A tale of two bazaar economies:
An Input-Output analysis for Germany and Italy

by E. Breda and R. Cappariello

Domestic value added content of exports:
a cross-country comparison for the major European economies

by R. Cappariello

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Motivation: why measure import and value added of exports?

- Given the development of the global production chains, are the conventional trade statistics still good indicators of a country's gains from exports? Probably not.

- These two papers focus on (i) the **import content** and (ii) the **domestic value-added** content of exports and its main component, **compensation of employees.**

(i) International outsourcing is measured by a set of different indicators for Italy and Germany;

(ii) the aptitude of manufacturing exports to generate domestic value added and labour income is calculated for France, Italy and Germany.
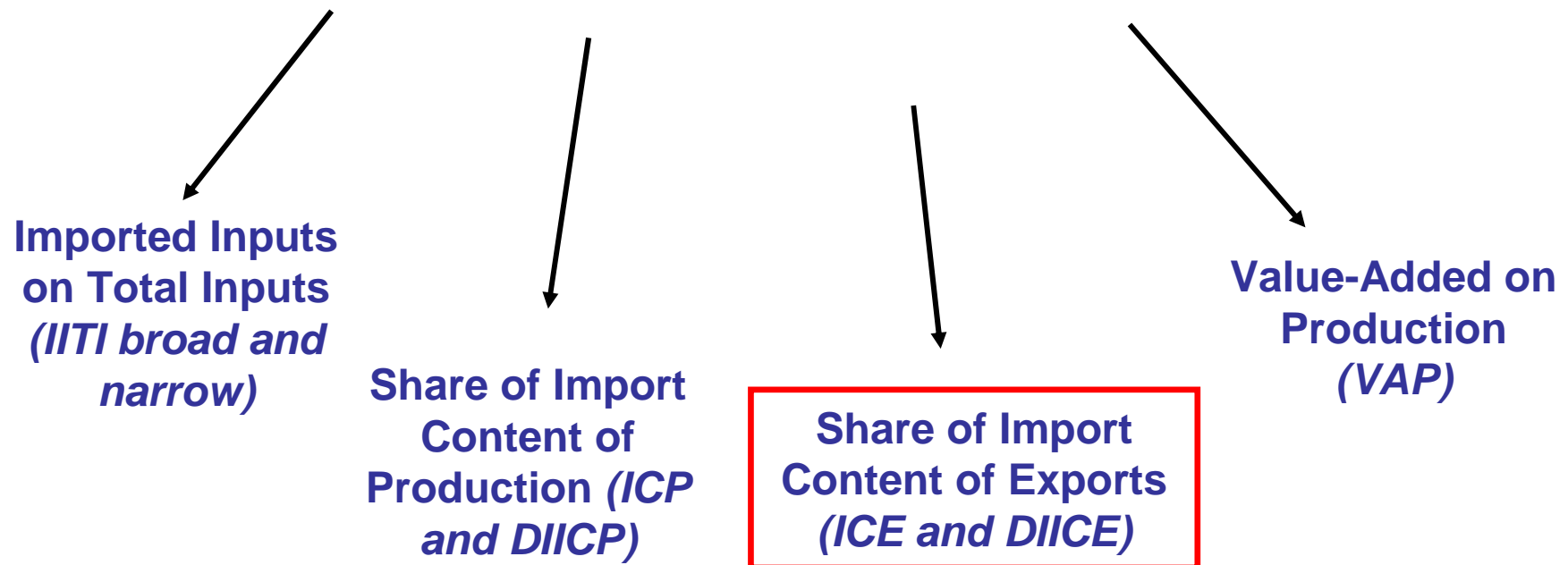
- **The two papers utilise** two strictly correlated concepts:

- **Direct and indirect import content of exports** measures the value of foreign inputs utilised directly and indirectly (as imported inputs embodied in domestic inputs) in manufacturing sector to produce exported goods *(Hummels and al., 2001; Chen and al., 2005)*.

- **Domestic value added of exports** estimates the value added created by manufacturing in the economy by taking into account the domestic inputs directly and indirectly embodied in exported goods.

- **They utilise the same methodology and data:**

- **Input-output tables** (Eurostat and Istat) providing the distinction between domestically produced inputs and imported inputs for 2000 and 2007,

- 46 NACE-sectors export data

- In the "bazaar economies" paper the definition of imported inputs includes the total purchase of *non-energy* products and market services, in the "domestic value added" paper, energy products have been excluded from inputs in a robustness check which confirms results.

