
Procurement and Location Strategies for Canola in Western Canada

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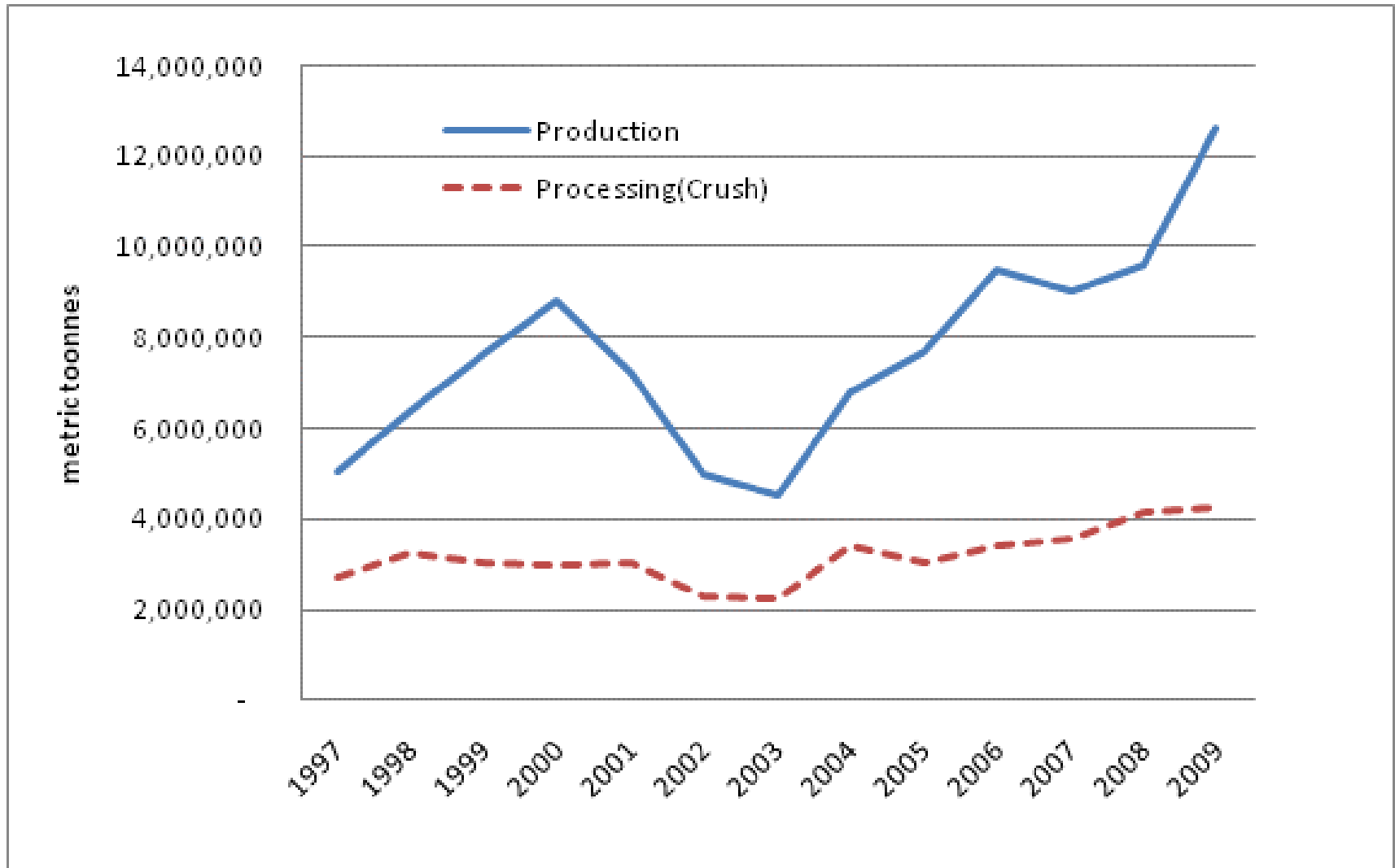


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Why Dreyfus and JRI Chose Yorkton

“...all the shoes are too much alike. Our cities become uneconomically large and the business districts within them are too concentrated. Methodist and Presbyterian churches are too much alike; cider is too homogeneous.” Hotelling, 1929

