

Constant Market Shares Analysis Part II

Decomposition of Shares

Capacity Building Workshop
"Enhancing Capacity on Trade Policies and Negotiations in Laos"
May 8-10, 2017
Vientienne, Lao PDR

John Gilbert

Professor
Department of Economics and Finance
Jon M. Huntsman School of Business
Utah State University
jgilbert@usu.edu

Introduction

- The decomposition of growth in export values is a simple way to illustrate what we mean by decomposing changes relative to constant share norms.
- However, it suffers from what is called the **order problem**. This means that the results are slightly different depending on whether the commodity effect or the market effect is calculated first.
- An alternative that does not suffer from this problem applies CMS ideas to the export share directly.
- In this session we'll establish the ideas using a simplified example, then consider the properties of the complete decomposition.

Simplified Share Decomposition

- To illustrate the idea of share decomposition, we consider a very special case.
- Suppose we have an economy, r , that exports one product to one partner economy, p .
- Let total exports of the economy be X_r and total world exports be X_W . Then the economy's share of world exports is X_r/X_W . This can be rewritten as:

$$\frac{X_r}{X_W} = \frac{X_r}{X_{Wp}} \frac{X_{Wp}}{X_W}$$

- In words, the country's export share is equal to its share of world exports to p multiplied by the share of p in world exports. The denominator of the first fraction on the right hand side and the numerator of the second fraction cancel.

Simplified Share Decomposition

- Now, let $\theta_r = X_r/X_W$, $\theta_{rp} = X_r/X_{Wp}$ and $\delta_p = X_{Wp}/X_W$.
- The expression becomes $\theta_r = \theta_{rp} \times \delta_p$.
- Let a change between any two periods be denoted by Δ , so $\Delta\theta_r$ is the change in the export share, and so on. Then it must be the case that:

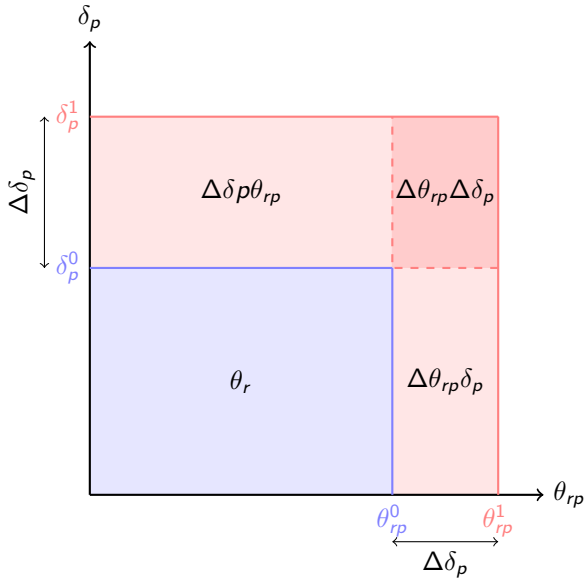
$$\Delta\theta_r = \Delta\theta_{rp}\delta_p^0 + \Delta\delta_p\theta_{rp}^0 + \Delta\theta_{rp}\Delta\delta_p$$

- The shares are evaluated at their initial values. This is the most simple version of an export share growth decomposition.

What Does It Mean?

- The economy in this simple example can grow its market share by getting a larger share of its partner market, by having the partner market grow overall, or both. We are disentangling these effects.
- The expression shows that we can break the change in the export share into three components.
- The first term is the effect on the share of expanding into in the partner market, holding the size of the partner constant.
- The second term is the effect of growth in the size of the partner, holding relative penetration constant.
- The third term is the interaction of these two effects.

Geometric Exposition



Simple Numerical Example

- Suppose that Laos PDR exports exclusively to Thailand, and its share of the Thai market is 10 percent.
- Suppose that Thailand takes 20 percent of the world's exports. The world export share of Laos PDR must be 2 percent.
- Now suppose that the Laos PDR share of Thailand's market increases to 15 percent, while the share of exports to Thailand in world exports rises to 25 percent. The new Laos PDR share of world trade is 3.75 percent.
- The change is $0.0175 = 0.05 \times 0.2 + 0.05 \times 0.1 + 0.05 \times 0.05$.
- Approximately 59 percent of the growth in the export share of Laos PDR is due to gaining market share in Thailand, about 29 percent is due to Thailand growing in world trade, and the remaining 14 percent is due to the interaction of those two factors.

