POLITICAL MARKET POWER REFLECTED IN MILK PRICING UNDER SUPPLY MANAGEMENT

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Background

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  2. Setting production levels (Quota),
  3. Controlling imports (Tariff Rate Quotas (TRQ) and Minimum Access Commitments (MAC)).

Briefs on Canadian Milk Markets

1. Canadian dairy producers supply two main markets: fluid milk, and industrial milk.
2. For industrial milk, the Canadian Dairy Commission (CDC) first sets a support price.
3. The responsibility for determining fluid milk prices remains with the provincial marketing boards.
4. Revenues from all milk sales are pooled and dairy producers receive a blended price.

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- In our model, quota levels, as opposed to price differentials (Ahn and Sumner, 2009, AJAE), are the choice variable.

Conceptual Framework

Policy Preference Function (PPF):

$$\max_{P} PPF = (1 - w)\Gamma(P) + w\Pi(P) \qquad (1)$$

where $\Gamma(P)$ is the consumers' surplus, $\Pi(P)$ is the producers' surplus, and P is the level of a policy instrument.

$$\max_{P} W = \Gamma(P) + \lambda\Pi(P) \qquad (2)$$

where $\lambda = \frac{w}{1-w}$, is defined as the relative welfare weight.

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   3. $P_m = P^{F*} - \bar{P}^{I*}$, maximum producers' profit.
2. the Divergence Rate of Welfare Weight (DRWW):

$$\frac{(\bar{w} - 0.5)}{(1 - 0.5)},$$

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3. Price differential between fluid milk and industrial milk in province i: $P_i^d = P_i^F - P^I$
4. Producers in province i receive a pooling revenue (blend price) :

$$P_i^b = \left[P_i^F(Q_i^F)Q_i^F + P^I(\sum Q_i^I)Q_i^I\right]/(Q_i^F + Q_i^I) \quad (3)$$

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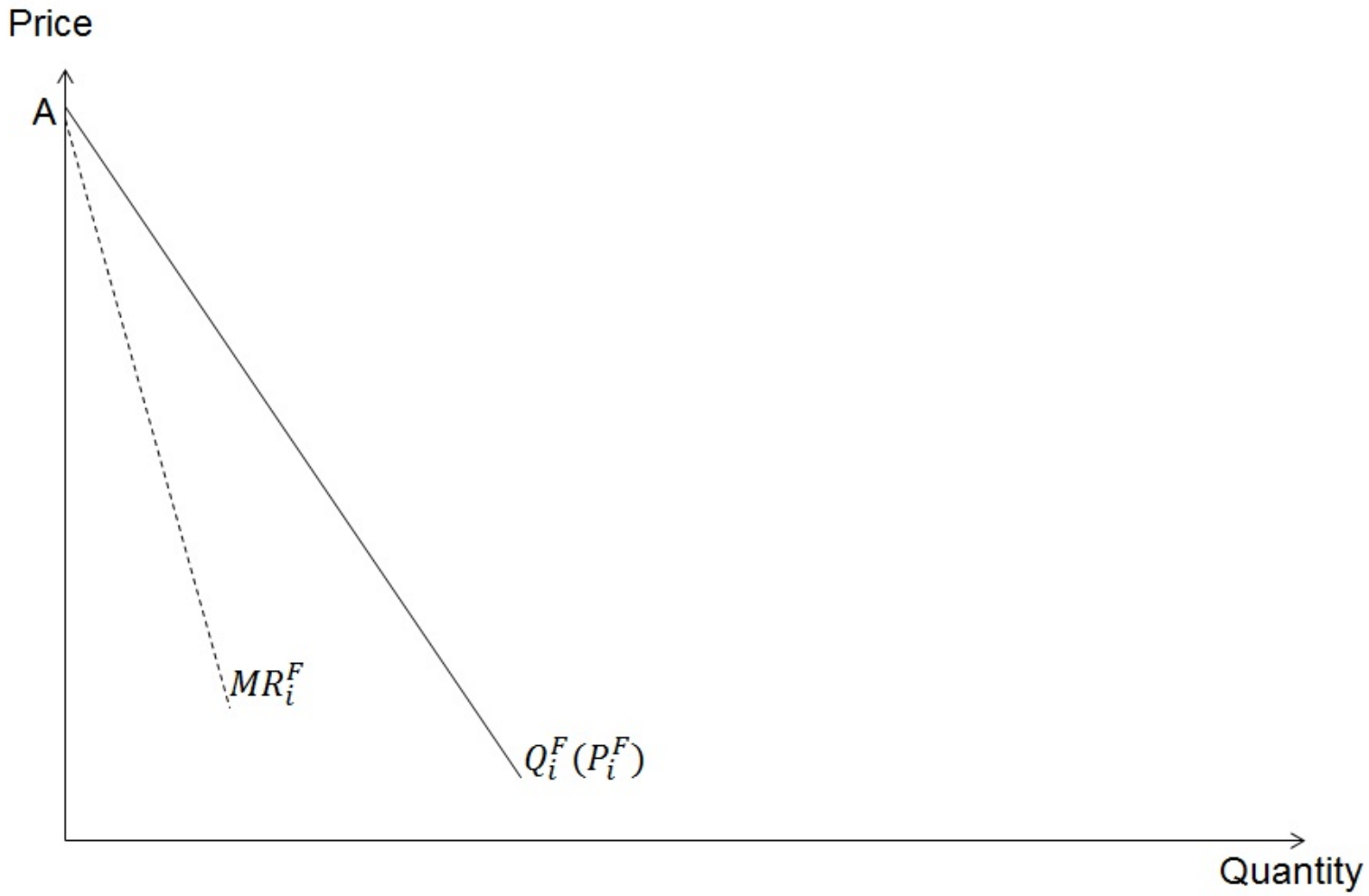
- Solving yields Q_i^{F*} and Q_i^{I*}. Substituting them into demand functions we can get P_i^{F*}, P^{I*} and the optimal price differentials P_i^{d*}.