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• **Concepts: indentify some metrics of international outsourcing, defined as "the import content" of manufacturing exports**

• **Measurament: apply an opportune methodology to estimate the level and the change of import content for Germany and Italy.**

• **Results: provide a description of the pattern of internationalisation of production through the utilisation of imported inputs in the two countries.**

International outsourcing: concepts and measures

Four different groups of indicators for outsourcing

Imported Inputs on Total Inputs *(IITI broad and narrow)*

Share of Import Content of Production *(ICP and DIICP)*

Share of Import Content of Exports *(ICE and DIICE)*

Value-Added on Production *(VAP)*

- **Let's focus on the definition of:**

- **Direct and indirect import content of exports (*DIICE*) includes the imported inputs contained "directly" and "indirectly" (in domestic inputs) utilised in each manufacturing sector to produce exported goods.**

$$DIICE = \sum_i X_i \left(\boxed{a_i^M} + \boxed{\sum_j a_j^M a_{ji}^D + \sum_j \sum_k a_k^M a_{kj}^D a_{ji}^D + \sum_j \sum_k \sum_s a_s^M a_{sk}^D a_{kj}^D a_{ji}^D + ...} \right)$$

with X_i the gross exports in industry *i*; a^D_{ji} and a^M_{ji} are respectively the share of domestic and imported inputs from sector *j* used in sector *i*

From this formula we'll obtain the one for calculating the *domestic value added* indicator in the other paper.

• **1995-2000, very intense growth in both countries, especially in Germany;**
• **2000-2004, quite constant in both countries: the reduction for Italy reflects the increasing importance of services;**
• **2005-07 growth resumed at a fast pace.**

Indicators of international outsourcing: Total economy

IITI Germany
IITI Italy
ICP Germany
ICP Italy
DIICE Germany
DIICE Italy
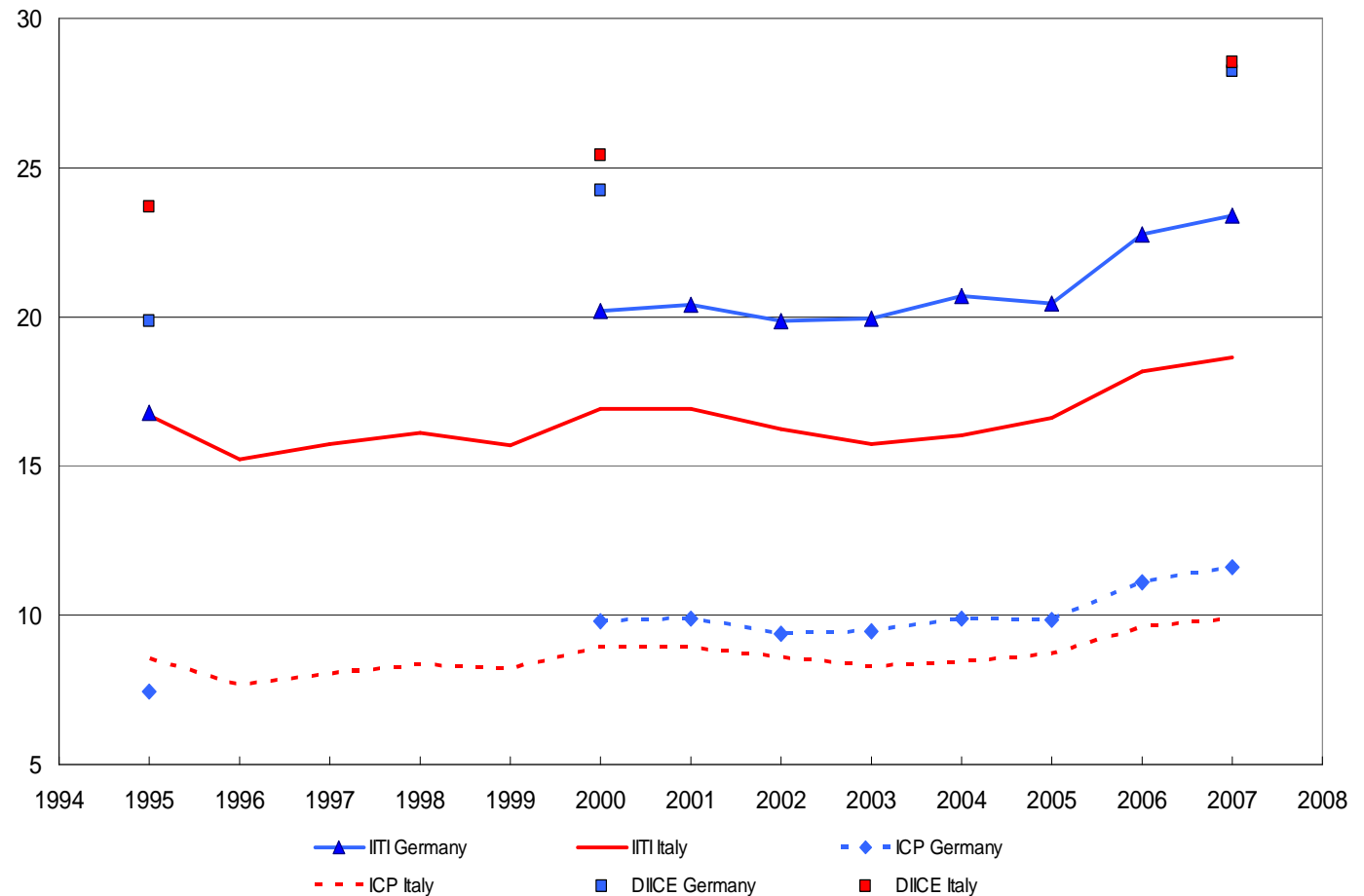
• **Very intense growth of all the indicators in both countries.**
• **In 2007 similar aptitude to use imported inputs: for every 100 euros of goods exported in manufacturing the direct and indirect IC were 33 and 31 euros respectively for Italy and Germany.**

