# IS THERE ANY PREFERED COMPETITIVENESS INDICATOR IN EXPLAINING FOREING TRADE IN EURO AREA COUNTRIES?

COMPNET
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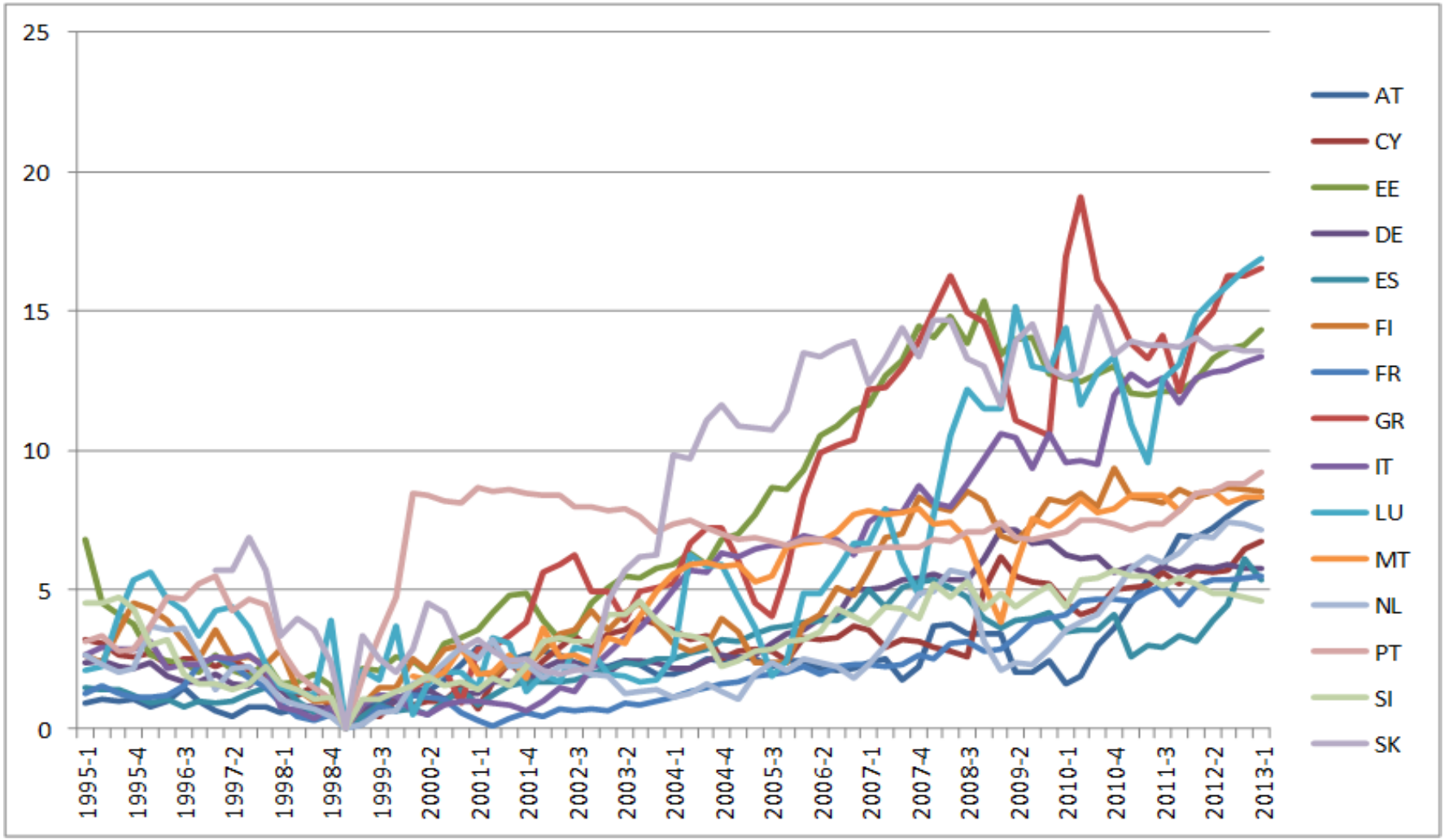
# Outline

- Motivation
- Data
- Estimation
- Results:
  - Export of goods
  - Imports of goods
  - Exports of services
  - Imports of services
- Conclusions
- Way forward

# Motivation (1): Increasing dispersion of HCIs across all euro area countries




*Source: ECB; standard deviation of indices in levels.*

# Motivation (II)

- Export performance important to mitigate short-run negative effects of fiscal consolidation.
- But external rebalancing also via import performance
- Do improvements in price competitiveness help both export performance and external rebalancing?
- If yes, is any of the existing HCIs better in explaining trade developments?

# Literature (1)

- M. Ca' Zorzi and B. Schnatz, ECB Working Paper No 833:
- analysis of exports performance for the EA based on different HCIs
- No HCI was found to outperform the others in forecasting EA exports.
- We extend the analysis for each of the 16 EA member states for both exports and imports of goods and services
- Include data for the crisis period up to 2013Q1

# Literature (II)

- With the internationalisation of parts of production processes, exports have become important for imports and vice versa

  - Esteves and Rua (2012) highlight the role of low domestic demand, in motivating firms to find new customers in foreign markets.

  - Allard (2009) and Allard et al. (2005) include export growth in import equations to highlight that part of the manufacturing production of goods is conducted in low cost countries before being reshipped domestically, requiring imported inputs to feed the export production.

