Chinese and U.S. Apple Trade in ASEAN

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\textbf{Background}

**ASEAN Apple Market**
- The Association of Southeast Asian Nations (ASEAN) countries import all the apples because the tropical climate is not conducive for apple production.
- Due to economic reforms and steady economic growth, apple imports by ASEAN countries have increased by 527% since 1990, while world apple trade has increased by 102%.
- The United States supplied between 30 - 50% of the ASEAN market until 1996 when Chinese exporters became dominant. By 2004, the market share for U.S. apple exports dropped to about 14%, whereas the Chinese market share jumped to about 70% (Figure 1).

**U.S. and Chinese Apple Markets**
- Both the United States and China provide subsidies for apple production. U.S. apples are of higher quality than Chinese apples. Market concentration in both countries leads to potential market power.
- Subsidies: The United States offered market-loss payment of $262 million because of stagnant production, investing no market power.
- Quality: Due to better crop management practices in the United States relative to China, U.S. exporters supply high quality apples to ASEAN, while Chinese exporters compete with low-quality apples.
- According to McCracken et al. (1991) show that southeast Asian wholesalers consider U.S. apples to be of high quality and apple branding by origin.
- Market concentration: According to McCracken et al. (1991), 88% of Washington State apple exporters use intermediaries for exporting apples.
- According to U.S. International Trade Commission (2011), Chinese apple exporters sell their apples to intermediaries who deals to a specialized supply firm, leading to consolidation.

**Objectives**
1. Investigate market power in both domestic and ASEAN markets.
2. Analyze the impacts of domestic and trade policies on U.S. and Chinese, and ASEAN apples markets.

These objectives are accomplished by:
1. Developing a theoretical model under imperfect competition in differentiated products and obtaining analytical results.
2. Implement the theoretical model through econometric estimation and simulation analysis.

**Theoretical Model**
- **Profit Function:** \( \pi = \rho(x, z) - c(x) - \psi(x, \alpha, \theta) \)
  - \( \rho(x, z) \) is the marginal revenue function for apple production, \( c(x) \) is the cost function, \( \psi(x, \alpha, \theta) \) is the symmetric competitive market demand function.

**First Order Conditions/Reaction Functions for the export and domestic market:**
- **Export Demand Relationship**
  - \( y = \frac{\partial x}{\partial p} + \frac{\partial x}{\partial y}p + \frac{\partial x}{\partial y}y + \frac{\partial x}{\partial \theta} \theta + \frac{\partial x}{\partial \alpha} \alpha \)
- **Domestic Demand Relationship**
  - \( y = \frac{\partial x}{\partial p} + \frac{\partial x}{\partial y}p + \frac{\partial x}{\partial y}y + \frac{\partial x}{\partial \theta} \theta + \frac{\partial x}{\partial \alpha} \alpha \)

**Empirical Model**
- Nonlinear TSLS is used to estimate a system of 8 equations and 8 variables.

**Data:** 1986-2008
- Endogenous variables: Food and Agricultural Organization and International Labour Organization.

**Econometric Results**

**Implications**
- **U.S. market power in ASEAN:** increased between 1992 and 1999 and decreased thereafter achieving zero by 2004 (Figure 2).
- **Chinese market power in ASEAN:** increased dramatically after 1998 when the Chinese market share rose, and reached a peak of 0.66 by 2005 (Figure 2).
- The Lerner index is zero in the U.S. domestic market, implying competitive pricing. This is because \( \psi = 0 \).
- The Lerner index in the Chinese domestic market averages 0.048, but the conjectural elasticity is not statistically different from zero.

**Simulation Results**
- **Tariff:** China-ASEAN free trade agreement expands Chinese exports by 13.81% and contracts U.S. Exports by 39.24%.
- As a result, the higher Chinese exports cause the Chinese apple price in ASEAN to decline by 11.68% and the lower U.S. exports cause the U.S. apple price increase by 1.46%.
- **Transport Cost:** Increasing transport cost has a smaller negative impact on Chinese exports than on U.S. exports because of China’s close proximity to ASEAN.
- A 10% increase in transport cost reduces Chinese exports by 30.93%, whereas a similar increase in transport cost contracts U.S. exports by 37.35%.
- **Subsidy:** A 10% increase in Chinese subsidy augments Chinese export and domestic sales by 42.82% and 30.91%, respectively. The increase in Chinese exports to ASEAN lowers U.S. exports by 57.31%.
- A similar increase in U.S. subsidy augments U.S. exports and domestic sales by 18.59% and 9.02%. The increase in U.S. exports to ASEAN reduces Chinese export by 10.84%.
- Chinese subsidy augments China’s welfare by $47.3 million and lowers the U.S. welfare by $5.3 million. U.S. subsidy raises U.S. welfare by $13.3 million and reduces Chinese welfare only by $1.4 million.
- Domestic subsidies drive out the competition and increase the welfare to the detriment of competing counting countries.

**Conclusions**
- **U.S. apple producers using exporting firms to sell apples in ASEAN:** This leads to market concentration and exporters mark prices above marginal cost. In the U.S. domestic market, perfect competition prevails.
- **In China:** because apples change hands several times before they are exported, market consolidation occurs in the ASEAN markets. Therefore, Chinese export market power in ASEAN in the Chinese domestic market, market power is small and statistically insignificant.
- **China-ASEAN free trade agreement favors Chinese exports and harms U.S. exports.**
- Transport cost has a larger negative impact on Chinese exports than on U.S. exports because of China’s close proximity to ASEAN.
- Chinese subsidy has a larger adverse impact on U.S. Exports and Welfare than U.S. subsidy has on Chinese exports and welfare.

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