

German Firms in International Trade: Evidence from Recent Transaction-level Data

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Motivation

- Recent theoretical literature on heterogeneous firms highly influenced by empirical findings from micro-level data [Melitz \(2003\)](#), [Bernard and Jensen \(1995, 1999\)](#)
 - Internationally active firms differ substantially from purely domestic firms
 - Within the group of internationally active firms, activities are highly concentrated
- Customs transaction data has been used to explore the role of firms for a number of developing countries, but also developed countries such as
 - United States (US) in 1997 and 2007 [Bernard et al. \(2007, 2018\)](#)
 - France in 2003 [Mayer and Ottaviano \(2008\)](#)
 - Hungary in 1999 [Békés et al. \(2011\)](#)
- We use German transaction-level data for the year 2018 to explore the differences in activities within the group of trading German firms
 - Largest European economy
 - Third largest exporter and importer of the world after China and the US
 - Very recent period after the financial crisis

German transaction-level data

- Covers most in- and outgoing German extra-EU transactions (some transactions cannot be assigned to firms) and a large proportion of German intra-EU transactions (due to reporting thresholds and practices) for the years 2009-2018
- For each export/import transaction, we observe i.a. time (month/year), German firm ID, 8-digit product ID, country of origin/destination, and transaction value
- Via firm ID, we can merge information on main economic activity according to the Statistical Classification of Economic Activities in the European Community (NACE, Rev. 2) from firm register data
 - Allows to distinguish manufacturing firms from wholesale and retail firms
[Bernard et al. \(2010, 2015\)](#)
- Earlier versions have been used to answer a whole array of specific questions related to firm heterogeneity [Wagner \(2016, 2019, 2021\)](#), [Schank et al. \(2007\)](#)

This paper

- Focus on the most recent year available (2018; we will update this to 2019 in the upcoming version of the paper)
- Detailed dissection of German exports and imports along multiple firm-level margins
 - Who trades what?
 - Trade by firm categories (manufacturing, wholesaler, retailer, rest)
 - Trade by product types (HS sections: 22 categories)
 - Trade by firm categories and product types
 - Margin decompositions
 - Joint country-product distributions
- Coherent „grand picture“ of recent German firm-level trade

Data

The main data: AH-Core (AH for Außenhandel)

- Prepared by the German Federal Statistical Office
- Problem 1: Intra-EU trade value can be collectively reported by a conglomerate in the raw data → distribution to subsidiaries using additional data
- Problem 2: Unlike extra-EU trade, where tariffs require precise data collection, intra-EU trade is only recorded when firms surpass specific reporting thresholds → redistribution using VAT data [Kruse et al. \(2021\)](#)
- Subject to continuous updates
- Will be made available to the research community (2023?)

| 2018 Coverage | Extra | Intra |
|---------------|---------------|---------------|
| Exports | 85.38 (87.86) | 77.78 (82.73) |
| Imports | 82.67 (87.34) | 79.44 (83.48) |

