Measuring Water in the Tariff with TRQs Imposed: Dairy Products in Canada

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Introduction

- Numerous cases where countries have Tariff Rate Quotas (TRQs) in place with very large over-TRQ tariffs imposed
- Canada's dairy industry just one example of use of such "mega-tariffs"
- Sample of other prominent examples:
  - Canadian poultry products
  - US sugar
  - US peanuts
  - Japanese rice
  - Korean rice

Introduction 2

- Raises domestic policy question:
  - How much protection actually needed to keep out imports and preserve domestic rents?
- Put differently, this is trade negotiation question:
  - How much can these over-TRQ tariffs be lowered with no effect on domestic industry prices and profits?
  - How much “unused” or “surplus” protection exists with current TRQs?
- In trade literature this surplus protection is termed “*water in the tariff*” (WIT)
- Here we measure WIT for small sample of Canadian dairy products

Introduction 3

- This issue not only of interest to trade policy makers
- Also important for the protected farmers concerned, in this case Canadian dairy farmers
- In negotiations and lobby efforts, Canadian dairy lobby repeatedly argues against lowering over-TRQ tariffs, even when this requires giving up an increase in TRQ levels, increasing imports
- If there is water in the (over-quota) tariff, it could be reduced costlessly, whereas increasing TRQ levels raises immediate costs to all in terms of reduced quotas and foregone milk sales

Definition of Water in the Tariff

- To be competitive imports must enter country, duty paid, at less than prevailing domestic wholesale price
- Water in the Tariff (WIT) is calculated in two steps

  (1) What tariff level would raise the world price to a level equal to the domestic wholesale price, and just keep out imports (the minimum protective tariff, or nominal rate of protection)?

  (2) How much higher is the current (over-quota) tariff than that nominal rate of protection?

Expectation of WIT

- Protection needed to cover high milk costs?
  - Depends on (a) raw milk p differential,
    (b) raw milk cost share, and
    (c) non-milk cost differential
- If (a) = 100%, (b) = 50%, and (c) = 0, then tariff of (100%)*(50%) = 50% needed to compensate for added raw milk costs
  - Any tariff >50% would generate “water”
  - Assumes competitive CDN processing sector (i.e., one non-milk “cost” factor is profit, assumed equal between Canada and U.S.
  - If you expected (a) = ~50% as in early 2000s, you would have expected ½ needed tariff, or 25%

WIT Equation

- The nominal rate of protection (NRP) for some dairy product can be defined as

$$NRP = (P_c - P_w)/P_w * 100\%$$

where P_c = Canadian domestic wholesale price, and
P_w = landed foreign wholesale price, adj to cif

- We can then define WIT as

$$WIT = T_c - NRP$$

where T_c = the applied tariff actually in effect, in this case the Canadian Over-TRQ tariff rate

Empirical Strategy

- Two primary pieces of data are needed, in addition to current tariff levels
  - the landed world price (in c.i.f. terms)
  - the domestic wholesale price
- However, concerns about concentration levels among Canadian dairy processing firms, so that their margins are above competitive levels
  - In 1999, output share of top four dairy processors exceeds 45%
  - In 2007, three largest processors processed 70% of milk produced in Canada (AAFC, 2007)
  - Supporting evidence also found in Rude and Goddard (1995), Cranfield (1995) and Chen and Weerahewa (1998)

Processor Market Power?

- Additional evidence can be found in comparing Canadian and US processor margins (average revenues net of raw milk costs) for a sample of products
  - For butter and skim milk powder, these costs are now roughly $20/hl in Canada and $10/hl in the U.S.
  - For cheddar cheese, current costs are roughly $50/hl in Canada vs $10/hl in the U.S.
  - For fluid milk the difference is $110/hl vs $40/hl
- The following three figures illustrate the time series on these margins

