as follows:

(1) Supply:

$$Q_t^i = f_1(P_{t-1}^i, Q_{t-1}^i, PPF_t)$$

(2) Demand:

$$P_t^i = f_2(Q_t^i, POTH_t, CPC_t, M_t^i)$$

where:

Q_t^i = U.S. sales of commodity i at time t ;

P_t^i = U.S. wholesale price of commodity i at time t ;

PPF_t = price paid by farmers at time t ;

$POTH_t$ = U.S. price of competing commodity at time t (price of pompon chrysanthemums is the case of carnations; price of carnations is the case of standard and pompon chrysanthemums);

CPC_t = U.S. consumption expenditures per capita at time t ;

M_t^i = U.S. imports of commodity i at time t .

Following economic theory, it is expected that the supply of commodity i (Q_t^i) is positively related to prices obtained in the previous period (P_{t-1}^i) and previous year sales (Q_{t-1}^i), and negatively influenced by the prices paid by growers (PPF_t) for the purchase of production inputs. The demand equation is solved for price. Thus, the wholesale price obtained by growers for commodity i (P_t^i) will be inversely related to quantity sold (Q_t^i) and the price of other competing commodities ($POTH_t$), and directly related to national consumption expenditures per capita (CPC_t). If import competition, represented here by the level of imports (M_t^i), plays a role

in influencing a particular market, should inversely relate to prices obtained in the domestic market.

The Florida market for standard and pompon chrysanthemums is also represented by a supply and demand equation, with particular attention paid to both competition from imports and California production. The equations are specified as follows:

(3) Supply:

$$QF_t^j = f_3(PF_{t-1}^j, QF_{t-1}^j, PPF_t FWD_t)$$

(4) Demand:

$$PF_t^j = f_4(QF_t^j, CPC_t, QC_t^j, M_t^j)$$

where:

QF_t^j = Florida sales of commodity j at time t;

PF_t^j = Florida wholesale price of commodity j at time t;

PPF_t = price paid by farmers at time t;

FWD_t = Florida weather dummy (having the value of one during the 62, 69, 70, 73, 77 seasons and zero otherwise);

CPC_t = U.S. consumption expenditures per capita at time t;

QC_t^j = California sales of commodity j at time t;

M_t^j = U.S. imports of commodity j at time t.

The a priori expectation is that the Florida supply of commodity j (QF_t^j) will be positively related to prices obtained by Florida growers in the previous period (PF_{t-1}^j) and previous year Florida sales (QF_{t-1}^j),

and negatively related to prices paid by growers (PPF_t). To represent unfavorable weather conditions (due to freezes or hurricanes) a dummy variable was constructed to take the value of one during the inclement weather years, and the value of zero during the remaining years. This variable (FWD_t) should negatively influence Florida sales.

Turning now to the demand side, the wholesale price achieved by Florida growers (PF_t^j) will be inversely related to sales of commodity j (QF_t^j), and positively related to national consumption expenditures per capita (CPC_t). If California production (QC_t^j) and imports (M_t^j) of commodity j play a significant role in influencing conditions in the Florida market, they should negatively affect prices achieved by Florida growers.

The models described, consisting of a demand and supply for each commodity, were estimated using ordinary least squares (OLS) because of the recursive nature of the underlying equations. Annual data for the years 1962-1978 were used in the statistical estimation. Data were drawn from publications of the U.S. Department of Agriculture [8, 9] and the U.S. International Trade Commission [10, 11], and are summarized in Tables 1 through 5.

STATISTICAL RESULTS

The results of the statistical estimation for the U.S. markets of carnations, standard and pompon chrysanthemums are presented in Table 6. Table 7 shows the regression results for the Florida standard and pompon chrysanthemum markets. In general, the empirical results obtained were satisfactory in terms of high coefficients of determination

Table 6.--Regression results for U.S. cut flower markets, 1962-1978 (t-values in parentheses).

Variable	Carnations		Standard chrysanthemums		Pompon chrysanthemums	
	Q_t	P_t	Q_t	P_t	Q_t	P_t
Intercept	-204.12 ^c (2.05)	5.55 ^a (4.89)	4.41 (1.64)	16.74 ^b (2.73)	2.49 (.440)	-.699 (1.23)
P_{t-1}	46.96 ^a (3.34)	----	4.11 ^b (2.36)	----	1.22 (.220)	.803 ^a (3.42)
Q_t	----	-.0043 ^a (3.26)	----	-.0189 (.705)	----	-.0003 (.020)
Q_{t-1}	.946 ^a (16.72)	----	.602 ^a (4.24)	----	.929 ^a (8.14)	----
PPF_t	-.895 ^a (5.38)	----	-.237 ^b (2.37)	----	-.003 (.196)	----
$POTH_t$	----	.918 (.830)	----	-1.62 (.326)	----	.108 ^c (2.10)
CPC_t	----	1.33 ^a (4.17)	----	1.98 ^a (4.55)	----	.027 (.180)
M_t	----	-.011 ^a (3.13)	----	.022 (.397)	----	-.007 (.412)
R^2	.957	.853	.671	.876	.954	.795
D.W.	1.89	1.79	2.71	1.66	----	----
rho	----	----	----	----	.333	.263

^a Indicates significance at the 1 percent level.