Indicators of international outsourcing: manufacturing

Legend: IITI Germany · IITI Italy · ICP Germany · ICP Italy · DIICE Germany · DIICE Italy
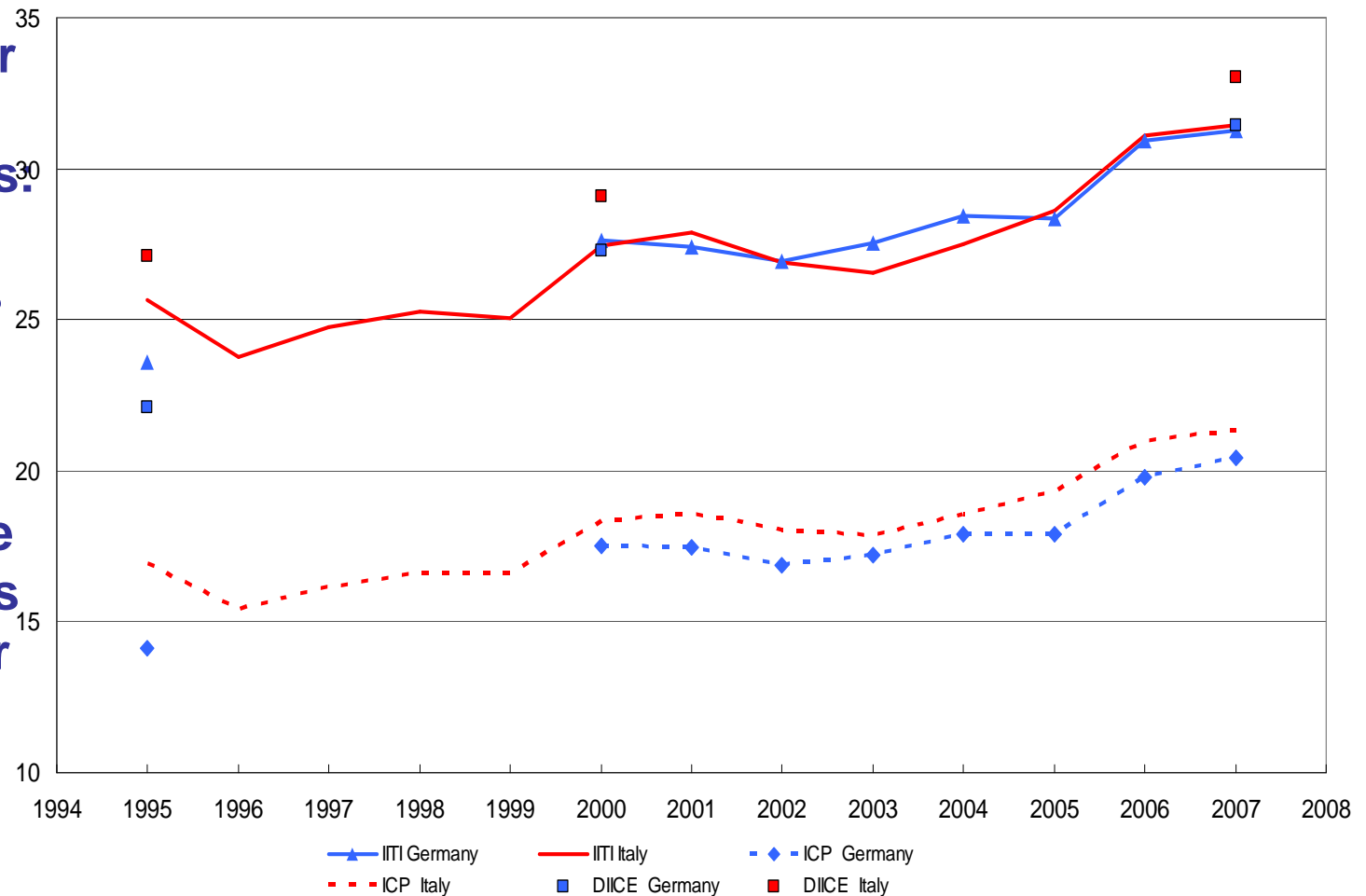
A shift and share analysis

