

# Potential Fresh Apple Imports from China: A Preliminary Case Study

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# Outline

- Background
  - China's place in world fresh apple production and trade
  - Representative risk mitigation measures
  - Perceptions about Chinese growers and exporters
- Empirical apple model
  - Model framework
  - Simulation of imports from China

# Fresh Apple Production and Trade

(Thousand metric tons)

Exporter	Importer							Total Exports
	China	US	RNA	EU-15	SHE	ASEAN	ROW	
China	<b>18,657</b>	0	2.7	56.1	0	352.2	280.6	691.6
US	19.3	<b>2,755</b>	212.9	37.5	0	81.4	151.1	502.3
RNA	0	33.8	<b>682</b>	0	0	0	7.3	41.1
EU-15	0	0	0	<b>6,270</b>	0	5.0	526.9	531.9
SHE	25.0	159.7	72.6	476.5	<b>1,840</b>	22.7	481.2	1,237.7
ASEAN	0	0	0	0	0	<b>0</b>	0	0
ROW	93.6	3.6	22.1	282.3	0	13.5	<b>13,421</b>	415.1
<b>Total Production</b>								<b>43,625</b>
<b>Total Imports</b>	137.9	197.1	310.3	852.4	0	474.7	1,447.1	3,419.6

**Red: domestic production; Black: imports and exports**

# Fresh Apple Wholesale Prices

(Dollars per metric ton)

Exporter	Importer						
	China	US	RNA	EU-15	SHE	ASEAN	ROW
China	346	-	1,066	911	-	459	375
US	733	661	727	1,132	-	751	766
RNA	-	689	796	-	-	-	813
EU-15	-	-	-	985	-	656	627
SHE	700	943	571	1,048	606	692	626
ASEAN	-	-	-	-	-	-	-
ROW	774	956	778	794	-	545	701

**Red: price of domestically produced apples**  
**Black: price of traded apples in importing country market**

# Pest Risk Mitigation

- Reviewed regulatory policies of U.S., Australia, Canada and Argentina concerning fresh apples and pears from China since 1994
- Diverse lists of identified pest of concern among the regulatory analyses; 14 pest commonly identified and/or of high risk potential (moths, brown rot, fruit flies, weevils, mites)
- Risk mitigation protocols include pre-harvest, harvest, post-harvest and shipping measures (e.g.: registered orchards in designated areas; bagging of fruit; cold treatment; isolation; inspection and monitoring)

