



Trade Facilitation: Impact of border processes and the contribution of express delivery

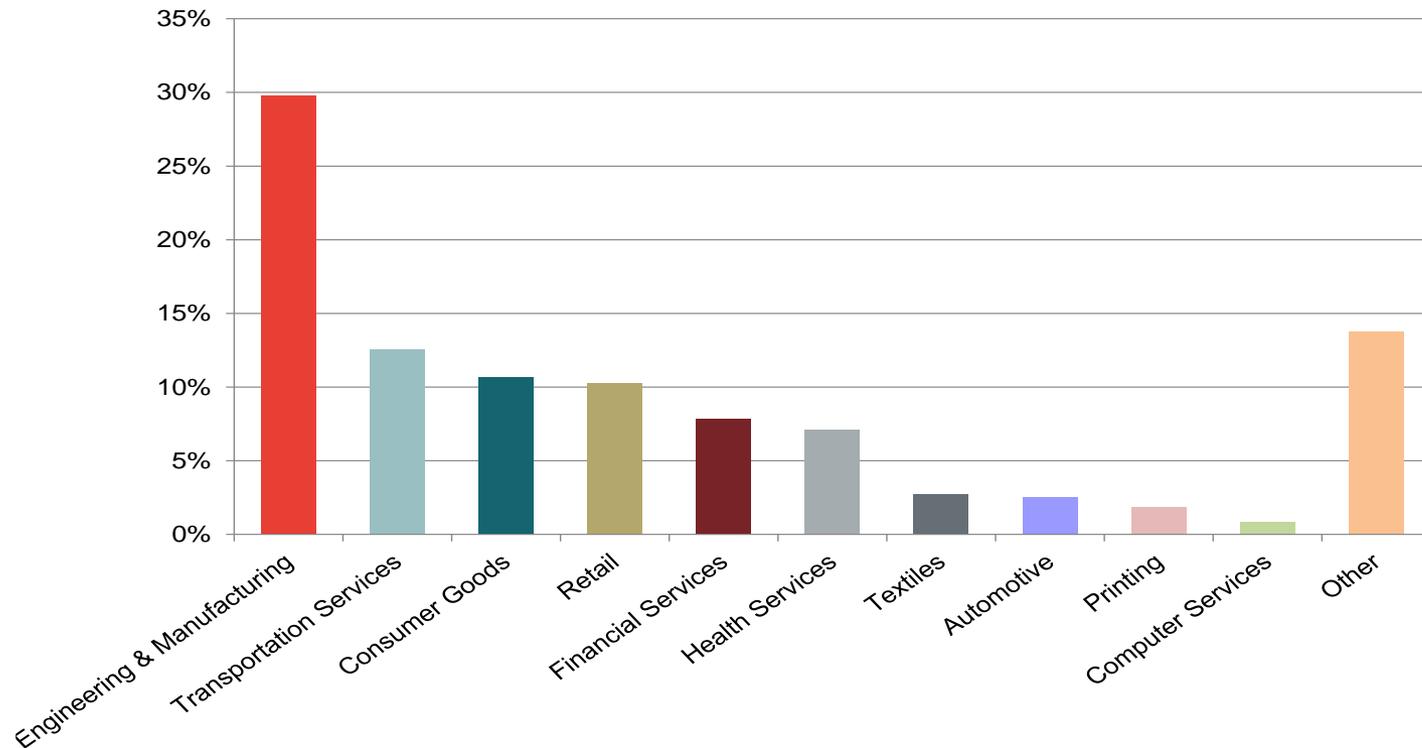
EUROPEAN AVIATION CONFERENCE, CRANFIELD

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Overview of attributes that customers value in express delivery services

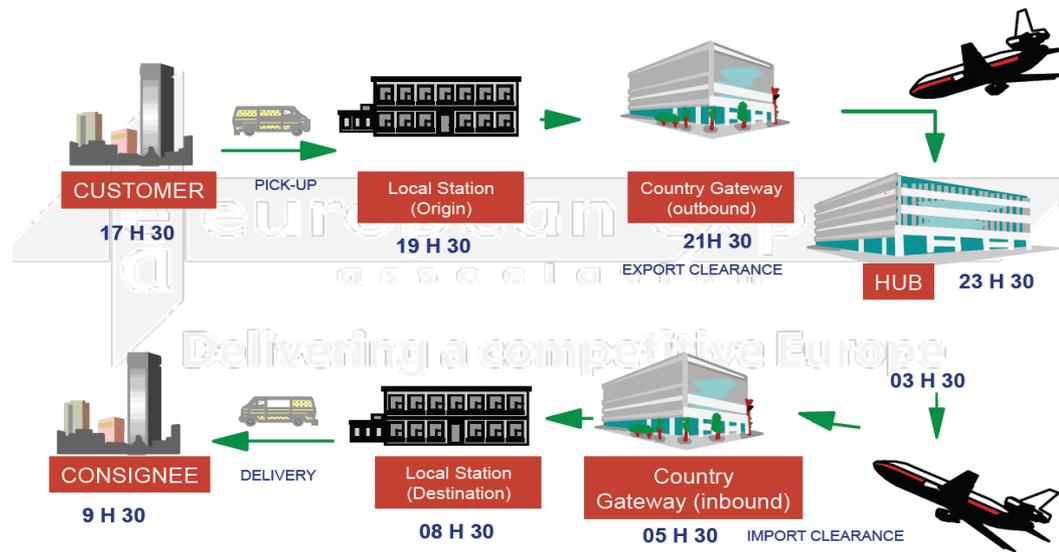


Global breakdown of international express delivery users by sector of activity, 2013



