Assessing the impact of trade facilitation on trade and climate change

Yann Duval,
Trade Facilitation Section,
Trade and Investment Division, ESCAP
Overview

- Trade costs and trade facilitation: overview
- Main data sources (and limitations)
- Assessment of impact of TF on trade and climate change? Some pointers for discussion…
Trade Facilitation (TF)?

“The plumbing of international trade” (Staples, 1998)

“The simplification and harmonization of international trade procedures.”, where trade procedures are the “activities, practices and formalities involved in collecting, presenting, communicating and processing data required for the movement of goods in international trade.” (based on WTO documents)

“Any measure, or set of measures, that aims to increase the cost-effectiveness of international trade transactions”. http://www.gfptt.org/Entities/TopicProfile.aspx
Trade Transactions: Buy-Ship-Pay Model

INvolves

BUY

- Prepare for Export

SHIP

- Export
- Transport

PAY

- Prepare for Import
- Import

Commercial Procedures
- Establish Contract
- Order Goods
- Advice on Delivery
- Request Payment
- Packing
- Certification
- Accreditation
- Warehousing

Transport Procedures
- Establish Transport Contract
- Collect, Transport and Deliver Goods
- Provide Waybills, Goods Receipts Status Reports, etc.

Regulatory Procedures
- Obtain Import/Export Licenses, etc.
- Provide Customs Declaration
- Provide Cargo Declaration
- Apply Trade Security Procedures
- Clear Goods for Export/Import

Financial Procedures
- Provide Credit Rating
- Provide Insurance
- Provide Finance
- Execute Payment
- Issue Statements

Trade Transaction: Example of Rice Export in Thailand

About 24 documents and 15 parties involved in exporting Rice from Thailand

Total = 22 Days (by ship)

1. Conclude sales contract and trade terms
2. Have product sampled and technically examined
3. Arrange transport
4. Prepare export permit
5. Apply for cargo insurance
6. Prepare and submit customs declaration
7. Stuff container and transfer it to port of departure
8. Clear goods through customs
9. Handle container at terminal and stow it on vessel
10. Prepare documents required by importer as listed in L/C
11. Claim payment of goods

*Data collected by Institute for IT Innovation, Kasetsart University (2007)
Trade facilitation essential to trade competitiveness

- Lower transaction costs
  - Lower costs related to preparation, submission and approval of documents; lower cost of clearance and transportation of goods

- Reduce average transaction time
  - Less waiting time at borders, faster clearance process and transportation → reduce need for financing, risk of spoilage…

- Increased timeliness
  - Because procedures and processes are rationalized and transparent, facilitation of just-in-time delivery

- Compliance with security initiatives in major export markets
How important are Trade Facilitation and Behind-the-Border (BtB) Measures for trade?

- Consistently strong evidence that trade facilitation matters
  - No. of import or export documents, cost of moving goods from factory to ship deck, customs efficiency
  - Port infrastructure, internet/IT services infrastructure
  - Transport and Logistics services/competition
- TF matters more than Tariffs for trade – particularly for trade with OECD countries
- General Business/Investment environment regulations also matters for trade
  - Contract enforcement, ease of getting credit, ease of starting a business, bankruptcy law…
Impact on Trade of a 5% Improvement in selected areas

- Bilateral import
- Bilateral import from south/intra-regional

BtB trade facilitation: 8%
BtB business facilitation: 7%

Source: Duval and Utoktham (2009)
Overview

- Trade costs and trade facilitation: overview
- Main data sources (and limitations)
- Assessment of impact of TF on trade and climate change? Some pointers for Discussion
Doing Business Dataset

www.doingbusiness.org

Cross-country performance ranking in 10 business regulatory areas

Trade-Across-Border ranking
- Time (days) for import/export
- Cost of import/export
- Number of documents for import/export

→ Ok for cross-country comparative analysis

Now very commonly used, but…

Stringent assumption on type of shipment to ensure comparability

Quality of TF data questioned by some experts

Economic and Social Commission for Asia and the Pacific
Logistics Performance Index (LPI) Dataset

http://www.worldbank.org/lpi/

LPI indicators

- Efficiency of clearance process by Customs and other border control agencies;
- Quality of Transport and IT infrastructure for logistics;
- Ease and affordability of arranging shipments;
- Competence in the local logistics industry (e.g., transport operators, customs brokers);
- Ability to track and trace shipments;
- Domestic logistics costs (e.g., local transportation, terminal handling, warehousing);
- Timeliness of shipments in reaching destination.