Data Infrastructure

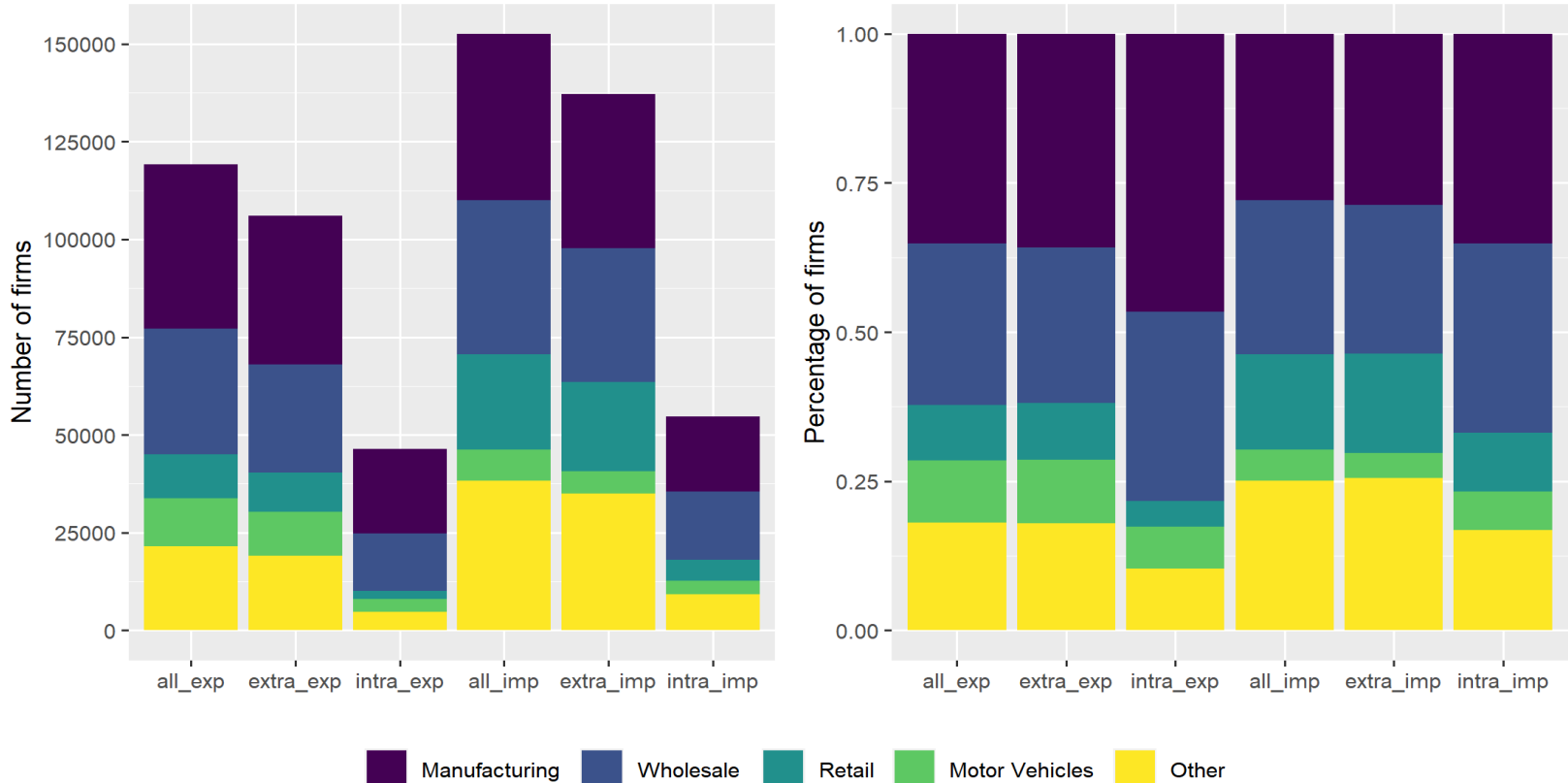
- **AH-Core** (extra- and intra-EU trade subject to restrictions, mergeable)
- AH-Extra (almost 100% coverage of extra-EU trade, not mergeable)
- **AH-Steuer** (intra-EU trade below reporting thresholds, no product info)
- **URS-Merkmale** (basic firm information such as sector, revenue, state, employees)
- Invest-Core (detailed investment data, not all firms/sectors)
- Produktionsmerkmale (product-level production values and quantities, not all firms/sectors)
- Eventually: Bundesbank data on trade in services

Who trades what?