Market Equilibrium in Milk Markets under Supply Management



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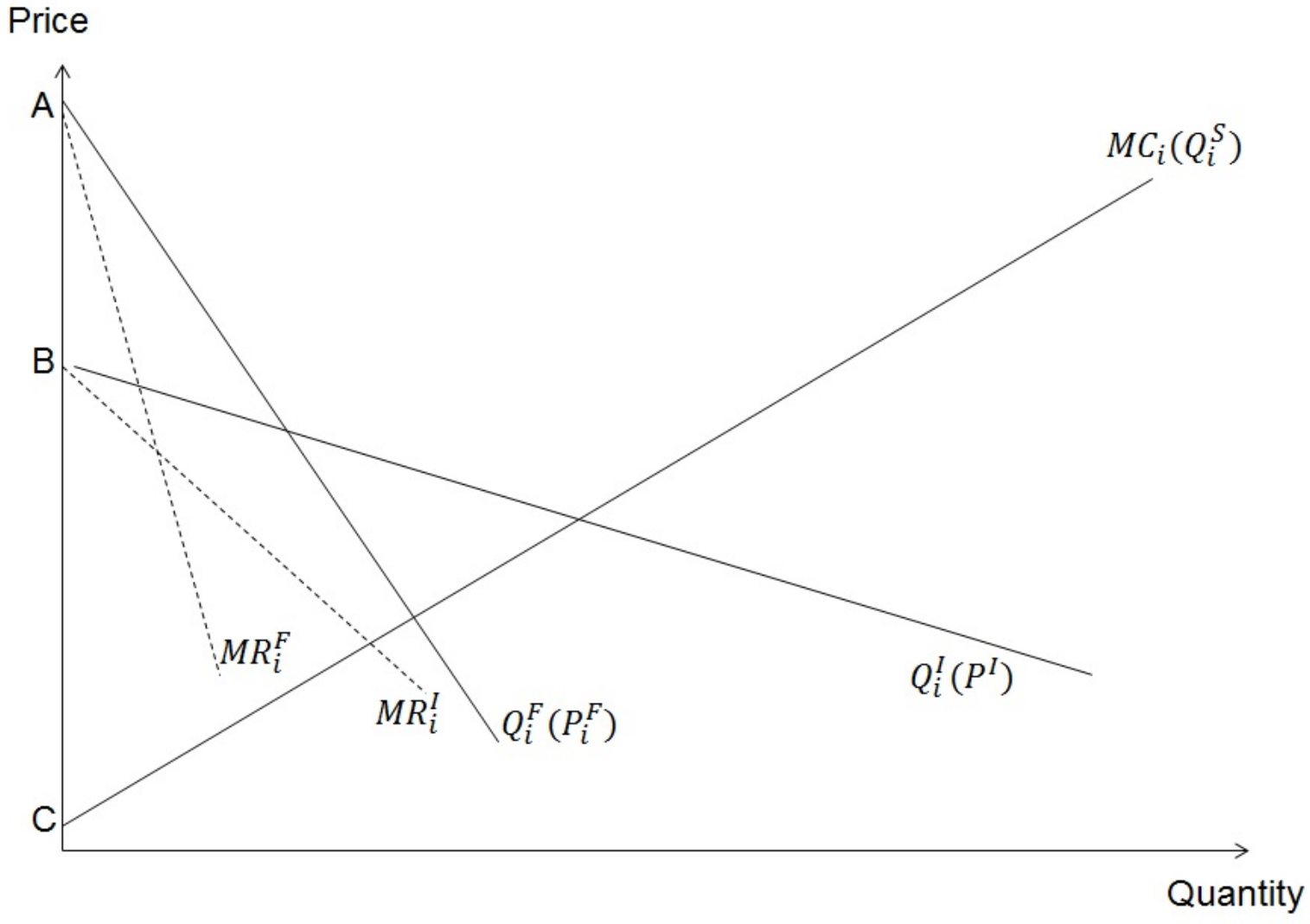
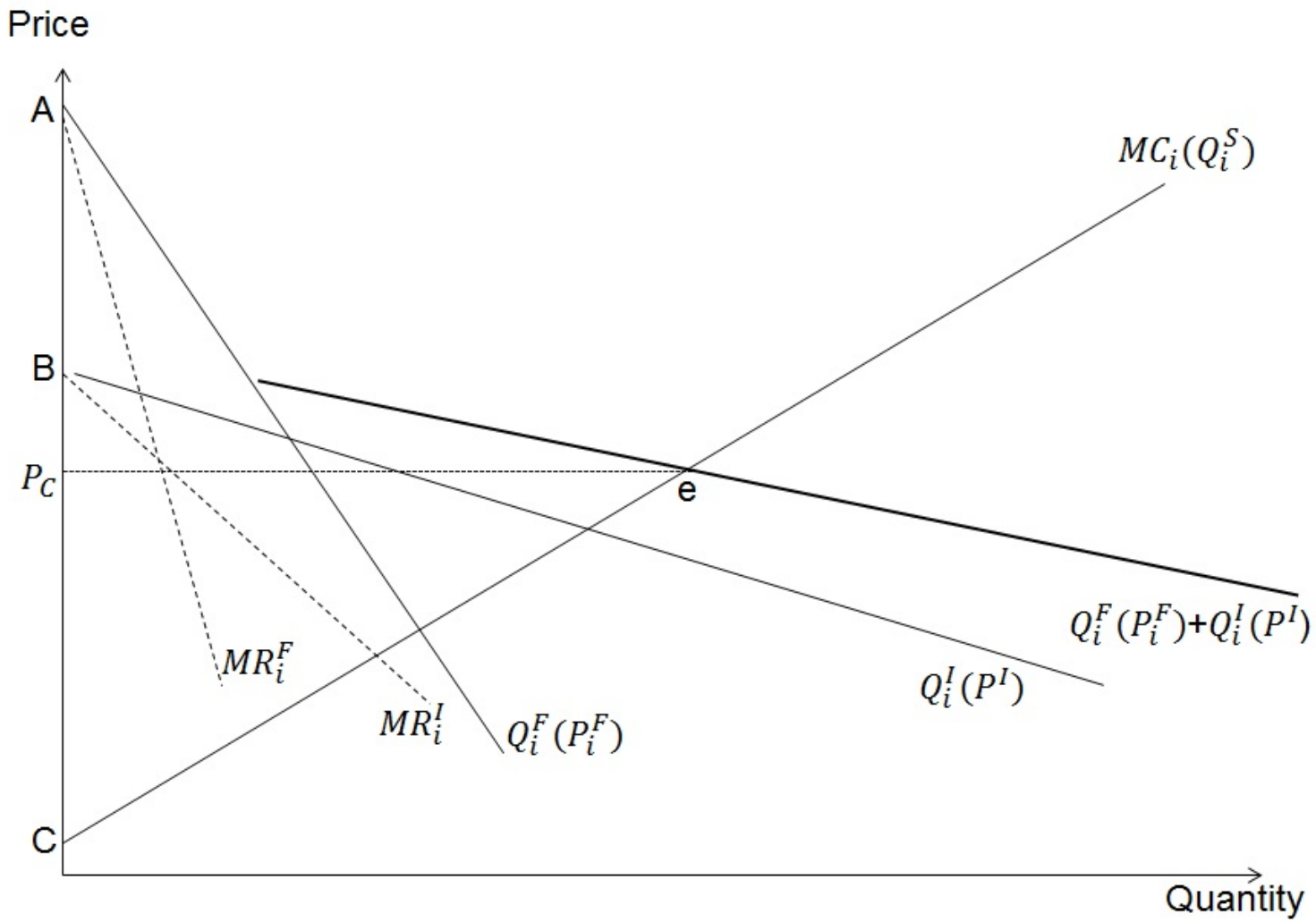


