Global value chains and the Basque economy

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Sustainability, that's it!

EXCELENCIA MARÍA DE MAEZTU
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CONTEXT

- Globalization, delocalization, vertical integration → growing interest in understanding the economic implications of international trade and global value chains

- International trade statistics are not a good indicator for analysing the effects of these trends

- High volume of exports does not necessarily mean that international trade has high impact on the domestic economy

- Basque Country (BC): exports/ GDP=65%, but exports do not generate 65% of GDP: part of the value of exports is added by other regions: INTERMEDIATE IMPORTS

- For instance, part of the value of the gasoline exported by the BC to the USA is the value of the crude oil that the BC imports from Saudi Arabia

VALUE CHAINS HAVE BECOME GLOBAL

| LOCAL VALUE CHAINS – Trade of final goods	GLOBAL VALUE CHAINS – Trade of intermediate and final goods	
	The Basque Country exports to Italy: Tires, Passenger cars, Vehicle parts and accessories, Goods transport vehicles, Tubes and hollow profiles,….	**Italy exports to the Basque Country:** Turbojets, turboprops, Copper bars and profiles, Alloy Steel, Iron or Steel bars, Vehicle parts and accessories…

Currently, trade in intermediate goods predominates => Need of new methods of measuring international trade that better reflect its impact on the domestic economy: Factor content of trade, TiVA, VAiT, VAX

HOW MUCH WEALTH AND EMPLOYMENT ARE SUPPORTED BY INTERNATIONAL TRADE?
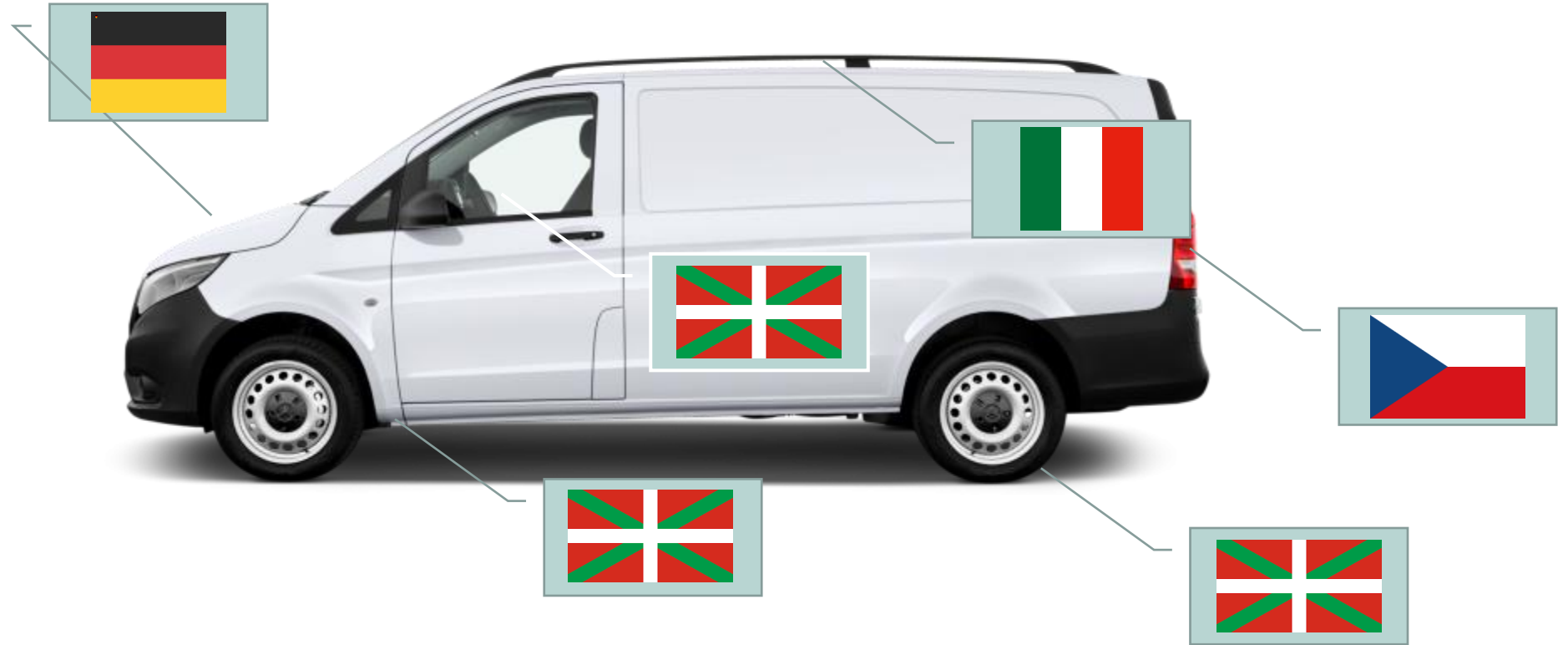
- What is the actual economic impact of trade in the BC?

- To what extent Basque exports relay on (intermediate) imports from other regions?

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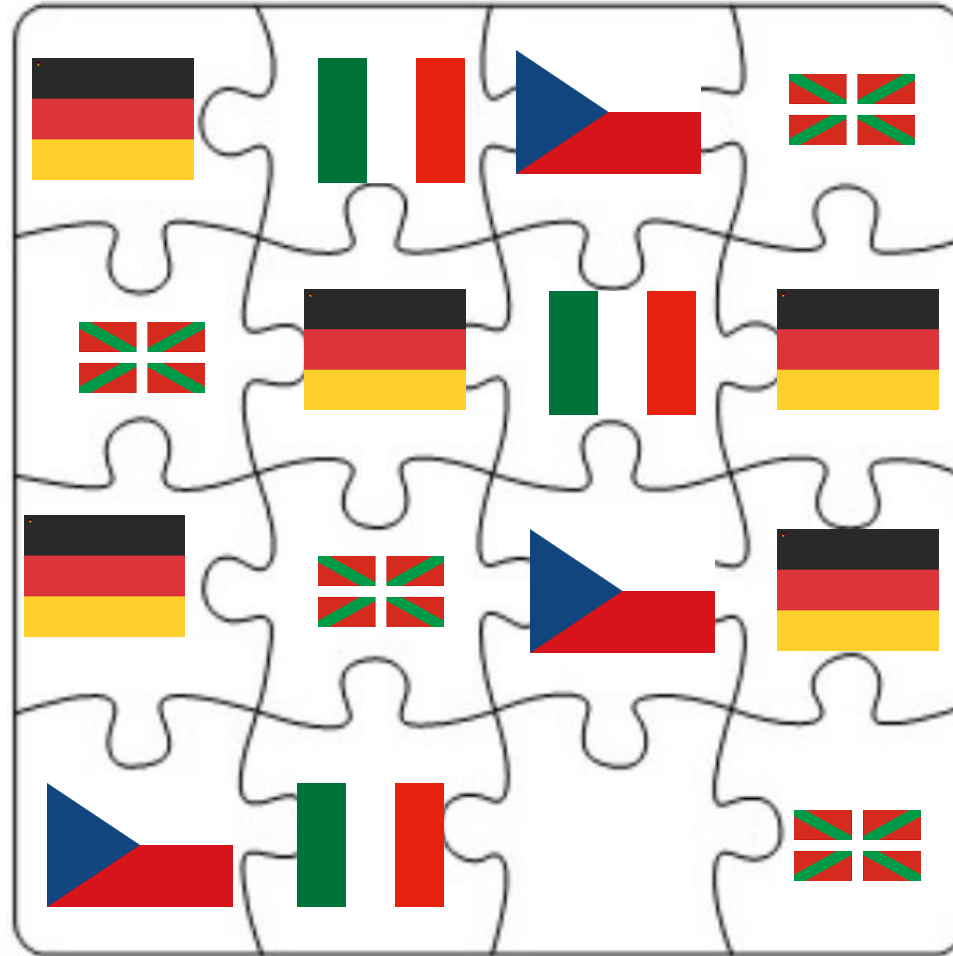
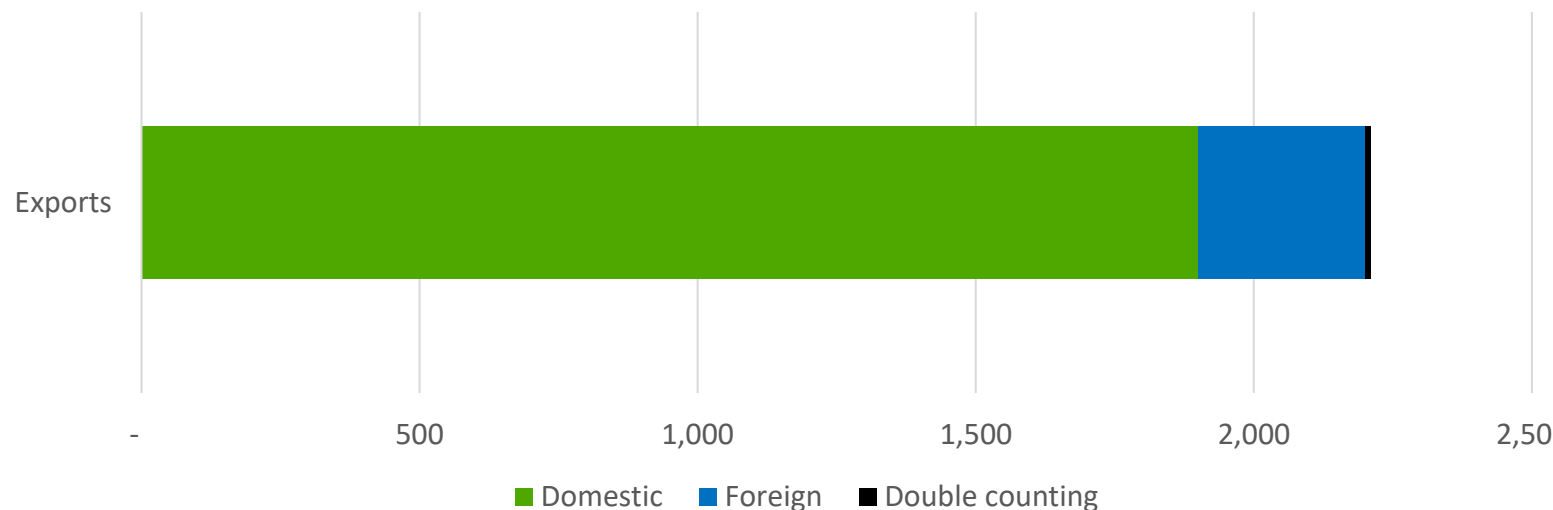# DECOMPOSITION METHOD BASED ON **MRIO** TABLES IDENTIFIES THE ORIGIN OF THE FACTOR CONTENT OF EXPORTS