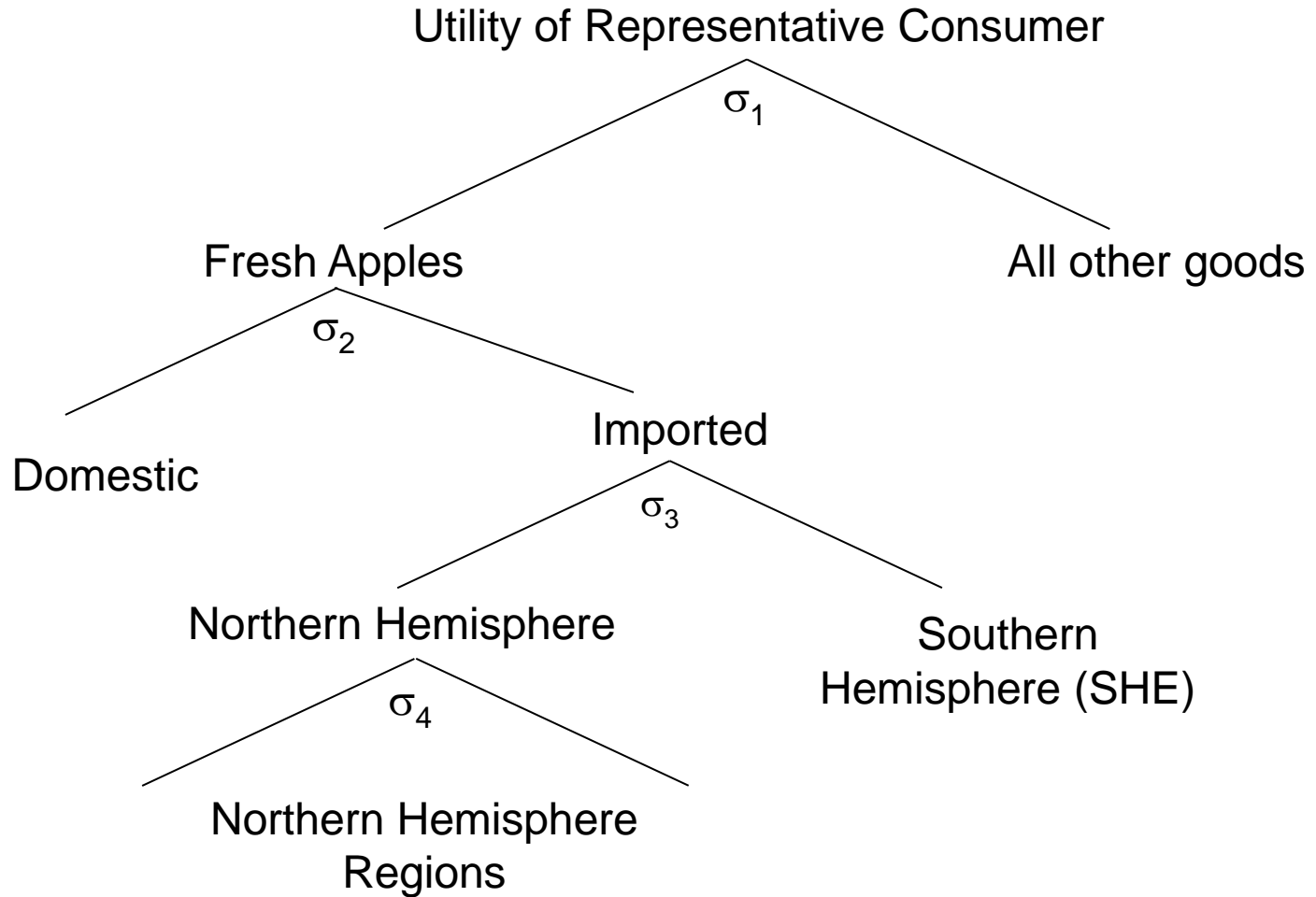
# Perceptions about Chinese exporters

- Interviews conducted in Beijing and Shandong Province in June 2006 and July 2007
- Exporting has resulted in technological innovations and improved management
- Export markets clearly differentiated by quality demanded—higher quality standards involved higher costs for inputs and processing
- Pest-related management only part of cost of meeting higher standards
- AQSIQ inspectors acknowledged having to reject some shipments despite industry measures
- Lead firm can be important to opening a market (e.g: Fook Huat Tong Kee Ltd.)

# Model Description

- PE model of global fresh apple trade
- 7 regions/countries
- Apples treated as heterogeneous product

# Consumer Demand





# Frequency of Outbreak and U.S. Cost of Control

- Frequency (N) of pest outbreaks in U.S.

$$N = risk * q_{us,china}$$

- A pest outbreak would result in:
  - Potential productivity loss for U.S. apple growers
  - Pest control costs

- Pest control costs (CP):  $CP = \frac{ccost * N * pcteff}{yield * (1 - PL)}$

# Supply of Apples

- Treat fresh apples shipped to domestic and export markets as differentiated products
- Model only Chinese apples as a source of risk and only to the U.S.
- In U.S. if a pest outbreak were to occur:
  - Would reduce level of fresh apple production for given level of inputs
  - Reduce the net price received by U.S. apple growers

# Welfare Measures

- Consumers: Equivalent variation
  - Additional income measured at initial prices that would be equivalent to price and quantity changes induced by allowing imports of fresh Chinese apples into U.S.
- Producers: Producer surplus
- Tariffs: Affect prices but tariff revenue not modeled

# Model Calibration/Parameter Values

Region	$\eta_D$	$\sigma_1$	$\sigma_2$	$\sigma_3$	$\sigma_4$	$\sigma_T$	$\eta_S$
US	-0.3	0.2	1.15	0.5	2.3	-2.0	0.8
NA	-0.4	0.2	0.9	0.5	1.8	-2.0	0.8
EU-15	-0.3	0.2	1.0	0.5	2.0	-2.0	0.8
China	-0.4	0.2	4.1	0.5	5.0	-2.0	0.8
SHE	-0.2	0.2				-2.0	0.8
ASEAN	-0.56	0.2		0.5	1.33	-2.0	0.8
ROW	-0.4	0.2	2.5	0.5	5.0	-2.0	0.8

# Modeling Removal of Import Restrictions

- Assume that China achieves market share similar to their current market share in Canada
- Assume FOB price of Chinese apple exports to U.S. is same as Chinese apple exports to EU

# Model Results – No Risk

Variable	Change (measured in same units as corresponding variable)
U.S. production (1,000 mt)	-2.9
China production (1,000 mt)	4.1
Consumption (1,000 mt)	
(US, US)	-2.9
(US, China)	7.8
(China, China)	-3.5
U.S. wholesale price (\$/kg)	-0.001
U.S. producer price (\$/kg)	-0.001
U.S. equivalent variation (\$million)	3.288
U.S. producer surplus (\$million)	-2.357
U.S. net welfare (\$million)	0.931

# Model Results – With Risk

(Frequency of outbreaks that result in no U.S. welfare gain)

Variable	Low Cost	Ave Cost	High Cost
	<b>Assumptions</b>		
Control costs/acre (\$)	1,800	2,100	2,400
Productivity loss (%)	10.0	17.5	25.0
Percent acres affected (%)	1.0	3.0	5.0
	<b>Model results</b>		
Freq. of outbreaks/year	0.196	0.063	0.023
Risk per kg	2.5E-8	8.0E-9	3.0E-9

# Summary and Conclusions

- In our experience, factors that play critical roles in opening new markets include:
  - economic opportunity, scientific assessment, traceability, persistence (on the part of the exporter) and political will.
- How does the situation look for fresh apples from China?
  - Limited economic opportunity: likely high-price imports; consumers gain from additional variety; U.S. welfare increases if pest risk small enough
  - Past regulatory decisions are informative about pest risks and management, but analysis for U.S. for apples not undertaken yet. Traceability is feasible.
  - Chinese apple exporters lack experience in U.S. market and political will is an open question