Market Equilibrium in Milk Markets under Supply Management

Note: Competitive Equilibrium: $P_0 = P_C - P_C = 0$.



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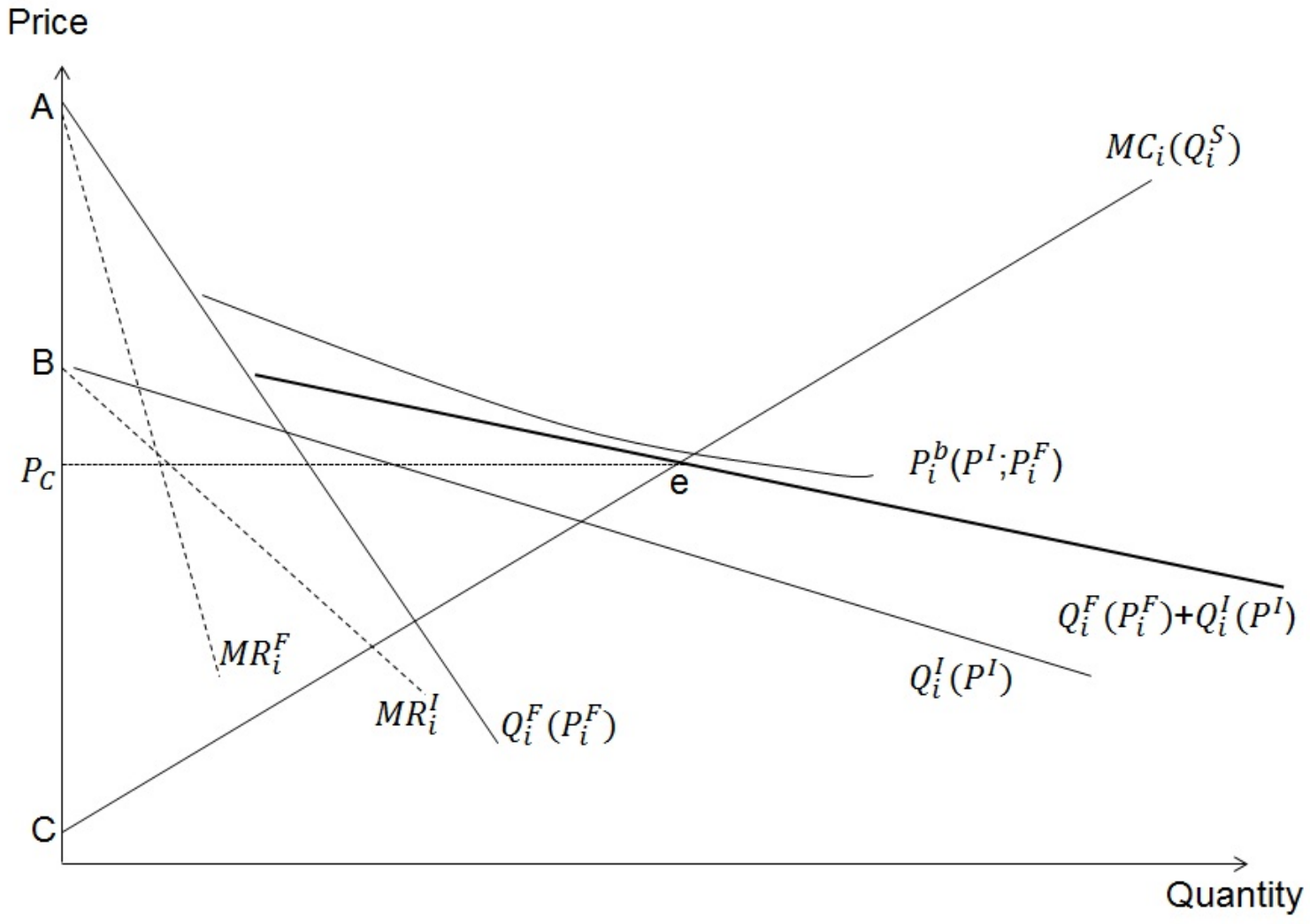