JRC TECHNICAL REPORTS

Measuring bilateral trade in terms of value added
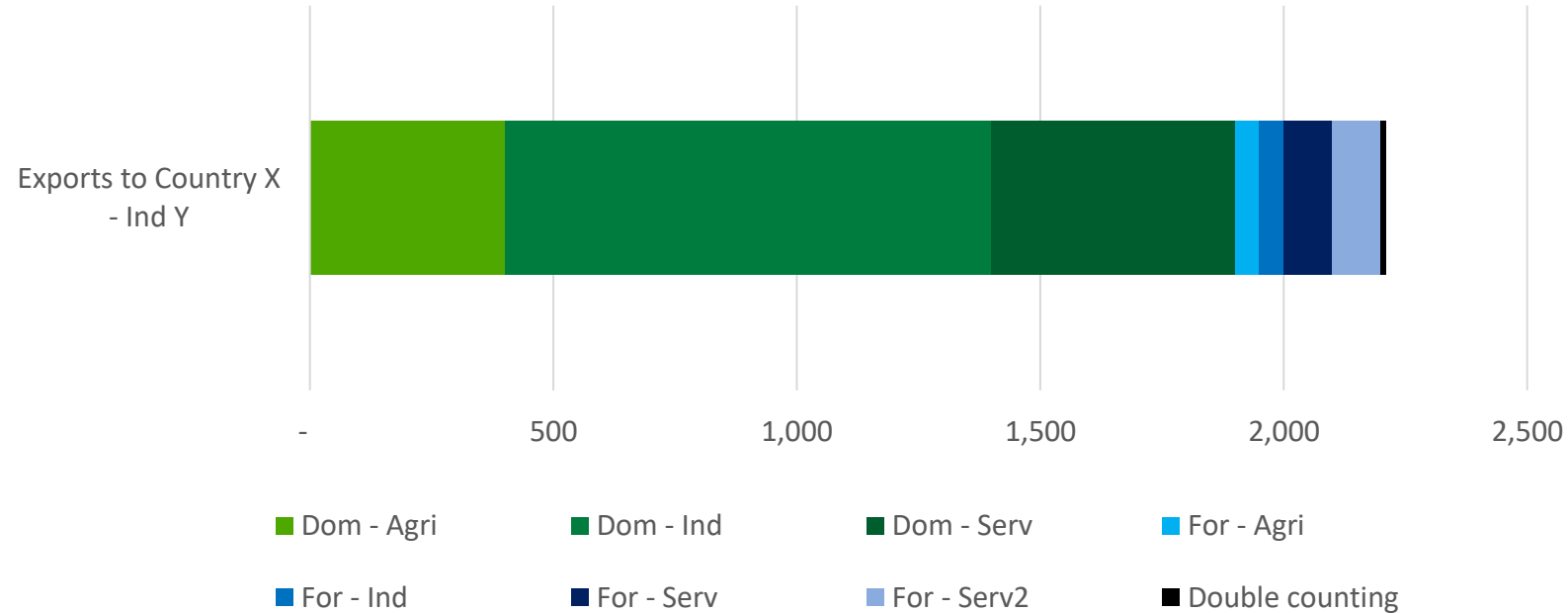
Arto, I., Dietzenbacher, E. and Rueda-Cantuche, J. M.

2019

Exports: Domestic / Foreign / Double counting

DECOMPOSITION AT INDUSTRY AND COUNTRY LEVEL

Exports to Country X - Ind Y

Legend:
- Dom - Agri
- Dom - Ind
- Dom - Serv
- For - Agri
- For - Ind
- For - Serv
- For - Serv2
- Double counting

- Domestic: E.g.: VA in the Basque engineering industry, associated to the exports of the Basque metallurgy to the Polish automotive sector, which ends up in the French final demand of German cars

- Foreign: VA in the plastics sector of Germany, associated to the exports of office supplies from France of the Basque engineering industry, associated to the exports of the Basque metallurgy to the Polish automotive sector, which ends up in the French final demand of German cars

WE DEPART FROM THE OECD ICIO TABLE (2015):

65 countries/regions and 36 industries (ISIC Rev. 4 classification).
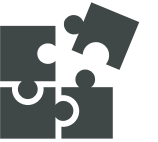
INTEGRATE THE BASQUE COUNTRY IN THE ICIO TABLE

- Input-Output tables of the Basque Country

- Exports by products (36 sectors) and by countries of destination (65 countries, including the rest of Spain).

- Imports matrix by products (36 sectors) and countries of origin (65, including the rest of Spain).

- Disaggregate flows/columns of Spain in the ICIO: Basque Country – Rest of Spain

The part corresponding to Rest of Spain (RoS) derives by difference:

RoS = Spain – Basque Country

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DESCOMPOSITION OF THE VALUE OF EXPORTS…

Exports 42,226 M€

Basque exports (2015)

42,226

| - | 5,000 | 10,000 | 15,000 | 20,000 | 25,000 | 30,000 | 35,000 | 40,000 | 45,000 |

DESCOMPOSITION OF THE VALUE OF EXPORTS…

Exports 42,226 M€

Domestic	Foreign	Double counting
21,565	20,471	190
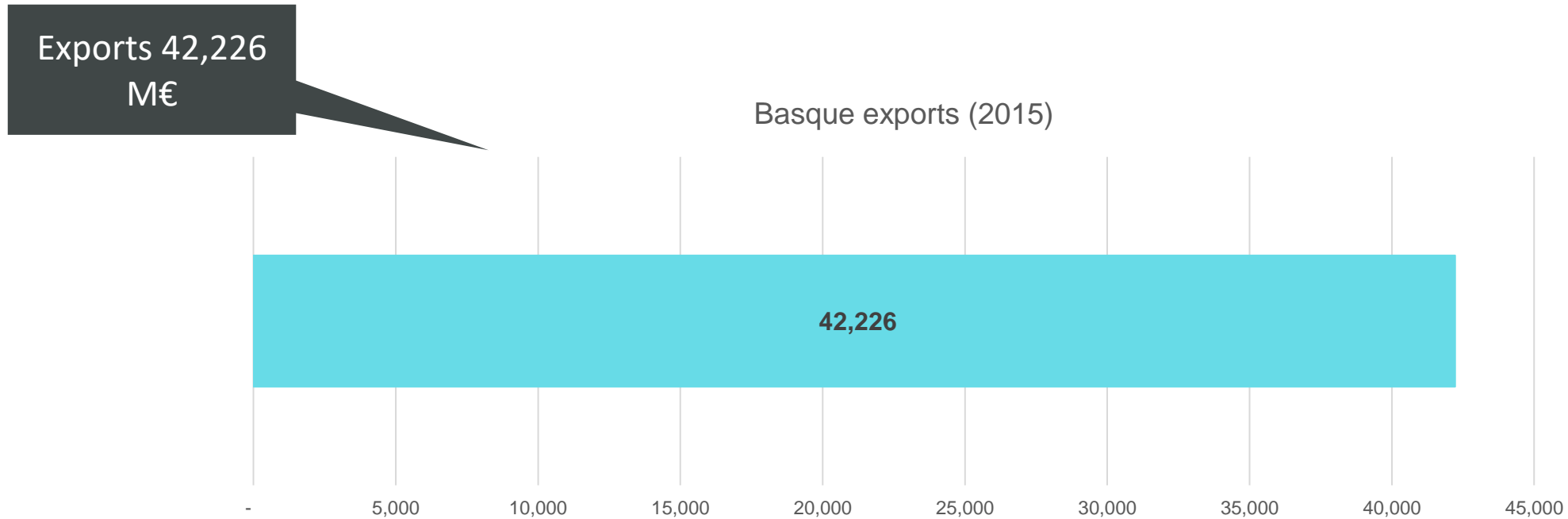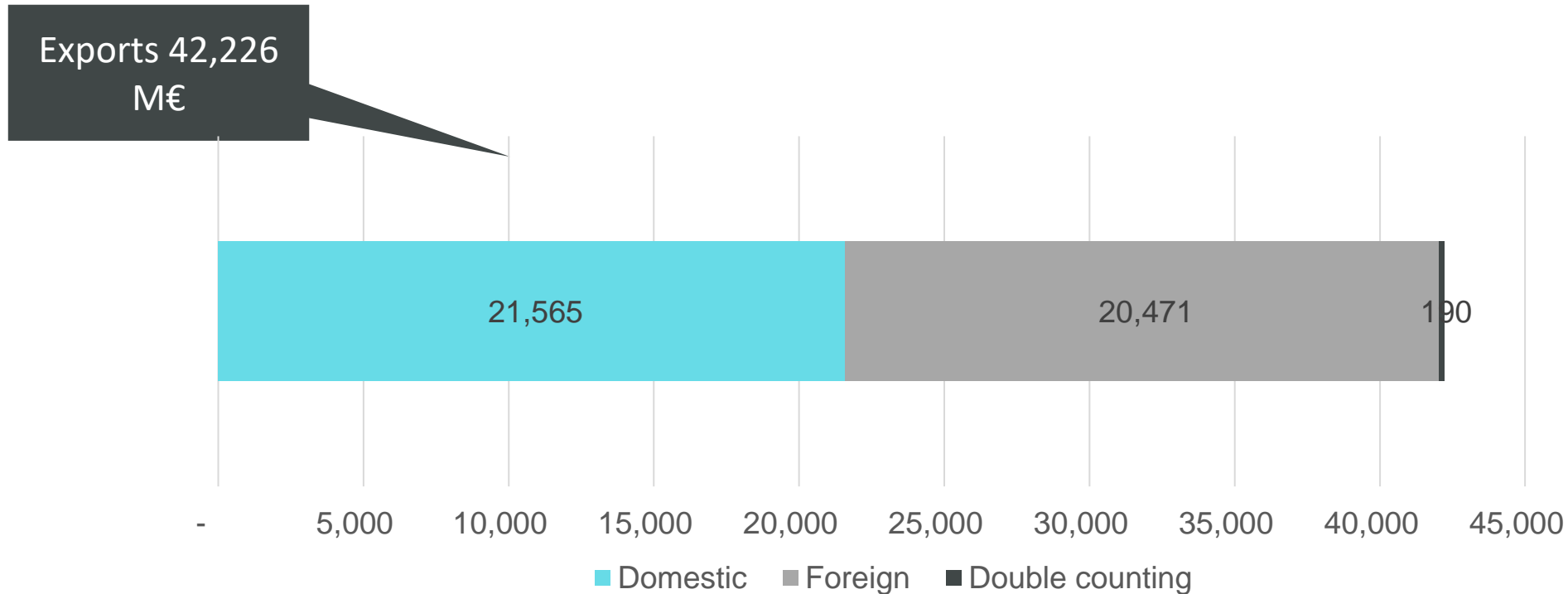
51% VA by the Basque Country (i.e. Basque GDP), 48% VA by other regions (1% double counting)