Also detailed perception survey data and indicators on domestic trade facilitation issues.
Trade Logistics and Facilitation in Cambodia

Source: LPI 2010, World Bank
## Trade Logistics and Facilitation in Cambodia

<table>
<thead>
<tr>
<th></th>
<th>Cambodia</th>
<th>East Asia &amp; Pacific</th>
<th>Low income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearance time with physical inspection (days)</td>
<td>5.92</td>
<td>3.36</td>
<td>4.09</td>
</tr>
<tr>
<td>Clearance time without physical inspection (days)</td>
<td>1.39</td>
<td>1.55</td>
<td>2.61</td>
</tr>
<tr>
<td>Physical inspection (%)</td>
<td>28.96</td>
<td>24.92</td>
<td>38.83</td>
</tr>
<tr>
<td>Multiple inspection (%)</td>
<td>10.54</td>
<td>10.1</td>
<td>12.26</td>
</tr>
<tr>
<td>Lead time export for port/airport, median case (days)</td>
<td>1.32</td>
<td>3.58</td>
<td>5.83</td>
</tr>
<tr>
<td>Lead time import for port/airport, median case (days)</td>
<td>4</td>
<td>4.93</td>
<td>6.38</td>
</tr>
<tr>
<td>Number of agencies - exports</td>
<td>6</td>
<td>4.06</td>
<td>4.19</td>
</tr>
<tr>
<td>Number of agencies - imports</td>
<td>6.5</td>
<td>4.12</td>
<td>4.5</td>
</tr>
<tr>
<td>Typical charge for a 40-foot export container or a semi-trailer (US$)</td>
<td>1,000.00</td>
<td>521.18</td>
<td>2,025.34</td>
</tr>
<tr>
<td>Typical charge for a 40-foot import container or a semi-trailer (US$)</td>
<td>2,924.02</td>
<td>890.54</td>
<td>1,177.04</td>
</tr>
</tbody>
</table>

Source: LPI 2010, World Bank
## Trade Facilitation and Logistics Performance

### Logistics Performance Index (LPI) 2010 Ranks*

<table>
<thead>
<tr>
<th>Country</th>
<th>LPI Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>28</td>
</tr>
<tr>
<td>Malaysia</td>
<td>29</td>
</tr>
<tr>
<td>Poland</td>
<td>30</td>
</tr>
<tr>
<td>Lebanon</td>
<td>33</td>
</tr>
<tr>
<td>Latvia</td>
<td>37</td>
</tr>
<tr>
<td>Turkey</td>
<td>39</td>
</tr>
<tr>
<td>Brazil</td>
<td>41</td>
</tr>
<tr>
<td>Lithuania</td>
<td>45</td>
</tr>
<tr>
<td>Argentina</td>
<td>48</td>
</tr>
<tr>
<td>Chile</td>
<td>49</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>LPI Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>27</td>
</tr>
<tr>
<td>Thailand</td>
<td>35</td>
</tr>
<tr>
<td>Philippines</td>
<td>44</td>
</tr>
<tr>
<td>India</td>
<td>47</td>
</tr>
<tr>
<td>Tunisia</td>
<td>61</td>
</tr>
<tr>
<td>Honduras</td>
<td>70</td>
</tr>
<tr>
<td>Ecuador</td>
<td>71</td>
</tr>
<tr>
<td>Indonesia</td>
<td>75</td>
</tr>
<tr>
<td>Paraguay</td>
<td>76</td>
</tr>
<tr>
<td>Syrian Arab</td>
<td>80</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>LPI Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vietnam</td>
<td>53</td>
</tr>
<tr>
<td>Senegal</td>
<td>58</td>
</tr>
<tr>
<td>Uganda</td>
<td>66</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>68</td>
</tr>
<tr>
<td>Benin</td>
<td>69</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>79</td>
</tr>
<tr>
<td>Congo, Dem. Rep.</td>
<td>85</td>
</tr>
<tr>
<td>Madagascar</td>
<td>88</td>
</tr>
<tr>
<td>Kyrgyz Republic</td>
<td>91</td>
</tr>
<tr>
<td>Tanzania</td>
<td>95</td>
</tr>
</tbody>
</table>