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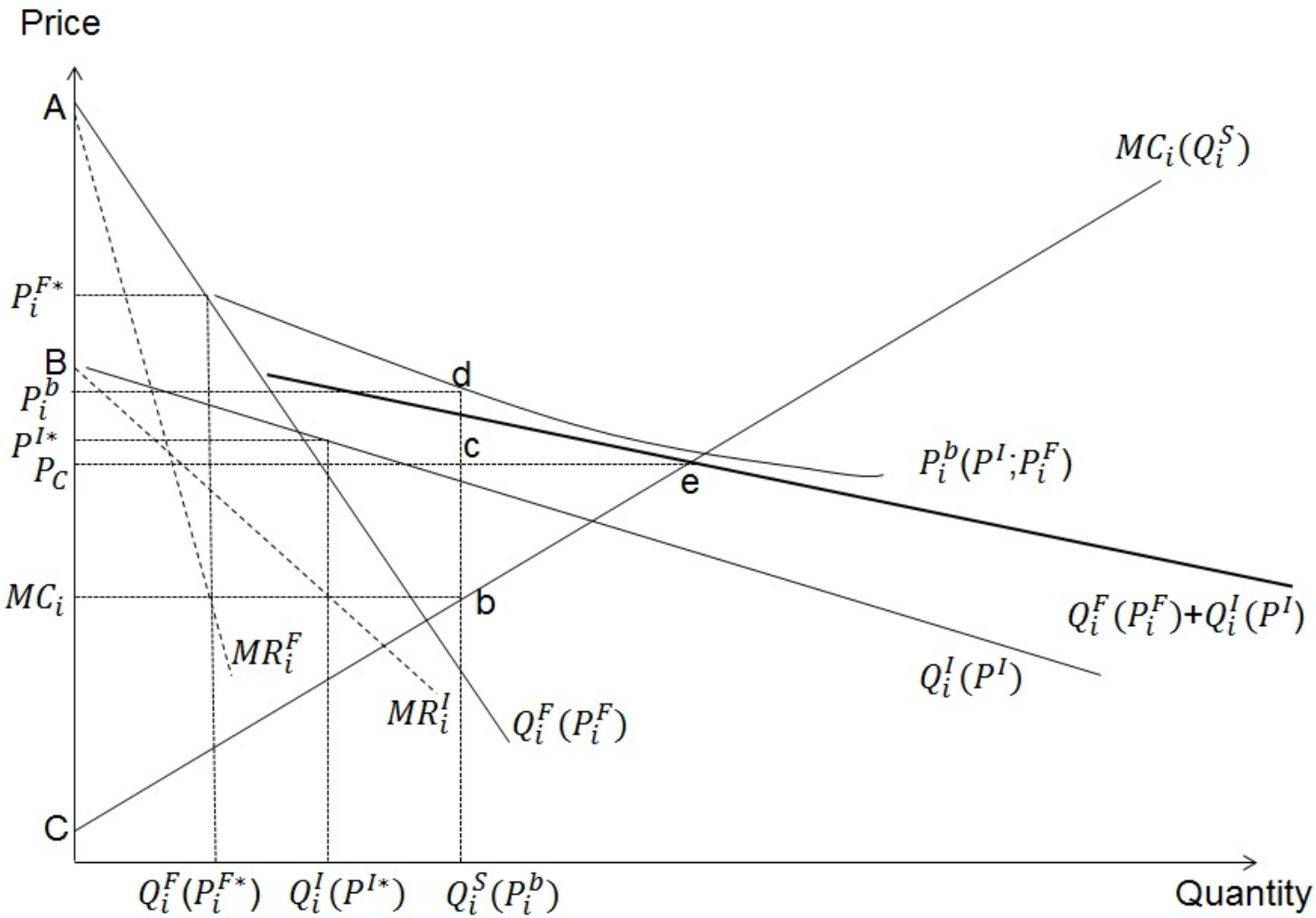
Note: Full political market power: $P_m = P_i^{d*} = P_i^{F*} - P^{I*}$. $\frac{(\bar{P}-P_0)}{(P_m-P_0)}$?