Basque exports rely on intermediate imports

BASQUE EXPORTS CREATE WEALTH AND EMPLOYMENT WITHIN THE BASQUE COUNTRY AND ABROAD

How is it distributed by trade partner?

VA in Basque exports (2015)

Employment in Basque exports (2015)

31 % GDP Basque Country

1 € exports => 48 cents. imports

21,565 — Domestic

20,471 — Foreign

34% employment Basque Country

1 job in the Basque Country, 1.6 abroad

326 — Domestic

530 — Foreign
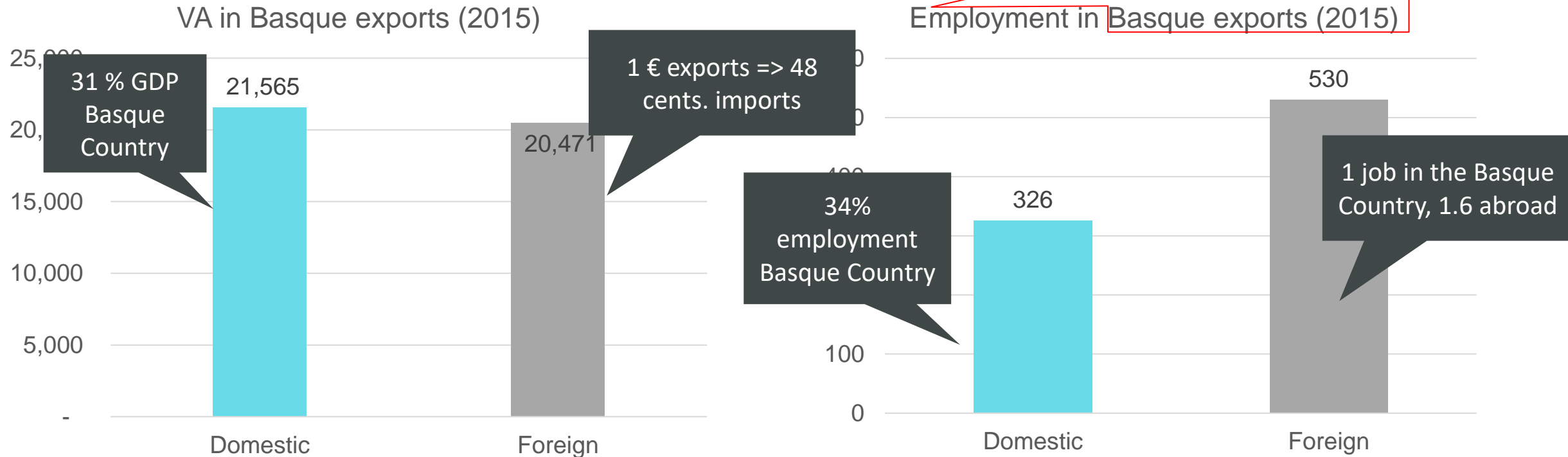
Almost half of the VA comes from abroad, something that indicates a high degree of integration in global value chains.

Imports of intermediate goods are labour intensive.

COUNTRIES
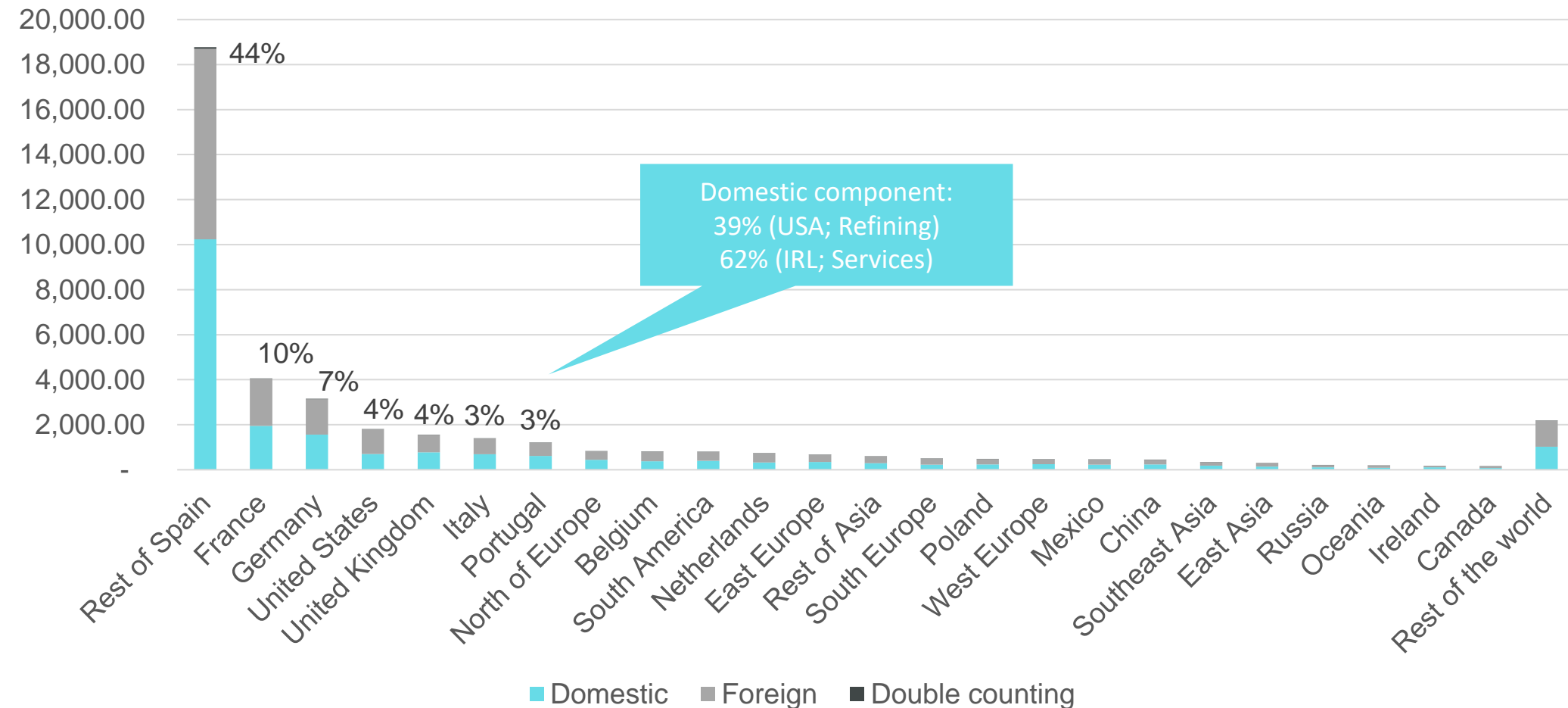
Exports concentrated in a small number of countries/regions. The main importers are RoS (44%) and the rest of the European Union (32%).