- We consider the importance of import content of exports in import equations

# Data and variables

- Quarterly data from 1995:Q1 – 2013:Q1; 73 observations
- Countries EA 16, Belgium excluded
- Variables:
- ***Export and import volumes***, goods and services (ESA1995), Total trade (both intra- and extra- euro area)
- ***Foreign Demand***: geometric weighted average of imports to the euro area member state from 20 main trading partners taken from projections data base
- ***Domestic demand***
- ***Harmonised Competitiveness Indicators (HCIs)*** : Real Effective exchange rates of each EA member state based on relative measures of CPI, domestic sales PPI, ULCM, ULCT and GDP deflators against 20 main trading partners
- For services HCIs based on CPI, CPI services (CPIS), ULCT and GDP deflators are reported based on Schmitz (2012).

# Estimation (I)

- Export Equations:

$$\Delta \log X_t = \alpha_0 + \beta_i \sum_{i=1}^{p} \Delta \log X_{t-i} + \gamma_i \sum_{i=0}^{q} \Delta \log FD_{t-i} + \delta_i \sum_{i=0}^{r} \Delta \log HCI_{t-i} + \varepsilon_t$$

$\Delta \log X_t$ : growth rate of real exports in goods/services
$\Delta \log FD_t$ : growth rate of foreign demand
$\Delta \log HCI_t$ : growth rate of harmonized competitiveness indicator

- Import Equations:

$$\Delta \log M_t = \alpha_0 + \beta_i \sum_{i=1}^{p} \Delta \log M_{t-i} + \gamma_i \sum_{i=0}^{q} \Delta \log DD_{t-i} + \delta_i \sum_{i=0}^{r} \Delta \log HCI_{t-i} + \zeta_i \sum_{i=0}^{s} \Delta \log X_{t-i} + u_t$$

$\Delta \log M_t$ : growth rate of real imports for goods/services
$\Delta \log DD_t$ : growth rate of domestic demand
$\Delta \log X_t$ : growth rate of real exports (import content of exports)

# Estimation (II)

- Start with a model of 4 lags
- Impose a priori the inclusion of the contemporaneous value and first lag of each variable

- Does the initial model pass the diagnostic tests?

  - Yes: lags are then excluded based on their significance

  - No: (a) change the number of lags and/or

    identify outliers that create heteroskedasticity and normality problems and include dummy variables

    (b) elimination of insignificant lags

- The resulting models could contain different numbers of lags for each euro area member state and each HCI model.
- Conduct several robustness checks

# Exports of goods: Long-run elasticity of exports with respect to HCIs


- Low (but sign.) sensitivity: NL, IT, DE, SK; High sensitivity: EE, FI, MT
- An average value of the elasticity is close to **-0.8**
- In most cases, the magnitude of the estimated coefficients in the case of broad economy **price/cost-based HCIs is higher** compared to PPI/ULCM-deflated HCIs.
- We should go beyond labour cost developments in the tradable sectors and take into account **cost developments in non-tradable sectors**.
- **Non-price competitiveness factors**, may have an important contribution in explaining exports developments of goods in several euro area countries

# Exports of services: Long-run elasticity of exports with respect to HCIs


- An average value of the elasticity is close to **-0.7**
- Exports are **sensitive to developments in HCIs mainly in the big euro area countries**: FR, DE, IT, NL, ES as well as in SK.
- The **HCIs deflated by CPIS are on average less important** in explaining exports of services
- Exports of services **are more sensitive** to price developments as compared to exports of goods in **DE, IT and the NL**, while the opposite is true for France and Spain
- **Non-price competitiveness factors** may also play an important role in explaining developments of services exports in these countries

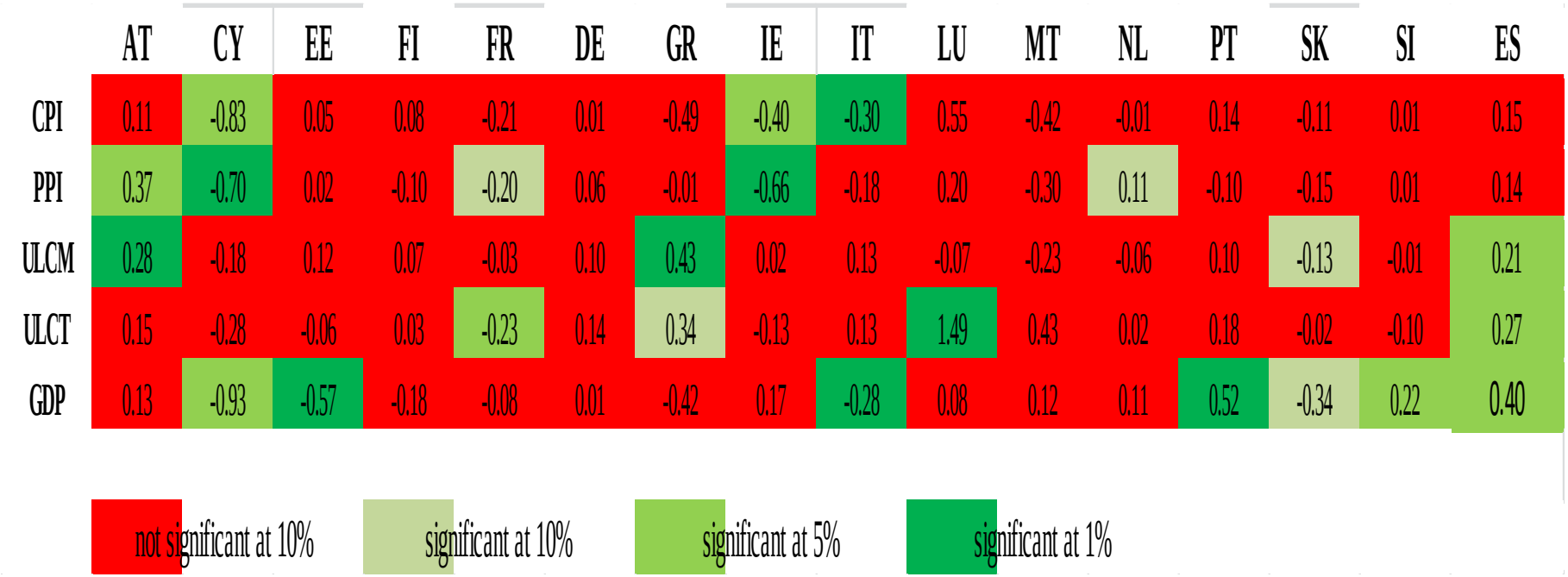
# Robustness check Exports (I): The role of HCI weights

- We employ **alternative HCIs**, as calculated based on the proportion of a trading partner in a country's exports only.
- On average our previous conclusions hold,
- However point estimates of relative price elasticities according to the alternative CPI-, PPI-, ULCT- and GDP-deflator-based HCIs are somewhat smaller as compared to their standard counterparts.