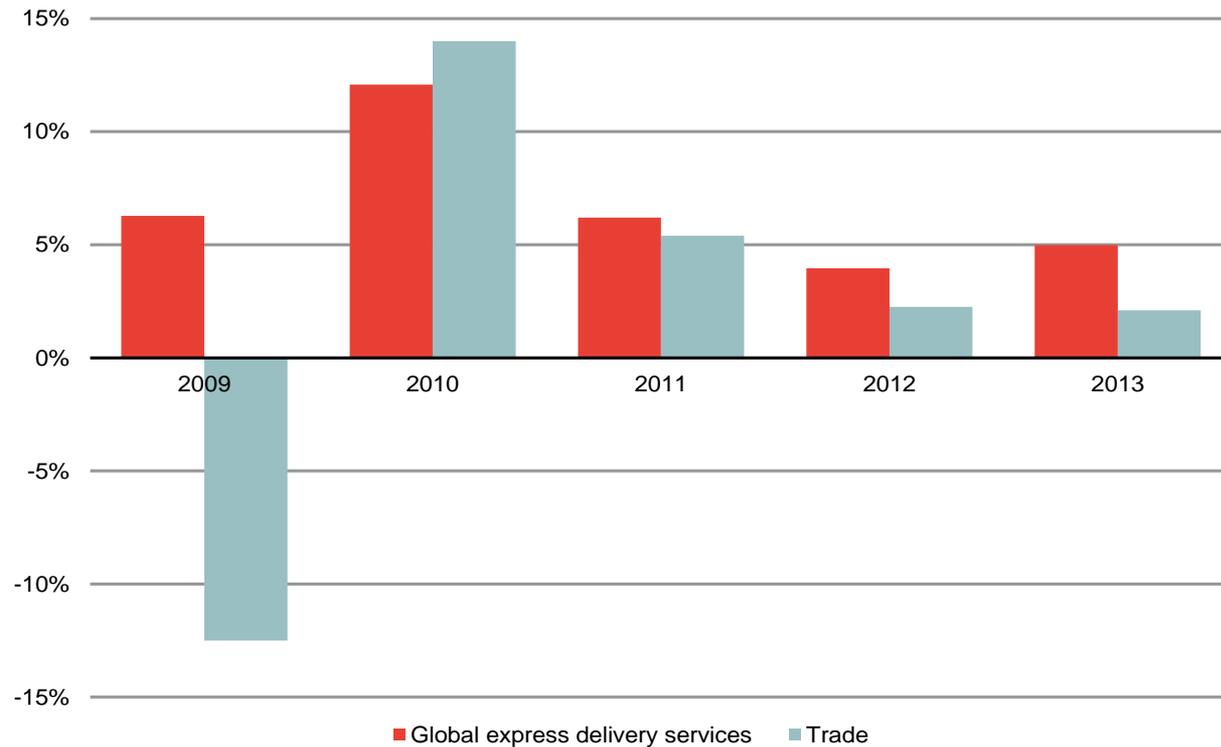
Source: Frontier analysis based on the data of members of the Global Express Association

Steps involved in providing express delivery services



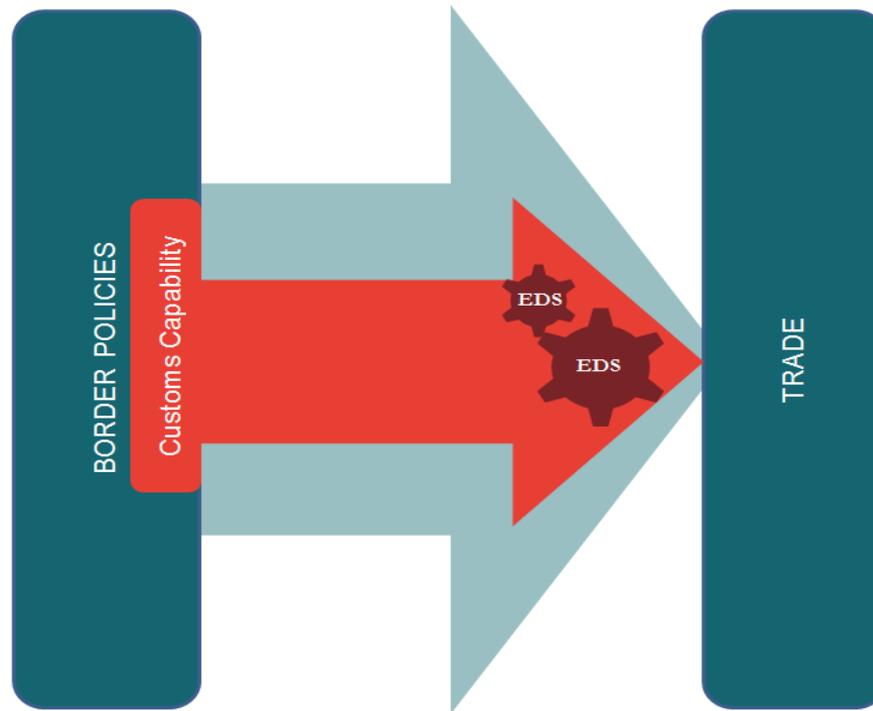
Source: GEA, EEA

Trade and international express delivery services, % year on year change



Source: WTO and GEA members' data

To what extent do border policies impact on trade? Is this just an issue for express delivery?