SECTORS
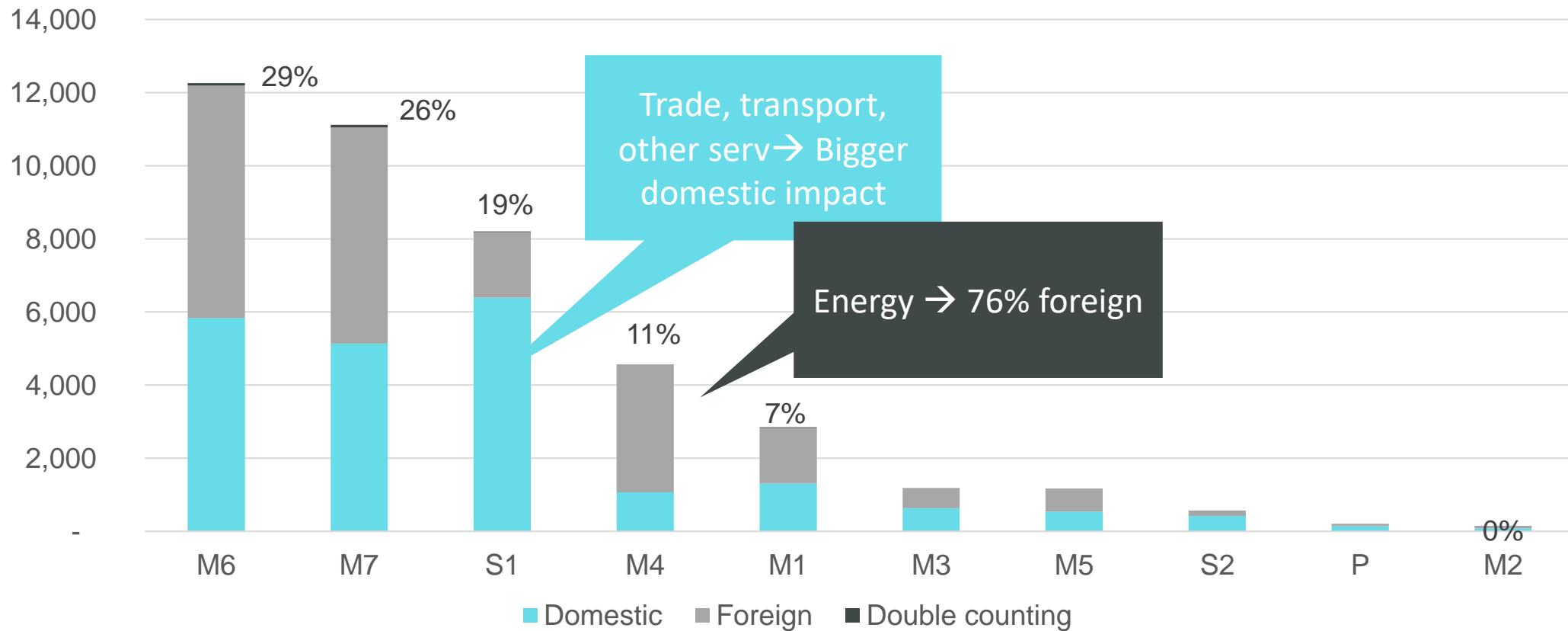
Four groups of industries 86% of exports. Services larger domestic component than manufacturing or energy.

P primary; M1 Food, beverages; M2 textile; M3 Wood, paper; M4 energy; M5 chemicals; M6 basic metals and others; M7 machinery and transport equipment; S1 transport services, trade and business services; S2 other services.

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VALUE ADDED: ORIGIN & DESTINATION

DESCOMPOSITION OF THE VALUE OF EXPORTS

Exports 42,226 M€

21,565

20,471

190

- 5,000 10,000 15,000 20,000 25,000 30,000 35,000 40,000 45,000

■ Domestic ■ Foreign ■ Double counting
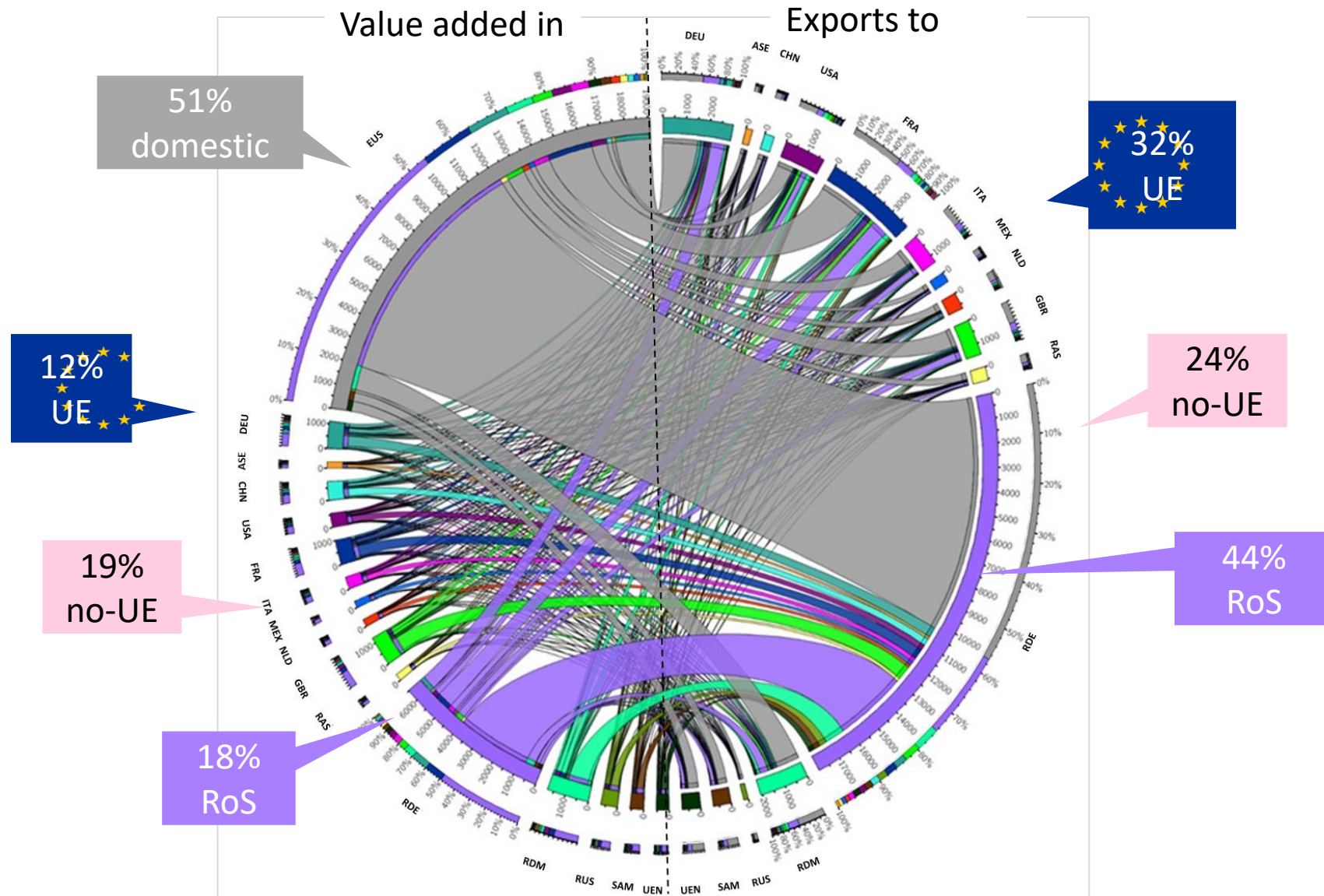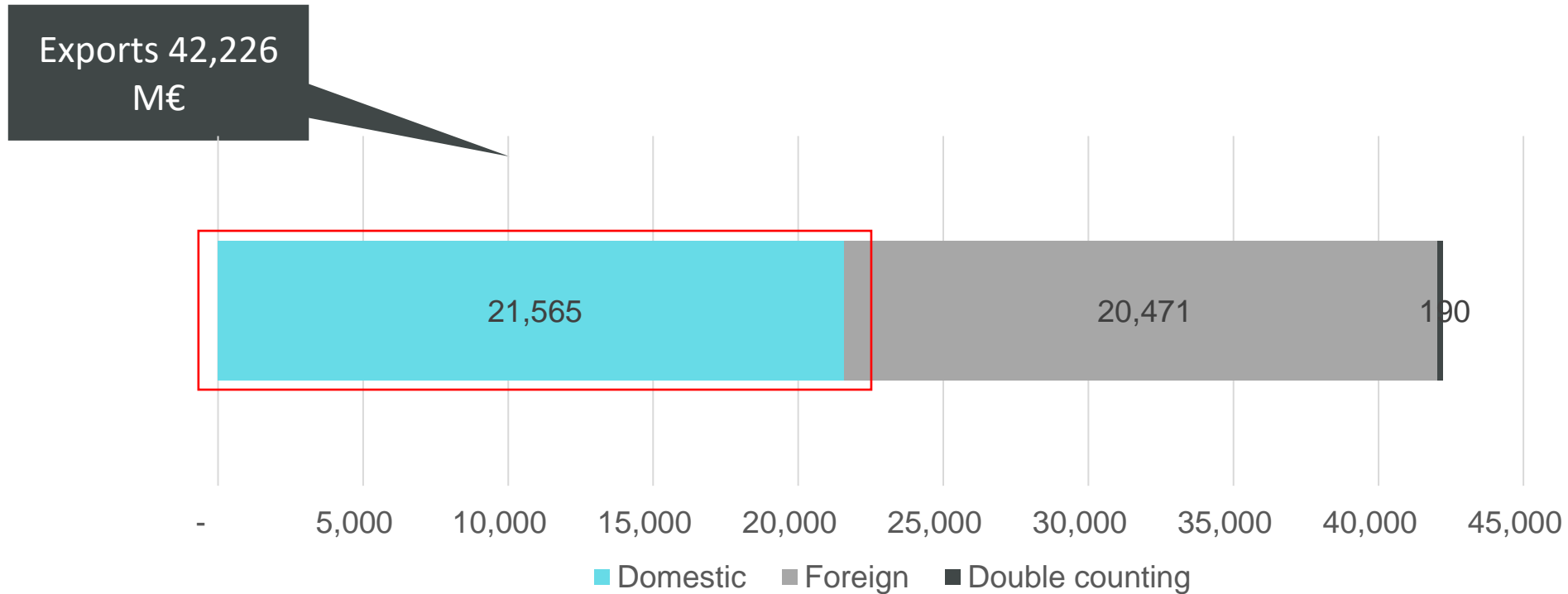
DOMESTIC VALUE ADDED / EMPLOYMENT BY DESTINATION