# Robustness check Exports (II): The role of domestic demand

- We include DD as an additional variable explaining exports and also examine the asymmetric effect of domestic demand on exports
- Statistically significant negative impact of falling DD on exports (consistent with substitutability): PT, GR, IT
- Statistically significant positive impact of falling DD on exports (complementarity): NL
- A growth in DD is found to be positive for exports (complementarity) in IT and SK.
- **HCI coefficients are not affected and remain robust to inclusion of domestic demand**

# Imports of goods: Long-run elasticity of imports with respect to HCIs




- **Imports appear to have become largely insensitive to changes in relative prices.**
- **FI, DE, MT, NL**: relative prices have an **insignificant** impact on the demand for imports across all specification.
- **AT, GR, LU, NL, PT, SI, ES**: an increase in the HCI (real appreciation) is found to **favour** imports.
- **CY, EE, FR, IE, IT and SK**: **negative and significant** estimated elasticities in cases when these are significant. [puzzle]

# Imports of services: Long-run elasticity of imports with respect to HCIs

| | AT | CY | EE | FI | FR | DE | GR | IE | IT | LU | MT | NL | PT | SK | SI | ES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CPI | 0.24 | -0.27 | 1.24 | 0.11 | -0.24 | -0.23 | 0.17 | -0.42 | 0.49 | 0.00 | 0.69 | -0.42 | -0.18 | -0.37 | 0.56 | -0.48 |
| CPIS | 0.48 | -0.16 | -0.10 | -0.96 | -0.23 | -0.18 | -0.26 | -0.33 | -1.39 | 0.48 | 0.84 | -0.34 | -0.93 | -0.13 | 0.25 | -0.41 |
| ULCT | 0.10 | 0.43 | -0.16 | 0.24 | -0.49 | -0.25 | -0.43 | -0.54 | 0.44 | 0.19 | 0.28 | -0.70 | -0.43 | 0.04 | 0.02 | -0.36 |
| GDP | 1.06 | -0.59 | 0.66 | -0.26 | -0.23 | -0.28 | -0.29 | 0.15 | 0.45 | 0.17 | 0.05 | -0.20 | -0.07 | -0.01 | 0.27 | -0.44 |

not significant at 10% | significant at 10% | significant at 5% | significant at 1%

- **Imports largely insensitive to changes in relative prices.**
- **AT, EE, IT, MT, SI**: an increase in the HCI **favourable for** imports in some cases.
- **The HCIs based on total economy price indices seem to have a significant impact compared to relative prices based on services only.**

# Robustness checks Imports (I): The role of HCI weights

- We employ **alternative HCIs**, as calculated based on the proportion of a trading partner in a country's imports only.
- Our previous conclusions hold in general, with some cases gaining more significance

# Summary-Policy implications

- **Exports of goods:**
- The HCIs based on broad cost and price measures are more appropriate
- Non-price competitiveness factors matter
- **Imports of goods:**
- Largely insensitive to HCIs
- **Exports of services:**
- Sensitive to developments in HCIs in big-5+ SK
- The HCIs deflated by CPIS are on average less important in explaining exports of services
- **Imports of services:**
- Largely insensitive to HCIs with the exception of Austria, Estonia, Italy, Malta, Slovenia