^b Indicates significance at the 5 percent level.

^c Indicates significance at the 10 percent level.

Table 7.--Regression results for Florida cut flower markets, 1962-1978 (t-values in parentheses).

Variable	Standard chrysanthemums		Pompon chrysanthemums	
	QF _t	PF _t	QF _t	PF _t
Intercept	3.79 (1.95) ^c	10.31 (7.61) ^a	1.99 (.759)	.369 (2.82) ^b
PF _{t-1}	-.046 (.207)	-----	3.64 (.796)	-----
QF _t	-----	-.204 (1.36)	-----	-.017 (1.07)
QF _{t-1}	.737 (4.57) ^a	-----	.815 (6.52) ^a	-----
PPF _t	-.0056 (.205)	-----	-.021 (1.80) ^c	-----
FWD _t	-.799 (1.12)	-----	-.225 (.455)	-----
CPC _t	-----	1.38 (3.53) ^a	-----	.304 (2.26) ^b
QC _t	-----	.076 (2.16) ^b	-----	-.028 (1.80) ^c
M _t	-----	.218 (3.58) ^a	-----	-.013 (1.03)
R ²	.755	.974	.816	.955
D.W.	1.98	-----	-----	-----
rho	-----	.411	.324	.310

^a Indicates significance at the 1 percent level.

^b Indicates significance at the 5 percent level.

^c Indicates significance at the 10 percent level.

(R^2), the level of statistical significance of the various coefficients (as expressed by the value of the t-statistic), and conformity of signs to theoretical expectations.

Tables 6 and 7 also report a test of autocorrelation based on the Durbin-Watson statistic (D.W.). In cases where the problem of autocorrelation was evident, such as the national pompon chrysanthemum market and the two Florida chrysanthemum markets, a first-order iterative technique was applied to correct for autocorrelation and the corresponding autoregressive coefficient (ρ) is reported.

Turning first to the empirical results obtained for the national cut flower markets, the coefficient for the import competition variable was statistically significant only in the case of carnations and had a negative sign for both carnations and pompon chrysanthemums. Standard chrysanthemum prices were not influenced by imports according to these results, while the national carnations market appears to have been adversely affected as a result of foreign competition.

The results obtained for the Florida chrysanthemum markets indicate that only pompons have been adversely influenced by imports. At the same time, California production appears to have also significantly affected the Florida pompon market but not the standard chrysanthemum one.

CONCLUSIONS

This study has posed the question of whether import competition has had an adverse effect on the U.S. and Florida cut flower industry. The answer, resulting from econometric models of various cut flower markets would appear to be yes in the cases of the national carnation

and pompon chrysanthemum markets, as well as the Florida pompon market. Florida's pompon market has also been affected by the increasingly dominant position of California as a national producer of this product.

REFERENCES

1. Amin, M. M. and C. N. Smith, "Competition from Cut Flower Imports", Proceedings of the Florida State Horticultural Society, Vol. 87, 1974.
2. Smith, C. N. and W. E. Waters, "Some Observations on Imports and Exports of Floricultural Products with Special Reference to Latin America", Proceedings of the Florida State Horticultural Society, Vol. 82, 1969.
3. Smith, C. N., "Latin American Competition in the Cut Flower Market", Proceedings (Tropical Region) of the American Society of Horticultural Science, Vol. 21, 1971.
4. Smith, C. N., "Changing Patterns in the U.S. Commercial Cut Flower Industry", Proceedings of the Florida State Horticultural Society, Vol. 85, 1972.
5. Smith, C. N., "Changing Comparative Advantage for Floricultural Products in the Americas", Staff Paper 26, Food and Resource Economics Department, University of Florida, December 1975.
6. Smith, C. N., "Import Competition in the U.S. Cut Flower Market", Proceedings (Tropical Region) of the American Society for Horticultural Science, Vol. 29, 1979.
7. U.S.D.A. and Florida Department of Agriculture, Marketing Florida Ornamental Crops: Fresh Flowers & Ferns, (Several issues).
8. U.S.D.A., Floriculture Crops: Production, Area and Sales (Several issues).
9. _____, Flowers and Foliage Plants: Production and Sales, (Several issues).
10. U.S. International Trade Commission, Fresh Cut Flowers, U.S.I.T.C. Publication No. 827, August 1977.
11. _____, Fresh Cut Flowers, Summary of Trade and Tariff Information, U.S.I.T.C. Publication No. 841 (1-15-1), April 1978.