Figure 2.3: Canada and US Processing Margin of Butter and SMP

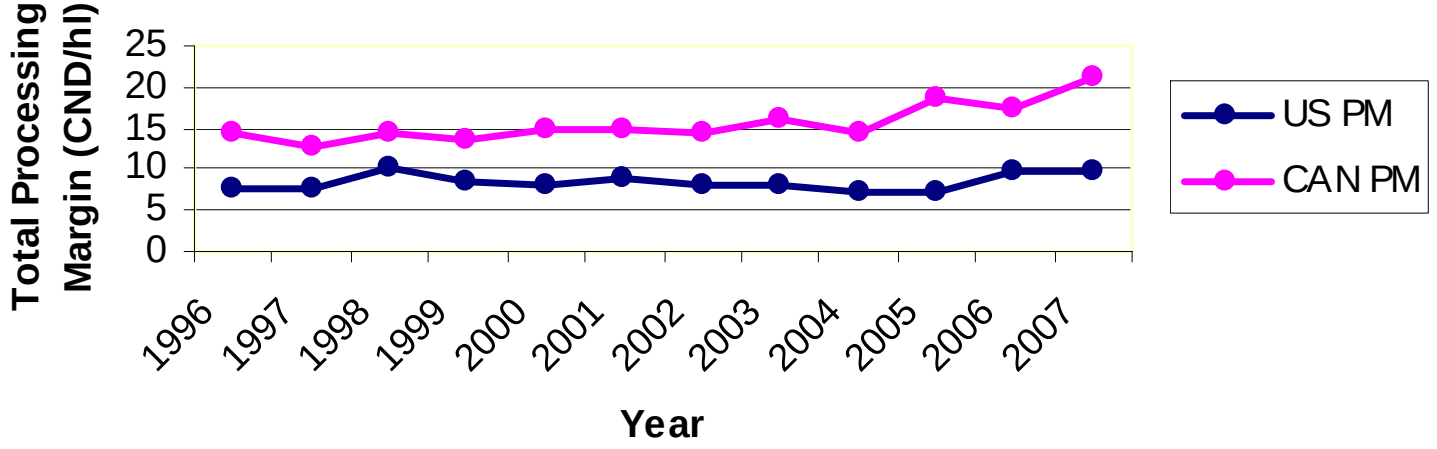


Figure 2.4: Canada and US Processing Margin of Cheddar and its by products

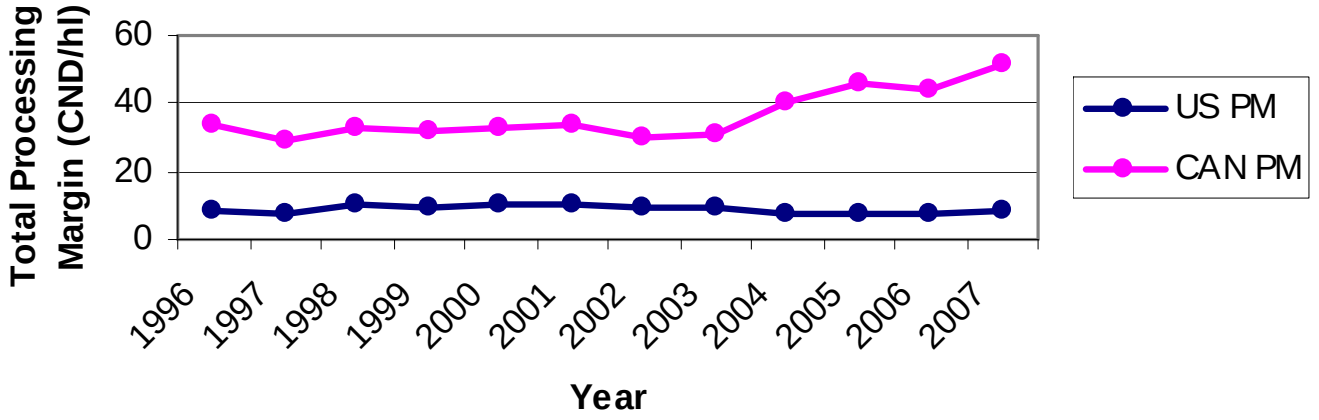
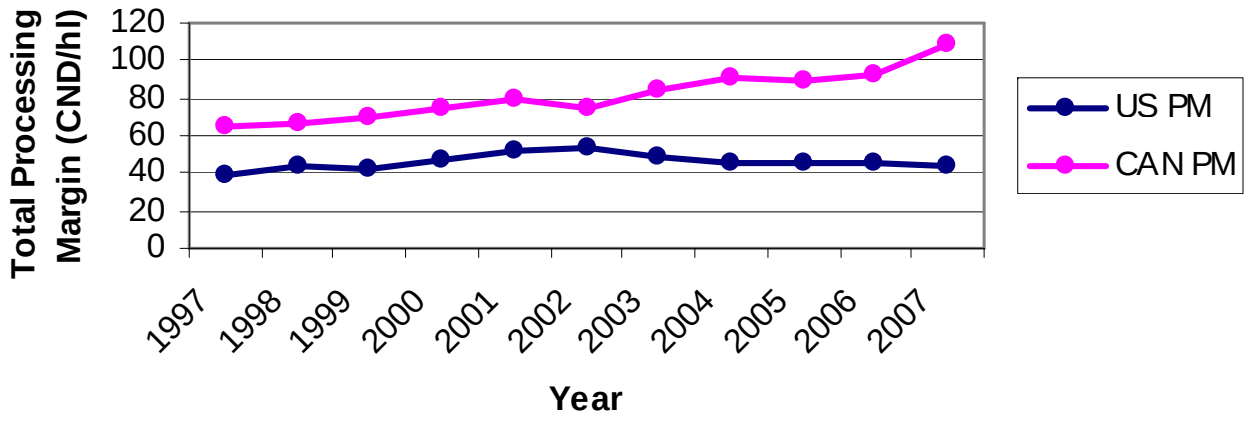