Source: Frontier Economics; EDS : Express Delivery Services

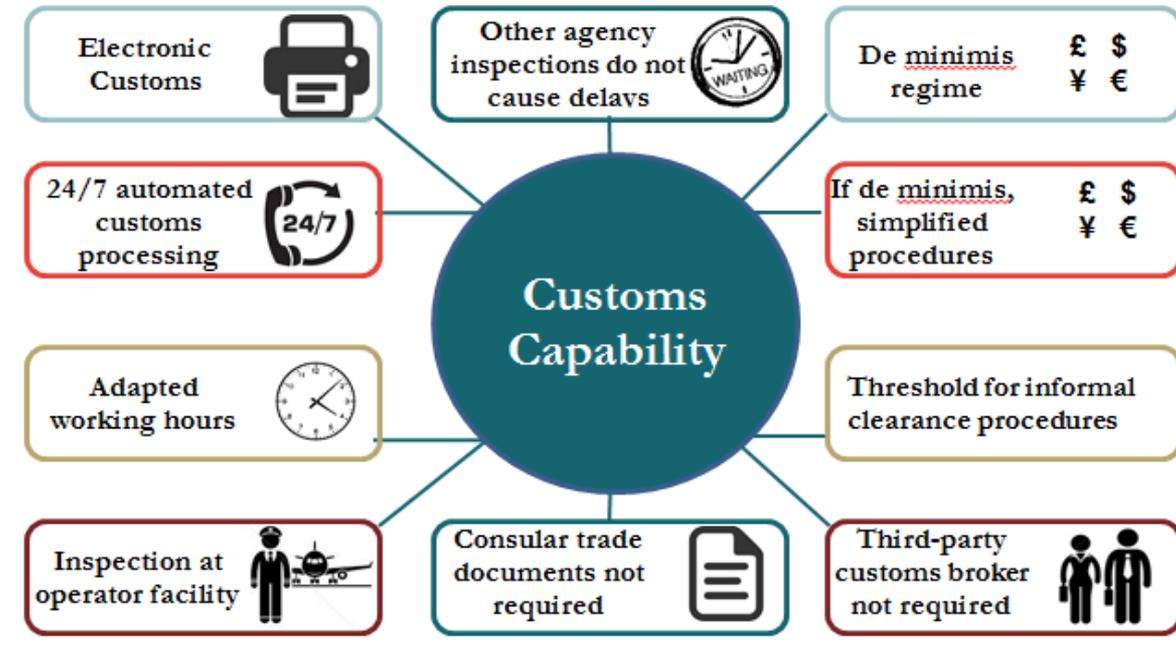
Customs capability database



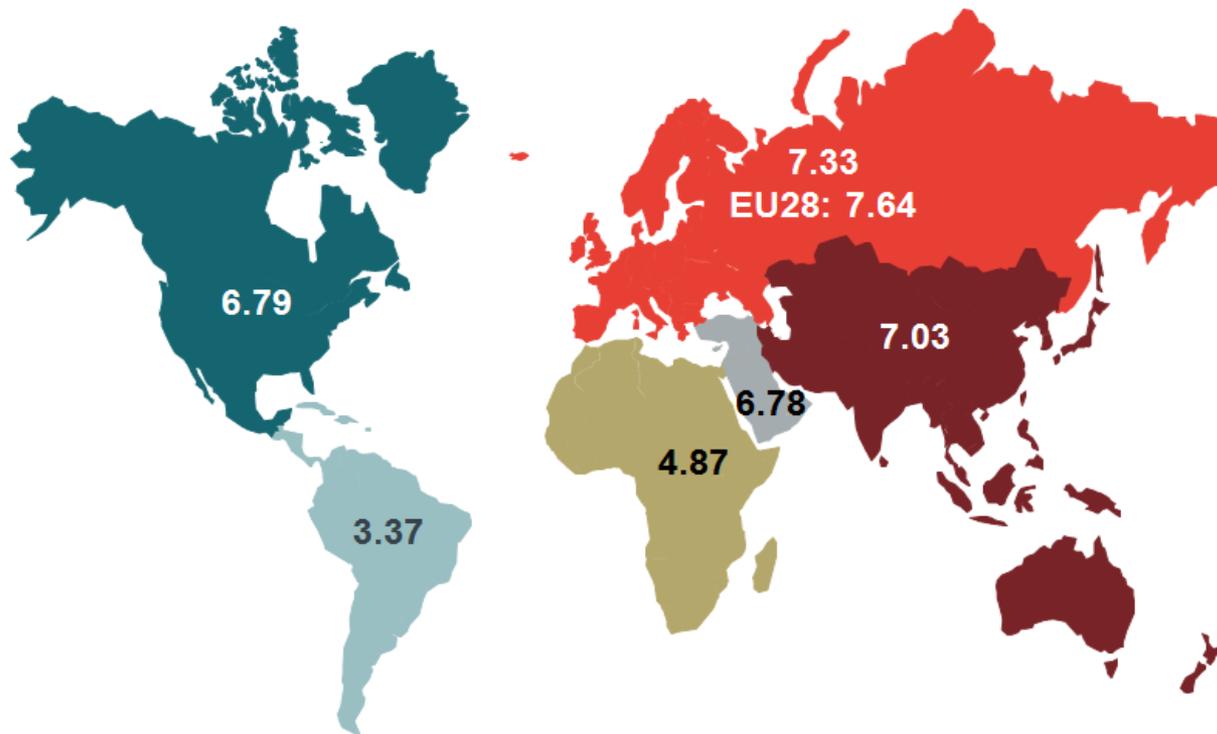
The screenshot displays the GEA Global Express Association website. At the top left is the GEA logo. To the right is a 'Login' link. Below the logo is a search bar with the text 'Search here...' and a 'Search' button. A navigation menu includes links for 'ABOUT US / OUR POSITIONS / CUSTOMS CAPABILITIES / CONTACT US / REGISTRATION / MEMBERS ONLY / LIBRARY / LINKS'. Below the menu is a sub-menu with 'DATABASE SEARCH / PRINT REPORTS'. The main content area features a large image of a red Scania truck with 'TNT' and 'sure we can' branding. Overlaid on the image is the text 'Express delivery is growing fast (7% p.a. 2003-2008)'. Below the image is the heading 'Customs Capabilities'. Under this heading are two options: 'Search database' with a magnifying glass icon and a description: 'Search for specific customs capabilities (e.g. de minimis) for any countries via an easy to use database wizard.'; and 'Print reports' with a printer icon and a description: 'View or print the customs capability report for any country.'

