AN EVALUATION OF MILK QUOTA EXCHANGE POLICIES

CATPRN Trade Policy Brief 2011-02
March 2011

Karl Meilke

Alex Cairns

Department of Food, Agricultural and Resource Economics
University of Guelph

http://www.catrade.org

Introduction

Since the inception of supply management in Canada milk production quota has been used to regulate output and participation in the dairy industry. In recent years, milk quota values have increased dramatically, almost tripling in value since the mid-1980s. This led to the Dairy Farmers of Ontario (DFO) intervening on the milk production quota exchange on two occasions: first, in November 2006 with a progressive transfer assessment and then in July 2009, replacing the former policy with a firm price ceiling – fixing the unit price of quota at $25,000. These policies represent a significant redistribution of economic benefits from milk producers selling their quota to those remaining in the industry. In this report we explore the reasons for the increase in production quota values; and assess the welfare and distributional effects of each of the two quota policy schemes. Our results suggest that the increase in quota values were driven by basic economic factors and that the efficiency losses from intervention in the quota exchange are non-trivial with the cost to the Ontario dairy sector in quota allocation inefficiency totalling $4.1 million per year.

The Canadian Dairy Industry

The operation of the Canadian dairy industry is extremely complex and highly regulated. However, its essential features entail: 1) farm level milk prices based on a cost of production formula[1]; 2) classified pricing, by end use, of milk purchased for processing; 3) production quotas designed to supply all the milk and dairy products the domestic market requires at the formula price; and 4) high import tariffs to keep foreign dairy products, above Canada's WTO minimum access commitments, from entering the domestic market. Our study is focused on the Ontario dairy market which supplies about 32 percent of Canada's raw milk.

One of the primary responsibilities of the DFO is to establish the rules and regulations that apply to the transfer of milk production quota among Ontario dairy producers.[2] Since March 1980 the DFO has operated an exchange where production quota could be traded amongst willing buyers and sellers, allowing the market to freely determine its price. Although economists have been frequent critics of supply management most would agree that, given supply management, an open and transparent production quota transfer mechanism is a positive aspect of the milk marketing system.

Figure 1 shows that, in constant 2006 dollars, a unit of milk production quota was worth about $15,000 in the mid-1990s.[3] At that point the value of production quota exploded reaching more than $30,000/unit in 2004, an average annual increase of 11.7 percent per year in real terms. The reasons for this rapid rise in quota values will be discussed later but the increase caused the DFO to intervene on two occasions; each time instituting a major change in quota

---

[1] Although it is often stated that milk prices are based on a cost of production formula this is not entirely correct since changes in personal disposable income and changes in the consumer price index receive 60 percent of the weight in the formula used to set the price of table milk and cream while industrial milk prices are determined by the Canadian Dairy Commission in a different fashion.

[2] You must be an active milk producer to own quota.

[3] A unit of milk production quota allows a milk producer to deliver one kilogram of butterfat per day and this is roughly equal to the annual milk (butterfat) production of an average dairy cow.

transfer policy designed to slow or halt the growth in the value of production quota. It is these policies that are the primary focus of this paper.

In November 2006 the Progressive Transfer Assessment (PTA) policy was implemented and it imposed a variable in-kind tax on producers selling quota on the exchange (also known as the pay-what-you-bid provision). The PTA policy allowed producers purchasing quota on the exchange to bid what they were willing to pay for a unit of quota and to specify the quantity they were willing to buy at that price; at the same time an in-kind tax was imposed on the quantity of quota sellers put on the exchange to impose a ceiling on the price they received at $25,500/unit of quota. It was instituted based on the assumption that speculative behaviour was driving the spike in quota prices. As illustrated in Figure 1, the PTA halted the rapid escalation of quota prices at around $30,000/unit but it failed to achieve the anticipated result of lowering the price to the resale value of $25,500/unit. In response, in August 2009 the quota system was changed again to impose a ceiling price on quota of $25,500, with scheduled monthly reductions to $25,000/unit by January 2010. Under this system buyers will pay and sellers will receive $25,000 per unit of quota (after January 2010) if the ceiling price is binding and less if it is not binding.