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- Solving for λ_i^*, and substitute to $\lambda = \frac{w}{1-w}$, we can get $\bar{w}$ and $DRWW = \frac{(\bar{w}-0.5)}{(1-0.5)}$.

Table 1: Price and Quantity in the Base Dairy Year (2004/2005)

Regions	Class 1(a) Price ($C\$/hl$ std)	Class 4(a) Price ($C\$/hl$ std)	Blend Price	Class 1(a) Milk Volumes (hl std)	Class 4(a) Milk Volumes (hl std)
BC	68.45	65.77	68.40	3215909	64755
MB	73.42	66.91	71.83	1035855	335206
ON	74.65	65.99	73.64	9722811	1273708
QC	75.03	68.87	74.30	6136907	823254
NB	75.51	61.46	75.01	586788	22001
NS	75.43	65.89	74.47	904502	101194

Sources: Canadian Dairy Information Centre (CDIC)
Blend prices are calculated using equation (3)

Table 2: Simulated P^d that Maximize Profits and Degree of PMP of Milk Producers (2004/2005)

Provinces	Observed P^d	Simulated P^d		Calculated Degree of PMP	
		Mean	Confidence intervals	Mean	Confidence intervals
BC	2.69	45.59	(14.23, 100.69)	0.059	(0.027, 0.189)
MB	6.50	53.76	(21.58, 112.45)	0.121	(0.058, 0.301)
ON	8.66	52.56	(20.39, 111.10)	0.165	(0.078, 0.350)
QC	6.16	53.50	(20.79, 112.63)	0.115	(0.055, 0.425)
NS	9.54	59.90	(27.94, 119.54)	0.159	(0.080, 0.453)
Average	7.93	54.58	(22.66, 112.95)	0.141	(0.070, 0.341)