The absolute variation of the indices broken down in two parts:

• the change of intensity in industries' international outsourcing (the *within component*).

• the change relative to the economy structure (the *between component*).

• For Italy: the increased use of imported inputs (for both the whole economy and the manufacturing sector) is partially counterbalanced by a shift towards less internationally integrated sectors.

• For Germany, both components move in the same direction.

• The firms' propensity to use imported inputs within each sector grew at a similar pace in both countries.

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• **Concepts: indentify some metrics of the value added and the labour income ("compensation of employees") content of manufacturing exports**

• **Measurament: apply an opportune methodology to estimate the level and the change in value added content and labour share for France, Germany and Italy.**

• **Results: provide a description of the relationship between gross trade and its value added components.**

• **Suggest some clues on the extent at which domestic value added is generated in the upstream sectors (industrial and services), that is, the ones providing inputs to manufacturing.**

Value added and labour content: concepts and measures

Four different indicators:

Direct value added content of exports value added generated by each manufacturing sector within its own sector (VAX)

Domestic value added of exports value added created by each sector in all the domestic economy (DVAX)

Direct labour content of exports "compensation of employees" created by each sector in its own sector (CEX)

Domestic labour content of exports labour income generated by exports in all the domestic economy (DCEX)

- **Let's focus on the definition of:**

- **Domestic value added of exports of exports (*DVAX*) includes the value added contained "directly" and "indirectly" in domestic inputs:**

$$DVAX = \sum_i X_i \left[\boxed{va_i} + \sum_j va_j a_{ji}^D + \sum_j \sum_k va_k a_{kj}^D a_{ji}^D + \sum_j \sum_k \sum_s va_s a_{sk}^D a_{kj}^D a_{ji}^D + ... \right]$$