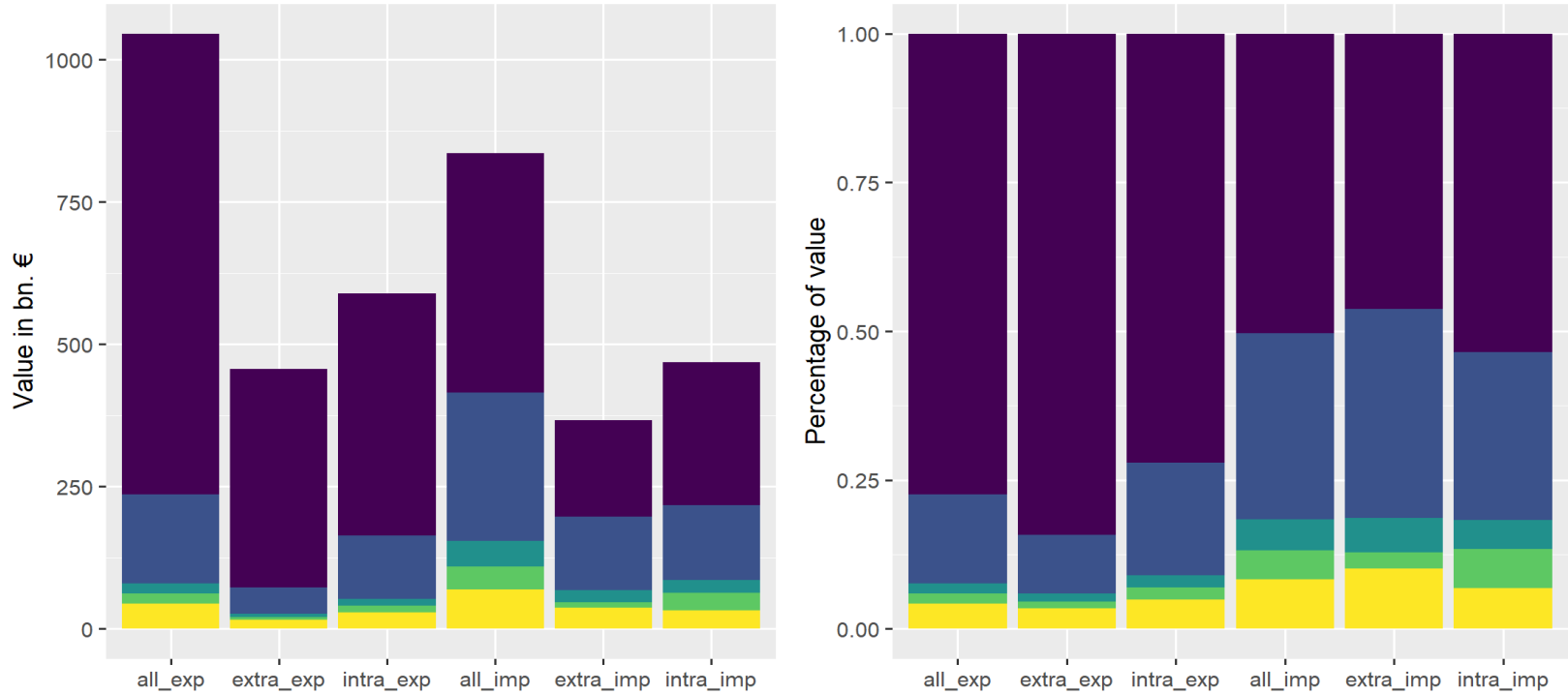
Trade by firm categories

- Merge firms' **primary economic activity**
 - Five categories (Manufacturing, Wholesale, Retail, Vehicles, Others)
Bernard et al. (2010), Blum et al. (2010), etc.
- Focus for now on the **firms** (ignoring information about products): What are the differences in the trade activities of manufacturing firms vs. wholesalers/retailers?
- We count for each firm category and trade direction:
 - the **number of trading firms** in total, extra-EU and intra-EU
 - the **value of traded goods** in total, extra-EU and intra-EU

Trade by firm categories: Firms (2018)



Trade by firm categories: Value (2018)