*LPI captures country TF performance in terms of trade-related procedures, infrastructure and services.*
Trade costs can be classified into several categories:
- Policy-related trade costs (e.g., tariffs)
- Monetary and non-monetary domestic and international transport costs
- Language and culture barriers encountered in international trade

ESCAP Trade costs measures overall trade costs
Trade Facilitation and Trade Costs

Figure VIII. Estimated trade costs in industrialized countries

- Transport costs (21%)
  - Freight costs (11%)
  - Transit costs (9%)
  - Policy barriers (tariff and NTBs) (8%)
  - Language barrier (7%)
- Border-related trade barriers (44%)
- Retail and wholesale distribution costs (55%)
  - Currency barrier (14%)
  - Information costs barrier (6%)
  - Security barrier (3%)

Based on Novy (2009), who suggests the following measure of trade costs

\[ \tau_{ij} \equiv \left( \frac{t_{ij}}{t_{ji}} \right) \frac{1}{2} - 1 = \left( \frac{x_{ii}x_{jj}}{x_{ij}x_{ji}} \right)^{\frac{1}{2(\sigma-1)}} - 1 \]

This measures how much more expensive (in terms of geometric mean) bilateral trade costs are compared to internal trade costs.
Intra-Regional Trade Costs (2003 vs. 2007)

- **ASEAN**: Indonesia, Malaysia, Philippines, Thailand
- **East and Northeast Asia**: China, Japan, Korea, Macao, Mongolia
- **SAARC**: Bangladesh, India, Pakistan, Sri Lanka
- **North and Central Asia**: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Russian Federation
- **Pacific Developed Countries**: Australia, New Zealand

Source: ESCAP Trade Cost Database
Comparison of Inter-regional Trade Costs and Intra-regional Trade Costs

- North and Central Asia: 162% (Trade with China in 2007), 162% (Trade with Their Own Region in 2007)
- SAARC*: 132% (Trade with China in 2007), 150% (Trade with Their Own Region in 2007)
- EU25: 126% (Trade with China in 2007), 120% (Trade with Their Own Region in 2007)
- Pacific Developed Countries: 93% (Trade with China in 2007), 74% (Trade with Their Own Region in 2007)
- ASEAN*: 62% (Trade with China in 2007), 61% (Trade with Their Own Region in 2007)

Source: ESCAP Trade Cost Database
This approach:

- Allows calculation of bilateral trade costs
- \( \rightarrow \) check how trade costs vary with different trading partners [not possible with other datasets]

But,

- Derived from a theory-consistent gravity equation, so cannot be used in one
- Difficult to calculate sectoral level trade costs, as lack of data availability
- Methodology not widely adopted yet
Other Sources of Trade Cost/Trade Facilitation Data

- World Economic Forum
  - [www.weforum.org/gcr](http://www.weforum.org/gcr)
- National level or ad-hoc subregional surveys of logistics service providers or traders
- Trade Process Analysis studies (on-going by ARTNeT)
- Time Release Studies (typically managed by national Customs offices using WCO methodology)
  ...

World Economic Forum

[www.weforum.org/gcr](http://www.weforum.org/gcr)

National level or ad-hoc subregional surveys of logistics service providers or traders

Trade Process Analysis studies (on-going by ARTNeT)

Time Release Studies (typically managed by national Customs offices using WCO methodology)

...
Overview

- Trade costs and trade facilitation: overview
- Main data sources (and limitations)
- Assessment of impact of TF on trade and climate change? Some pointers for Discussion
Some pointers for discussion…

Q1: Impact of TF on “climate smart” goods trade?

Extended Gravity model at the 6-digit level

\[ X_{\text{climate smart goods}} = f (\text{Distance}, \text{GDP}, \ldots, \text{TF}) \]
Q2: Impact of TF on climate change?

- TF increases trade
  - Use CGE to model TF impact on trade, with resulting impact on carbon emission calculated using the GTAP-E database.
Q2: Impact of TF on climate change?

- TF affects waiting time at border, transportation time, transportation mode

- What is the climate change effect (CCE) of different types of transport modes (sea vs. rail vs. road)
  - Calculate how reduction of use of a particular transport route/mode [influence by policy/infrastructure development] could affect carbon emissions

- What is the CCE of waiting time (additional fuel consumption, particularly in case of perishable goods)
  - Extrapolation could be made based on detailed surveys/observations (or transport operators) at selected borders

- Evaluate benefits of various transport Emission Reduction Schemes, such as the International Maritime Emission Reduction Scheme
Q2: Impact of TF on climate change?
- TF affects paper usage (paper is arguably a climate change intensive good)
  - 1.1 billion pieces of paper/year for UK imports of food only.