Figure 2.5: Canada and US Processing Margin of Fluid milk (2%) and its by products



Processor Market Power? 2

- In explaining these numbers one should note
  - Technology is largely the same for all products
  - Most inputs except labour and milk trade with little or no duties
  - Economies of scale could play some role but recent (last decade) mergers in Canada have moved average plant sizes much closer together
  - Yet processor margins have *widened* within the past decade
- Difficult NOT to conclude that market power and concentration is important in dairy processing, and even that it has grown in recent years

Need for Better Margin Data

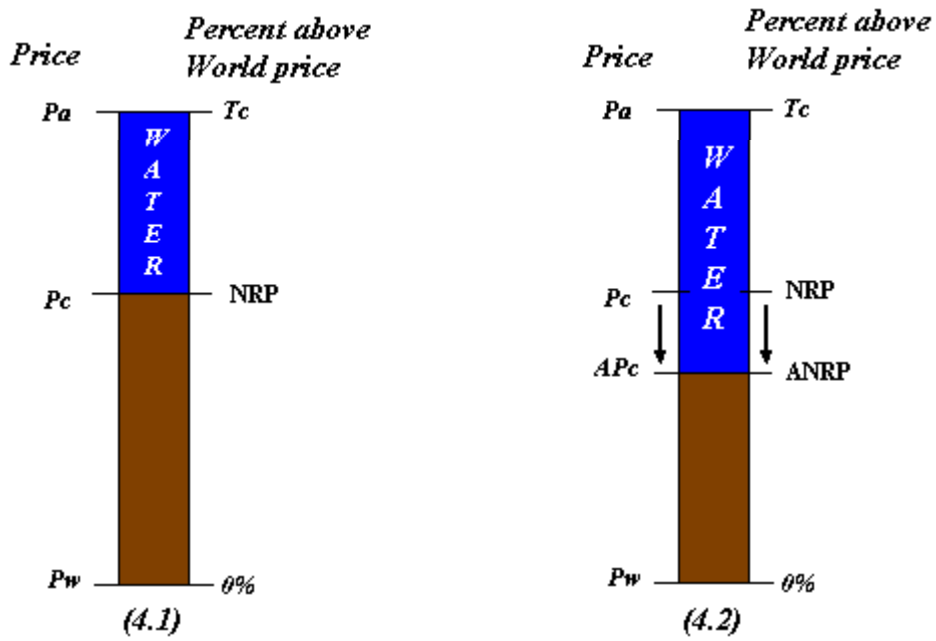
- If this is true, when faced with serious import competition, CDN processors would lower their wholesale prices to match import prices, until those margins fell to more competitive levels
  - This means observed wholesale prices are not those that would prevail with import competition
- We must find more realistic estimate of processor margins that are closer to competitive levels (with market power rents squeezed out)
  - We term this revised estimate of processor margins the Adjusted Nominal Rate of Protection