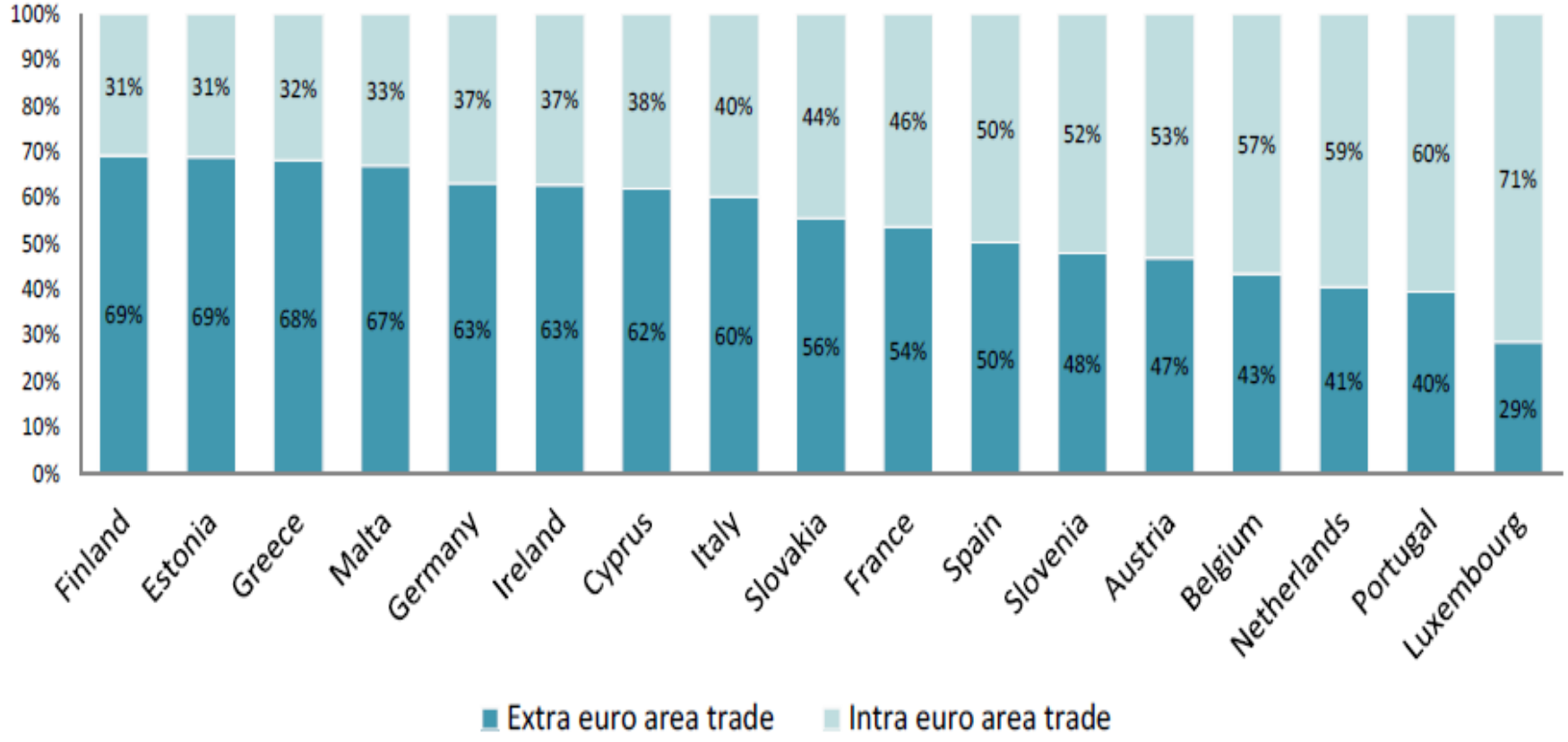
- Role of relative prices might be overstated
- Room for non price competitiveness factors
- Price/cost pressures in non-tradable sector should be monitored together with those in the non-tradable sector

# Way forward

- Domestic demand adjusted for imports content of components (see Bussiere et al. (IMF, 2012)), currently implemented
- Value added trade and value added HCIs (see Bayoumi et al, 2012)?
- Quality adjusted HCIs (see Benkovskis and Wörz, 2012a and 2012b)?

# Intra vs extra trade (new working paper)

Chart 1. Intra vs. extra euro area trade (Jan. – Aug. 2013)




*Source: Eurostat, trade here refers to exports*

# Reserve Slides

# Motivation (1b): Increasing dispersion of HCIs across all euro area countries

- Across the majority of euro area countries HCIs depreciated in the second half of the 1990s followed by appreciation in the first decade of the new millennium and depreciation thereafter (exceptions: EE, SK, PT, IT)
- Different HCIs move similarly (except for the ULCM-based HCIs in some cases: IE, GR, PT)
- **BUT: Dispersion of different HCIs has increased over time**

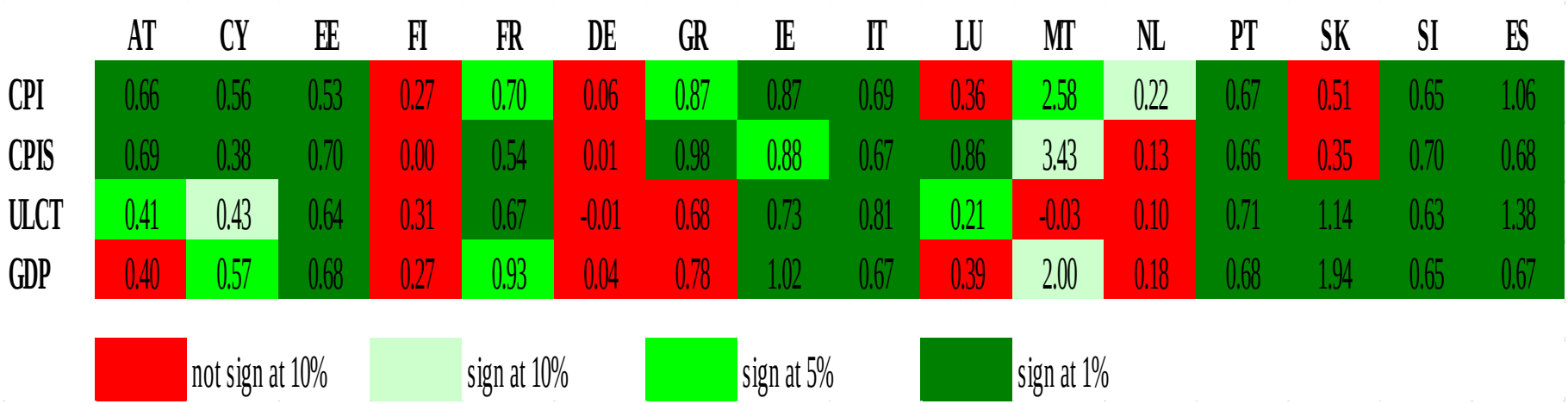
# Exports of goods: Long-run elasticity of exports with respect to foreign demand