Complete Decomposition

$$\Delta\theta_r = \sum_p \sum_i \Delta\theta_{ir} \beta_{ip}^0 \delta_p^0 \quad (\text{Market Share Effect})$$

$$+ \sum_p \sum_i \Delta\beta_{ip} \theta_{irp}^0 \delta_p^0 \quad (\text{Commodity Composition Effect})$$

$$+ \sum_p \sum_i \Delta\theta_{irp} \Delta\beta_{ip} \delta_p^0 \quad (\text{Commodity Adaptation Effect})$$

$$+ \sum_p \Delta\delta_p \theta_{rp}^0 \quad (\text{Region Composition Effect})$$

$$+ \sum_p \Delta\theta_{rp} \Delta\delta_p \quad (\text{Region Adaptation Effect})$$

Market Share Effect

- Shows the impact of changes in the market shares by commodity and destination, weighted by the commodity composition of each destination and the regional composition of world trade in the base year.
- It can be thought of as the increase in competitiveness having controlled for the initial commodity and regional composition of the country's exports.

Commodity Composition Effect

- Shows to what extent the change in market share can be explained by the initial commodity composition of the country's exports.
- It will be positive if the initial commodity composition of exports favors those goods in which world trade is growing relatively rapidly.

Commodity Adaptation Effect

- Shows to what extent the country has been successful in adapting the commodity composition of its exports to meet changes in the commodity composition of world demand.
- It will be positive if the region has adapted faster than average to the change in the commodity composition of world trade.

Region Composition Effect

- Shows to what extent the change in market share can be explained by the initial regional pattern of the country's exports.
- It will be positive if the regional pattern of exports favors countries the imports of which are growing relatively quickly.

Region Adaptation Effect

- Can be interpreted as showing to what extent the country has been successful in adapting the regional composition of its exports to meet changes in the world regional import demand structure.
- It will be positive if the region has adapted faster than average to the change in the regional pattern of world trade.

Application Example

- We will again demonstrate using Thailand's export data in 2006 and 2014.
- For this exercise we need exactly the same data as we used in the value decomposition.
- **Exploring the Code:** Open the files 08_CMS_Shares (the code) and 07_CMS_Data_THA (the data).

Table: Decomposition of Thailand's Export Share Change 2006–2014

	Thailand
Market Share Effect	0.002
Commodity Composition Effect	0.020
Commodity Adaptation Effect	-0.035
Region Composition Effect	0.101
Region Adaptation Effect	-0.012
Total Change	0.074

- Thailand's share of the world export market increased by 0.074 percentage points between 2006 and 2014.
- There were small but favorable commodity composition effects, and larger favorable regional composition effects - the largest component.
- Hence, Thailand has benefited from fast growth in its trading partners.
- A relatively small, but positive effect was from improving market share in existing markets.
- Adaptation effects were negative, however, suggesting that Thailand lost market share relative to some faster adapting economies.

- Download the data necessary to construct a CMS decomposition is shares for other economies in the region using the same techniques.
- Modify the code to handle the new countries, and generate the decomposition.
- Are economies in the region exhibiting similar or divergent patterns in their export competitiveness?

Application: Breakdowns by Region

- CMS techniques can be further modified to provide insights into how preferential agreements are affecting trade by delving deeper into how intra-regional trade is changing relative to extra-regional trade.
- This is done by partitioning each of the components of the decomposition by partner, or by a group of partners.
- We will again demonstrate using Thailand's export data in 2006 and 2014.
- **Exploring the Code:** Open the files 08_CMS_Break (the code) and 07_CMS_Data_THA (the data).

Table: Decomposition of Thailand's Export Share Change 2006–2014

	Intra-ASEAN	Extra-ASEAN
Market Share Effect	-0.007	0.009
Commodity Composition Effect	0.002	0.018
Commodity Adaptation Effect	-0.004	-0.031
Region Composition Effect	0.070	0.031
Region Adaptation Effect	-0.011	-0.001
Total Change	0.049	0.025

- Around two-thirds of Thailand's export share growth over the period was intra-ASEAN, and only around one third was expansion of extra-ASEAN trade.
- We see that a large proportion of Thailand's regional composition effect is explained by the economies of ASEAN – Thailand seems to have benefited much more strongly from its regional export profile with ASEAN than with non-ASEAN economies.
- It has also been more successful at adapting its commodity profile to ASEAN economies than outside (although still less than typical).
- On the other hand, it has been less successful at adapting changes in the regional composition in the ASEAN market than overall.