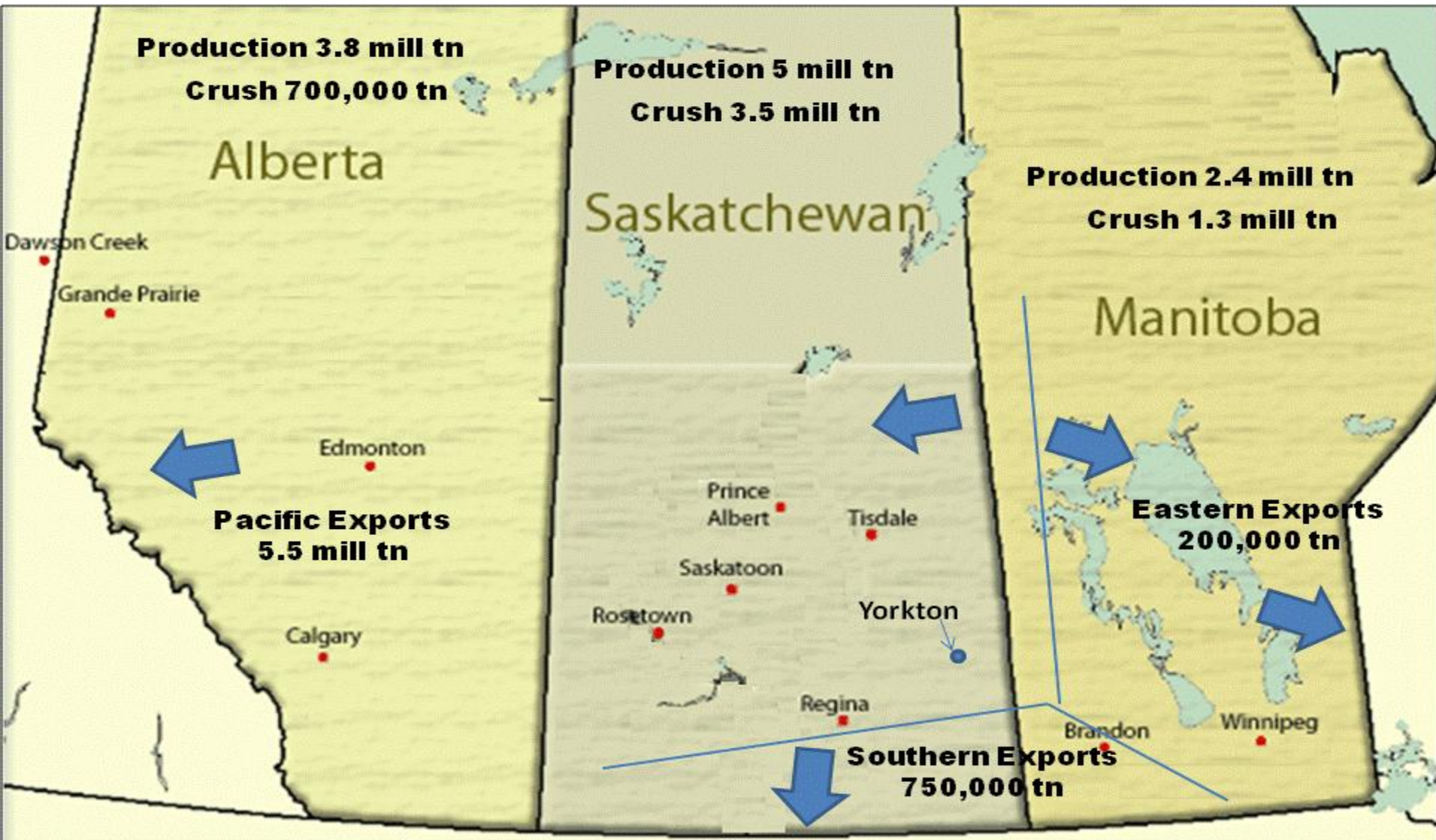
Total Canola Production and Processing in Canada



Capacity for Western Canadian Crushers

Company*	Location	2001 Daily Capacity	2010 Daily Capacity
ADM	Lloydminster, SK	2,000	2,000
Viterra	Ste. Agathe, MB	N/A	1,000
Bunge Canada	Altona, MB	1,000	1,100
Bunge Canada	Nipawin, SK	1,000	1,000
Bunge Canada	Fort Sask., AB	700	700
Bunge Canada	Harrowby, MB	1,400	1,400
Canadian Agra	Sexmith, AB	0	0
Canbra Foods Ltd. (JRI)	Lethbridge, AB	975	1,120
Cargill Ltd	Clavet, SK	2,000	2,400
JRI	Yorkton, SK	N/A	2,400
Dreyfus	Yorkton, SK	N/A	2,400
Total		9,075	15,520

Estimated Production and Movement of Canola



Sources: AAFC 2006B, CGC, 2009 and author calculations

Theory of plant location

Profit function:

$$\pi_{ij} = (P_o - t_{ij})Y_o(Y_s) + (P_m - t_{ij})Y_m(Y_s) - C(Y_s) - C_f - (P_s - t_{ij})Y_s$$

t_{ij} is the transportation cost from port to point (i,j) ;