Exports by partner (2015)

No-EU ~ 5%
GDP / employment
Basque Country

RoS ~ 15%
GDP / employment
Basque Country

EU ~ 10%
GDP / employment
Basque Country

Rest of Spain 44%
France 10%
Germany 7%
United States 4%
United Kingdom 4%
Italy 3%
Portugal 3%
Rest of the World 5%
2% 2% 2% 2% 2% 2%
1% 1% 1% 1% 1% 1% 1% 1%
0% 0% 0% 0% 0%
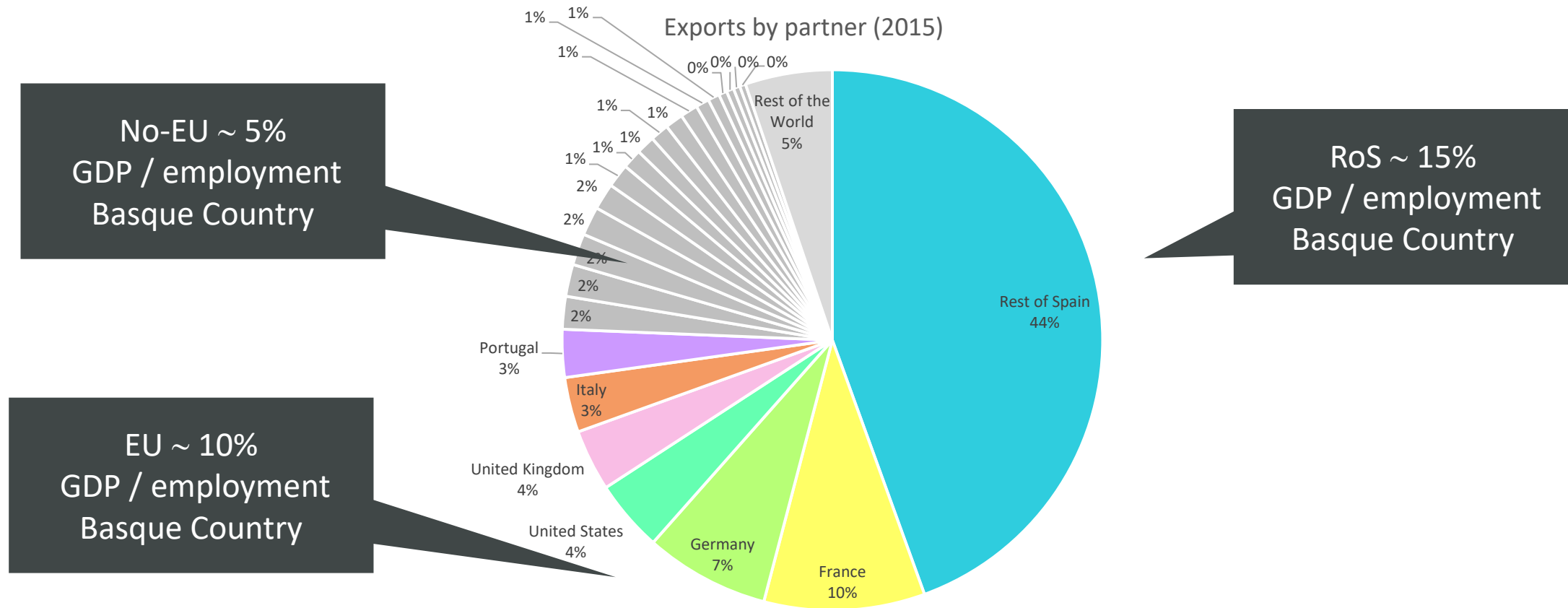
Main trade partners are RoS and the EU. This is reflected in the impact of trade.

DOMESTIC VALUE ADDED BY SECTOR

Value added in | Exports in

Basic metals and non metallic other products 21%

Basic metals and other non metallic products 27%

Machinery and transport equipment 17%

Machinery and transport equipment 24%

Transport, trade and business services 40%

Transport, trade and business services 32%
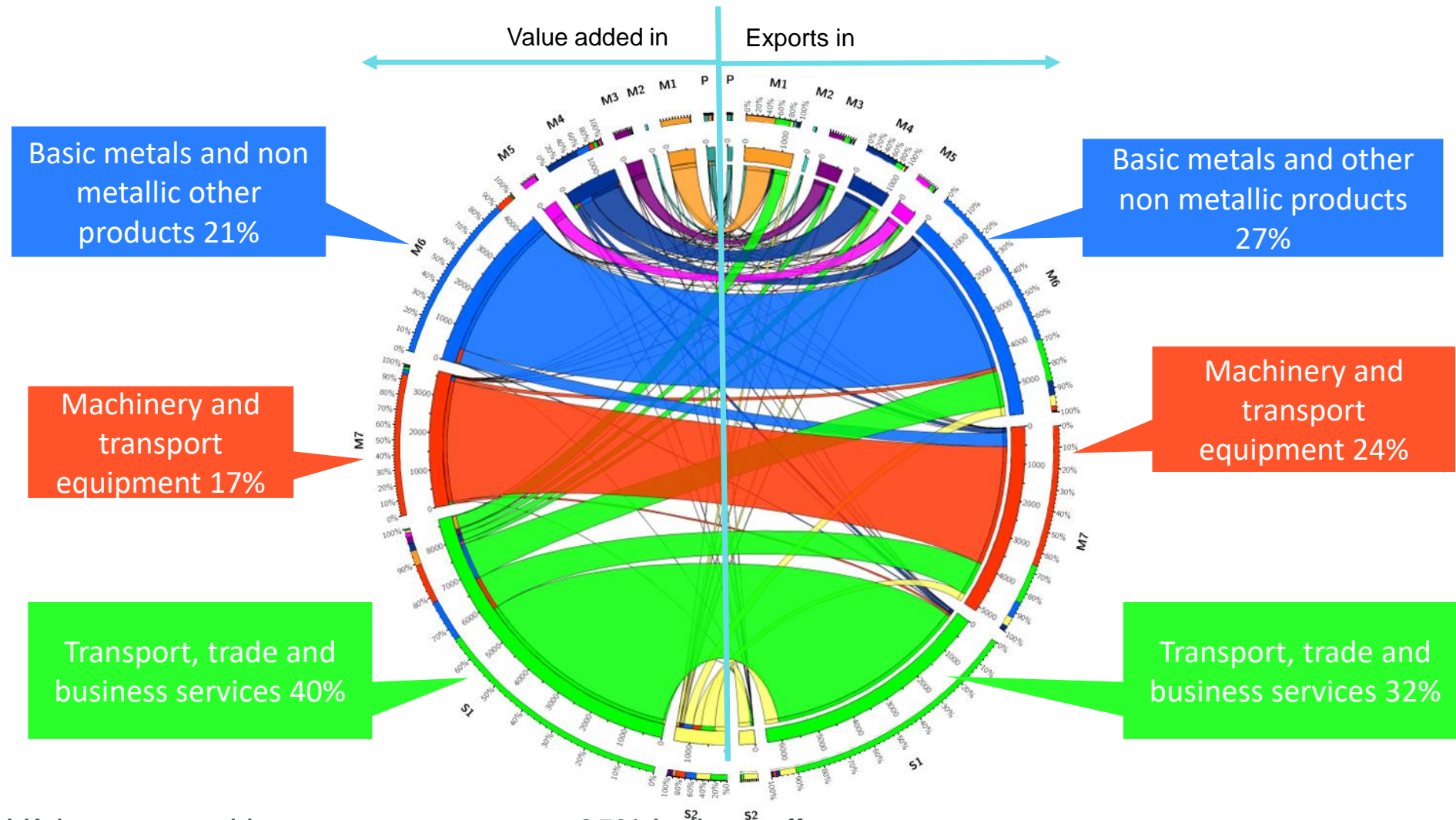
65% VA is generated in exporter sectors vs. 35% indirect effects