| | AT | CY | EE | FI | FR | DE | GR | IE | IT | LU | MT | NL | PT | SK | SI | ES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CPI | 0.94 | 1.09 | 1.47 | 0.96 | 0.85 | 1.10 | 0.75 | 0.51 | 1.20 | 1.79 | 1.01 | 0.88 | 0.88 | 1.08 | 1.03 | 0.61 |
| PPI | 0.87 | 0.87 | 0.98 | 1.27 | 0.84 | 1.07 | 0.43 | 0.74 | 1.25 | 1.30 | -0.01 | 0.93 | 0.92 | 1.11 | 0.96 | 1.05 |
| ULCM | 1.01 | 0.92 | 1.25 | 1.55 | 0.91 | 1.00 | 1.45 | 1.66 | 1.19 | 1.34 | 0.70 | 0.89 | 1.06 | 1.07 | 1.01 | 0.98 |
| ULCT | 0.90 | 1.08 | 1.36 | 1.44 | 0.88 | 1.03 | 1.16 | 0.69 | 1.21 | 1.37 | 0.91 | 0.76 | 0.98 | 1.09 | 1.01 | 0.95 |
| GDP | 0.94 | 1.10 | 1.53 | 1.62 | 0.83 | 1.08 | 0.78 | 0.83 | 1.17 | 1.44 | 0.88 | 0.76 | 1.03 | 1.04 | 1.12 | 0.54 |

not sign at 10% | sign at 10% | sign at 5% | sign at 1%

- Between 0.4 (for Greece) and 1.8 (for Luxembourg) with an average value of **1.1** across all models
- A **strong** (and mostly significant at 1%) **relation** between foreign demand and exports, with the exception of Cyprus, Malta and Ireland.

# Exports of services: Long-run elasticity of exports with respect to foreign demand




- Between 0.2 (for Luxembourg) and 3.4 (for Malta) with an average value of **0.9** across all models
- Compared with exports of goods the foreign demand elasticity of exports of services appears to be **statistically insignificant for a larger number** of euro area countries.

# Imports of goods: Long-run elasticity of imports with respect to domestic demand

| | AT | CY | EE | FI | FR | DE | GR | IE | IT | LU | MT | NL | PT | SK | SI | ES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CPI | 0.92 | 1.81 | 0.54 | 1.26 | 2.35 | 1.51 | 1.66 | 1.02 | 1.72 | 1.14 | 1.14 | 0.54 | 1.26 | 0.43 | 0.67 | 1.27 |
| CPI-40 | 0.95 | 1.68 | 0.60 | 0.79 | 2.34 | 1.51 | 1.65 | 1.02 | 1.55 | 1.14 | 0.97 | 0.61 | 1.26 | 0.50 | 0.67 | 1.27 |
| PPI | 1.02 | 1.76 | 0.59 | 0.83 | 1.90 | 1.56 | 1.48 | 1.16 | 1.67 | 0.99 | 0.96 | 0.66 | 1.23 | 0.62 | 0.77 | 1.28 |
| ULCM | 1.49 | 1.60 | 0.66 | 1.02 | 1.83 | 1.54 | 1.47 | 0.72 | 1.57 | 0.96 | 1.21 | 0.58 | 1.39 | 0.57 | 0.67 | 1.08 |
| ULCT | 0.99 | 1.49 | 0.75 | 1.02 | 1.94 | 1.57 | 1.51 | 0.92 | 1.61 | 1.16 | 0.83 | 0.51 | 1.25 | 0.65 | 0.80 | 1.12 |
| GDP | 0.86 | 1.79 | 0.88 | 0.71 | 1.68 | 1.51 | 1.68 | 0.74 | 1.67 | 1.06 | 1.53 | 0.69 | 1.35 | 0.54 | 0.61 | 1.23 |

not significant at 10% | significant at 10% | significant at 5% | significant at 1%

- Between 0.5 (Slovakia) and 2.4 (France), with an average of **1.2** across models where this elasticity is found to be statistically significant

# Imports of goods: Long-run elasticity of imports with respect to exports

| | AT | CY | EE | FI | FR | DE | GR | IE | IT | LU | MT | NL | PT | SK | SI | ES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CPI | 0.67 | 0.53 | 0.64 | 0.38 | 0.37 | 0.58 | 0.35 | 0.56 | 0.37 | 0.84 | 0.99 | 0.76 | 0.44 | 0.81 | 0.76 | 0.64 |
| CPI-40 | 0.67 | 0.43 | 0.71 | 0.59 | 0.39 | 0.59 | 0.41 | 0.56 | 0.39 | 0.85 | 1.12 | 0.94 | 0.45 | 0.81 | 0.76 | 0.64 |
| PPI | 0.61 | 0.45 | 0.63 | 0.64 | 0.52 | 0.59 | 0.34 | 0.35 | 0.38 | 0.68 | 1.09 | 0.85 | 0.48 | 0.73 | 0.71 | 0.63 |
| ULCM | 0.59 | 0.64 | 0.83 | 0.55 | 0.50 | 0.63 | 0.28 | 0.81 | 0.28 | 0.67 | 1.26 | 0.87 | 0.39 | 0.70 | 0.75 | 0.73 |
| ULCT | 0.67 | 0.78 | 0.78 | 0.53 | 0.46 | 0.61 | 0.37 | 0.60 | 0.21 | 0.99 | 1.26 | 0.94 | 0.49 | 0.80 | 0.62 | 0.85 |
| GDP | 0.68 | 0.55 | 0.74 | 0.64 | 0.60 | 0.58 | 0.38 | 0.74 | 0.35 | 0.47 | 0.95 | 0.94 | 0.41 | 0.76 | 0.80 | 0.84 |

not significant at 10% | significant at 10% | significant at 5% | significant at 1%

- The import content of exports, proxied by real export growth in the import equations, has a **broad based positive impact** on the growth of real imports**.** **Germany**: unique factor affecting import growth
- **Slovakia**: the import content of exports seems to be even more important than domestic demand.