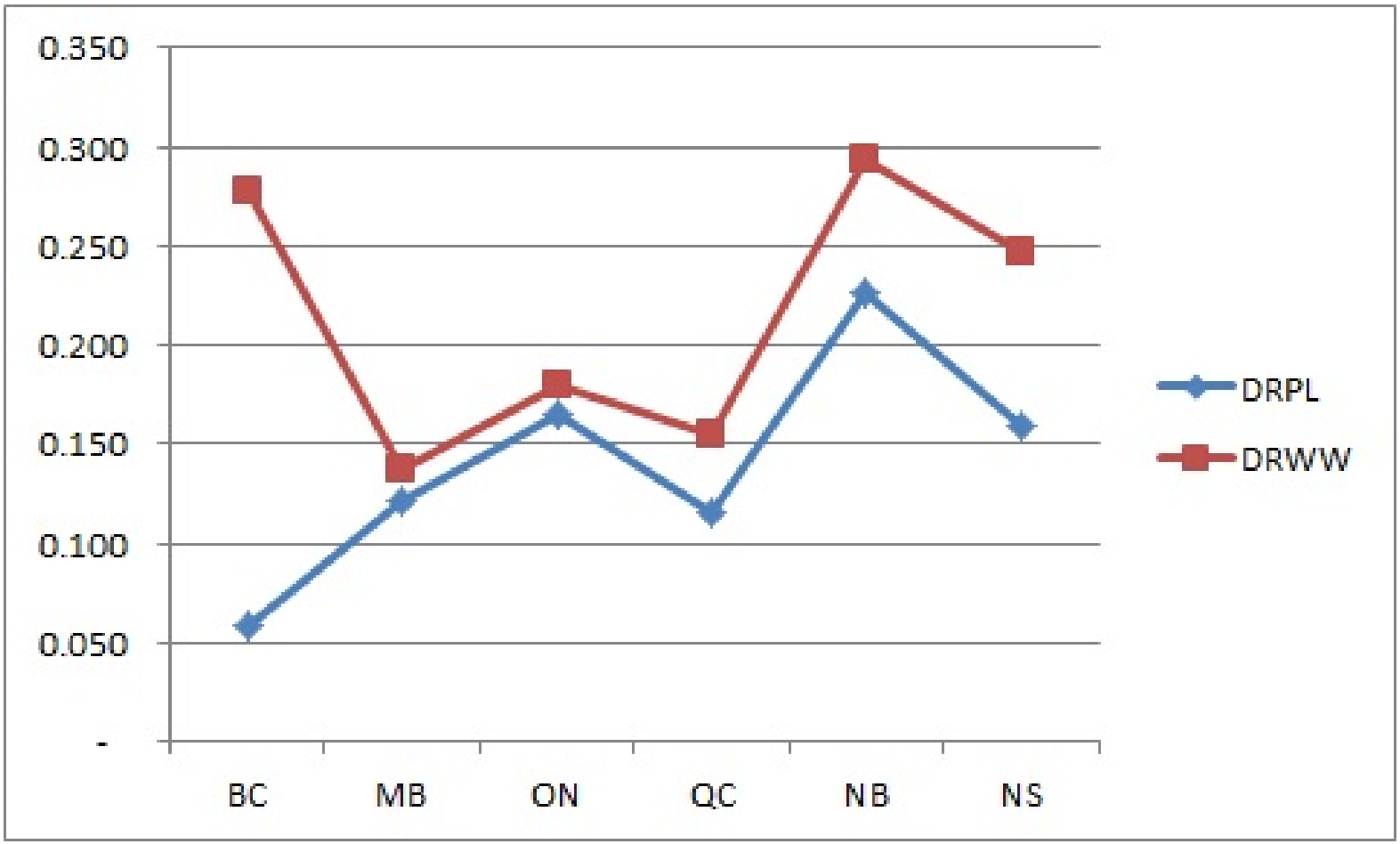
Results are simulated with an estimated $\eta^F = -0.57(0.13)$, an estimated $\eta^I = -0.52(0.10)$ and an assumed milk supply elasticity of 1.

Table 3: Imputed Welfare Weights and Degree of PMP of Milk Producers (2004/2005)

Provinces	Imputed Welfare Weight λ		Calculated Degree of Political Market Power	
	Mean	Confidence intervals	Mean	Confidence intervals
BC	1.769	(1.248, 2.750)	0.278	(0.110, 0.467)
MB	1.320	(1.119, 1.563)	0.138	(0.056, 0.220)
ON	1.439	(1.167, 1.808)	0.180	(0.077, 0.288)
QC	1.365	(1.143, 1.620)	0.154	(0.067, 0.237)
NB	1.831	(1.275, 3.076)	0.293	(0.121, 0.509)
NS	1.657	(1.228, 2.430)	0.247	(0.102, 0.417)
Average	1.564	(1.196, 2.208)	0.215	(0.089, 0.356)