P_o , P_m and P_s are the export prices of canola oil, meal and seed

Y_o , Y_m and Y_s are the quantities for the firm

$C(Y_s)$ is the variable cost function

C_f is a fixed cost

Theory of plant location – bias to edge

$$\pi_{\text{port}} = (P_o)Y_o + (P_m)Y_m - C(Y_s) - C_f - (P_s)Y_s$$

$$Y_o = \alpha_o Y_s \text{ and } Y_m = \alpha_m Y_s$$

$$\pi_{ij} = \pi_{\text{port}} + (t_{ij}(Y_s))(1 - \alpha_o - \alpha_m)$$

Theory of plant location



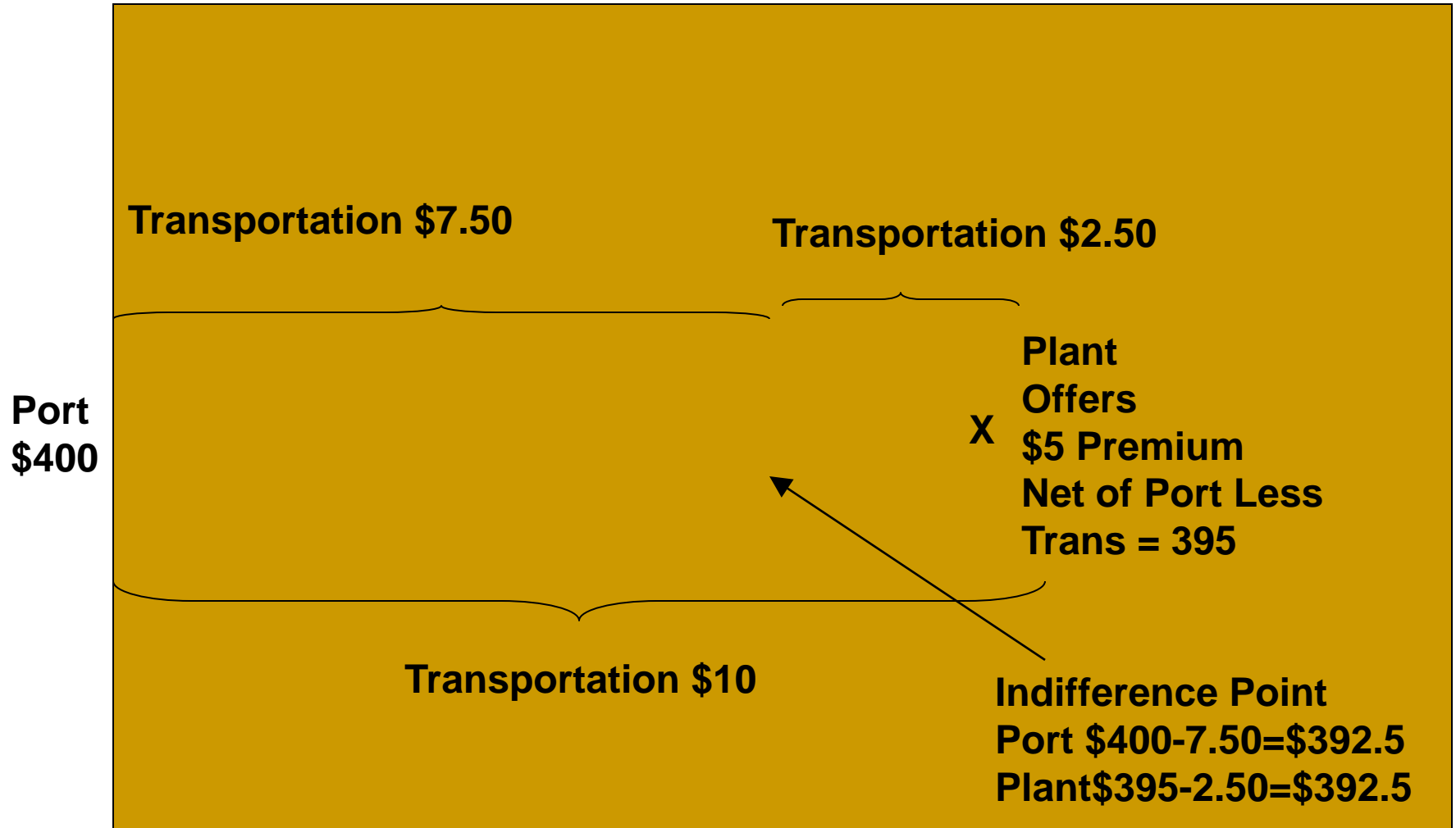
Theory of plant location – premiums

Profit is now hampered by the premium such that:

