THE CURRENT GATT BILATERAL TRADE DISPUTE AND MARKET SHARING QUOTA VALUES IN ONTARIO

by

Scot Lougheed

Department of Agricultural Economics and Business
University of Guelph

April, 1989

AAEA 89

#7383

INTRODUCTION

The Canadian dairy industry is a highly regulated system of supply management for all of the milk produced in Canada. Under Canada's system the term Industrial Milk is used to denote milk that is processed into dairy products other than fluid milk for consumption. To ship industrial milk a producer must hold Market Sharing Quota equivalent to the amount that will be shipped. The average Ontario dairy farm holds some $175,000(+) in quota representing over 25% of an average farms total asset value and approximately 37% of the average farms total equity. Anything that will affect quota value is of great interest to those holders of milk quota.

The purpose of this study is to research and discuss the significance of a bilateral trade dispute currently before a GATT panel and the effect that its potential outcome could have on industrial milk quota values in Ontario. The GATT panel has been asked by the United States to rule on the Canadian governments move to add ice-cream and yoghurt to the Import Control List in February of 1988.

The Dairy Producers of Canada contend that there are world trading problems in the dairy industry, however the Canadian system of supply management is part of the solution, not the problem. They argue that a supply management system will govern surplus stocks and control direct subsidies on exports (Dairy Farmers of Canada, October 1988). In order to have such a regulated industry imports have to be controlled (OMMB Discussion Paper, January 1989).

The current dispute centers around a ruling that a GATT Panel made for the U.S. and Japan last year over Japanese import quotas on beef. The U.S. position refers to a specifically worded section in GATT Article XI that they say defines ice-cream and yoghurt as processed products and not "like

products" in "early stages of processing". Therefore the importation levels of those two products cannot be restricted by Canada.

Some would query as to whether or not this dispute was brought about by the Free Trade Agreement recently signed by Canada and the United States. That Agreement and this dispute are of two separate sources and it should not be viewed in that manner. Conceptually however, this case could be representative of a similar case against any one of the other supply managed commodities in Canada and therefore the ruling of the Panel will possibly have far reaching effects (Globe & Mail, January 1989).

A price shock to ice-cream prices in an econometric model is to be used to try and determine what will happen to Ontario Market Sharing Quota values in the event of a ruling against Canada by the Panel.

CONCEPTUAL MODEL

Quota value is most commonly defined as the present value of the future stream of resource rents (Warley and Brown, 1988). Economic theory tells us that in a Marshallian cross static demand-supply equation, the area below the equilibrium price line but above the supply curve is representative of the producer surplus (producer rent) being defined as any payments to factors of production in excess of their opportunity cost (Blomquist et al., 1983).

To follow with this conceptual illustration of the diagram with quota values at the aggregate level, Figure 1 shows the industry marginal cost curve represented by the short-run supply curve S_{QSM}; this is the restricted amount of milk that can be produced under a system of supply management. The shaded area bounded by the points labelled (A, B, NQP_Q, P_{SM}) is representative of the economic rents accruing to the producers due to milk production under quota. It is represented by a change of Area I

minus Area III (Figure 1) in producer surplus from the no quota case (Warley and Brown, 1988). These economic rents are the static returns to holding the quota.

In Ontario, Market Sharing Quota (MSQ) is the producers' "license" to produce milk to be sold for the industrial milk market. MSQ is available in two forms:(a) unused MSQ (MSQ), and;(b) used MSQ (MUSQ). Unused quota allows a producer to ship milk in the current period and once it has been filled it becomes used MSQ. The current period is the dairy year which is from August to July of each calendar year. All used quota is renewed as unused at the beginning of each dairy year.

All quota in Ontario has to be traded through the quota exchange operated by the Ontario Milk Marketing Board except for that which is either transferred within a family (ie. from parent to child taking over the family farm) or sold as a part of an ongoing operation. Used MSQ is not traded during the months of August and September of each dairy year.

For purposes of this study the static returns from holding MSQ are defined as the difference between the price of MSQ and the price of MUSQ. We know that MSQ can generated returns from now until perpetuity but MUSQ cannot start to generate those returns until the next dairy year. The difference is the equivalent static value that the quota holder (the producer) places on holding either MSQ or Used MSQ in that current dairy year. This static quota value can be converted to real quota value by discounting.