- Covers 139 countries
- Key Performance Indicators of border efficiency (as impact on express carriers)
- Many mirror articles in the WTO Agreement

Overview of customs capability measures for shipment requiring immediate release

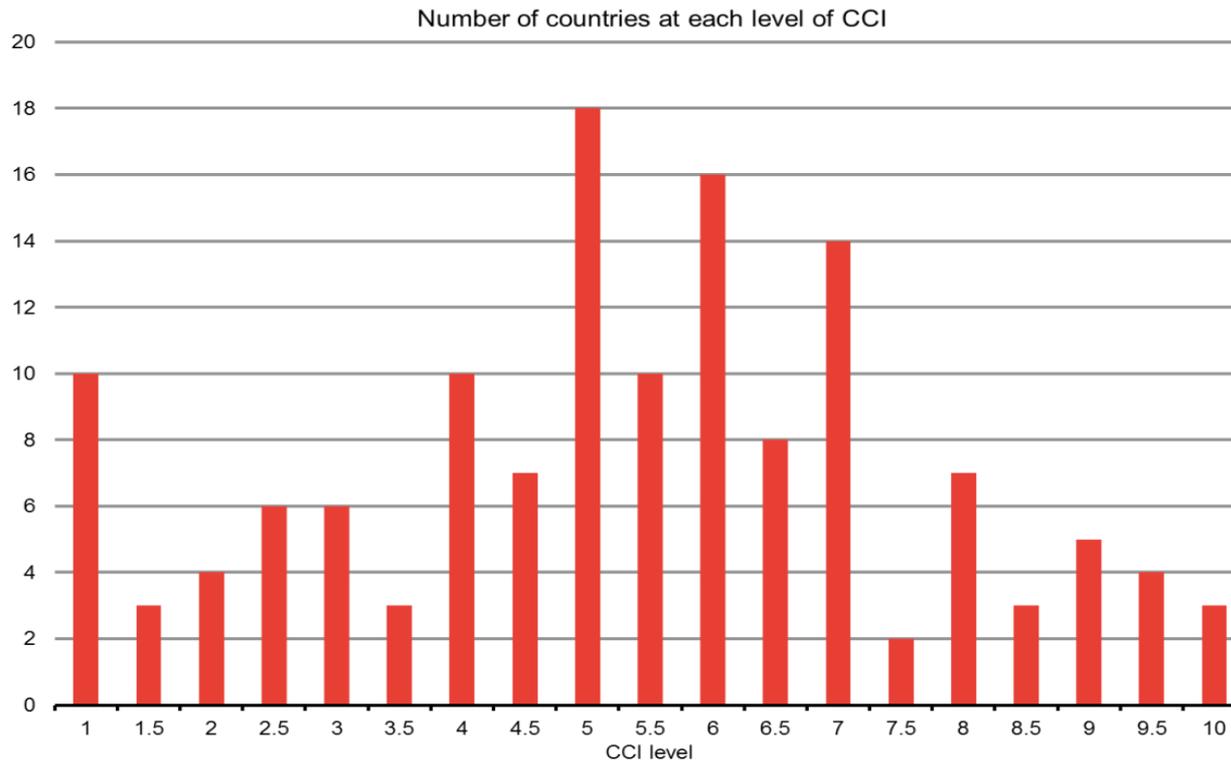


Weighted average CCI by Region (weights based on national GDP)



Source: GEA data, Frontier calculations

Distribution of countries across CCI levels



Source: GEA data, Frontier calculations

Background on trade facilitation

- Extensive research from impact of narrowly defined customs processes to broader issues including transport and communications infrastructure and regulatory institutions (such as standards and testing bodies)
- Barriers considered also include informal and tacit barriers such as measures of corruption
- Common approaches include:
 - compute trade transactions costs of barriers in dollar terms
 - measured restrictiveness of processes by indices (such as the Logistics Performance Index developed by the World Bank)
- The impact of on trade has been estimated in various ways, either econometrically, or by using computable general equilibrium modelling