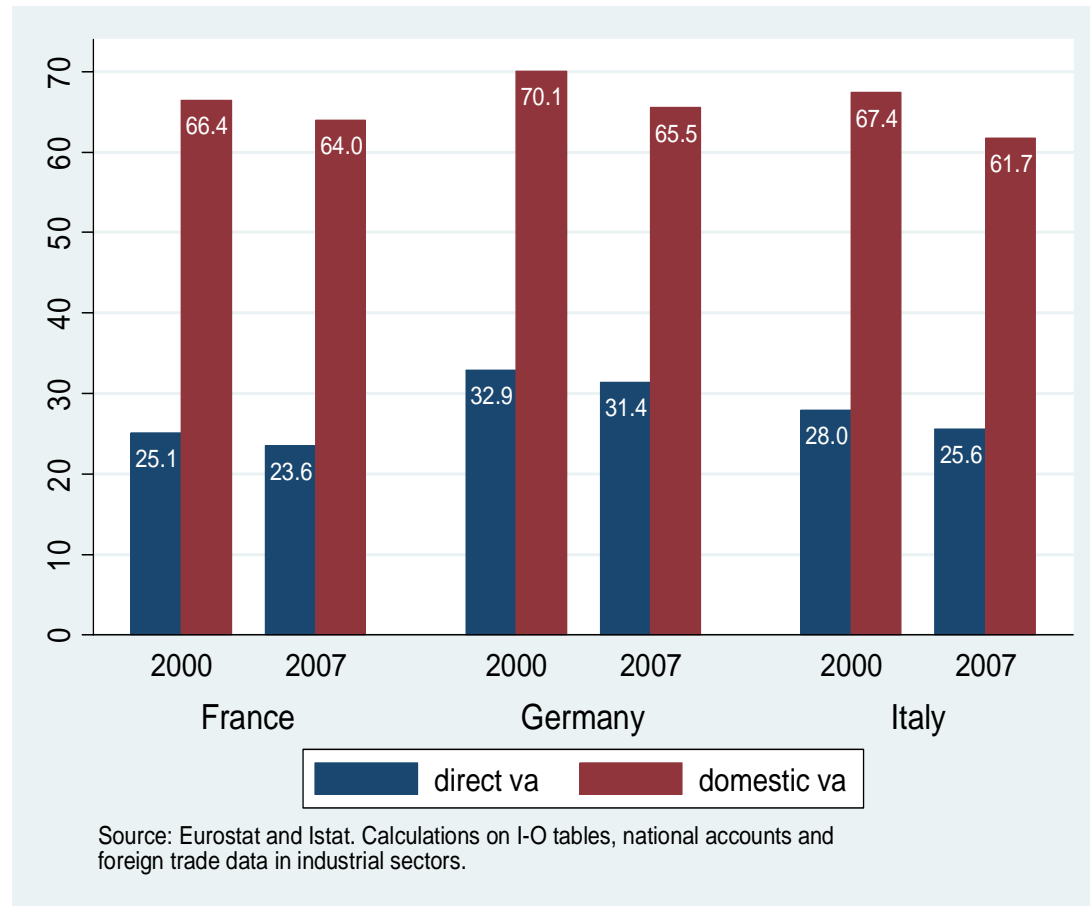**where *va_i* is the value added content of one unit of product *i*.**

With a different formulation, *DVAX* can be calculated by removing from the gross exports the "direct" and "indirect" imported inputs:

$$DVAX = \sum_i X_i \left[1 - DIICE \right]$$

- **2000-2007: reduction of value added content for each unit of exports (*VAX*).**

- **Higher level of direct value added content for German industry.**

- **Instead in 2007 domestic value added (*DVAX*) of German exports is similar to the one estimated for France and a bit closer to Italy.**