Exports of manufactures rely on services but not the other way around

DOMESTIC EMPLOYMENT BY SECTOR

Employment in | Exports from

Basic metals and other non-metallic products 23%

Basic metals and other non-metallic products 28%

Machinery and transport equipment 17%

Machinery and transport equipment 23%

Transport, trade and business services 44%

Transport, trade and business services, 31%
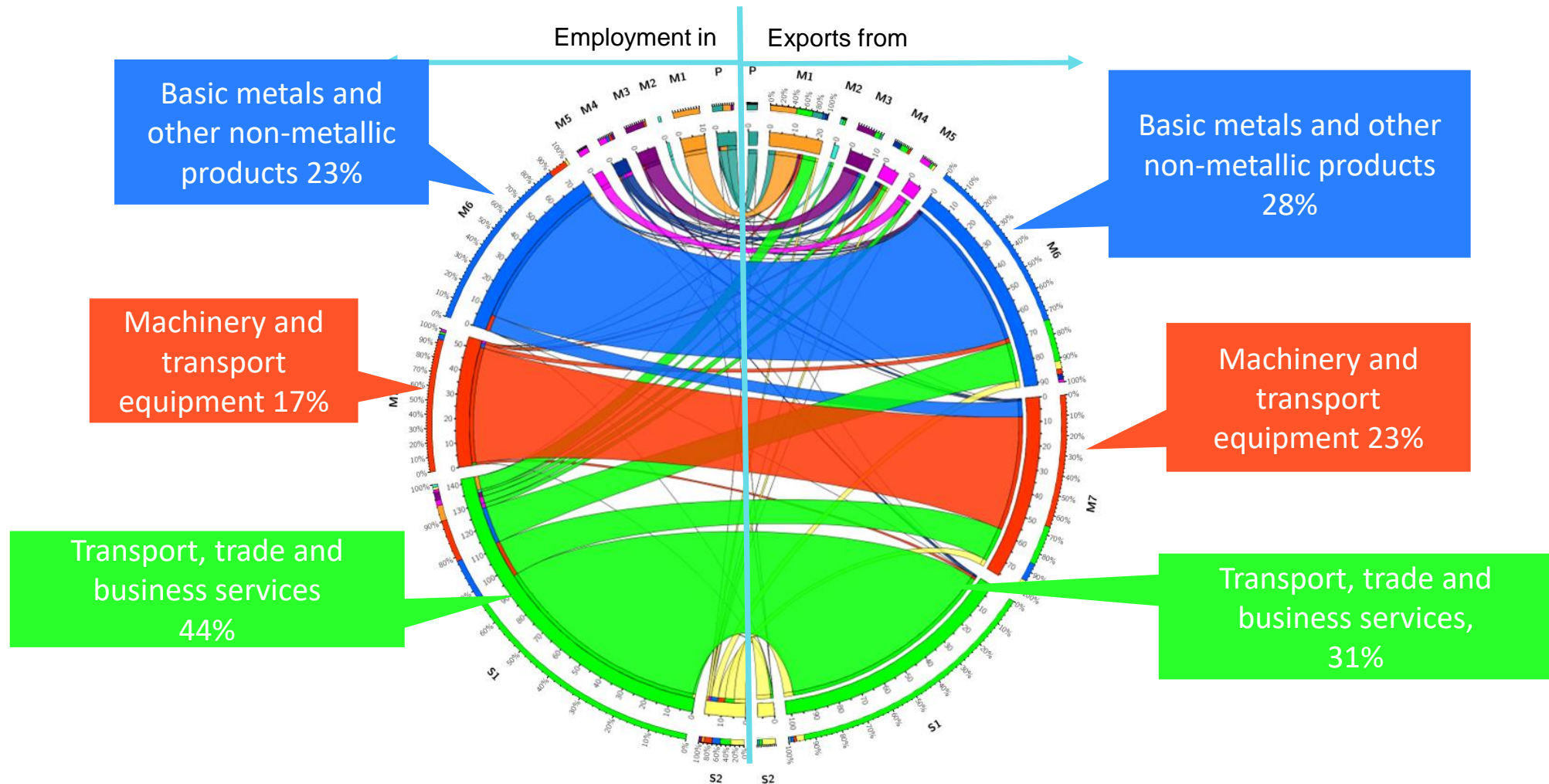
65% employment generates in exporter sectors vs. 35% indirect effects

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THE ROLE OF INTERNATIONAL TRADE IN THE BASQUE ECONOMY

- MRIO databases are a useful tool to analyse the role of international trade in regional economies, the role of regions in GVC, countries dependencies

- Basque exports in 2015 amounted to 42,226 M€ (62% GDP): this does not mean that they contributed to 62% of GDP

- Exports support 31% of Basque GDP (21,565 M€) and 34% employment (326,000 jobs):
    - 15% exports RoS, 10% EU (Germany 3%, France 2%), 5% non-UE

- Factor content of exports: 51% domestic VA, 48% foreign VA (intermediate imports): 1 € exports => 51 cents VA in the Basque Country; 48 cents VA abroad (imports). High vertical integration

THE BASQUE ECONOMY IS HIGHLY INTEGRATED IN GLOBAL VALUE CHAINS

- The difference between Gross Exports (42,226 M€) and Basque VA in exports (21,565 M€) is due to the fact that the Basque economy imports larger quantities of intermediate products (20,471 M€) that are processes by the different economic sectors and then exported.

- Basque exports rely on foreign factors, especially labour (530,000 jobs abroad, 62% of the global employment supported by Basque exports). Or, VA and employment in other regions are supported by Basque exports

- In the exports of basic metals and non-metallic products; machinery and transport equipment; food and beverages; chemicals and energy the largest component is the foreign (76% in the case of energy).

REFLECTIONS ABOUT IRiE

// ESPON IRiE
Interregional Relations in Europe

- The information produce in the project IRiE constitutes a unique window of opportunity to expanding and deepening the analysis of the role of GVC at the regional level:

  - Assess the inter-linkages with other Spanish and European regions

  - Identify niches for capturing a greater share of the GVC

  - Increase the level of integration of the different regions and find "synergies" between the economic activities of regions

  - Identify and reduce the vulnerability to disruptive events

THANKS

$$\mathbf{A} = \begin{bmatrix} \mathbf{A}^{11} & \cdots & \mathbf{A}^{1s} & \cdots & \mathbf{A}^{1n} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ \mathbf{A}^{r1} & \cdots & \mathbf{A}^{rs} & \cdots & \mathbf{A}^{rn} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ \mathbf{A}^{n1} & \cdots & \mathbf{A}^{ns} & \cdots & \mathbf{A}^{nn} \end{bmatrix}$$

$$\mathbf{B} \equiv (\mathbf{I} - \mathbf{A})^{-1} = \begin{bmatrix} \mathbf{B}^{11} & \cdots & \mathbf{B}^{1s} & \cdots & \mathbf{B}^{1n} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ \mathbf{B}^{r1} & \cdots & \mathbf{B}^{rs} & \cdots & \mathbf{B}^{rn} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ \mathbf{B}^{n1} & \cdots & \mathbf{B}^{ns} & \cdots & \mathbf{B}^{nn} \end{bmatrix}$$

$$\mathbf{L}^{rr} = (\mathbf{I} - \mathbf{A}^{rr})^{-1}$$

Matrix **A** reflects the (direct) requirements of intermediary goods by unit of output by sector and country.

Matrix **B** reflects the total output (direct and indirect) required to satisfy the final demand by sector and country.

Matrix **L** reflects the total output of <u>domestic origin</u> needed to satisfy the final demand. It is used to distinguish the **domestic component**.

OTHER AUXILIARY MATRICES

$$\mathbf{A}^{(r)} = \begin{bmatrix} \mathbf{A}^{11} & \cdots & \mathbf{A}^{1,r-1} & \mathbf{A}^{1,r+1} & \cdots & \mathbf{A}^{1n} \\ \vdots & \ddots & \vdots & \vdots & \ddots & \vdots \\ \mathbf{A}^{r-1,1} & \cdots & \mathbf{A}^{r-1,r-1} & \mathbf{A}^{r-1,r+1} & \cdots & \mathbf{A}^{r-1,n} \\ \mathbf{A}^{r+1,1} & \cdots & \mathbf{A}^{r+1,r-1} & \mathbf{A}^{r+1,r+1} & \cdots & \mathbf{A}^{r+1,n} \\ \vdots & \ddots & \vdots & \vdots & \ddots & \vdots \\ \mathbf{A}^{n1} & \cdots & \mathbf{A}^{n,r-1} & \mathbf{A}^{n,r+1} & \cdots & \mathbf{A}^{nn} \end{bmatrix}$$

$$\mathbf{C}^{(r)} = \left(\mathbf{I} - \mathbf{A}^{(r)}\right)^{-1} = \begin{bmatrix} \mathbf{C}^{(r)11} & \cdots & \mathbf{C}^{(r)1,r-1} & \mathbf{C}^{(r)1,r+1} & \cdots & \mathbf{C}^{(r)1n} \\ \vdots & \ddots & \vdots & \vdots & \ddots & \vdots \\ \mathbf{C}^{(r)r-1,1} & \cdots & \mathbf{C}^{(r)r-1,r-1} & \mathbf{C}^{(r)r-1,r+1} & \cdots & \mathbf{C}^{(r)r-1,n} \\ \mathbf{C}^{(r)r+1,1} & \cdots & \mathbf{C}^{(r)r+1,r-1} & \mathbf{C}^{(r)r+1,r+1} & \cdots & \mathbf{C}^{(r)r+1,n} \\ \vdots & \ddots & \vdots & \vdots & \ddots & \vdots \\ \mathbf{C}^{(r)n1} & \cdots & \mathbf{C}^{(r)n,r-1} & \mathbf{C}^{(r)n,r+1} & \cdots & \mathbf{C}^{(r)nn} \end{bmatrix}$$

Matrix $\mathbf{A}^{(r)}$ reflects the requirements (direct) of <u>non domestic</u> intermediary goods by unit of output by sector and country.

Matrix $\mathbf{C}^{(r)}$ reflects <u>non domestic</u> total output (direct and indirect) required to satisfy the final demand by sector and country. It is used to distinguish the **foreign component**.