Salvage value is not taken into account because a holder of quota can sell it on the monthly exchange for whatever the exchange price is at any time that the producer desires to offer the quota held for sale. There are also Income Tax regulations regarding the depreciating of the quota as an asset but they too are not taken into account here.

We would expect that a worse-case scenario decision for the upcoming GATT Panel will be that the Canadian position will be ruled against and the products will have to be removed from the Import Control List allowing for the movement of conceptually cheaper priced American ice-cream and yoghurt products onto the Canadian market. This would result in a shift of the demand curve to the left (Figure 2) as this is representative of a derived demand for industrial milk by the milk product manufacturers; as more American products moved into the Canadian market the domestic manufacturers would produce less. The supply management system could either:

(a) keep the current restricted supply level by adjusting to a lower milk price (either all industrial milk prices or a differentially lower price for milk made into ice-cream and yoghurt products), which would result in lower aggregate quota values or;

(b) adjust the restricted supply level, by removing quota for production, in order to maintain the aggregate quota value.

Both of these actions would affect the price of quota; action (a) would likely result in a lower price as the returns to the quota would be lower, and action (b) would likely see higher prices for a restricted product. For purposes of this analysis, the differential pricing policy will be ignored and we will assume that all milk prices will be lowered.

ECONOMETRIC MODEL DEVELOPMENT

A model utilizing the derived demand for industrial milk and the supply of industrial milk products is developed. This model is then utilized to show the effects of the two policy options open to the supply

management boards in the maintenance of either quota value or production level.

The derived demand for industrial milk is specified as a geometric-lagged, linear equation of the shipments of milk incorporating those variables that economic theory would tell us that input demand would be a function of. The variables are summarized in Table 1 and hold to their expected relationships. All of the product price data input is deflated by the Canadian Consumer Price Index (1981:3=100) to convert nominal dollar amounts into real dollar amounts. Three seasonal dummy variables are added to account for seasonal trends in demand for the products. A lagged time trend is added to account for the delays in producer decisions at the farm level.

The deflated price of industrial milk is the averaged Canadian price across all classes. The deflated price of milk products variable is composed of á weighted average of the three major milk products: deflated price of ice-cream, which is varied for our analysis; deflated price of butter, and; deflated price of cheese. These weights are .15, .53 and .32, based on shares of industrial milk going into production of the products historically. The cheese price is also composed of a weighted average representation, namely: deflated price of cheddar cheese; deflated price of processed cheese, and; deflated price of variety (specialty) cheese. These weights were .30, .30 and .40, respectively. The weights were estimated from per capita consumption figures for Canada. Table 1 also presents the determined values for the demand equation.

An industry supply curve is estimated over the same period as a function of a deflated-no-quota MSQ price for milk, a lagged milk shipments amount and three quarterly, dummy variables. The lagged dependent variable is included to account for partial adjustment; a producer has a physical

lag in changing production levels of milk over time. The dummy variables account for the seasonality of the consumption of dairy products. The function is assumed to be tied very closely to the amounts of milk shipped; the total amount of milk shipped is equated to the amount to be processed therefore representing that amount of production. The values from the supply equation regression are presented on Table 2.

The simulation performed combines both the estimated supply and demand equations. The actual supply is set to equal the milk shipments to proxy the restricted amount of milk shipped under Market Sharing Quota. The portion of the estimated supply curve to the left of the restricted supply curve is required to be estimated in order to calculate the no-quota-price of milk. The no-quota price is defined as the point NQP_Q on the conceptual diagram that outlines the supply management situation (Figure 1).

The model is simulated over the period from the 1st quarter of 1982 to the 2nd quarter of 1987. This period provides for the largest amount of usable data present for all the variable estimations. The model performed well and Table 3 provides a summary of the validation statistics for the four key variables. The simulation captures the main turning points and that plus the statistical parameters from the estimated equations provide enough confidence to use the model for the intended shock to the demand curve.

DETERMINATION OF THE POLICY SHOCK; TYPE AND AMOUNT

To determine the model shock, we return to the hypothesis. That is, if we lower the price of ice-cream, the derived demand curve will shift to the left and the changes in quota value will be observed. In Table 4 a summary is presented of available data for ice-cream prices in Canada and the United States.