- **French and Italian manufacturing industries activate relatively more value added in the upstream sectors rather than in their own industries.**
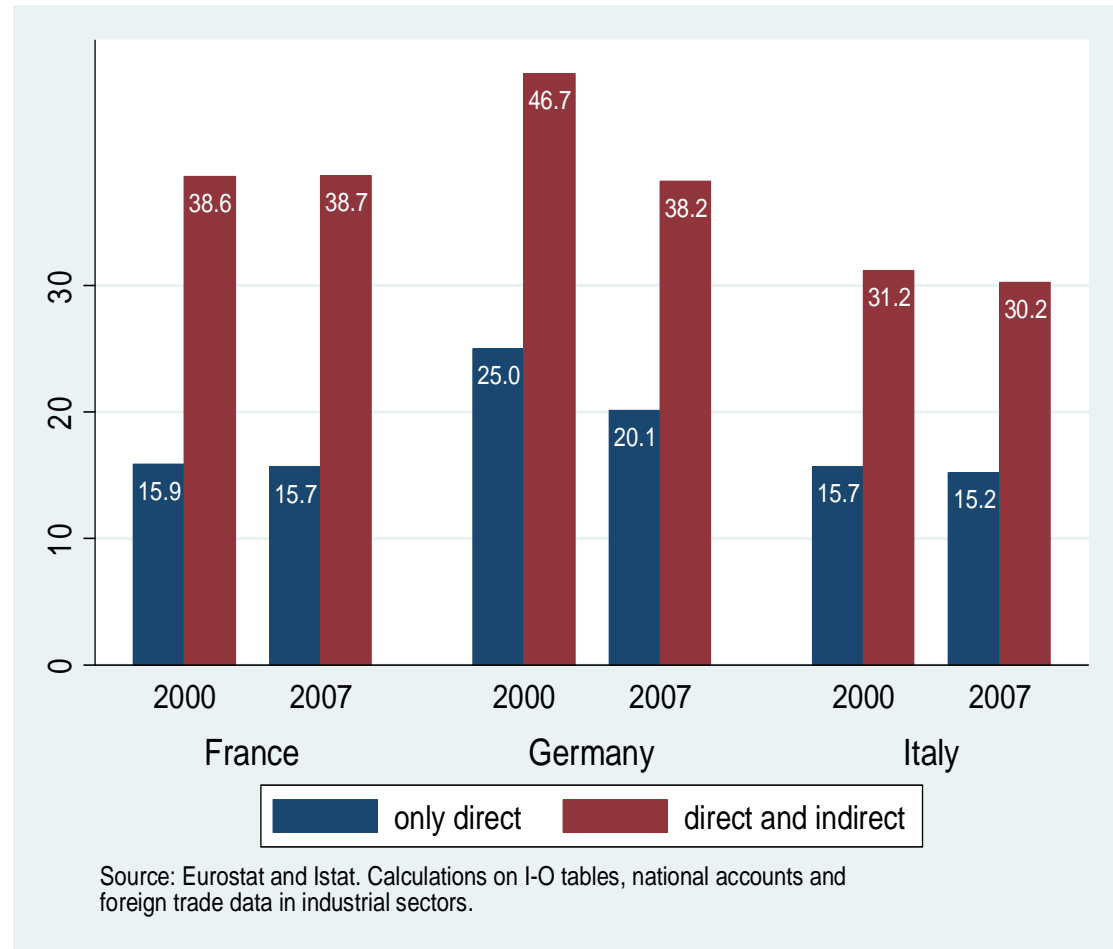
VAX and DVAX

(in percentage of exports)

Source: Eurostat and Istat. Calculations on I-O tables, national accounts and foreign trade data in industrial sectors.

CEX and DCEX

(in percentage of exports)

• **In 2000 the "compensation of employees" content for Germany higher than for Italy and France.**

• **In 2000-2007, it decreased for Germany whereas for Italy and France remained stable.**

• **Considering DCEX, the reduction of the labour share for Germany is confirmed.**

• **Because the greater importance of the indirect component, the *DCEX* for France appears similar to the one for Germany in year 2007.**

Source: Eurostat and Istat. Calculations on I-O tables, national accounts and foreign trade data in industrial sectors.

Value added, labour and import content in exports

	Italy		France		Germany	
	2000	2007	2000	2007	2000	2007
Direct value added (VAX)	28.0	25.6	25.1	23.6	32.9	31.4
of which: labour content (CEX)	*15.7*	*15.2*	*15.9*	*15.7*	*25.0*	*20.1*
Domestic value added (DVAX)	67.4	61.7	66.4	64.0	70.1	65.5
of which: Domestic labour content (DCEX)	*31.2*	*30.2*	*38.6*	*38.7*	*46.7*	*38.2*
Direct imported inputs	21.3	25.4	22.0	23.9	20.7	23.7
Direct and indirect imported inputs	32.6	38.3	33.6	36.0	29.9	34.5

- **Similar pattern of fragmentation of production for German and Italian manufacturing industries. For France the process was less intense.**
- **German exports maintained the ability to create more value added. When considering the extent to which exports create value added in the economy (DVAX) and not just in their own industries (VAX), the higher aptitude of Germany with respect to France is strongly attenuated.**

To conclude:

•Between 2000 and 2007, similar pattern of fragmentation of production for German and Italian manufacturing industries through an increased use of imported inputs to reduce costs.

• For France the decrease of domestic value added (and the corresponding increase of IC) was less intense. Probably this was due to a different strategy of delocalisation for French manufacturing firms: in 2000 the level of FDI abroad in manufacturing was higher. This probably contributes to explain the weaker performance of French manufacturing exports.

• Although the similar strategies of use imported inputs between Italy and Germany, German manufacturing exports maintained the ability to create more value added (A different role in the global value chain?)

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