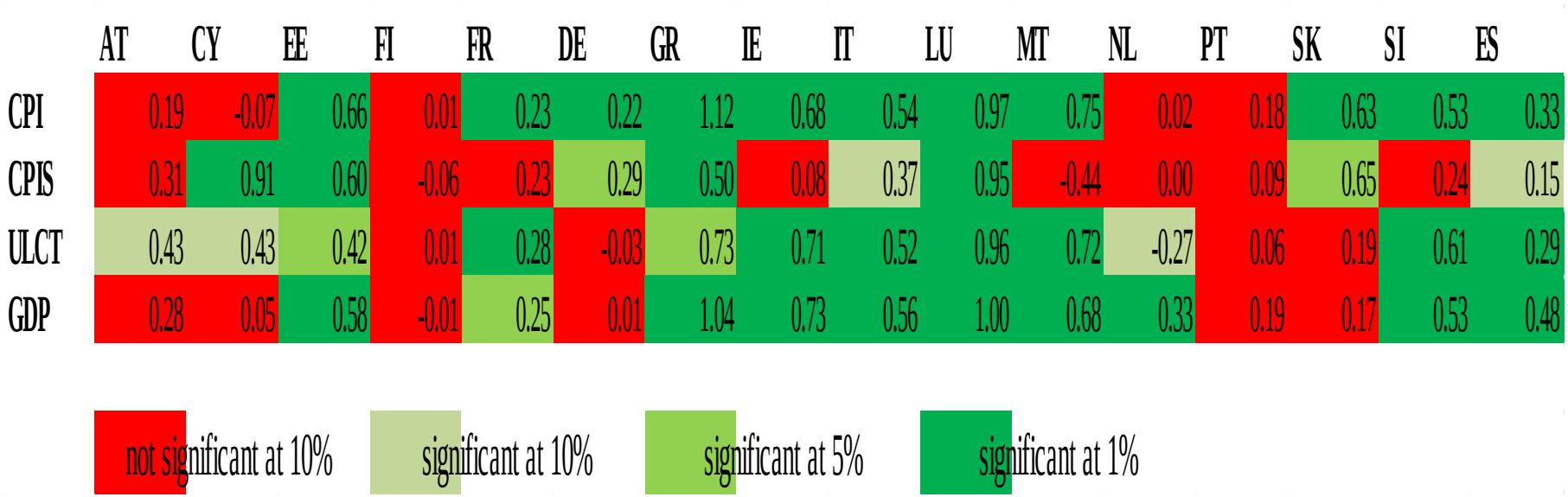
# Imports of services: Long-run elasticity of imports with respect to domestic demand

| | AT | CY | EE | FI | FR | DE | GR | IE | IT | LU | MT | NL | PT | SK | SI | ES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CPI | 1.46 | 0.54 | 0.49 | 1.37 | 0.23 | 0.98 | 0.30 | 0.26 | 0.96 | 0.10 | -0.09 | 0.70 | 1.12 | 1.48 | 0.39 | 1.76 |
| CPIS | 1.10 | 0.42 | 0.60 | 1.47 | 0.72 | 0.77 | 0.57 | 0.57 | 2.23 | 0.08 | -0.01 | 0.45 | 1.92 | 1.37 | 0.92 | 1.59 |
| ULCT | 0.69 | 0.76 | 0.64 | 1.36 | 0.02 | 1.64 | 0.06 | 0.40 | 1.26 | 0.06 | -0.09 | 1.13 | 1.56 | 1.47 | 0.52 | 1.69 |
| GDP | 0.79 | 0.84 | 0.47 | 0.90 | 0.08 | 1.79 | -0.07 | 0.17 | 0.94 | 0.07 | -0.06 | 0.43 | 0.97 | 1.55 | 0.54 | 1.76 |

not significant at 10% | significant at 10% | significant at 5% | significant at 1%

- Between 0.4 (Ireland) and 2.2 (Italy), with an average of **1.1** across models where this elasticity is found to be statistically significant.
- Domestic demand elasticity seems to be **lower in magnitude and less significant for imports of services** than for goods (with the exceptions of Finland, the Netherlands, Portugal, Slovakia and Spain)