The higher U.S. price is hypothesized to result from a different data definition than the Canadian one; the U.S. definition is for the average price across all types and brands of ice-cream while the Canadian definition is that of a generic vanilla ice-cream. The Canadian price is representative of the cheapest possible ice-cream. A simple survey to determine price differentials amongst types and brands was performed in Guelph. The assumption being made is that prices in any one store are representative of average price differentials and thus a basis for adjustment will be found. The results of the survey are found in Table 5.

In a brief discussion with one of the staff in the store that the survey took place in, it was estimated that over 80 percent of their stock re-orders is of the brand that is on sale that particular week. No brand preference could be determined as all of the brands went on sale at or close to the current sale price on an almost regular, rotating basis. It was further estimated that less than 2 percent of their sales would be of the highest priced product. The differing definition and the regularity of sale prices was determined to be the contributing factors in the Canadian price being lower on a comparable product.

Conceptually, as the sale price of ice-cream is about 40% lower than the normal price, we can say that the Canadian data should be that same percentage amount higher. That price is approximately 16% higher than the U.S. product data given (1985). From this analysis it is determined that a shock of a 16 percent decrease in the deflated price of ice-cream would be used for the policy analysis. This would presumably provide for the intended movement of the demand curve after the shock.

REPORT OF THE MODEL ESTIMATION

The simulations for the model resulted in three sets of data for analysis at the mean. These are (i) a base simulation that showed the intersection points for the estimated demand and supply curves, and;(ii) the resultant points from the shock holding shipments of milk at the current level, and;(iii) the points if the aggregate quota value was desired to be maintained at the pre-shock level.

At the mean, for the period, the base simulation yielded a quantity of 1.18831 million hectolitres to be produced at a price to the farmer of $47.96/hL; point P_{SM} on Figure 1. The no-quota price is valued at $39.58/hL; point NQP_0 on Figure 1. When the demand curve is shifted there are two alternative values that the milk price can take on. If the short-run supply curve is shifted to restrict the quantity of production so as to maintain the quota value, the resultant price will be $46.54/hL for milk and the no-quota price will be $38.86/hL. However, if the short-run supply curve is to be maintained at the original level of production, then the price of milk will fall to $46.32/hL.

The summary of the model estimation at the mean for the period estimated appears in Table 6. The representation of the static diagram from that summary appears in Figure 3.

CONCLUSIONS FROM THE MODEL

Based on the results, if in a worse case scenario such as the GATT Panel ruling against the Canadian government, a 16 percent reduction in the price of ice-cream and yoghurt products will lead to a 16.65 percent reduction in Market Sharing Quota price if the current production levels are maintained. The price of milk will fall by 3.42 percent from the current price. If the quantity of milk is adjusted downwards in order to

maintain the asset value, the price of MSQ will rise by less than 1 percent (0.83%) while the quantity of milk will also only be restricted by less than 1 percent (0.82%). The price of milk will be reduced by only 2.96 percent from the base price.

Based on the milk sales statistics for Ontario, it is estimated that 60.69 percent of the total annual production of milk goes towards industrial milk products (Ontario Ministry of Agriculture and Food, 1987). If we then accept that for the average farm a proportionate amount of the total quota value held is MSQ ($106,000) and the value of MSQ will fall some 16 percent, if production adjustments are not made, we can extrapolate that total asset values for quota may fall 9.69 percent for the average Ontario farm. That figure is representative of approximately 3.6 percent of the average farms equity.

Overall, the estimations from the model approximate the effects that a price reduction in ice-cream and yoghurt products might have on the value of Market Sharing Quota. It should be reiterated that all of the three types of quota available in Ontario (Fluid, MSQ and Used MSQ) are traded on the Ontario Milk Marketing Board's quota exchange and that is the only place where price and hence value can be set. From basic economics it should also be remembered that as an item (Market Sharing Quota) for which there is a demand is reduced in supply, the price will rise. As well, when the demand for that item is reduced, the price will decrease. Both of these phenomena we see happening here.