Evaluating Quota Values

To evaluate quota values we apply the standard infinite time horizon capital asset pricing model (equation 1) where CV is the capitalized value of milk quota, E(R) the expected rental rate of milk quota, and (r) the discount rate.[4]

$$CV = E(R)/r \qquad\qquad (1)$$

This formula can be used to shed light on the "speculative bubble" question. In this simple case, $r = E(R)/CV$. In Figure 2 we show the values of (r) consistent with quota valued at $25,000/unit and $30,000/unit, for rental rates varying from $28/hl to $34/hl. Note that even with a rental rate as low as $28/hl; a discount rate of 8.6 percent is consistent with a $30,000/unit quota price. The implied discount rate at $32/hl is 9.8 percent and at $34/hl it is 10.4 percent. Between 2002 and 2009, the prime interest rate plus two percentage points, has averaged 4.9 percent and in 2009 it equalled 2.6 percent (Table 1). In our view the discount rates shown in Figure 2 are not consistent with the existence of a speculative bubble in quota prices, i.e., a discount rate of near ten percent is not indicative of irrational exuberance. Figure 2 also illustrates that to drive the imputed value of quota to $25,000/unit the discount rate has to rise to above ten percent for a reasonable range of rental rates.

In our view, the rapid rise in quota values between 1995 and 2006 is the rational outcome of declining interest rates, declining policy risk and a "catch-up" in quota values with their intrinsic value as credit constraints were eliminated. However, in one important sense the cause of the rapid increase in quota values is immaterial. When interest rates increase quota values can fall quite rapidly, especially if perceived policy risk increases at the same time as might happen

---

[4] All of the data used in constructing the model is provided in Cairns, Meilke and Bennett as is analysis conducted using a capital asset pricing model that explicitly accounts for policy risk. However, the general conclusions are the same regardless of the model used.

if the Doha Development Agenda of multilateral trade negotiations are concluded. With quota fully priced in our view, or overpriced in the view of the DFO, rising interest rates world have serious consequences for dairy producers who are highly leveraged.

The Cost of Quota Market Inefficiency

In order to quantify the effects of the quota policies a simple linear, synthetic model of the Ontario quota exchange calibrated to 2007 data was constructed. The calibration to 2007 data was selected because it was the first full year after the imposition of the transfer assessment policy (November 2006 – July 2009).

The model contains two equations: the excess supply curve for quota and the excess demand curve for quota. In order to calibrate the model estimates of the excess supply and excess demand elasticities for Ontario dairy quota are required. Lambert et al. (1995) address the price responsiveness of the excess supply and excess demand and provides estimates of -5 for the demand elasticity and 10 for the supply elasticity. The demand elasticity is imposed at the annual average bid price on the quota exchange in 2007 ($28,653) and the supply elasticity at the ceiling price ($25,500). Both are calibrated to the total quantity of quota traded in 2007 of 6,892.8 kilograms. Using the excess demand and supply curves the unrestricted equilibrium price for quota in 2007 would have been $26,470 and 9,512 kilograms of quota would have traded. Hence, the equilibrium price was only marginally (3.8 percent) above the initial price ceiling but at the equilibrium price 40 percent more quota (9,512 kg vs. 6,892.3 kg) would have been traded.

Welfare Analysis of the Quota Transfer Policies

The welfare analysis of the transfer assessment policy and the price ceiling policy are consistent with expectations. Under the PTA buyer surplus declined by $17.9 million and seller surplus by $7.9 million in comparison to the baseline figures. The in-kind tax revenue equals $21.7 million and the deadweight loss from the policy is $4.1 million. Hence, the PTA transfers $21.7 million from the buyers and sellers of quota to the general dairy sector at a cost of $4.1 million. The deadweight loss in the quota market represents about two percent of the farm cash receipts from the sale of dairy products in Ontario in 2007. The transfer efficiency of this policy (the deadweight loss divided by the in-kind tax revenue) equals $0.19, indicating it wastes 19 cents to transfer a dollar of income to the beneficiaries of the in-kind tax. Clearly, the beneficiaries of the transfer assessment policy are the milk producers remaining in the industry who receive an asset that is worth at least $25,500/unit for free, albeit in very small quantities.