# Imports of services: Long-run elasticity of imports with respect to exports



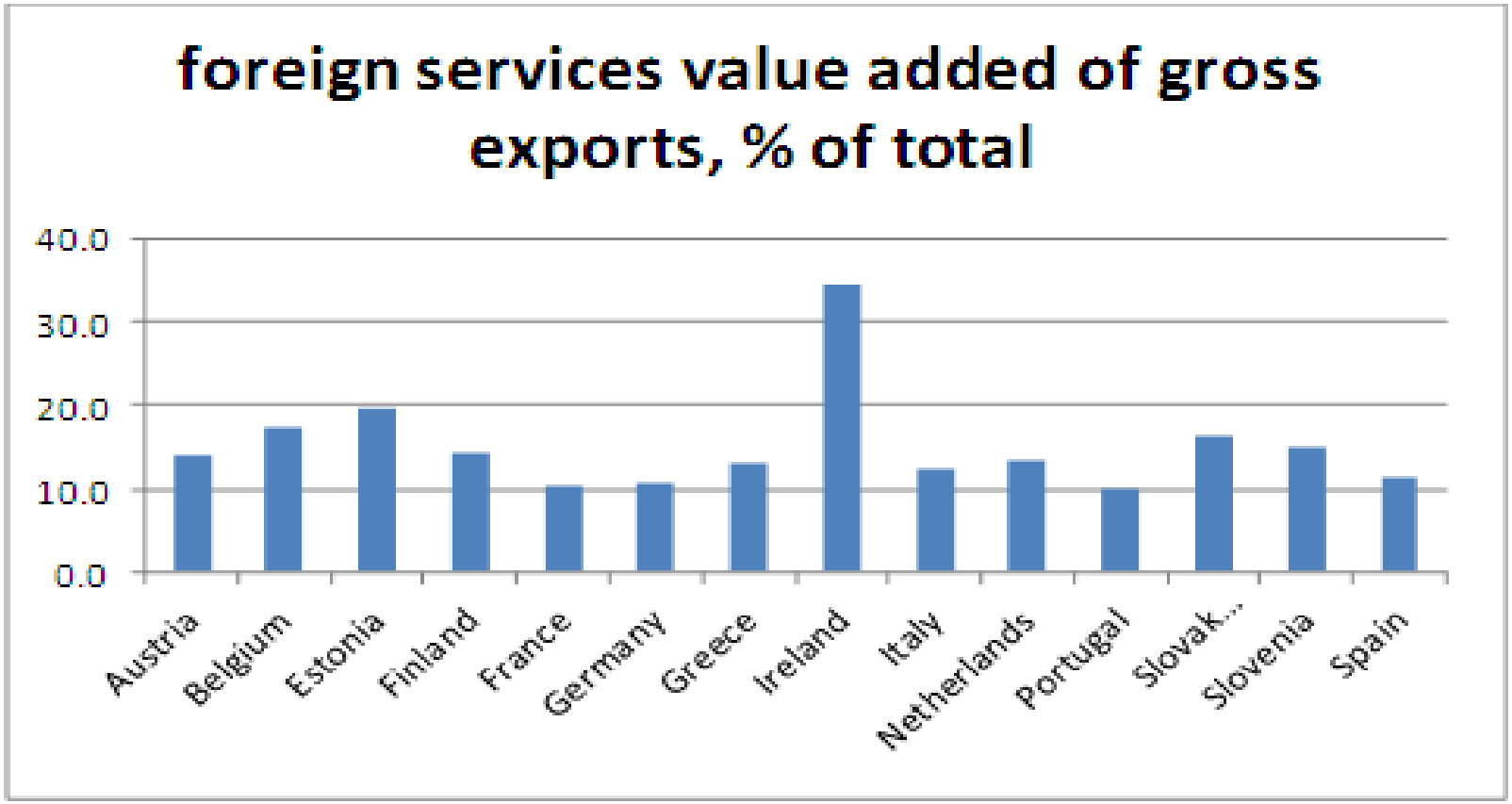

- **The import content of exports**, proxied by real export growth in goods and services, has a **broad based positive impact** on the growth of real imports
- For most cases, domestic demand is more important than the import content.
- For the countries that domestic demand was insignificant the import content of exports is important.
- The **import content of exports** seems to be **less important for imports of services** compared to goods.

# Example of contribution of services in GVC

- Activities and components that go into the production of the typical American car are the following (services in bold):
- **R&D for advanced technology (Japan – 17.5%)**
- **Design (3% (estimate))**
- Assembly (Korea – 30%)
- Assembly (US – 37%)
- Supply of minor parts (Taiwan – 4%)
- **Advertising and marketing (UK – 2.5%)**
- **Data processing (Ireland and Barbados – 2%)**
- **Transport and insurance (4% (estimate))**

**Source:** World Trade Organization, Annual Report 1998 (page 36), at: http://www.wto.org/ english/res_e/booksp_e/anrep_e/anre98_e.pdf

# Foreign services value added




Source: WTO-OECD database

# Importance of goods vs services in EA member states trade (taken from Schmitz 2012)

**Table 4: Overview of different trade weights for euro area HCIs, 2007-09**

| | Services share | Manuf. share | Services | | Manufacturing | | Combined | |
|---|---|---|---|---|---|---|---|---|
| | | | Intra - EA | Extra - EA | Intra - EA | Extra - EA | Intra - EA | Extra - EA |
| Austria | 34.3% | 65.7% | 63.3% | 36.7% | 64.0% | 36.0% | 63.8% | 36.2% |
| Belgium | 25.8% | 74.2% | 58.5% | 41.5% | 59.9% | 40.1% | 59.6% | 40.4% |
| Cyprus | 72.3% | 27.7% | 46.3% | 53.7% | 65.0% | 35.0% | 51.5% | 48.5% |
| Estonia | 38.2% | 61.8% | 51.2% | 48.8% | 49.4% | 50.6% | 50.1% | 49.9% |
| Finland | 38.8% | 61.2% | 41.1% | 58.9% | 47.1% | 52.9% | 44.8% | 55.3% |
| France | 30.6% | 69.4% | 47.8% | 52.2% | 59.6% | 40.4% | 56.0% | 44.0% |
| Germany | 27.0% | 73.0% | 43.3% | 56.7% | 47.1% | 52.9% | 46.1% | 53.9% |
| Greece | 57.5% | 42.5% | 37.3% | 62.7% | 61.4% | 38.6% | 47.5% | 52.5% |
| Ireland | 64.0% | 36.0% | 40.8% | 59.2% | 37.9% | 62.1% | 39.7% | 60.3% |
| Italy | 29.8% | 70.2% | 53.2% | 46.8% | 56.1% | 43.9% | 55.2% | 44.8% |
| Luxembourg | 77.0% | 23.0% | 59.0% | 41.0% | 62.6% | 37.4% | 59.9% | 40.1% |
| Malta | 60.1% | 39.9% | 44.5% | 55.5% | 53.0% | 47.0% | 47.9% | 52.1% |
| Netherlands | 31.1% | 68.9% | 46.4% | 53.6% | 51.0% | 48.9% | 49.6% | 50.4% |
| Portugal | 36.2% | 63.8% | 61.6% | 38.4% | 76.1% | 23.9% | 70.9% | 29.1% |
| Slovakia | 17.0% | 83.0% | 45.8% | 54.2% | 53.4% | 46.6% | 52.1% | 47.9% |
| Slovenia | 23.2% | 76.8% | 66.4% | 33.6% | 67.2% | 32.8% | 67.0% | 33.0% |
| Spain | 41.8% | 58.2% | 51.5% | 48.5% | 65.4% | 34.6% | 59.6% | 40.4% |
| Average | 41.5% | 58.5% | 50.5% | 49.5% | 57.4% | 42.6% | 54.2% | 45.8% |