The model does have some shortcomings in that all of the forces that come to play in a market cannot be included in an econometric estimation. Another factor that may play a large role in the price of ice-cream products might be the price of sugar; this was not recognized in the estimation. Future research should possibly include that and other

parameters. There is also a definite lack of econometric research on MSQ values that could be used for comparative analysis. Further, remember that these estimations are based on what might have been not on what will be in the future. The analysis does indicate though what could happen given the parameters outlined.

REFERENCES

Blomquist, Ake, Wonnacott, Paul, Wonnacott, Ronald. 1983. An Introduction to Microeconomics, First Canadian Edition. McGraw-Hill Ryerson Limited, Toronto.

Dairy Farmers of Canada. 1988 Dairy Policy. Ottawa, January.

Dairy Farmers of Canada. 1988. Statement on the current status of the GATT Negotiations. Ottawa, May.

Doyle, Richard. 1988. GATT and the Canadian Dairy Industry. An address to the Ontario Milk Producers Geneva Park Meeting. October 12.

Globe and Mail. 1989. Haagen-Dazs controversy chills marketing board. Toronto, January 12 issue.

Lane, S.H., Brinkman, G.L. 1988. A Study of Milk Quota Values in Ontario. Ontario Milk Marketing Board, Toronto, January.

Miracle Food Mart, Stone Road Mall, Guelph. 1989. Survey of shelf prices. March 13.

Ontario Milk Marketing Board. 1989. Discussion Paper: National Dairy Policy. Provincial Annual Meeting. January.

Ontario Milk Marketing Board. 1985. Dairy Statistics Handbook. Toronto.

Ontario Milk Marketing Board. Ontario Milk Producer. Various issues. Toronto.

Ontario Ministry of Agriculture and Food and The University of Guelph Department of Agricultural Economics and Business. 1987. Ontario Farm Management Analysis Project 1987. Guelph.

Tomek, Wm. G, Robinson, K.L. 1981. Agricultural Product Prices, Second Edition. Cornell University Press, Ithaca, N.Y.

Warley, T.K., Brown, D. 1988. Agricultural Policies. Department of Agricultural Economics and Business, University of Guelph, December.

Table 1: Estimated Derived Demand for Industrial Milk in Ontario, 1980 to 1987.

Explanatory Variable	Coefficient	t-Statistic	Calculated Elasticity
Constant	1.469565	0.1286143	----
Deflated Price of Milk	-21.80966	-2.66120	-0.2101
Deflated Price of Milk Products	30.3872	2.698004	0.3042
Dum1	0.3292648	1.756264	0.329
Dum2	3.657692	15.58679	3.657
Dum3	2.822109	11.32316	2.822
Time	-0.9954293E-01	-2.923443	-0.00095
Rho	0.552753	3.21573	----

Adjusted R-Squared: 0.961304
Durbin-Watson: 1.4778 ;low:.951;up:1.958 (incl.)
F-Statistic: 112.7 ;significant

Table 2: Estimated Supply Function for Industrial Milk in Ontario, 1980 to 1987.

Explanatory Variable	Coefficient	t-Statistic	Calculated Elasticity
Constant	1.191732	0.4117897	----
Deflated No Quota Price	119.9655	1.130707	1.1288
Lagged Shipments of Milk	0.6029593	3.071142	7.165
Dum1	2.069889	3.249069	2.07
Dum2	5.105835	8.613165	5.10
Dum3	2.365760	7.883280	2.36

Adjusted R-Squared: 0.934439
Durbin-Watson: 1.4557 ;low:.863;up:1.940(incl.)
F-Statistic: 60.8620 ;significant

Table 3: Results of the Model Simulation;
1982 Quarter 1 to 1987 Quarter 2

Variable:	Correlation Coefficient:	Root Mean Squared Error:
Price of Milk	0.93804	2.50943
Deflated Price of Milk	0.69173	0.02104
Deflated No-Quota Price	0.33214	0.00296
Current Price of Quota (PMSQ-PUMSQ)	0.32473	0.29351

Table 4: Comparison of Ice-cream Prices in Canada and the United States, 1981 and 1985.

	Canada (CDN)	United States (CDN)
	$'s per litre	
1981:	1.17	1.25
1985:	1.44	1.67

Table 5: Price Comparison for Sample Ice-Cream as to Expensiveness (proxy for percentage butterfat).