Recent findings

- An OECD study suggests that even a modest reduction (1%) in trade transactions costs could increase global welfare by US\$40bn annually (Walkenhorst and Yasui, 2009)
- Another OECD study found improvements in measures of customs efficiency have a significant positive impact on imports (Wilson, 2009)
- World Economic Forum has found that reducing supply chain barriers facilitates trade and increases world GDP by several times more than removing all tariffs. CGE modelling indicates that an improvement in border administration and transport and communication infrastructure from current levels halfway to global best practice could increase global trade by 14.5%
- WTO's "Global value chains in a changing world" suggests that a 10% improvement in flow of efficiency in across-the-border operations can boost GDP of APEC economies by US\$21bn annually

Our approach

- Econometric analysis of trade flows (specifically imports) on a country-pair basis, using 2013 UN Comtrade data – a “gravity” model
- Directional data allows us to assess the impact of border process on both imports and exports. CCI of importing and exporting country used as explanatory factors
- To reduce extent to which CCI captures other institutional factors impacting on trade, also controlled for:
 - World Bank Ease of Doing Business Index
 - World Bank Logistics Performance Index (Infrastructure component)
- Extensive range of other control variables

Control variables used in econometric analysis

| Variable | Observation level | Source |
|--------------------------------|--------------------|---|
| Population size | Country level | World Bank Indicators |
| GDP per capita | Country level | World Bank Indicators |
| Distance | Country pair level | Frontier analysis – great circle route distance between GPS coordinates of the main airport in each country |
| Colonial relationship | Country pair level | CEPII (Centre d'études prospectives et d'informations internationales) database |
| Common language | Country pair level | CEPII (Centre d'études prospectives et d'informations internationales) database |
| Contiguity | Country pair level | CEPII (Centre d'études prospectives et d'informations internationales) database |
| Openness | Country level | World Bank Indicators |
| Express delivery average price | Country pair level | Derived from data from GEA members on volumes and revenue for each country pair |

Continuation of control variables used in econometric analysis

| Variable | Observation level | Source |
|--------------------------------|-------------------|---|
| Unemployment level | Country level | World Bank Indicators |
| Inflation rate | Country level | World Bank Indicators |
| Human Development Index | Country level | World Bank Indicators |
| OECD | Country level | OECD website indicating the list of countries members of the OECD |

Average impact of improving CCI score by 1 on exports, imports and trade

- Model fit good (R^2 c. 74%)
- Coefficients have expected signs and plausible magnitude
- Most significant at 95% or 99% level

| Institutions-related control variable: | World Bank Ease of Business | World Bank LPI Infrastructure | Including both institution related control variables |
|--|-----------------------------|-------------------------------|--|
| CCI Export | 4.8% | 6.0% | 5.0% |
| CCI Import | 4.5% | 4.6% | 3.7% |
| Average Impact on Trade | 4.7% | 5.3% | 4.4% |

Source: Frontier Analysis

Sensitivity tests

- The effect identified is linear, i.e. no detectable sign of decreasing returns to improving border processes, nor “big bang” from starting from a low base
- No significant regional variation in results when restricting sample to smaller sub-regions (subject to sample size)
- No obvious sign of omitted variable bias with regard to missing CCI data
- Model fit not improved if CCI components modelled independently, suggesting Index is a reasonable measure

Interaction with express delivery

- Individual elements of CCI are border processes especially important for time-sensitive (express delivery)
- But our results relate to trade in total
- Is express the sole (or main conduit) for this additional trade?
 - Additional tests show that parameters on CCI fall between 33% and 66% with the inclusion of (confidential) express volumes in the regression
 - Implies, on average 50% of the trade facilitated by “express” border processes carried by other non-express modes
 - Highlights the facilitating role of express delivery in wider trade flows

Conclusions

- Results confirm earlier findings that non-price factors can make a significant contribution to facilitating trade
- Findings sit comfortably with other evidence from WEF, OECD, WTO which have identified large positive impacts on trade from improving border processes
- The effect is not particular to countries with poor processes, nor is it subject to diminishing returns
- Results provide some support for the idea of express delivery as a facilitator in wider trade flows:

- Annex

Custom Capability Database Variables

| Reference name | Corresponding question in Custom Capability Questionnaire | Scoring |
|--|---|--|
| Electronic customs / Pre-arrival processing | Does Customs accept and process electronically the data required for release of shipments in advance of their actual arrival so that they can be released either prior to or immediately after arrival? | 1 = yes 0 = no |
| 24/7 automated customs processing | Is full-time (24/7) automated processing for the customs ports at which you operate available? | 1 = yes 0 = no |
| Adapted working hours customs personnel | Are the working hours of Customs personnel adapted to commercial needs? | 1 = yes 0 = no |
| Inspection at operator facility or transfer? | For shipments arriving by air, does Customs inspect and release goods at the operator's facility or require their transfer to another facility? | 1 = operator's facility 0 = transfer required |
| Other agency inspections cause delays | If there are inspections by agencies other than Customs, do those cause delays? | 1 = no 0 = yes |
| <i>De minimis</i> regime present? | Does the customs administration apply a <i>de minimis</i> regime that allows goods the value of which does not exceed a certain amount to be exempted from duties and taxes? | 1 = yes 0 = no |