Manufacturing
 Wholesale
 Retail
 Motor Vehicles
 Other

Trade by firm categories

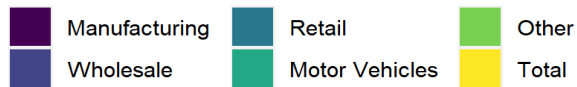
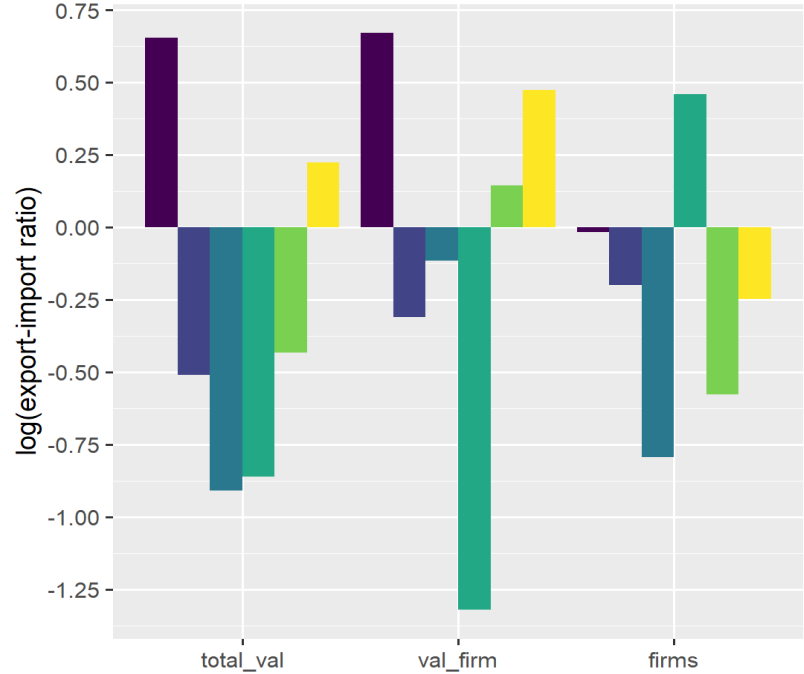
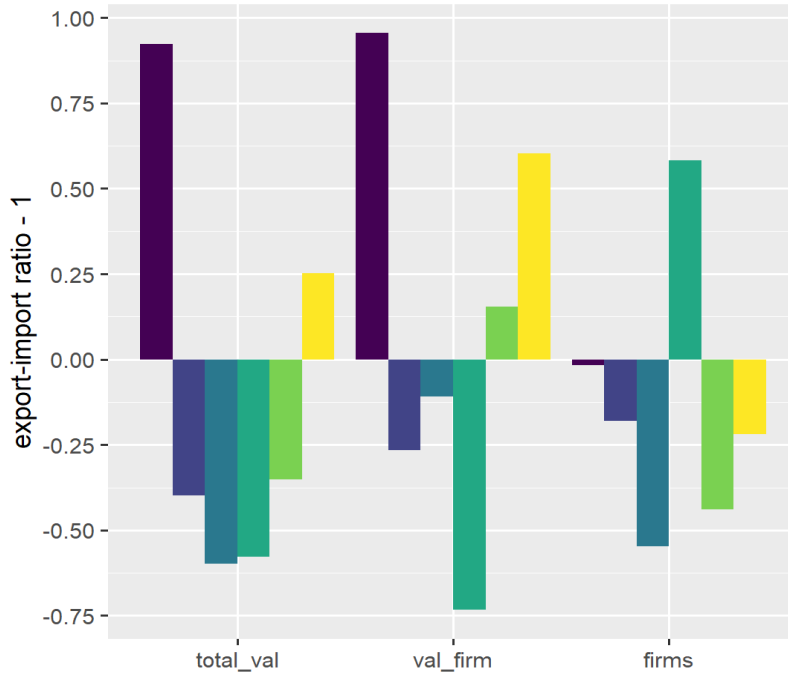
| Firm Category | All Trade | | Extra-EU | | Intra-EU | |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | # of exporters | # of importers | # of exporters | # of importers | # of exporters | # of importers |
| Manufacturing | 41,908 | 42,605 | 38,045 | 39,325 | 21,628 | 19,243 |
| Wholesale | 32,273 | 39,386 | 27,590 | 34,272 | 14,698 | 17,390 |
| Retail | 11,066 | 24,467 | 10,017 | 22,751 | 1,973 | 5,374 |
| Motor Vehicles | 12,341 | 7,796 | 11,323 | 5,762 | 3,292 | 3,551 |
| Other | 21,520 | 38,345 | 19,043 | 35,000 | 4,775 | 9,194 |
| Total | 119,108 | 152,599 | 106,018 | 137,110 | 46,366 | 54,752 |

| Firm Category | Exports (bn. €) | Extra-EU share | Imports (bn. €) | Extra-EU share |
|----------------|-----------------|----------------|-----------------|----------------|
| Manufacturing | 809.4 | 47.5% | 420.7 | 40.3% |
| Wholesale | 156.7 | 28.8% | 260.8 | 49.4% |
| Retail | 17.8 | 34.3% | 44.2 | 47.7% |
| Motor Vehicles | 17.2 | 30.2% | 40.7 | 24.8% |
| Other | 44.8 | 35.3% | 69.1 | 53.5% |
| Total | 1045.9 | 43.7% | 835.5 | 43.9% |