Margin Adjustment

- To estimate this adjusted NRP we turn to US data on processor margins by dairy product to adjust the Canadian processor margin
- What we do is calculate US processor margins by product, using standardized product conversion factors, US raw milk costs and US wholesale market revenues
- We then adjust these calculations substituting Canadian raw milk prices for the US raw milk costs in an additive fashion (i.e., we assume the payment of higher raw milk prices does not increase any other processor costs)
- The results are illustrated in Fig. 1

Illustration of WIT

Fig. 1: Applied tariff, Nominal and Adjusted Nominal Rates of Protection, and Water in the Tariff



*Pa: The price of duty paid foreign product. Pa = Pw * (1+Tc)*
Pc: Canadian wholesale price. Pw: World wholesale price.
Tc: Canadian over quota tariff (Applied rate). NRP *: Nominal rate of protection*
APc : Adjusted Canadian wholesale price. ANRP *: Adjusted nominal rate of protection*

Implications of Adjusted Processor Margin Calculation

- "Adjusted Processor Margin" calculated for Canada may be understated if there are significant economies of size that Canadian processors cannot realize
  - However, as noted, many mergers among Canadian processors in the past decade with the threat of import competition from large plants in the US
- Possibility that some cost items have unit prices higher in Canada; but only labour significant
- Processing technology acknowledged to be mostly the same for larger-sized plants
- Conclusion: this margin much more realistic

Data: P_w and P_c

- In calculating P_w, wholesale prices taken from each of the three major potential sources by product (U.S., EU, and Oceania), for 1996-2007
  - Least expensive source chosen; see next slide for e.g.
  - C.i.f. prices calculated by adding transport costs, sourced from USDA trade data
  - Canadian trade data alternative P_w source; these prices lower, reported in paper
- To calculate P_c, wholesale prices taken from AAFC data for Quebec for butter, skim milk powder and cheddar cheese. For fluid milk average fluid milk retail prices for 13 Cdn cities, adjusted down by US fluid milk retail margin