Brand Name	Price per litre
Haagen-Dazs	7.58
Beatrice "Light-30% less Fat"	2.59
Sealtest "All Natural"	2.845
Sealtest "Parlour"	2.495 * On Weekly Sale: 1.495
Miracle Mart	2.145
Meadowgold (Ault)	1.1725

(Miracle Food Mart, March 13, 1989)

Table 6: Summary of the Model Estimation

	Base	Q_{SM}	Q_{SMZ}
Market Price of Industrial Milk ($'s/hL)	47.96	46.32	46.54
No-Quota Market Price of Industrial Milk ($'s/hL)	39.58	39.58	38.86
Quantity of Milk (thousands of hectolitres)	1,188.31	1,188.31	1,178.55

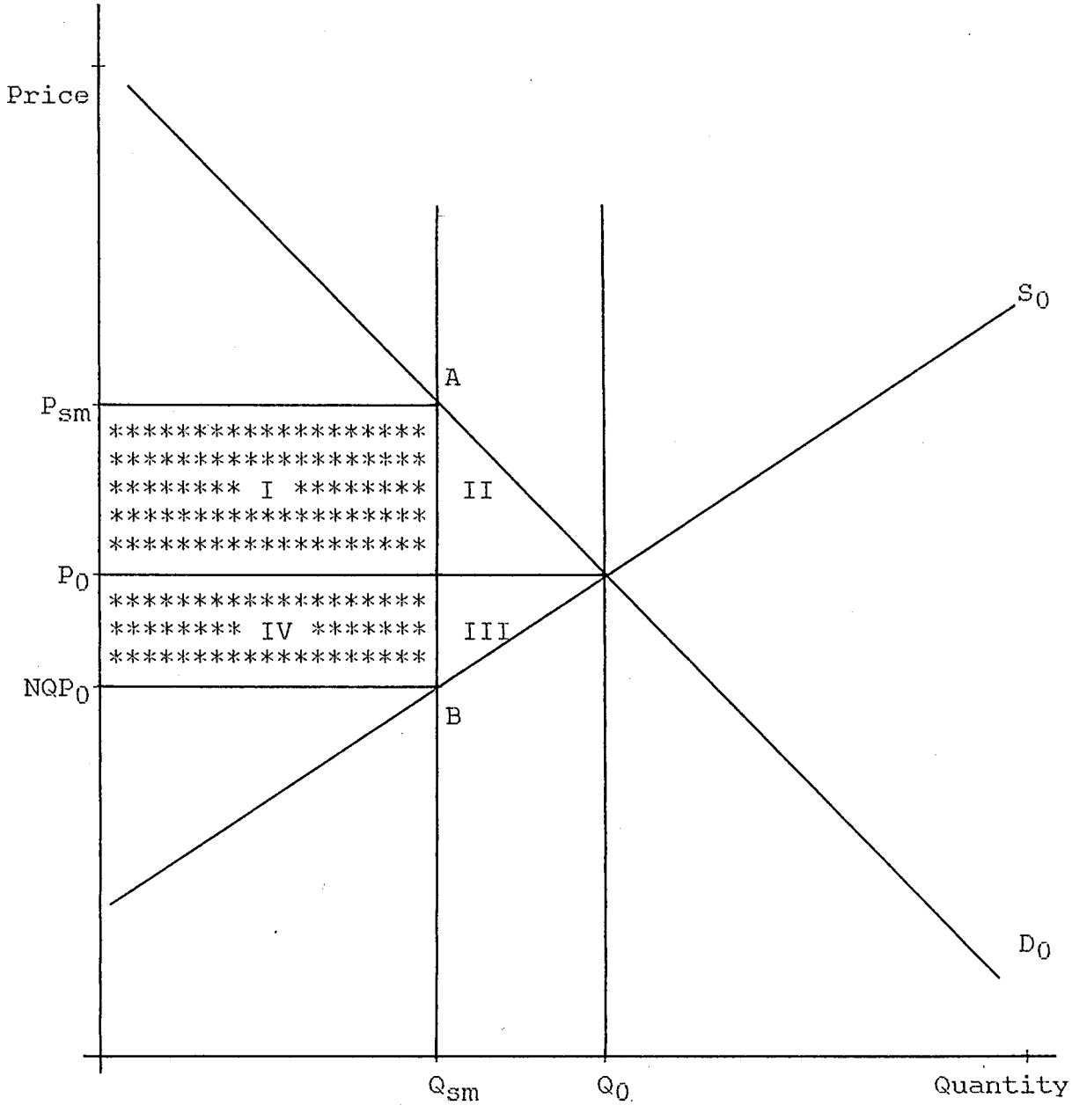

Figure 1: Example of Static Demand and Supply showing Consumer and Producer Surplus at the Theoretical Restricted Short-Run Supply Curve

