Constant Market Share Analysis of the Pattern of Southeast Asian Export Growth in the 2000s

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

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The main purpose of this paper is to give an overview of trends in export growth in Southeast Asia over the last decade.

We use constant market share (CMS) analysis to decompose the changes in export growth for the ASEAN6 economies, and provided some insights into the ways in which these economies have under/over performed relative to world norms, taking account patterns of commodity and regional diversification.

We also introduce some small modifications to the technique and discuss some of the applications.
Constant market share (CMS) analysis is a technique for decomposing the growth in a country’s exports into components that correspond to holding its market shares constant at various levels.

The technique is a crossover from the industrial organization literature, and was introduced in the trade context in Tyszynski (1951).
The theoretical foundations of CMS analysis are drawn from the idea that demand for exports in a given market from competing sources is a function of the relative prices. This suggests that export shares will remain constant except as relative prices vary. So, changes in exports beyond the constant share norm can be attributed to price changes - or changes in the level of ‘competitiveness.’ How we define the norm depends on the level at which we view the market.
Let $\mathbf{I}$ be a set of commodities exported by the country of interest, which is indexed by $i$. Let $\mathbf{J}$ be a set of regions to which the goods are exported, which is indexed by $j$. Then we can define the identity:

$$V_{ij}^1 - V_{ij}^0 \equiv rV_{ij}^0 + (V_{ij}^1 - V_{ij}^0 - rV_{ij}^0) \quad \forall i, j$$

Where $V$ is the value of the flow of exports from the country under study, a superscript indicates the period, and $r$ is the growth rate in world exports over the period.
Taking this expression and summing up both sides over commodities \( i \) and regions \( j \) then yields:

\[
\sum_i \sum_j V_{ij}^1 - \sum_i \sum_j V_{ij}^0 \equiv r \sum_i \sum_j V_{ij}^0 + \sum_i \sum_j (V_{ij}^1 - V_{ij}^0 - rV_{ij}^0)
\]

- The left hand side of the identity is simply the change in total exports from the country of interest over the period.
- The right hand side breaks this down into a component associated with the overall world growth in exports, and a residual, the ‘competitiveness’ effect.
- This is a ‘one-level’ analysis.
If the constant share normalization applies at the product level then:

\[ V_{ij}^1 - V_{ij}^0 \equiv r_i V_{ij}^0 + (V_{ij}^1 - V_{ij}^0 - r_i V_{ij}^0) \quad \forall i, j \]

Where \( r_i \) is the growth rate in world exports of commodity \( i \) over the period. Summing over \( i \) and \( j \) and rearranging now yields:

\[
\sum_i \sum_j V_{ij}^1 - \sum_i \sum_j V_{ij}^0 \equiv r \sum_i \sum_j V_{ij}^0 \\
\left( \text{Change in Exports} \right) \\
+ \sum_i (r_i - r) \sum_j V_{ij}^0 \\
\left( \text{Commodity Effect} \right) \\
+ \sum_i \sum_j (V_{ij}^1 - V_{ij}^0 - r_i V_{ij}^0) \\
\left( \text{Competitiveness Effect} \right)
\]

This is a ‘two-level’ analysis.
If the constant share normalization applies at the region level then:

\[
\sum_i \sum_j V_{ij}^1 - \sum_i \sum_j V_{ij}^0 = r \sum_i \sum_j V_{ij}^0
\]

\[
\text{Change in Exports}
\]

\[
\text{Growth Effect} + \sum_i (r_i - r) \sum_j V_{ij}^0
\]

\[
\text{Commodity Effect} + \sum_i \sum_j (r_{ij} - r_i) V_{ij}^0
\]

\[
\text{Market Effect} + \sum_i \sum_j (V_{ij}^1 - V_{ij}^0 - r_{ij} V_{ij}^0)
\]

\[
\text{Competitiveness Effect}
\]

Where \( r_{ij} \) is the growth rate in world exports of commodity \( i \) to region \( j \) over the period. This is a ‘three-level’ analysis.
Interpretation

The ‘three-level’ decomposition identifies four different components of the growth in the exports of the country of interest:

1. **World Growth Effect:** The part of the growth attributed to the overall rise in world exports.

2. **Commodity Effect:** The part of growth attributed to the commodity composition of the countries exports (positive if exports are concentrated in commodities in which world demand is growing relatively quickly).

3. **Market Effect:** The part of growth attributed to the regional composition of the countries exports (positive if exports are concentrated in markets which are experiencing relatively rapid growth.)