Continuation of Custom Capability Database Variables

| Reference name | Corresponding question in Custom Capability Questionnaire | Scoring |
|---|--|-------------------|
| If <i>de minimis</i> , simplified procedures? | If yes, are those goods subject to simplified procedures e.g. consolidated release/clearance? | 1 = yes 0 = no |
| Threshold for informal customs procedure | Does the customs administration apply a <i>de minimis</i> regime that allows dutiable goods the value of which does not exceed a certain amount to be exempted from formal declaration procedures | 1 = yes 0 = no |
| Necessity to provide a consular trade document? | Does Customs or any other agency require in connection with importation of goods that the importer provide any of the following items: - a consular invoice - a consular visa for a commercial invoice - other trade document | 1 = no 0 = yes |
| Third-party customs broker? | Does Customs or any other agency require clearance of import shipments by a third-party customs broker? | 1 = no 0 = yes |

CCI effect on trade – regression results

| | reg 1 | | reg 2 | | reg 3 | |
|-----------------------|--|-----------|--|-----------|----------------------|-----------|
| | Regression with Ease of doing business Index | | Regression with LPI - infrastructure component | | Regression with both | |
| | coefficient | (S.E.) | coefficient | (S.E.) | coefficient | (S.E.) |
| orig_CCI | 0.0481*** | (0.0145) | 0.0604*** | (0.0150) | 0.0505*** | (0.0152) |
| dest_CCI | 0.0451*** | (0.0152) | 0.0463*** | (0.0147) | 0.0371** | (0.0154) |
| ln_orig_pop | 1.311*** | (0.196) | 1.395*** | (0.227) | 1.369*** | (0.225) |
| ln_orig_pop2 | 0.00152 | (0.00577) | -0.00598 | (0.00649) | -0.00481 | (0.00647) |
| ln_dest_pop | 0.931*** | (0.197) | 1.010*** | (0.249) | 0.991*** | (0.248) |
| ln_dest_pop2 | 0.00637 | (0.00578) | 0.00118 | (0.00719) | 0.00213 | (0.00719) |
| ln_orig_gdppercapita | 2.225*** | (0.227) | 3.174*** | (0.244) | 3.093*** | (0.249) |
| ln_orig_gdppercapita2 | -0.0604*** | (0.0124) | -0.125*** | (0.0137) | -0.122*** | (0.0138) |
| ln_dest_gdppercapita | 1.939*** | (0.249) | 2.566*** | (0.274) | 2.476*** | (0.276) |
| ln_dest_gdppercapita2 | -0.0569*** | (0.0136) | -0.100*** | (0.0154) | -0.0962*** | (0.0154) |
| Indist | -3.301*** | (0.434) | -2.905*** | (0.421) | -2.975*** | (0.418) |
| Indist2 | 0.142*** | (0.0279) | 0.123*** | (0.0272) | 0.127*** | (0.0271) |
| colony | 0.537*** | (0.121) | 0.384*** | (0.132) | 0.397*** | (0.131) |
| comlang_off | 0.858*** | (0.0791) | 0.912*** | (0.0832) | 0.915*** | (0.0837) |
| contig | 0.171 | (0.163) | 0.445*** | (0.161) | 0.404** | (0.162) |
| orig_unemp | 0.0244*** | (0.00390) | 0.00793** | (0.00400) | 0.0110*** | (0.00400) |
| dest_unemp | -0.00551 | (0.00464) | -0.00837* | (0.00480) | -0.00565 | (0.00488) |

| | reg 1 | | reg 2 | | reg 3 | |
|--------------------------|--|------------|--|------------|----------------------|------------|
| | Regression with Ease of doing business Index | | Regression with LPI - infrastructure component | | Regression with both | |
| | coefficient | (S.E.) | coefficient | (S.E.) | coefficient | (S.E.) |
| orig_ifl | -0.0386*** | (0.00688) | -0.0323*** | (0.00691) | -0.0287*** | (0.00694) |
| dest_infl | 0.00617 | (0.00842) | 0.00872 | (0.00854) | 0.00867 | (0.00854) |
| orig_hdi | -0.160 | (0.152) | -0.482*** | (0.151) | -0.455*** | (0.153) |
| dest_hdi | -0.126 | (0.165) | -0.160 | (0.167) | -0.153 | (0.167) |
| oecd | 0.0791 | (0.0845) | -0.00891 | (0.101) | 0.00939 | (0.100) |
| oecdrest | 0.259*** | (0.0565) | 0.255*** | (0.0560) | 0.267*** | (0.0566) |
| lnprice | 0.930** | (0.391) | 1.127*** | (0.414) | 1.098*** | (0.409) |
| lnprice2 | -0.147*** | (0.0487) | -0.173*** | (0.0521) | -0.169*** | (0.0515) |
| orig_easeofdoingbusiness | -0.00605*** | (0.000965) | | | -0.00237** | (0.00102) |
| dest_easeofdoingbusiness | -0.00370*** | (0.000917) | | | -0.00193** | (0.000952) |
| orig_openess | 0.00564*** | (0.000389) | 0.00387*** | (0.000416) | 0.00389*** | (0.000416) |
| dest_openess | 0.00340*** | (0.000528) | 0.00266*** | (0.000557) | 0.00274*** | (0.000555) |
| origInfrastructure | | | 1.004*** | (0.0924) | 0.911*** | (0.0955) |
| destInfrastructure | | | 0.640*** | (0.0870) | 0.585*** | (0.0902) |
| Constant | -35.17*** | (3.640) | -47.02*** | (3.768) | -44.79*** | (3.837) |
| Observations | 7,046 | | 6,125 | | 6,125 | |
| R-squared | 0.743 | | 0.746 | | 0.747 | |