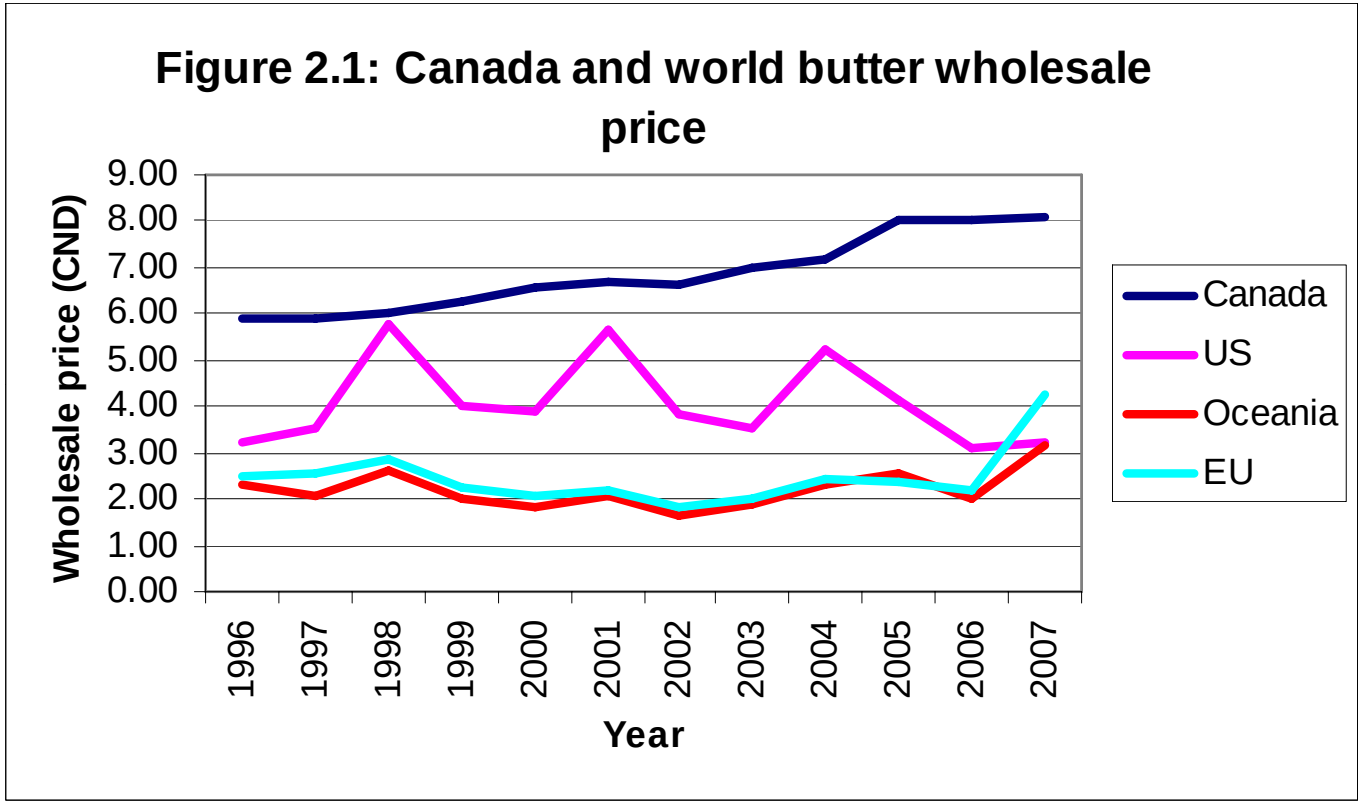
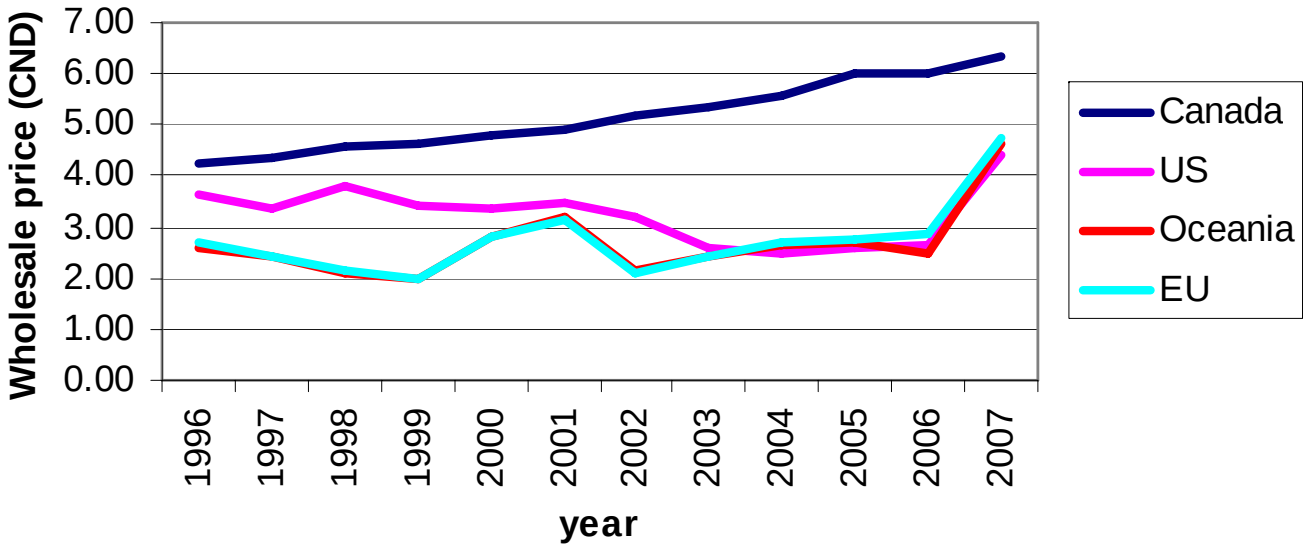