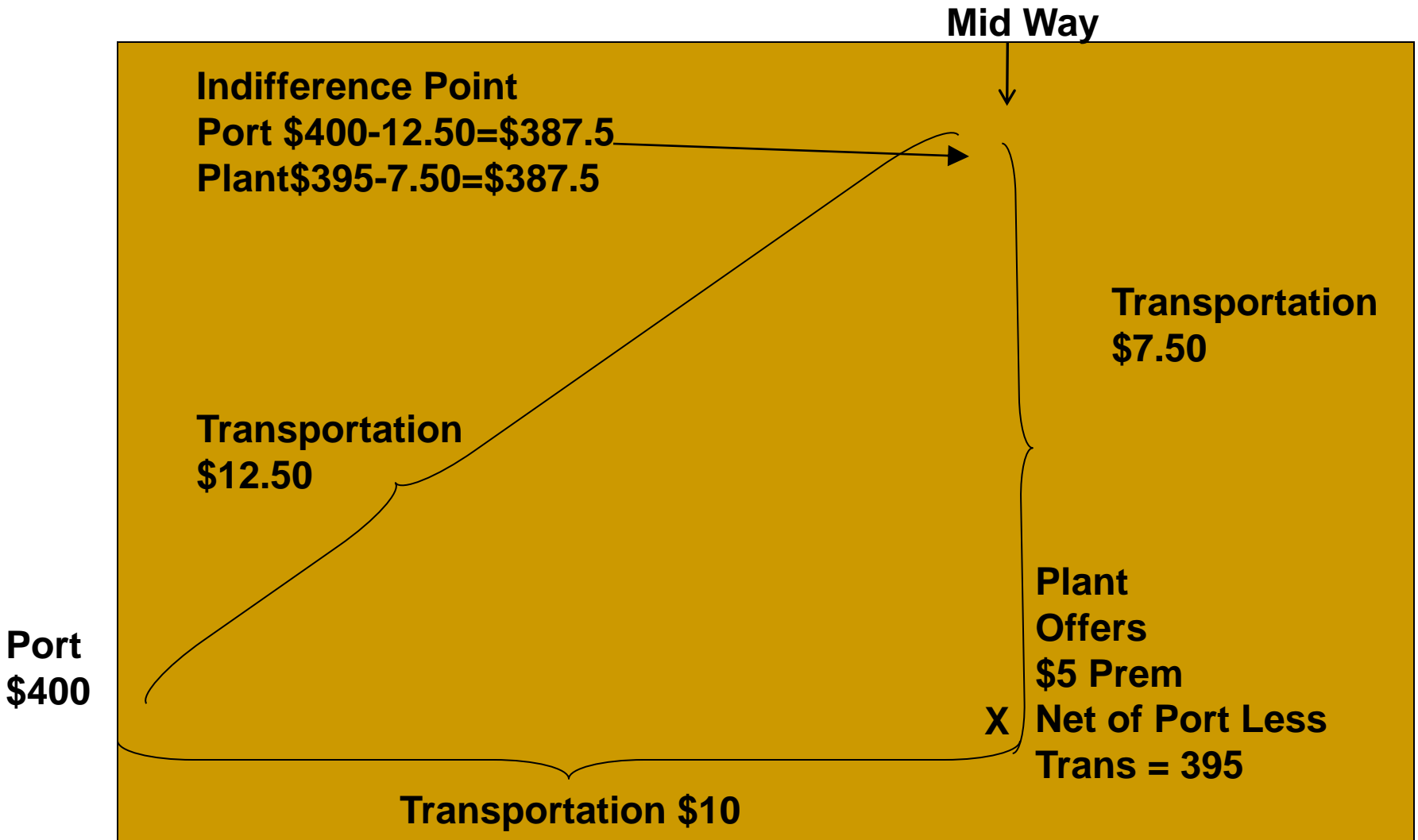
$$\pi_{ij} = \pi_{\text{port}} + ((t_{ij})(1 - \alpha_o - \alpha_m) - \kappa_{ij})\bar{Y}$$