BALANCE IN TERMS OF VALUE ADDED IS 649 M€
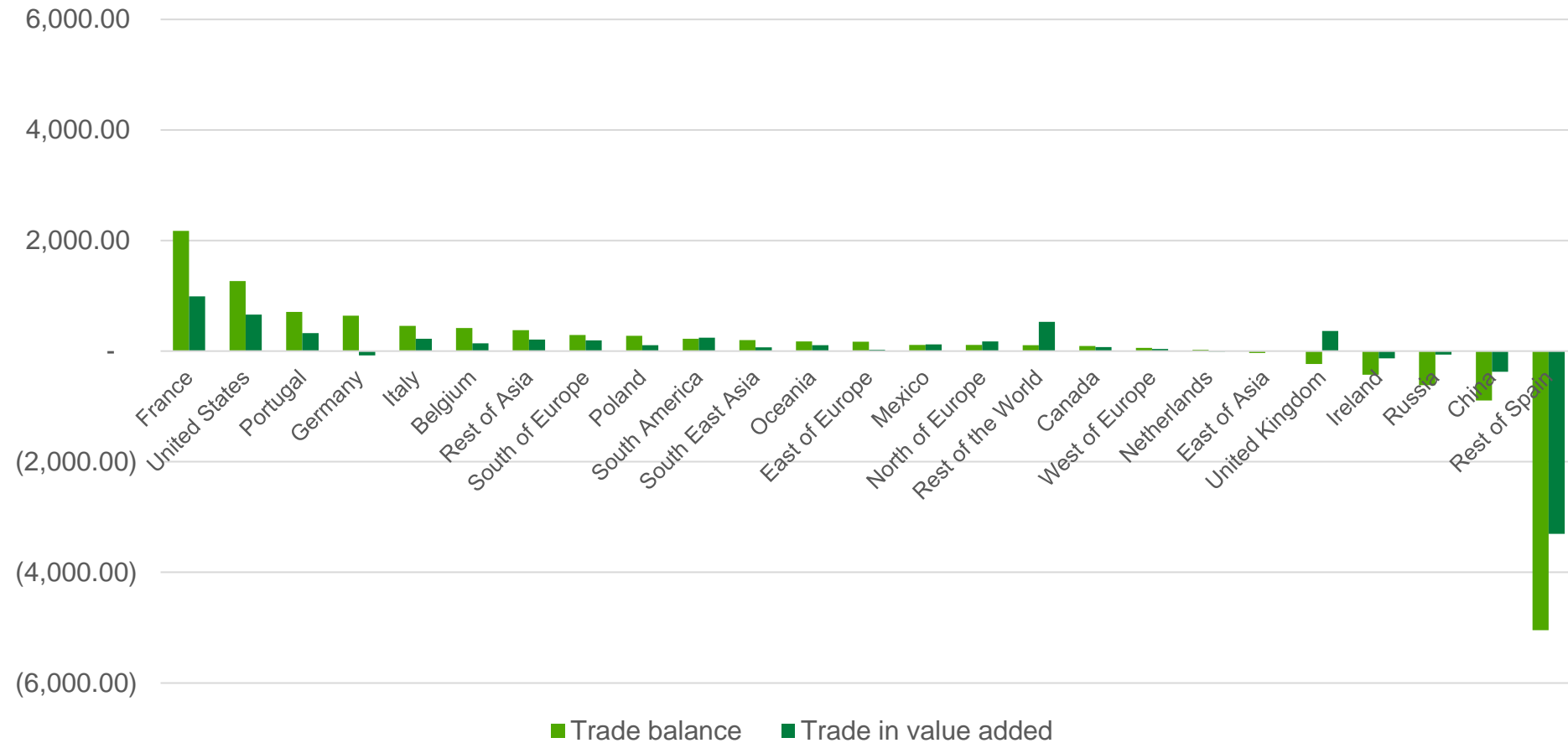
The balance in gross and net terms is similar, but changes by trade partner, generally tending to smooth out when measured in terms of value added.

IN TERMS OF EMPLOYMENT THE BALANCE IS NEGATIVE: 252k
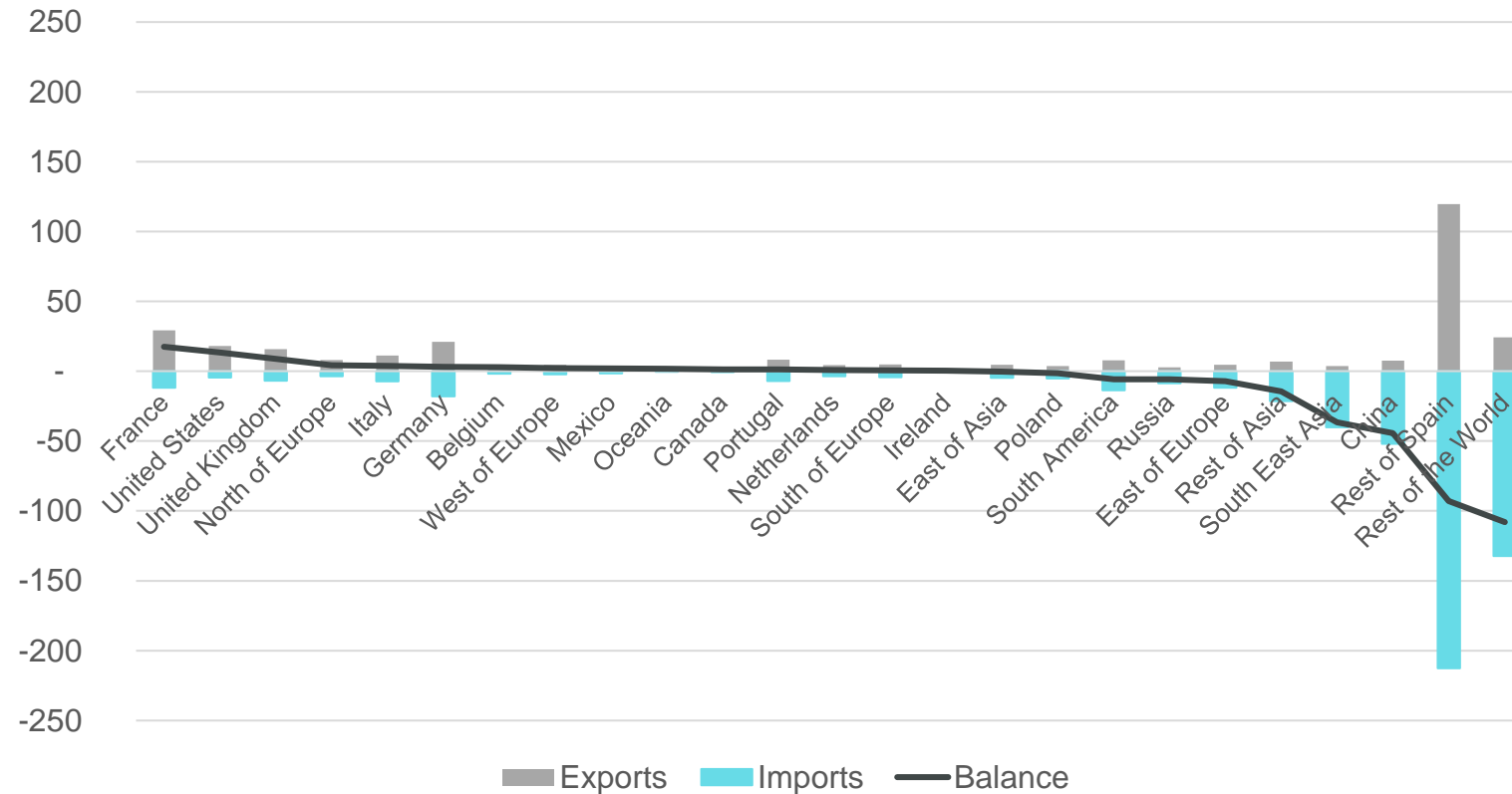
Both employment and value added, the balance is positive with the European Union (without RoS), United States and United Kingdom.

Stimulus policies in these countries would Benefit the Basque Country, since Basque exports of value added and employment would increase more tan imports.

SIMILAR TO BASQUE EXPORTS, BASQUE DEMAND GENERATES VALUE AND EMPLOYMENT WITHIN THE BASQUE COUNTRY AND ABROAD…

Imports of value added

22% from EU

Rest of Spain, 54%
United Kingdom, 3%
China , 4%
France, 4%
Germany, 7%

Imports of employment

13% from EU

Rest of the World, 23%
Rest of Spain, 37%
China , 9%
South East Asia, 7%
South America, 2%
Germany, 3%
Rest of Asia, 4%
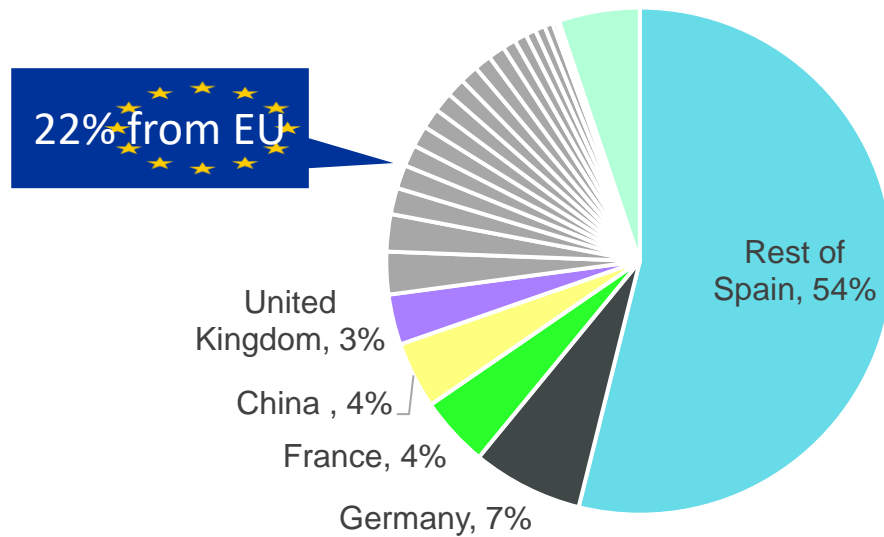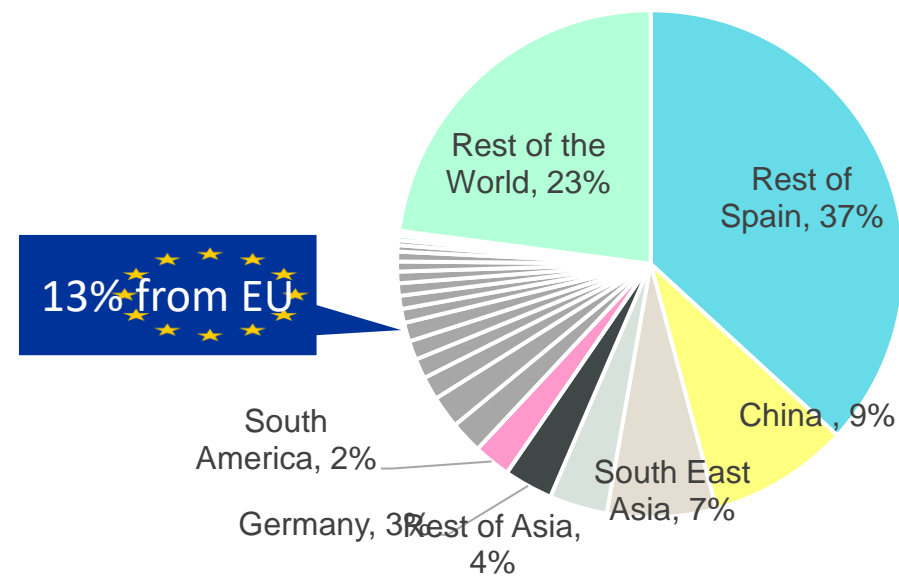
76% of the value added needed to satisfy Basque final demand comes from the European Union and the RoS. Nevertheless, in terms of employment the contribute 50%.