Figure 2.1: Canada and world butter wholesale price
Wholesale price (CND)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Year
Canada
US
Oceania
EU

Figure 2.2: Canada and world SMP wholesale price



Data: Adjusted P_c

- To calculate Adjusted P_c, US processing margins (=product revenues less raw milk costs) are calculated by product, and this is adjusted for the higher Canadian raw milk price
  - This is equivalent to adding the extra expenditure US processors would incur in buying Canadian milk. This is a major adjustment as can be seen in next figure comparing US and Canadian farm milk prices.
  - For butter and skim milk powder, joint costs are allocated according to the respective revenue shares
  - Adjustments are made by a revenue credit for joint product sales (e.g., whey powder in cheddar cheese, butterfat skim-off in fluid milk

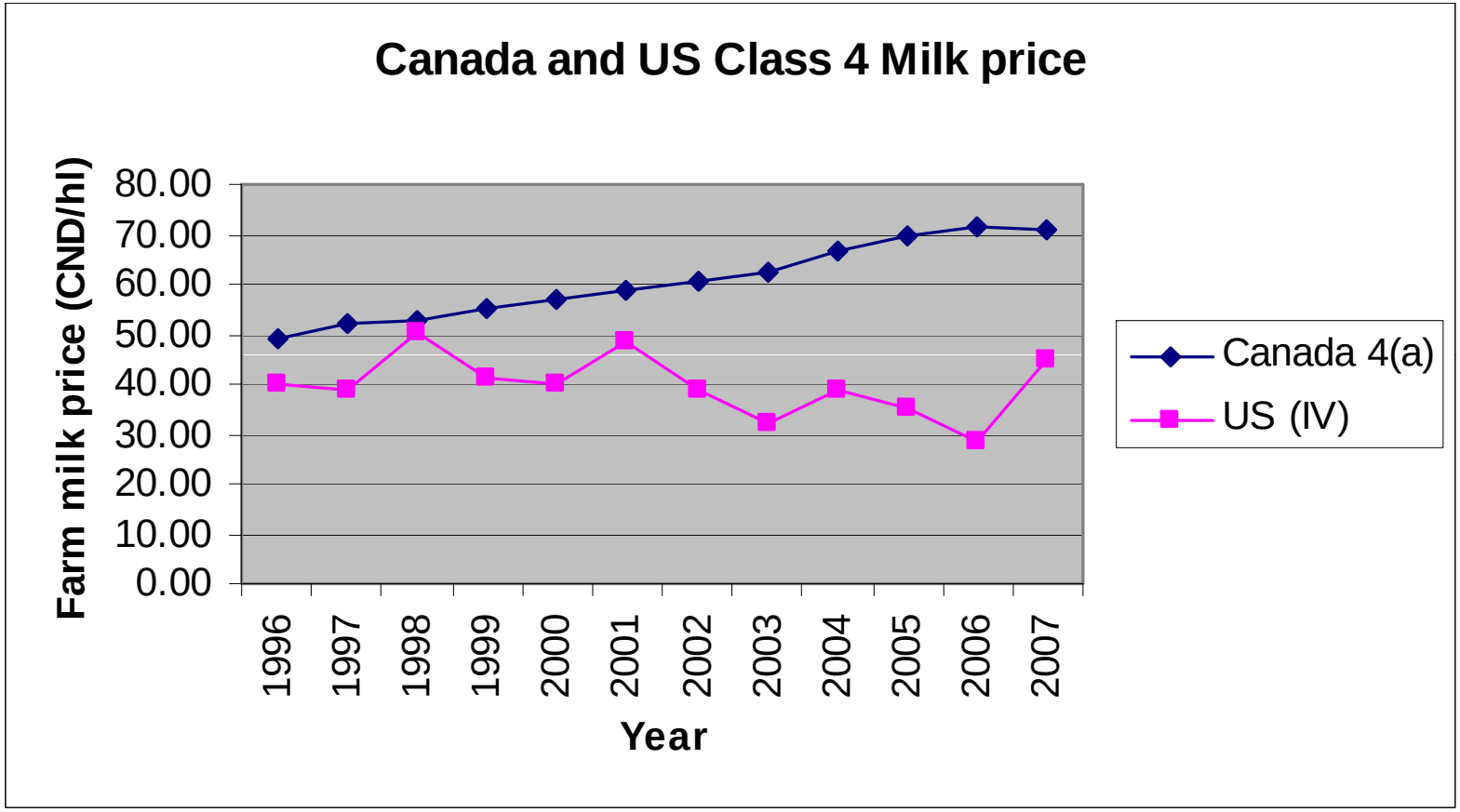

Canada and US Class 4 Milk price
Farm milk price (CND/hl)
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Year
Canada 4(a)
US (IV)

Table 1: Sources of the wholesale price data for USA, EU, Oceania and Canada					
	Wholesale price published in the world commodity market or by Governments				World prices calculated by Canada's Trade data
Dairy product	Canada	US	Oceania	EU	US, EU and Oceania
Butter	AAFC	CME	USDA	USDA	Trade Analyser
SMP	AAFC	CME	USDA	USDA	Trade Analyser
Cheddar	AAFC	CME	USDA	Eurostat & MCD	Trade Analyser
Fluid Milk	AAFC*	GAO	**	**	Trade Analyser
Farm milk	AAFC	USDA	***	***	Trade Analyser
Whey Powder	AAFC	USDA	***	***	Trade Analyser
Buttermilk Powder	AAFC	USDA	***	***	Trade Analyser

*: Canadian fluid milk wholesale price equals AAFC published retail price minus US retailing margin which is calculated by GAO wholesale and retail price.