4. **Competitiveness Effect:** The residual effect, which captures the difference between the actual export growth and the growth that would have occurred had the export shares remained constant. A positive value is interpreted as an increase in “competitiveness.”
The export data is drawn from COMTRADE from the period 2000-2009 for the ASEAN6 economies. For Vietnam we have used data from the period 2000-2008 as 2009 data has not yet been reported. We used the reported export values in preference to import values because of missing data for later years. All partner regions available in COMTRADE are disaggregated, and the commodities are disaggregated to the HS 2-digit level. Because the annual data can fluctuate quite a bit, we have smoothed by comparing the average for the first half of the decade against the second half.
Relative to world growth trends, four of the economies overperformed (Indonesia, Singapore, Thailand and Vietnam), while two underperformed (Malaysia and the Philippines).

Indonesia and Vietnam, the positive contribution indicates that these two economies are on average exporting goods that are experiencing relatively fast export growth (compared to the world average).

Members of ASEAN excepting the Philippines have been exporting to markets that are growing faster than average.

Only in the cases of Singapore, Thailand and Vietnam do we observe an increase in export competitiveness over the period.
Sectoral Decomposition

The decomposition can be adapted to a sectoral level by summing the identity over regions only to yield:

$$\sum_j V_{ij}^1 - \sum_j V_{ij}^0 \equiv r \sum_j V_{ij}^0$$

- Change in Exports
- Growth Effect

$$+ (r_i - r) \sum_j V_{ij}^0$$

- Commodity Effect

$$+ \sum_j (r_{ij} - r_i) V_{ij}^0$$

- Market Effect

$$+ \sum_j (V_{ij}^1 - V_{ij}^0 - r_{ij} V_{ij}^0)$$

- Competitiveness Effect
This is a ‘three-level’ decomposition of the pattern of sectoral growth, and the components are interpreted in the same way as before.

Summing the sectoral components yields the aggregate effects described above, so we can think of this approach as helping to identify the sectoral contributions of each component.

Of particular interest are those sectors that contributed most positively/negatively to the competitiveness effect.
<table>
<thead>
<tr>
<th>Description</th>
<th>HS Code</th>
<th>Competitiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal/veg fats &amp; oils</td>
<td>HS15</td>
<td>3.757</td>
</tr>
<tr>
<td>Rubber and articles thereof.</td>
<td>HS40</td>
<td>2.184</td>
</tr>
<tr>
<td>Wood and articles of wood</td>
<td>HS44</td>
<td>-1.507</td>
</tr>
<tr>
<td>Mineral fuels, oils &amp; product thereof</td>
<td>HS27</td>
<td>-6.837</td>
</tr>
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</table>
### Malaysia

<table>
<thead>
<tr>
<th>Description</th>
<th>HS Code</th>
<th>Competitiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubber and articles thereof.</td>
<td>HS40</td>
<td>0.907</td>
</tr>
<tr>
<td>Optical, photo</td>
<td>HS90</td>
<td>0.642</td>
</tr>
<tr>
<td>Mineral fuels, oils &amp; product thereof</td>
<td>HS27</td>
<td>-2.365</td>
</tr>
<tr>
<td>Electrical mchy equip parts thereof</td>
<td>HS85</td>
<td>-8.357</td>
</tr>
<tr>
<td>Description</td>
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<td>Competitiveness</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>---------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Wood and articles of wood</td>
<td>HS44</td>
<td>0.495</td>
</tr>
<tr>
<td>Vehicles o/t railw/tramw roll-stock</td>
<td>HS87</td>
<td>0.373</td>
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<tr>
<td>Nuclear reactors, boilers, mchy</td>
<td>HS84</td>
<td>-1.432</td>
</tr>
<tr>
<td>Electrical mchy equip parts thereof</td>
<td>HS85</td>
<td>-5.282</td>
</tr>
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<td>Description</td>
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<td>Competitiveness</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>---------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Electrical mchy equip parts thereof</td>
<td>HS85</td>
<td>17.930</td>
</tr>
<tr>
<td>Mineral fuels, oils &amp; product thereof</td>
<td>HS27</td>
<td>9.006</td>
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<tr>
<td>Art of apparel &amp; clothing access,</td>
<td>HS61</td>
<td>-0.805</td>
</tr>
<tr>
<td>Nuclear reactors, boilers, mchy</td>
<td>HS84</td>
<td>-4.913</td>
</tr>
<tr>
<td>Description</td>
<td>HS Code</td>
<td>Competitiveness</td>
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<tr>
<td>-------------------------------------------------</td>
<td>---------</td>
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<tr>
<td>Nuclear reactors, boilers, mchy</td>
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<td>Vehicles o/t railw/tramw roll-stock</td>
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<td>Art of apparel &amp; clothing access</td>
<td>HS62</td>
<td>-0.513</td>
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<tr>
<td>Meat and edible meat offal</td>
<td>HS02</td>
<td>-0.591</td>
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</table>
Vietnam