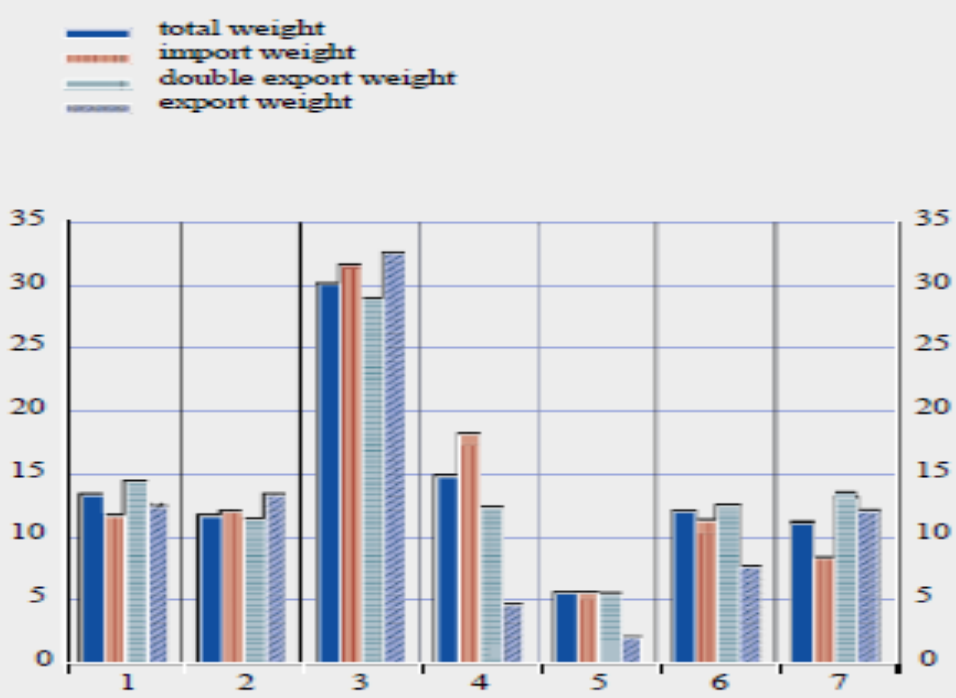
Source: ECB and own calculations.

# HCI weights based on manufacturing trade

Schmitz et al. (2012) “In the case of major advanced and other European economies, the simple export weight generally exceeds the import weight on account of the bilateral trade surpluses of the euro area with these countries. The opposite holds true for emerging Asian economies with which the euro area has an aggregate bilateral trade deficit, reflecting the strong export orientation of these economies.”

**Chart 2 Comparison of trade weights for individual countries and country groups in the EER-40 basket**

(percentages)

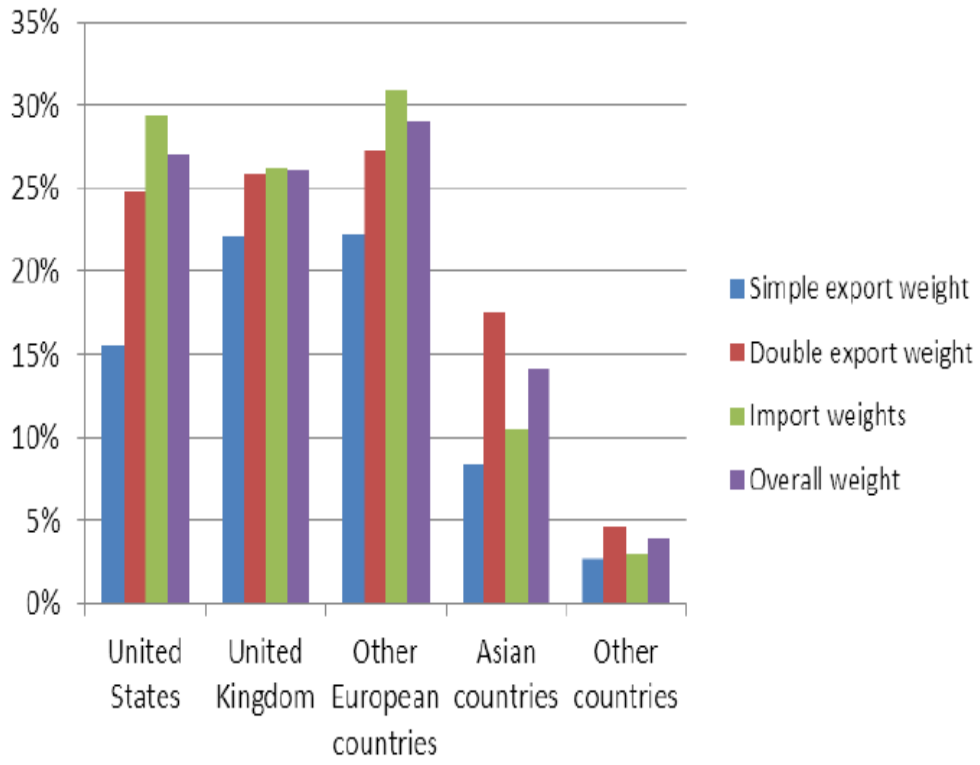



Source: ECB.

# HCI weights based on services trade

Schmitz (2012):"For the United States, the United Kingdom and the other European economies, import weights exceed the simple and double export weights. In the case of the United States, the euro area has a trade deficit in terms of services"

**Chart 7: Comparison of services trade weights for individual countries and country groups in the EER-20 basket, 2007-09**




Source: ECB and own calculations.