**: US fluid milk wholesale price is assumed to be the world price for Canadian market. Therefore, Oceania and EU prices are not collected.

***: Farm milk, whey powder and buttermilk powder are to calculate the processing margin in US and Canada. Therefore, the prices of these products of Oceania and EU are not collected.

Results Overall

- Water in Tariff calculations made for our four dairy products, and done with both Canadian wholesale price and Adjusted Wholesale price
- These WIT calculations were done for the period 1996-2007, but only 2002-2007 data listed here
- Certain relationships hold, by calculation, and can be seen in the following Tables
  - As P_c rises, WIT falls
  - As P_w rises, WIT rises
  - As the value of the Canadian dollar rises, WIT falls

Results for Butter

- Butter import source is Oceania
- WIT is *at least* 153% in 2007, using nominal Canadian wholesale price, grows to 184% using Adjusted Wholesale price
  - If world prices calculated using Canadian trade data, WIT is still higher (*true for all four products*)
- Average WIT for whole data period= 97% for Nominal Wholesale Price, 127% for Adjusted Wholesale Price (149% if using Canadian trade data for world prices)
- Much variability over period, due to fluctuations in P_w, value of CDN $

Table 2 : Water in the Tariff on Butter		
Fluid milk	Part A: CW/WW	Part B: ACW/WW
Year	**(I)** Minimum	**(II)** Minimum
2002	8.17%	41.56%
2003	39.49%	76.57%
2004	98.07%	126.28%
2005	71.99%	116.04%
2006	11.29%	45.99%
2007	148.51%	180.43%

Note: CW = Canadian Wholesale price of butter
ACW = Adjusted Canadian wholesale price of butter
WW = US wholesale price of butter

