When Apparel "Made in China" Become More Expensive, Will U.S. Consumers Have to Pay More?

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Background: China's soaring labor cost in recent years has triggered heated discussions on the future of "made in China" and its implication for U.S. consumers who rely heavily on "made in China" products (Rein, 2012). This is particularly the case in the U.S. apparel retail market, where over 98% of consumptions are supplied by imports and nearly 40% of them come from China in terms of value (AAFA, 2012). Although numerous studies have been conducted to evaluate the relationship between imports and the U.S. domestic apparel production or employment (Martin, 2007), the direct linkage between the price of imports and the U.S. apparel retail price has seldom been explored. Because such a price linkage is the key to understand the implication of a more expensive "Made in China" for U.S. consumers, this study tries to fulfill the research gap and specifically investigate to which extent the U.S. apparel retail price is influenced by the price of U.S. apparel imports from China. Results of the study will also illustrate the nature of competition in both the U.S. apparel import market and the U.S. apparel retail market, given the fact that price is jointly determined by demand and supply.

Theoretical framework: A revised Armington model was used to illustrate the connection between the U.S. apparel import price and the U.S. apparel retail price (Armington, 1969). Assume $Q = \left[\delta Q_c^{\frac{\sigma-1}{\sigma}} + (1-\delta) Q_{ROW}^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}$, where Q denotes the total demand for apparel in the U.S. market which is fulfilled by apparel imports from China (Q_c) and from rest of the world (Q_{ROW}). Q_c and Q_{ROW} compete with each other but not identical, therefore the elasticity of substitution of the two (σ) is positive. δ is a constant distribution parameter. Further assume the average price of U.S. apparel import from China and from rest of the world are p_c and p_{ROW} respectively; P denotes the average U.S. apparel retail price and it can be proved that: $P = \frac{p_c}{\partial Q / \partial Q_c} = \frac{p_{ROW}}{\partial Q / \partial Q_{ROW}}$ (Armington, 1969). Mathematically, $P = [\delta^\sigma p_c^{1-\sigma} + (1-\delta)^\sigma p_{ROW}^{1-\sigma}]^{\frac{1}{1-\sigma}}$ (1).

First-order partial derivative of Equation 1 yields $\frac{\partial P}{\partial p_c} = (1-\sigma)\delta^\sigma p_c^{-\sigma}[\delta^\sigma p_c^{1-\sigma} + (1-\delta)^\sigma p_{ROW}^{1-\sigma}]^{\frac{1}{1-\sigma}-1}$.

Because $\delta^\sigma p_c^{-\sigma}[\delta^\sigma p_c^{1-\sigma} + (1-\delta)^\sigma p_{ROW}^{1-\sigma}]^{\frac{1}{1-\sigma}-1} > 0$, therefore $\frac{\partial P}{\partial p_c} > 0$ when $\sigma < 1$; $\frac{\partial P}{\partial p_c} < 0$ when $\sigma > 1$; and $\frac{\partial P}{\partial p_c} = 0$ when $\sigma = 1$. The results suggest that the U.S. apparel retail price will change in the same direction with a change in the price of U.S. apparel import from China when Q_c and Q_{ROW} constitutes low-level competition ($\sigma < 1$); However, if Q_c and Q_{ROW} form strong competing

relationship ($\sigma > 1$), the U.S. apparel retail price will change in the opposite direction with a change in the price of U.S. apparel import from China.

Method and data: Equation 2, a linearized form of Equation 1, was used to empirically evaluate how the price of U.S. apparel imports from China might influence the U.S. apparel retail price $In(P_{it}) = \beta_0 + \beta_{1i} In(p_{c_t}) + \beta_{2i} In(p_{ROW_t}) + \beta_{3i} In[In(p_{c_t}) - In(p_{ROW_t})]^2 + \beta_{4i} In(Retail_{it}) + \varepsilon_{it}$ (2), where β_0 is a constant; $\beta_{1i} = \delta_i^{\sigma_i}$; $\beta_{2i} = (1-\delta_i)^{\sigma_i}$; $\beta_{3i} = \frac{1}{2}\delta_i^{\sigma_i}(1-\delta_i)^{\sigma_i}(1-\sigma_i)$; $\sigma_i = -2 \cdot \frac{\beta_{3i}}{\beta_{1i}\beta_{2i}} + 1$; i refers to menswear and womenswear, which were treated separately in the simulation because market of the two are relatively independent. P_{it} was measured by the annual U.S. consumer price index for apparel category i (BLS, 2013); p_{c_t} and p_{ROW_t} were measured by the annual average price of U.S. apparel import from China and from rest of the world respectively (OTEXA, 2013). $Retail_{it}$, measured by the annual U.S. retail sales for apparel category i in dollar amount (Census, 2013), was further added in Equation 2 to control the impact of total demand on retail price. Data from 2001 to 2011 were used in the simulation because 2001 was the year when China joined the World Trade Organization and the latest statistics were through 2011. Because the data set involves both cross-sectional and time series data, the panel data modeling technique and the generalized least square method (GLS) were adopted to tackle the potential estimation problems such as serial correlation and cross-sectional heteroskedasticity.

Findings: first, for menswear, the U.S. retail price is suggested to change by 0.137% in the same direction given a 1% change of the price of U.S. import from China ($p<0.01$); Second, for womenswear, there is no evidence showing the price of U.S. import from China has statistically significant impact on the U.S. retail price ($p>0.05$); Third, the U.S. apparel imports from China and from rest of the world are suggested constitute higher degree of substitution for womenswear ($\sigma=0.935$) than for menswear ($\sigma=0.602$). This may explain why the U.S. apparel import from China only had limited impact on the U.S. retail price of menswear but not womenswear.

Implications: first, the results imply that when "made in China" becomes more expensive, U.S. consumers may not have to pay more, largely because of increased substitution supply from other apparel exporters. Second, the results suggest that the U.S. apparel market is highly competitive and suppliers may not own much market power in price determination despite large market share. Third, the results imply that although "made in China" may lose market share in the U.S. market when it becomes more expensive, the magnitude could vary by product categories.

Table 1 Simulation results

Variables	Womenswear	Menswear
β_0	6.731**	6.731**
	(0.00)	(0.00)
β_{1i}	0.021	0.137**
	(0.64)	(0.00)
β_{2i}	0.394**	0.447*
	(0.00)	(0.05)
β_{3i}	0.261	0.307
	(0.41)	(0.54)
β_{4i}	-0.239**	-0.295**
	(0.00)	(0.00)
σ_i	0.935	0.602
R^2=0.89; F=17.19**(0.00)		

Note: p values are shown in parentheses;
* indicates Statistically significant at the 95% confidence level;
** indicates statistically significant at the 99% confidence level

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