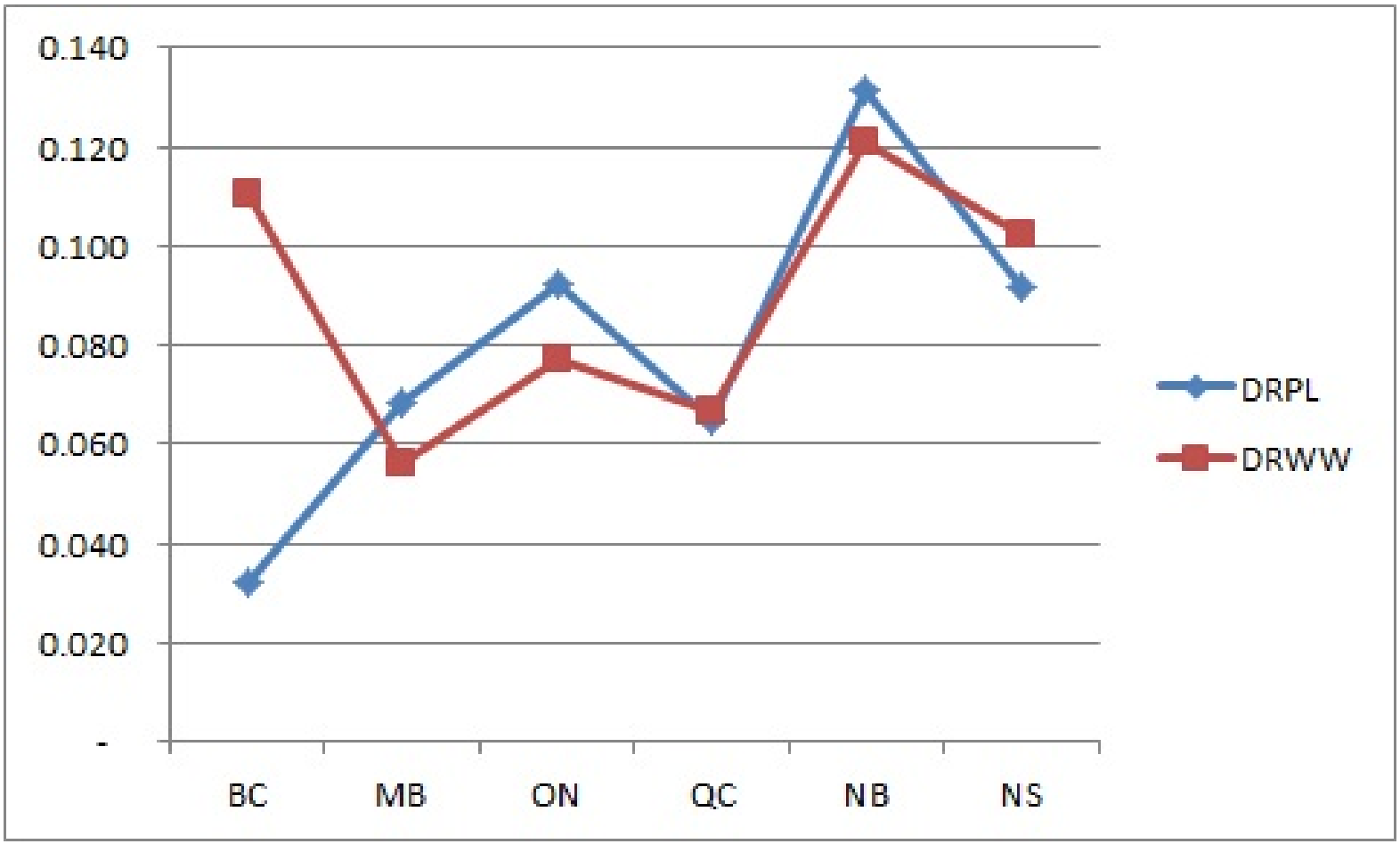
Results are simulated with an estimated $\eta^F = -0.57(0.13)$, an estimated $\eta^I = -0.52(0.10)$ and an assumed milk supply elasticity of 1.

Calculated Degree of Political Market Power with $\eta^F = -0.57$ and $\eta^I = -0.52$



Note: Results are obtained with estimated mean of $\eta^F = -0.57$ and $\eta^I = -0.52$.

Calculated Degree of Political Market Power $\eta^F = -0.315$ and $\eta^I = -0.324$



Note: Results are obtained with estimated upper bound $\eta^F = -0.57 + 1.96 \times 0.13 = -0.315$ and estimated upper bound $\eta^I = -0.52 + 1.96 \times 0.10 = -0.324$.

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  1. The national average of P^d is about 14% of profit-maximizing P^d.
  2. The national average of λ implies that the PMP of milk producers is about 22% of the PMP by producers.

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  1. The role of highly concentrated dairy processors, and
  2. The fact that there are some imports and non-dairy alternatives.

- Thank You for your attention!
- Welcome to Comment and/or Ask Questions!