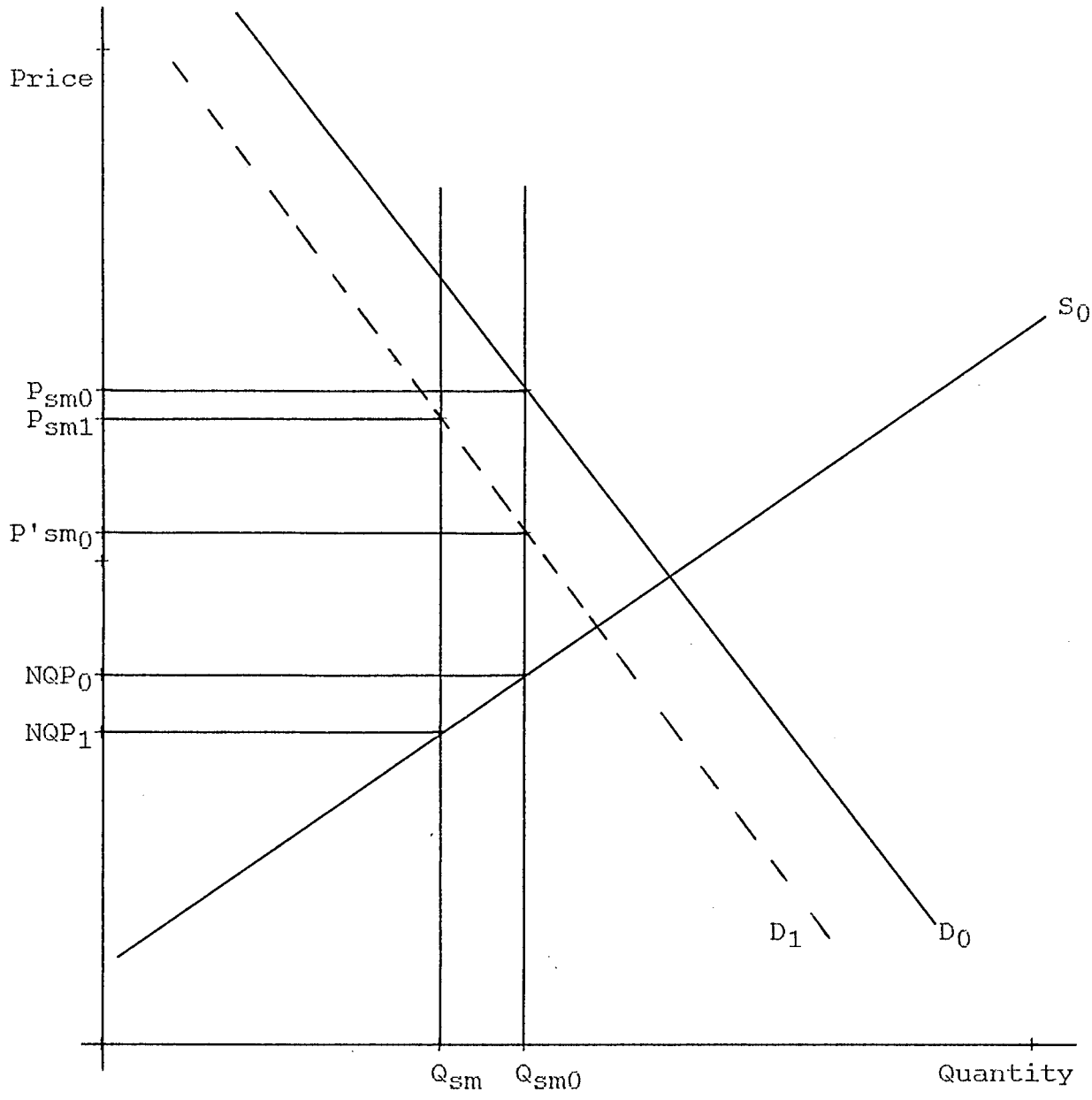

Figure 2: Static Diagram showing Theoretical Model to be Estimated and the Hypothetical Changes to Milk Prices