Source: Frontier analysis of data from GEA members and publicly available sources. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Linearity tests

| | Regression with Ease of doing business Index | | Regression with LPI - infrastructure component | | Regression with both | |
|-----------------------|--|-----------|--|-----------|----------------------|-----------|
| | coefficient | (S.E.) | coefficient | (S.E.) | coefficient | (S.E.) |
| ln_orig_pop | 1.281*** | (0.202) | 1.446*** | (0.231) | 1.469*** | (0.232) |
| ln_orig_pop2 | 0.00297 | (0.00595) | -0.00653 | (0.00662) | -0.00756 | (0.00663) |
| ln_dest_pop | 0.914*** | (0.201) | 0.983*** | (0.254) | 1.000*** | (0.255) |
| ln_dest_pop2 | 0.00724 | (0.00590) | 0.00271 | (0.00736) | 0.00181 | (0.00735) |
| ln_orig_gdppercapita | 2.218*** | (0.230) | 3.069*** | (0.253) | 3.136*** | (0.248) |
| ln_orig_gdppercapita2 | -0.0601*** | (0.0126) | -0.121*** | (0.0140) | -0.124*** | (0.0139) |
| ln_dest_gdppercapita | 1.887*** | (0.251) | 2.434*** | (0.280) | 2.518*** | (0.279) |
| ln_dest_gdppercapita2 | -0.0538*** | (0.0137) | -0.0940*** | (0.0156) | -0.0977*** | (0.0156) |
| Indist | -3.366*** | (0.450) | -3.017*** | (0.435) | -2.950*** | (0.437) |
| Indist2 | 0.143*** | (0.0291) | 0.127*** | (0.0282) | 0.123*** | (0.0284) |
| colony | 0.745*** | (0.144) | 0.607*** | (0.154) | 0.590*** | (0.154) |
| comlang_off | 0.880*** | (0.0833) | 0.915*** | (0.0878) | 0.909*** | (0.0872) |
| contig | 0.0615 | 0 | 0.297* | 0 | 0.356** | 0 |
| orig_unemp | 0.0240*** | (0.00405) | 0.0101** | (0.00411) | 0.00748* | (0.00412) |
| dest_unemp | -0.00564 | (0.00479) | -0.00599 | (0.00501) | -0.00861* | (0.00494) |
| orig_ifl | -0.0413*** | (0.00709) | -0.0305*** | (0.00718) | -0.0336*** | (0.00714) |
| dest_infl | 0.00382 | (0.00877) | 0.00668 | (0.00890) | 0.00666 | (0.00890) |

| | Regression with Ease of doing business Index | | Regression with LPI - infrastructure component | | Regression with both | |
|--------------------------|--|------------|--|------------|----------------------|------------|
| | coefficient | (S.E.) | coefficient | (S.E.) | coefficient | (S.E.) |
| orig_hdi | -0.0929 | (0.156) | -0.365** | (0.158) | -0.385** | (0.156) |
| dest_hdi | -0.112 | (0.169) | -0.131 | (0.171) | -0.137 | (0.171) |
| oecd | 0.0475 | (0.0888) | -0.0465 | (0.106) | -0.0625 | (0.106) |
| oecd rest | 0.274*** | (0.0591) | 0.275*** | (0.0591) | 0.265*** | (0.0586) |
| lnprice | 0.866** | (0.391) | 1.015** | (0.410) | 1.040** | (0.414) |
| lnprice2 | -0.139*** | (0.0487) | -0.159*** | (0.0517) | -0.162*** | (0.0522) |
| orig_easeofdoingbusiness | -0.00586*** | (0.000989) | -0.00204* | (0.00104) | | |
| dest_easeofdoingbusiness | -0.00371*** | (0.000935) | -0.00191* | (0.000974) | | |
| orig_openess | 0.00594*** | (0.000408) | 0.00418*** | (0.000435) | 0.00416*** | (0.000434) |
| dest_openess | 0.00348*** | (0.000553) | 0.00281*** | (0.000580) | 0.00272*** | (0.000582) |
| origInfrastructure | | | 0.956*** | (0.0977) | 1.037*** | (0.0941) |
| destInfrastructure | | | 0.602*** | (0.0920) | 0.656*** | (0.0886) |
| orig_I | 0.0993*** | (0.0294) | 0.0962*** | (0.0307) | 0.112*** | (0.0305) |
| dest_I | 0.0883*** | (0.0307) | 0.0738** | (0.0313) | 0.0906*** | (0.0302) |
| Constant | -33.83*** | (3.755) | -44.57*** | (3.987) | -46.51*** | (3.915) |
| Observations | 6,695 | | 5,805 | | 5,805 | |
| R-squared | 0.739 | | 0.743 | | 0.748 | |