Results for Skim Milk Powder

- Cheapest import source is New Zealand
- 2007: WIT values
  - 160% using nominal domestic wholesale price
  - 178% using Adjusted wholesale price
- Average over 12 years, 1996-2007:
  - 111% with nominal domestic wholesale price
  - 129% with adjusted wholesale price
- Wholesale price adjustment not so important here
  - suggests margins closer, fewer processor rents
- Also substantial year to year variability, like butter

Table 3: Water in the Tariff on SMP

Fluid milk	Part A: CW/WW	Part B: ACW/WW
Year	**(I)** Minimum	**(II)** Minimum
2002	65.67%	85.72%
2003	87.69%	109.57%
2004	80.51%	101.08%
2005	74.95%	105.21%
2006	69.11%	90.05%
2007	159.56%	177.52%

Note: CW = Canadian Wholesale price of SMP
ACW = Adjusted Canadian wholesale price of SMP
WW = US wholesale price of SMP

Results for Cheddar Cheese

- Lowest price import source is New Zealand
  - except for 2007 (US cheapest)
- For 2007: WIT
  - 75% using nominal domestic wholesale price
  - 171% using Adjusted wholesale price
- 1996-2007 Average WIT
  - 65% using nominal domestic wholesale price
  - 147% using Adjusted wholesale price
- Greatest difference in Canada-US wholesale margins for cheddar cheese; this adjustment makes major difference in Water calculations
- Also true that product heterogeneity v.large here

Table 4: Water in the Tariff on Cheddar		
Fluid milk	Part A: CW/WW	Part B: ACW/WW
Year	**(I)** Minimum	**(II)** Minimum
2002	40.85%	111.95%
2003	30.16%	104.62%
2004	59.97%	148.52%
2005	39.24%	142.18%
2006	-1.92%	111.70%
2007	74.60%	170.81%
Note: CW = Canadian Wholesale price of cheddar ACW = Adjusted Canadian wholesale price of cheddar WW = US wholesale price of cheddar		

Results for Fluid Milk

- Only import source is U.S.
- WIT calculations for 2007
  - 126% with nominal domestic wholesale price
  - 203% with Adjusted wholesale price
- Average for 1997-2007
  - 164% with nominal wholesale price
  - 208% with Adjusted wholesale price
- Adjustment makes large difference; consistent with large Canadian processor rents in fluid milk
- Data very consistent across all years
- Upward bias on Cdn wholesale p due to Cdn retail margin larger than US? Actual WIT higher

Table 5: Water in the Tariff on Fluid Milk (2% fat)		
Fluid milk	Part A: CW/WW	Part B: ACW/WW
Year	**(I)** US	**(II)** US
2002	183.83%	208.78%
2003	155.93%	200.26%
2004	143.82%	198.94%
2005	140.17%	193.96%
2006	111.15%	176.01%
2007	126.02%	202.95%

Note: CW = Canadian Wholesale price of fluid milk
ACW = Adjusted Canadian wholesale price of fluid milk
WW = US wholesale price of fluid milk

Conclusions

- All four products show relatively large WIT
  - At least 65% water in smallest case, rising to 165%
  - More accurately, in our view, 130% up to 210% water
  - Estimates of water higher with alternate world p data
- Butter:
  - At least 130% water cf. 298% tariff
  - Better estimate 150% using Adjusted margin
  - Even 190% for 2007 despite high Cdn $ value
- Skim Milk Powder:
  - At least 110% water cf. 200% tariff,
  - Better estimate 130% using Adjusted margin
  - Even 180% for 2007

Conclusions 2

- Cheddar Cheese
  - At least 65% water cf. 245% tariff
  - Better estimate 150% using Adjusted margin
  - Even 171% for 2007 despite high Cdn $ value
- Fluid Milk
  - At least 164% water cf. 241% tariff,
  - Better estimate 208% using Adjusted margin
  - 203% for 2007
  - These estimates likely biased downward
  - Necessary tariffs to protect fluid milk smallest of all four products examined here