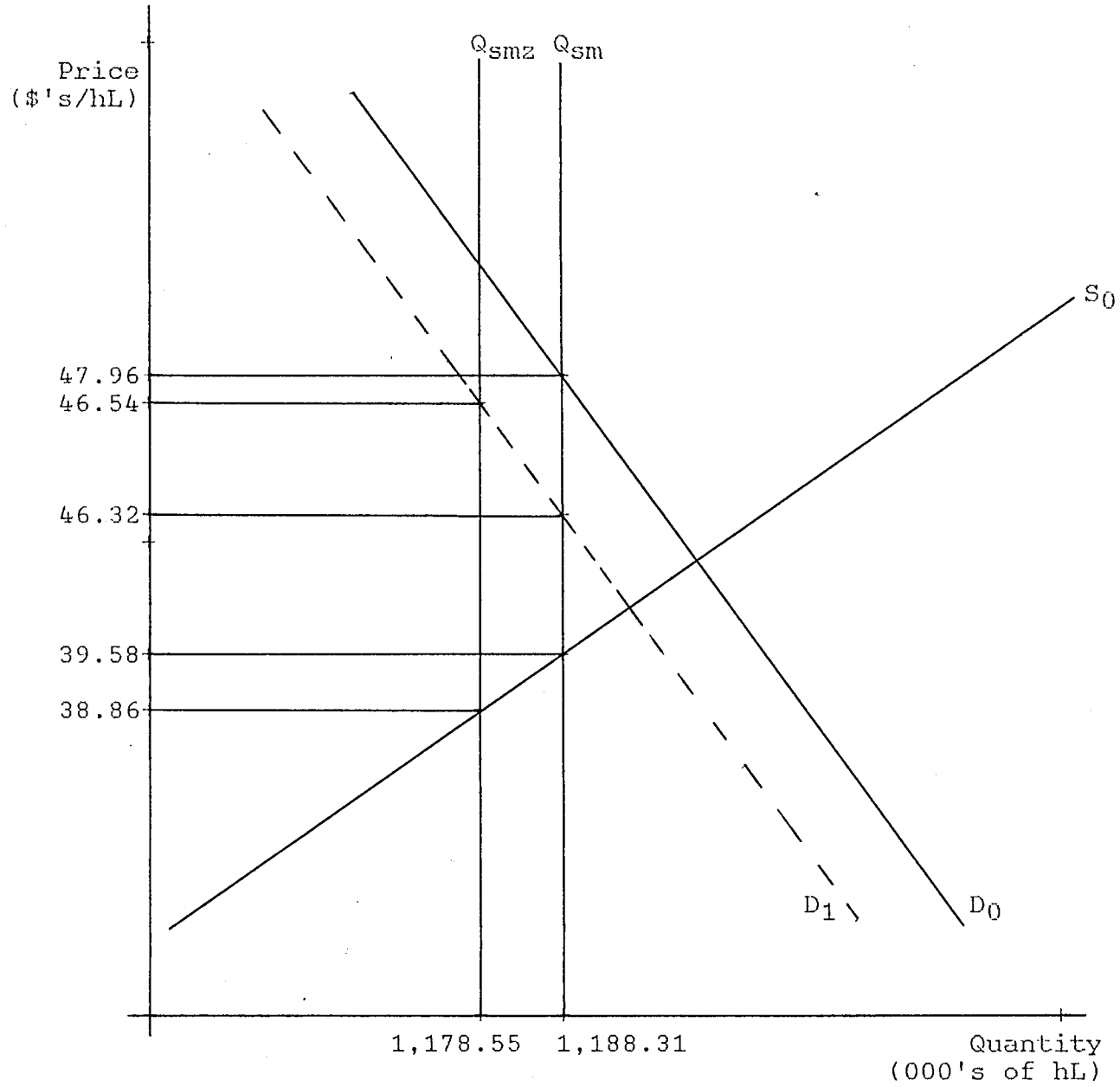

Figure 3: Static Diagram showing Estimated Model Results