In contrast to the PTA, under the price cap system which utilizes a price ceiling of $25,500/unit, no tax revenue is collected and there is a direct welfare transfer from the sellers of quota to the buyers of quota. Since this policy is designed to transfer welfare from quota sellers to quota buyers transfer efficiency is the deadweight loss divided by the change in buyer surplus and it equals 1.08 indicating that it costs $1.08 to transfer one dollar to quota purchasers under the price ceiling policy – an extremely inefficient policy if this is the policy objective.

Implications for Policy

Our findings suggest that the rapid increase in quota values between 1995 and 2006 were largely the outcome of market forces (a declining discount rate and policy risk) and the relaxation of credit constraints on lending money for quota purchases. The introduction of the in-kind tax and then a price ceiling in the quota market to halt the growth of quota values achieved its objective but at a high cost in terms of inefficiency in the quota market. The *status quo* (a price ceiling) with little quota being sold on the exchange and tight restrictions on the sale of on-going operations does not seem sustainable as long as the ceiling price remains binding. With the ceiling price, even if quota is offered for sale on the exchange, it entails the arbitrary distribution of small quantities of milk production quota to the many bidders with reservation prices above the price ceiling. This stifles the ambitions of those producers wishing to expand their low-cost operations. If radical changes in the milk market, such as lowering support prices or creating two classes of quota are impossible then it would be better to move back to a tax system rather than the current ceiling price (Barichello, Cranfield and Meilke 2009).

References

Barichello, R., J. Cranfield and K. D. Meilke. 2009. Options for the Reform of Supply Management in Canada with Trade Liberalization. *Canadian Public Policy* 35 (2): 203-217.

Lambert, R., R. Romain, B. Basillais and C. Roy. 1995. Analyse de la liberalisation des changes de quotas entre le Quebec et l'Ontario dans le secteur laitier. *Canadian Journal of Agricultural Economics* 43 (2): 209-223.

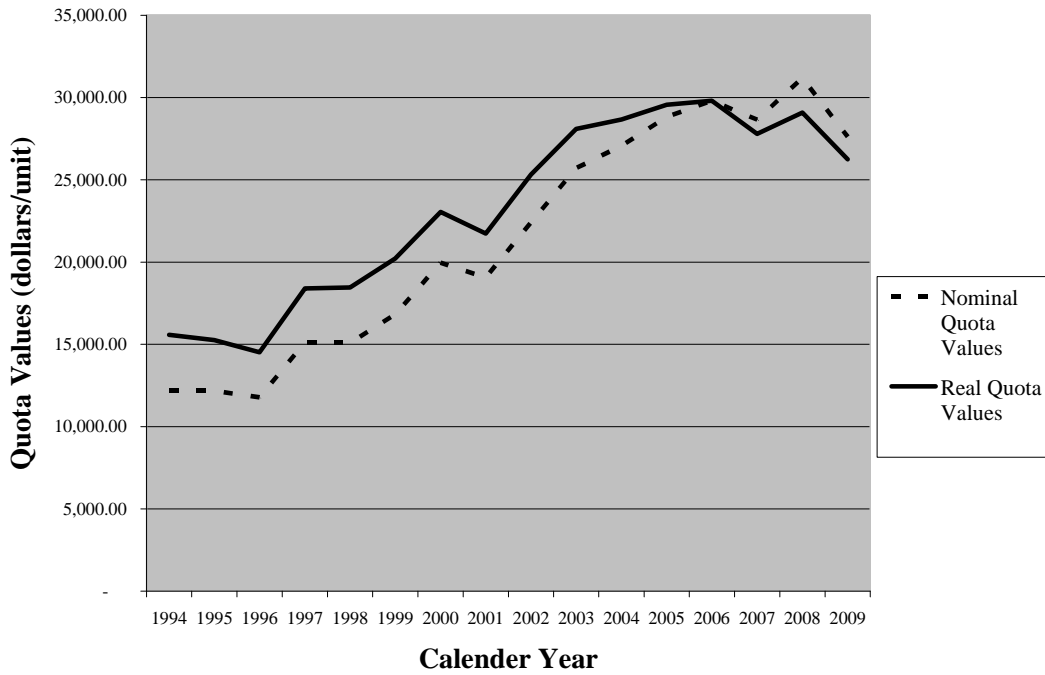**Figure 1. Nominal and Real (2006 = 100) Quota Values 1994-2009**

Figure 2: Implied Discount Rates Consistent with Different Rental Rates for Milk Quota.