FORMULA TO DECOMPOSE EXPORTS (ADR, 2019)

$$e_i^{rs} = \underbrace{\sum_{h,j,k} \sum_{p,q} v_h^r (b_{hi}^{rr} - l_{hi}^{rr}) a_{ij}^{rs} b_{jk}^{sp} y_k^{pq}}_{1} + \underbrace{\sum_{h,j,k} \sum_{p,q} v_h^r l_{hi}^{rr} a_{ij}^{rs} b_{jk}^{sp} y_k^{pq}}_{2}$$

$$+ \underbrace{\sum_{f,g,h,j,k} \sum_{p,q,z \neq r, t \neq r} v_f^t \left(b_{fg}^{tz} - c_{fg}^{(r)tz} \right) a_{gh}^{zr} l_{hi}^{rr} a_{ij}^{rs} b_{jk}^{sp} y_k^{pq}}_{3}$$

$$+ \underbrace{\sum_{f,g,h,j,k} \sum_{p,q,z \neq r, t \neq r} v_f^t c_{fg}^{(r)tz} a_{gh}^{zr} l_{hi}^{rr} a_{ij}^{rs} b_{jk}^{sp} y_k^{pq}}_{4}$$

$$+ \underbrace{\sum_{h} v_h^r (b_{hi}^{rr} - l_{hi}^{rr}) y_i^{rs}}_{5} + \underbrace{\sum_{h} v_h^r l_{hi}^{rr} y_i^{rs}}_{6}$$

$$+ \underbrace{\sum_{f,g,h} \sum_{z \neq r, t \neq r} v_f^t \left(b_{fg}^{tz} - c_{fg}^{(r)tz} \right) a_{gh}^{zr} l_{hi}^{rr} y_i^{rs}}_{7}$$

$$+ \underbrace{\sum_{f,g,h} \sum_{z \neq r, t \neq r} v_f^t c_{fg}^{(r)tz} a_{gh}^{zr} l_{hi}^{rr} y_i^{rs}}_{8}$$

According to this expression, exports of the industry *i* from country *r* to country *s* are the summation of eight elements, grouped in three components:

THE DOMESTIC COMPONENT

$$e_i^{rs} = \underbrace{\sum_{h,j,k} \sum_{p,q} v_h^r (b_{hi}^{rr} - l_{hi}^{rr}) a_{ij}^{rs} b_{jk}^{sp} y_k^{pq}}_{1} + \underbrace{\sum_{h,j,k} \sum_{p,q} v_h^r l_{hi}^{rr} a_{ij}^{rs} b_{jk}^{sp} y_k^{pq}}_{2}$$

$$+ \underbrace{\sum_{f,g,h,j,k} \sum_{p,q,z \neq r, t \neq r} v_f^t \left(b_{fg}^{tz} - c_{fg}^{(r)tz} \right) a_{gh}^{zr} l_{hi}^{rr} a_{ij}^{rs} b_{jk}^{sp} y_k^{pq}}_{3}$$

$$+ \underbrace{\sum_{f,g,h,j,k} \sum_{p,q,z \neq r, t \neq r} v_f^t c_{fg}^{(r)tz} a_{gh}^{zr} l_{hi}^{rr} a_{ij}^{rs} b_{jk}^{sp} y_k^{pq}}_{4}$$

$$+ \underbrace{\sum_h v_h^r (b_{hi}^{rr} - l_{hi}^{rr}) y_i^{rs}}_{5} + \underbrace{\sum_h v_h^r l_{hi}^{rr} y_i^{rs}}_{6}$$

$$+ \underbrace{\sum_{f,g,h} \sum_{z \neq r, t \neq r} v_f^t \left(b_{fg}^{tz} - c_{fg}^{(r)tz} \right) a_{gh}^{zr} l_{hi}^{rr} y_i^{rs}}_{7}$$

$$+ \underbrace{\sum_{f,g,h} \sum_{z \neq r, t \neq r} v_f^t c_{fg}^{(r)tz} a_{gh}^{zr} l_{hi}^{rr} y_i^{rs}}_{8}$$

Domestic impact. E.g.: VA in the Basque sector (r) of engineering (h), associated to the exports of the Basque sector (r) of de la metallurgy (i) to Polish sector (s) of automotive sector (j), and that ends up in the French (q) final demand of German (p) cars (k)

THE FOREIGN COMPONENT

$$e_i^{rs} = \underbrace{\sum_{h,j,k}\sum_{p,q} v_h^r(b_{hi}^{rr} - l_{hi}^{rr})a_{ij}^{rs}b_{jk}^{sp}y_k^{pq}}_{1} + \underbrace{\sum_{h,j,k}\sum_{p,q} v_h^r l_{hi}^{rr}a_{ij}^{rs}b_{jk}^{sp}y_k^{pq}}_{2}$$

$$+ \underbrace{\sum_{f,g,h,j,k}\sum_{p,q,z\neq r,t\neq r} v_f^t\left(b_{fg}^{tz} - c_{fg}^{(r)tz}\right)a_{gh}^{zr}l_{hi}^{rr}a_{ij}^{rs}b_{jk}^{sp}y_k^{pq}}_{3}$$

$$+ \underbrace{\sum_{f,g,h,j,k}\sum_{p,q,z\neq r,t\neq r} v_f^t c_{fg}^{(r)tz}a_{gh}^{zr}l_{hi}^{rr}a_{ij}^{rs}b_{jk}^{sp}y_k^{pq}}_{4}$$

$$+ \underbrace{\sum_{h} v_h^r(b_{hi}^{rr} - l_{hi}^{rr})y_i^{rs}}_{5} + \underbrace{\sum_{h} v_h^r l_{hi}^{rr}y_i^{rs}}_{6}$$

$$+ \underbrace{\sum_{f,g,h}\sum_{z\neq r,t\neq r} v_f^t\left(b_{fg}^{tz} - c_{fg}^{(r)tz}\right)a_{gh}^{zr}l_{hi}^{rr}y_i^{rs}}_{7}$$

$$+ \underbrace{\sum_{f,g,h}\sum_{z\neq r,t\neq r} v_f^t c_{fg}^{(r)tz}a_{gh}^{zr}l_{hi}^{rr}y_i^{rs}}_{8}$$

Imports to produce exports. This component is an indicator of both the degree of dependence on exports of supplies from other regions, and the level of vertical integration. E.g.: VA in the plastics sector (f) of Germany (t), associated to the imports of office supplies (g) from France (z) of the Basque sector (r) of engineering (h), and that is associated to the exports of the Basque sector (r) of metallurgy (i) to the Polish sector (s) of automotive components (j), that ends up in the French (q) final demand of German (p) cars (k)

AND DOUBLE COUNTING

$$e_i^{rs} = \underbrace{\sum_{h,j,k} \sum_{p,q} v_h^r (b_{hi}^{rr} - l_{hi}^{rr}) a_{ij}^{rs} b_{jk}^{sp} y_k^{pq}}_{1} + \underbrace{\sum_{h,j,k} \sum_{p,q} v_h^r l_{hi}^{rr} a_{ij}^{rs} b_{jk}^{sp} y_k^{pq}}_{2}$$

$$+ \underbrace{\sum_{f,g,h,j,k} \sum_{p,q,z \neq r, t \neq r} v_f^t \left(b_{fg}^{tz} - c_{fg}^{(r)tz} \right) a_{gh}^{zr} l_{hi}^{rr} a_{ij}^{rs} b_{jk}^{sp} y_k^{pq}}_{3}$$

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$$+ \underbrace{\sum_{h} v_h^r (b_{hi}^{rr} - l_{hi}^{rr}) y_i^{rs}}_{5} + \underbrace{\sum_{h} v_h^r l_{hi}^{rr} y_i^{rs}}_{6}$$

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$$+ \underbrace{\sum_{f,g,h} \sum_{z \neq r, t \neq r} v_f^t c_{fg}^{(r)tz} a_{gh}^{zr} l_{hi}^{rr} y_i^{rs}}_{8}$$

Value of exports that cross the border several times. For example, VA in exports of steel from the Basque Country to Poland (1st time) which is used in Poland to produce automotive components that are exported to the Basque Country and are used to produce vehicles that are exported to France (2nd time).