κ_{ij} is premium needed to attract \bar{Y}

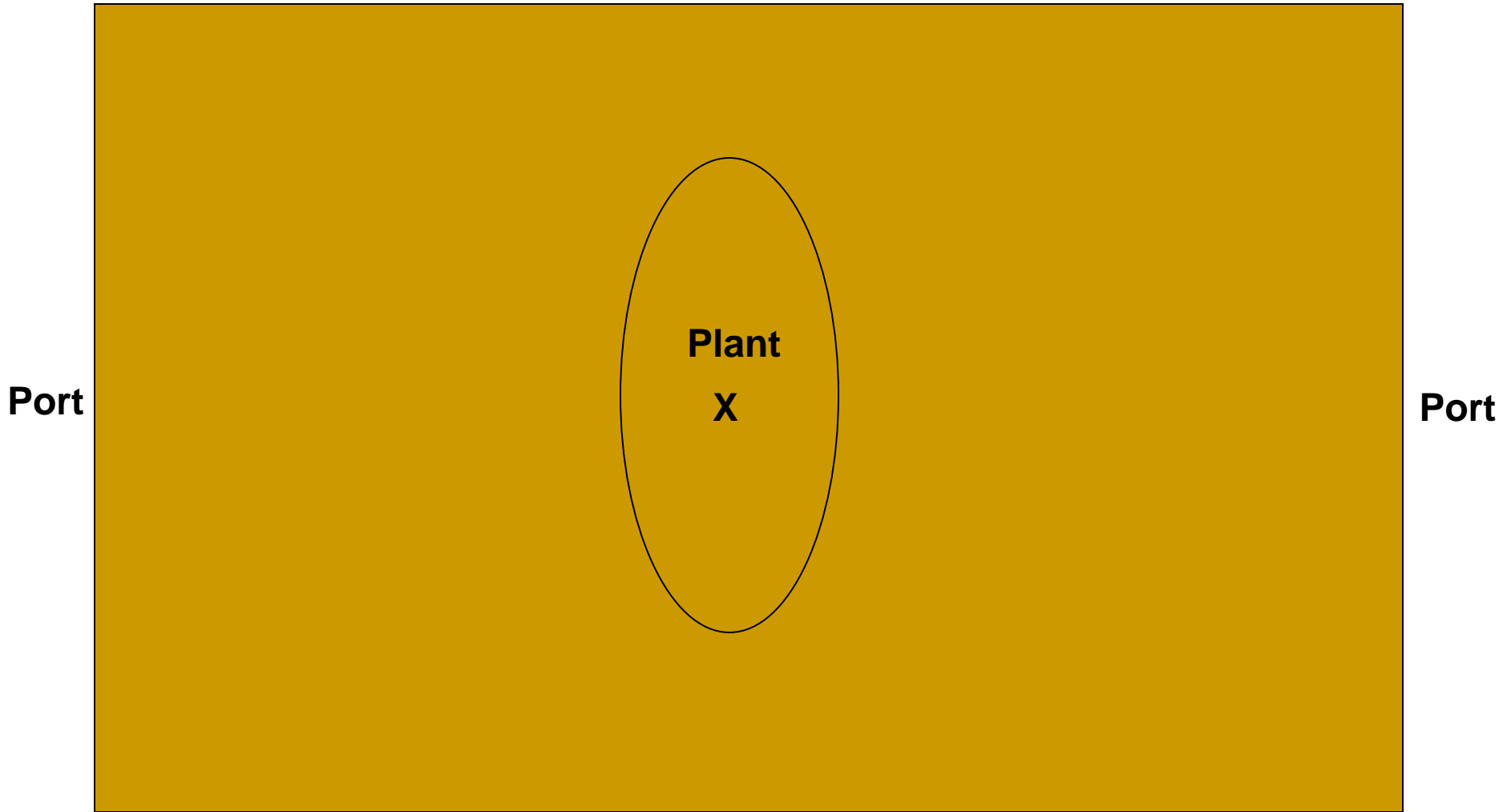
Spatial Effects – east west offer



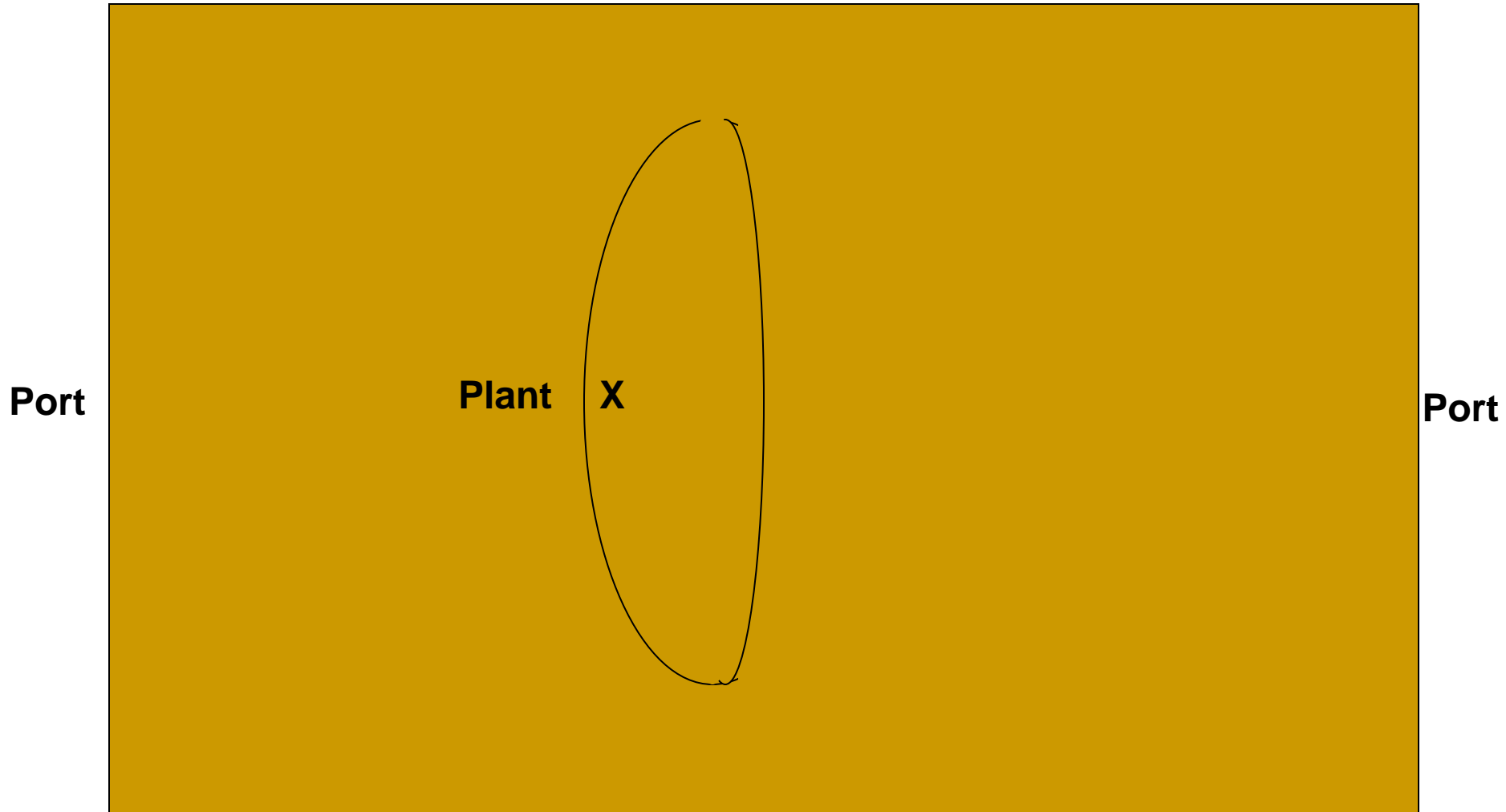
Spatial Effects – north south offer



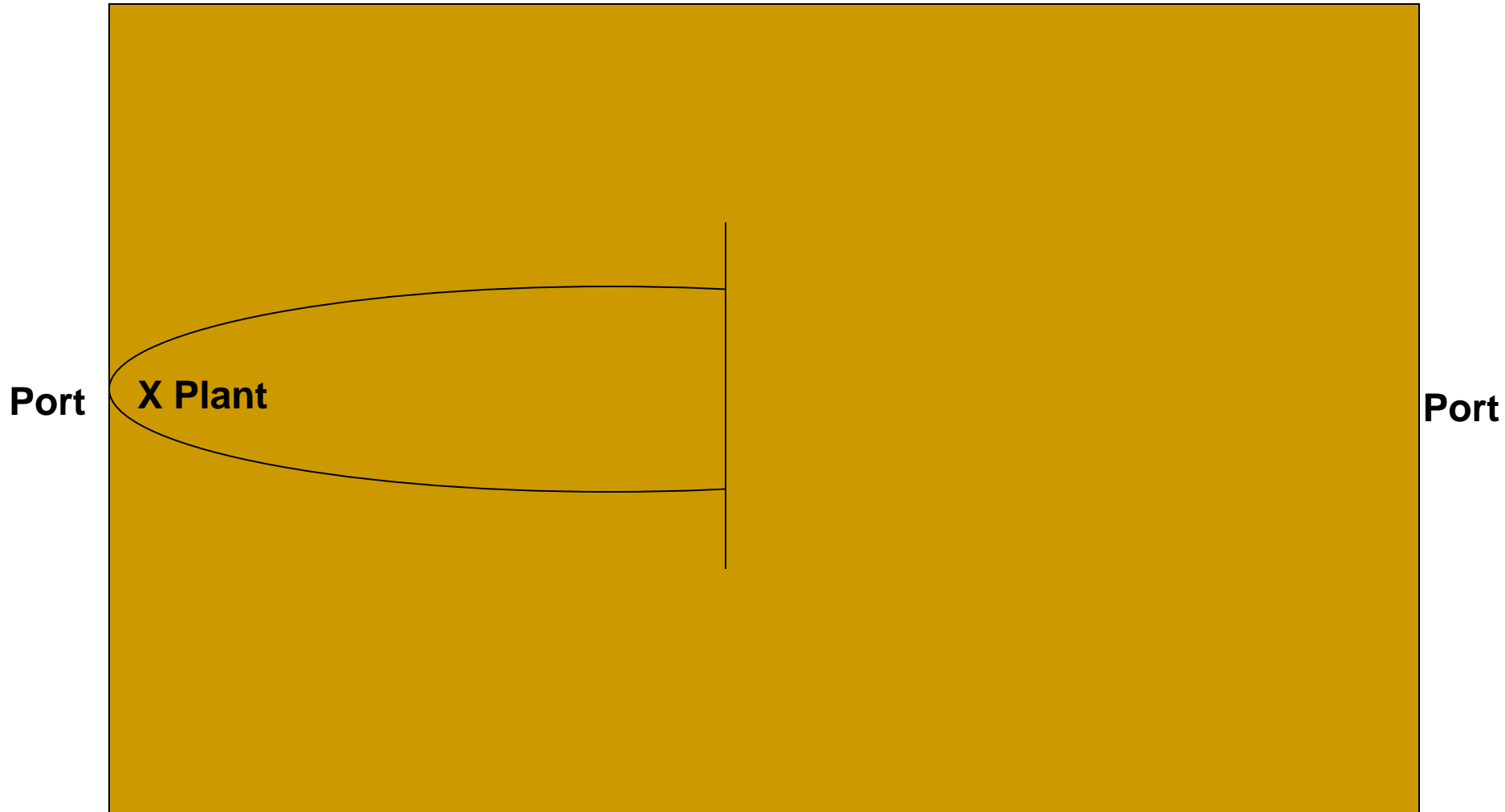
Spatial – theoretical central catchment



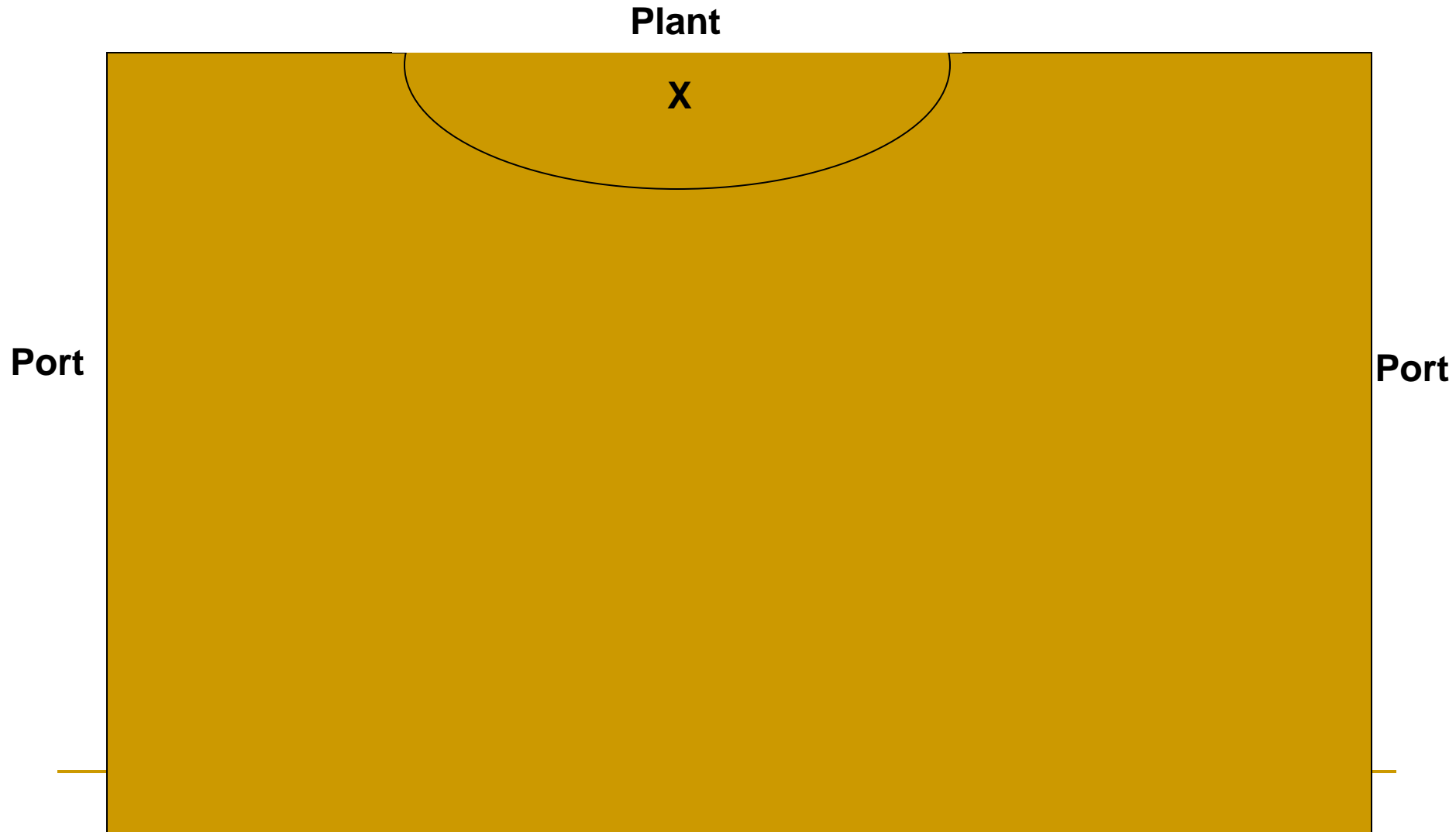
Spatial – edge of previous ellipse