Out of 250 documents involved in a food import transaction (UK)...

<table>
<thead>
<tr>
<th>Document papers destroyed</th>
<th>Document papers retained</th>
</tr>
</thead>
<tbody>
<tr>
<td>211 (93.78%)</td>
<td>14 (6.22%)</td>
</tr>
</tbody>
</table>

“The Cost of Paper in the Supply Chain:
“Project Hermes” Perishable Foods Sector”
Thank You
Email: duvaly@un.org

Just released by ESCAP/ECE:
Business Process Analysis Guide
for Simplifying Trade Procedures
available at:
www.unescap.org/unnext/
Annex
Economic Benefits of TF

- Trade facilitation costs = 1 to 15% of landed cost of imported good
  - even if only 1%, OECD estimates total gains from TF improvements to world economy of US$40 billion
- A 1% reduction in the fees charged for maritime and air transport services → increase Asian GDP some US$3.3 billion. (UNCTAD, 2001)
- 1 day less in delivery times = 0.5% of landed cost of goods (Hummels, 2001)
- Each additional day of delay prior to shipment reduces trade by more than 1% (Djankov et al., 2006)
Trade Facilitation in Asia and the Pacific

Big progress made in reducing time and cost of import and export

-4 days since 2006…

It now “only” takes 30 days!

BUT

“Group of 7” also achieved -4 days since 2006…

G-7 export time is now at 10 days!

ASEAN countries as a group clearly stand out in the region

-6 days since 2006

… ASEAN-5 still takes about 15 days!

Source: ADB/ESCAP 2009
The number of Trading Across Border (TF) reforms has continued to grow.

3 of the 38 new TF reforms are in Asia-Pacific:
- Bangladesh (EDI system)
- China (Doc. Requirements reduced)
- Viet Nam (customs admin. Reform) → -2 days in export time

*Mema Beye, Doing Business team. Presentation to the ARTNeT Trade Facilitation Research Team Meeting, 24-25 Nov. 09
The Gravity Model

- Based on Newton’s law of gravity
  - Gravity depends on mass of two objects and their distance
- Trade between two countries depends on:
  - Size of the two countries (GDP)
  - Distance between the two countries
- Intuitive model, only recently linked to economic theory
- It works! GDP and Distance typically explain more than 60% of changes in bilateral trade flows across years and country pairs
International Maritime Emission Reduction Scheme

New 2007 Initiative and Proposal on the IMO table (IMERS)

Ambition and Goals:
• Address differentiated priorities in one cohesive supra-national scheme
  – Halve maritime GHG emissions (through near- and long-term mitigation)
  – Reduce the gap in financing for adaptation (in $bn annually)

Cost:
Adding $1 to price of $1,000 of imported goods (=0.1%)

Key design details:
• No allocation of emissions to countries, one aggregated emission cap
• A fund established to invest in mitigation of shipping GHG emissions, and to provide contributory funding to climate change adaptation in developing countries
• Double mitigation: Reduction of GHG achieved by near-term technical and operational improvements and accelerating long-term breakthroughs
  – Mitigation outside the sector to optimize cost efficiency added
• A hybrid economic instrument based on harmonized charges & a quantity target
  – A charge-and-cap approach

Source: Dr Andre Stochniok, 2007
Tackling International Transport CO₂ Emissions...
Emissions are Far from Small*, and Grow Rapidly

Largest CO₂ emitting countries & international transport

1. USA: 22%
2. China: 17%
3. EU-25: 15%

170 countries: 15%

Int. shipping & aviation: 3%

Australia, Brazil, S. Arabia: 4%
S. Africa, Iran, Indonesia: 4%
Canada, Korea, S., Mexico: 5%
Russia, Japan, India: 15%

* International maritime CO₂ emission accounts “only” for ~1.8% of total emissions from fossil fuels. However, it is #9 if compared with the largest emitting nations and its share can triple by 2050. International aviation emission at 1.2% is #16, and its share can increase 5 times by 2050. Exempt from taxes, and unaffected by the Kyoto Protocol.

Source: Dr Andre Stochniol, 2007