Source: Frontier analysis of data from GEA members and publicly available sources. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Regional homogeneity tests

| | All countries to all countries - same as reg 3 in fig 1 | | OECD to OECD | | OECD to non-OECD and viceverse | | non-OECD to non-OECD | |
|-----------------------|---|-----------|--------------|----------|--------------------------------|-----------|----------------------|-----------|
| | coefficient | (S.E.) | coefficient | (S.E.) | coefficient | (S.E.) | coefficient | (S.E.) |
| orig_cci | 0.0505*** | (0.0152) | 0.253 | (0.219) | 0.0103 | (0.0567) | 0.0422** | (0.0179) |
| dest_cci | 0.0371** | (0.0154) | 0.0437 | (0.0536) | 0.0288 | (0.0220) | 0.0428** | (0.0207) |
| ln_orig_pop | 1.369*** | (0.225) | -9.998 | (9.271) | 1.139*** | (0.269) | 2.086*** | (0.636) |
| ln_orig_pop2 | -0.00481 | (0.00647) | 0.306 | (0.253) | 0.000963 | (0.00747) | -0.0252 | (0.0190) |
| ln_dest_pop | 0.991*** | (0.248) | 0.573 | (0.770) | 1.148*** | (0.388) | 1.064*** | (0.342) |
| ln_dest_pop2 | 0.00213 | (0.00719) | 0.0109 | (0.0242) | -0.00358 | (0.0112) | 0.000941 | (0.00989) |
| ln_orig_gdppercapita | 3.093*** | (0.249) | -4.089 | (19.56) | 3.649*** | (0.510) | 2.354*** | (0.297) |
| ln_orig_gdppercapita2 | -0.122*** | (0.0138) | 0.149 | (0.908) | -0.156*** | (0.0282) | -0.0790*** | (0.0165) |
| ln_dest_gdppercapita | 2.476*** | (0.276) | 0.781 | (1.997) | 3.397*** | (0.391) | 1.895*** | (0.378) |
| ln_dest_gdppercapita2 | -0.0962*** | (0.0154) | 0.00215 | (0.104) | -0.147*** | (0.0221) | -0.0644*** | (0.0211) |
| lndist | -2.975*** | (0.418) | -0.545 | (1.035) | -0.348 | (0.662) | -4.638*** | (0.538) |
| lndist2 | 0.127*** | (0.0271) | -0.0265 | (0.0686) | -0.0450 | (0.0427) | 0.235*** | (0.0348) |
| colony | 0.397*** | (0.131) | 0.620 | (0.423) | 0.803*** | (0.205) | 0.0223 | (0.179) |
| comlang_off | 0.915*** | (0.0837) | 0.173 | (0.194) | 0.761*** | (0.147) | 1.159*** | (0.105) |
| contig | 0.404** | (0.162) | 0.238 | (0.296) | 0.152 | (0.217) | 0.812*** | (0.226) |
| orig_unemp | 0.0110*** | (0.00400) | -0.0490 | (0.0641) | 0.0514*** | (0.00991) | 0.00184 | (0.00487) |
| dest_unemp | -0.00565 | (0.00488) | -0.0212 | (0.0143) | -0.0131** | (0.00659) | -0.00208 | (0.00664) |

| | All countries to all countries - same as reg 3 in fig 1 | | OECD to OECD | | OECD to non-OECD and viceverse | | non-OECD to non-OECD | |
|--------------------------|---|------------|--------------|-----------|--------------------------------|------------|----------------------|------------|
| | coefficient | (S.E.) | coefficient | (S.E.) | coefficient | (S.E.) | coefficient | (S.E.) |
| orig_ifl | -0.0287*** | (0.00694) | -0.128** | (0.0580) | -0.0209* | (0.0112) | -0.0288*** | (0.00949) |
| dest_infl | 0.00867 | (0.00854) | -0.0106 | (0.0278) | 0.00785 | (0.0129) | 0.00429 | (0.0115) |
| orig_hdi | -0.455*** | (0.153) | 1.283 | (1.979) | -0.979*** | (0.217) | 0.0155 | (0.224) |
| dest_hdi | -0.153 | (0.167) | 0.132 | (0.521) | -0.0531 | (0.237) | -0.270 | (0.234) |
| oecd | 0.00939 | (0.100) | | | | | | |
| oecdrest | 0.267*** | (0.0566) | | | | | | |
| lnprice | 1.098*** | (0.409) | 2.708 | (1.715) | 1.119** | (0.485) | 1.379** | (0.623) |
| lnprice2 | -0.169*** | (0.0515) | -0.364 | (0.224) | -0.146** | (0.0595) | -0.211*** | (0.0786) |
| orig_easeofdoingbusiness | -0.00237** | (0.00102) | 0.00816 | (0.0321) | 0.00119 | (0.00187) | -0.00464*** | (0.00130) |
| dest_easeofdoingbusiness | -0.00193** | (0.000952) | -0.00553* | (0.00299) | -0.000936 | (0.00128) | -0.00195 | (0.00131) |
| orig_openess | 0.00389*** | (0.000416) | -0.0227 | (0.0285) | 0.00557*** | (0.000714) | 0.00275*** | (0.000592) |
| dest_openess | 0.00274*** | (0.000555) | -0.00266 | (0.00172) | 0.00235*** | (0.000850) | 0.00338*** | (0.000752) |
| originfrastructure | 0.911*** | (0.0955) | -0.159 | (0.573) | 1.096*** | (0.172) | 0.990*** | (0.120) |
| destinfrastructure | 0.585*** | (0.0902) | -0.214 | (0.338) | 0.607*** | (0.134) | 0.627*** | (0.121) |
| Constant | -44.79*** | (3.837) | 109.9 | (181.1) | -60.46*** | (5.834) | -40.64*** | (6.791) |
| Observations | 6,125 | | 184 | | 2,159 | | 3,782 | |
| R-squared | 0.747 | | 0.907 | | 0.798 | | 0.709 | |

Source: Frontier analysis of data from GEA members and publicly available sources. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1



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