Spatial Limitations – theoretical edge



Spatial – edge of previous ellipse



Mid Way

1,1

X Plant

Plant X

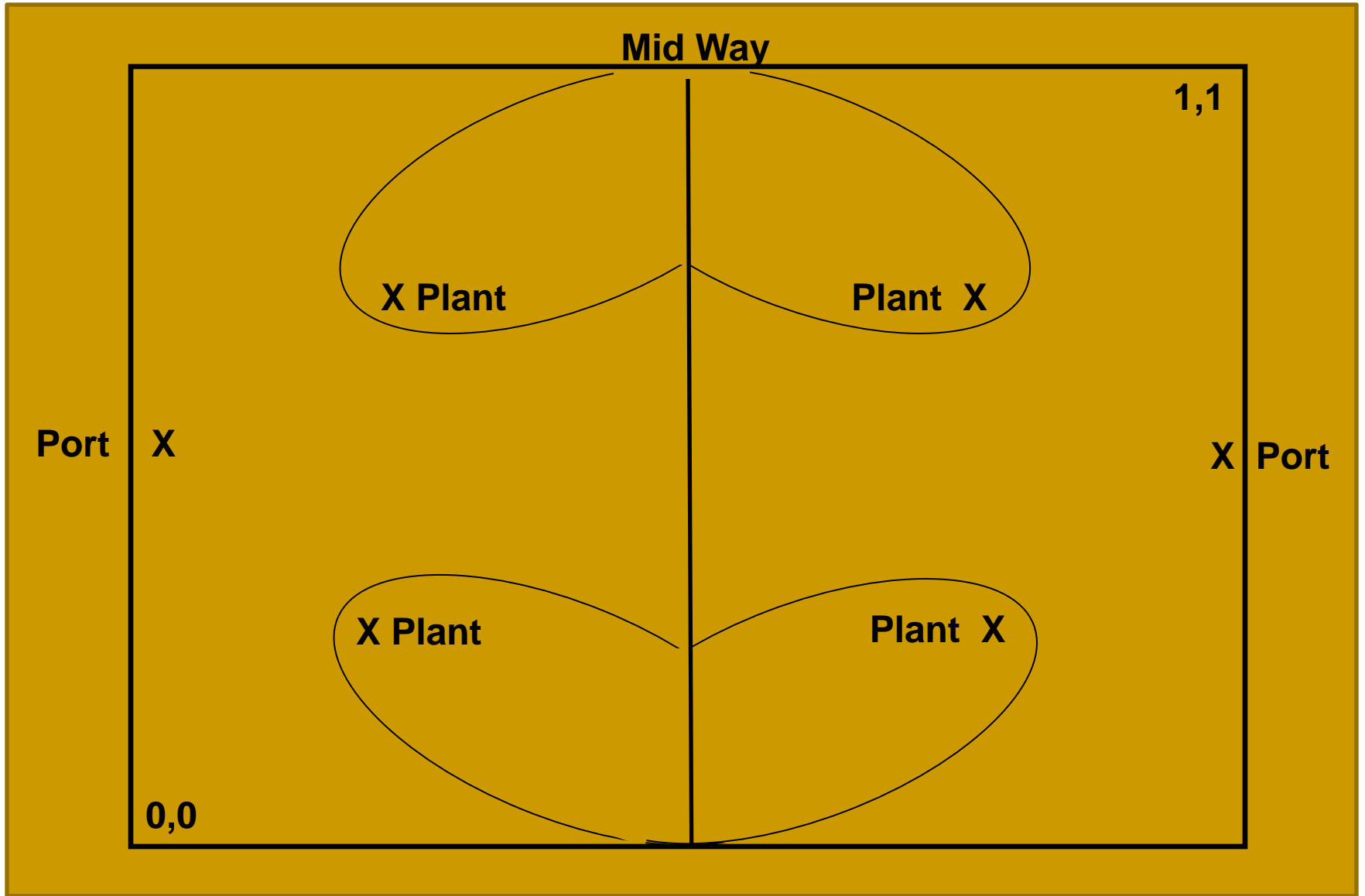
Port X

X Port

X Plant

Plant X

0,0



Simulations – Premiums

- 11.8 million tonnes in plane
- port price for input of \$400/tne
- price for oil of \$1,000/tne
- transportation costs \$40
- extract (.42)
- Plant Size = 850,000
- Premium = \$0.65/tne

Simulations – Premiums

- Two plants locate in center point
- Premium over \$20 per tonne
- Port profits are higher

Simulations – Price Discrimination

- Two plants at center
- Handling co. buys at local price
- Ships to plant
- Catchment area 4 times larger

- Transportation costs very high
- Profits Negative

Conclusions

- Four stable points in theoretical plane
- Dreyfus and JRI not in Yorkton to minimize premium – supplies? Made in Canada price
- Price discrimination is expensive

Next Steps

- Clarify premium function, Y endogenous up to capacity
- Consider transportation realities, railroad nodes versus space, elevation costs, non port demand
- Implications for basis in central region
- Crop yield variation impacts