<table>
<thead>
<tr>
<th>Description</th>
<th>HS Code</th>
<th>Competitiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical mchy equip parts thereof</td>
<td>HS85</td>
<td>1.387</td>
</tr>
<tr>
<td>Art of apparel &amp; clothing access</td>
<td>HS61</td>
<td>1.305</td>
</tr>
<tr>
<td>Ores, slag and ash.</td>
<td>HS26</td>
<td>-0.177</td>
</tr>
<tr>
<td>Mineral fuels, oils &amp; product thereof</td>
<td>HS27</td>
<td>-4.057</td>
</tr>
</tbody>
</table>
Several of the members of the ASEAN6 had relatively poor export growth relative to controlled world norms in mineral fuels, oils and products thereof (Indonesia, Malaysia and Vietnam).

Growth was also poor in electrical machinery and equipment (Malaysia and the Philippines), and textiles and apparel (Singapore and Thailand).

On the other hand, electrical machinery and equipment exports performed well relative to controlled world norms in Singapore and Vietnam, as did rubber and articles thereof in the case of Indonesia and Malaysia, and vehicles in Thailand and the Philippines.
Partition \( J \) into two groups, including \( P \), representing the membership of a regional group of interest. Then:

\[
\begin{align*}
\sum_{i} \sum_{j \in P} V_{ij}^1 - \sum_{i} \sum_{j \in P} V_{ij}^0 + \sum_{i} \sum_{j \notin P} V_{ij}^1 - \sum_{i} \sum_{j \notin P} V_{ij}^0 & \equiv r \sum_{i} \sum_{j \in P} V_{ij}^0 + r \sum_{i} \sum_{j \notin P} V_{ij}^0 \\
\end{align*}
\]

- **Change in Regional**
- **Change in ROW**
- **Regional Growth**
- **ROW Growth**

\[
\begin{align*}
+ \sum_{i} (r_i - r) \sum_{j \in P} V_{ij}^0 + \sum_{i} (r_i - r) \sum_{j \notin P} V_{ij}^0 \\
\end{align*}
\]

- **Regional Commodity**
- **ROW Commodity**

\[
\begin{align*}
+ \sum_{i} \sum_{j \in P} (r_{ij} - r_i) V_{ij}^0 + \sum_{i} \sum_{j \notin P} (r_{ij} - r_i) V_{ij}^0 \\
\end{align*}
\]

- **Regional Market**
- **ROW Market**

\[
\begin{align*}
+ \sum_{i} \sum_{j \in P} (V_{ij}^1 - V_{ij}^0 - r_{ij} V_{ij}^0) + \sum_{i} \sum_{j \notin P} (V_{ij}^1 - V_{ij}^0 - r_{ij} V_{ij}^0) \\
\end{align*}
\]

- **Regional Competitiveness**
- **ROW Competitiveness**
Again, this is a ‘three-level’ decomposition of the pattern of intra-regional and extra-regional growth, and the components are interpreted in the same way as before.

Summing the regional components yields the aggregate effects described above, so we can think of this approach as helping to identify the differences in the contributions of different regions to each component.

Of particular interest are cases where the residual effect is very different across regional groupings.
Regional Export Growth Trends

- World
- Indonesia
- Malaysia
- Philippines
- Singapore
- Thailand
- Vietnam

Graph showing export growth trends from 2001 to 2008 for various countries and the world.
Results

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CMS Analysis of ASEAN Trade Growth
Results

CMS Analysis of ASEAN Trade Growth
There is mixed evidence of trade growing more quickly among the ASEAN economies relative to their extra-regional trade, controlling for commodity and market effects.

Indonesia and Singapore were successful at expanding export markets within ASEAN relative to norms.

The competitiveness effect for Malaysia and the Philippines, however, is no different to non-member trade (proportionally).

For Thailand and Vietnam, the intra-ASEAN competitiveness effect is actually lower than the extra-ASEAN competitiveness effect.
Future Work

- Validate against import data
- A number of further decompositions
- We have smoothed using averages. These are linear constructs, so should be able to increase the information content using the information on underlying variation