Trade by firm categories

- In total, we have 119k exporting and 153k importing firms in the data
- Intra-EU trade somewhat underrepresented due to **reporting limits**
- **Exports**: Most firms active in manufacturing and wholesale; ca. 80% of the export value from the manufacturing sector (about half of this goes to non-EU destinations)
- **Imports**: relatively more retailers and other firms; only 50% of the import volume comes from manufacturing firms (about half of this comes from non-EU origins), a third comes from wholesalers (thereof only one quarter from non-EU origins)

Trade surplus (2018)



Trade surplus

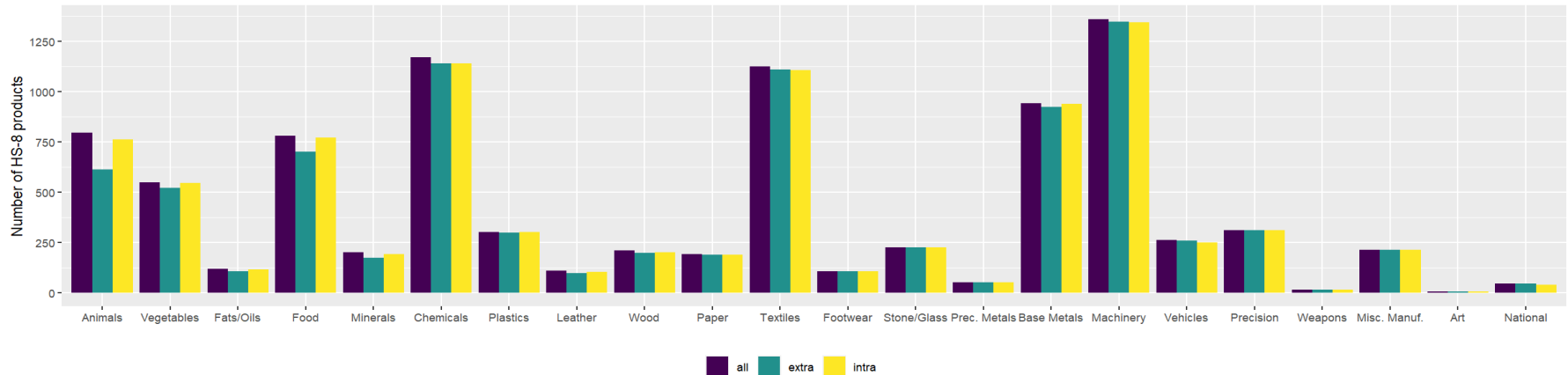
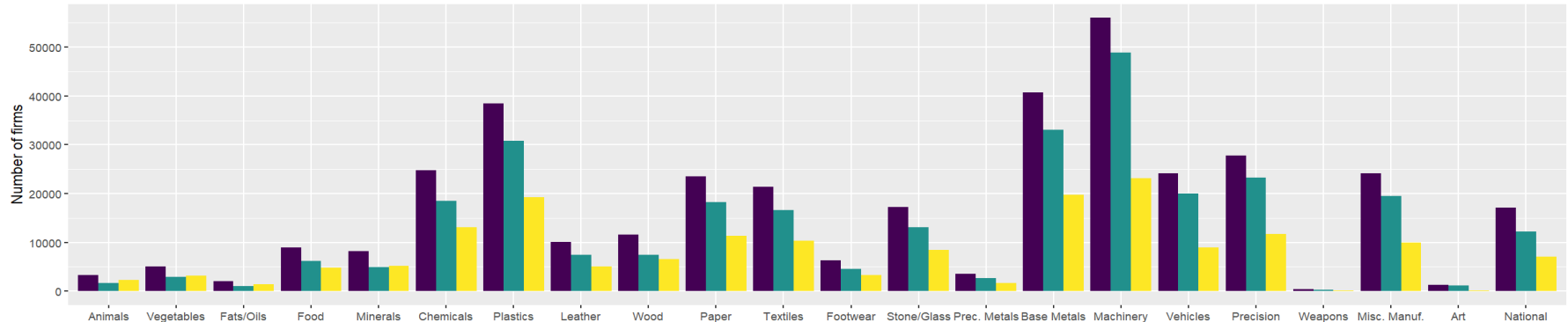
| | Ratio of exports to imports | | |
|---------------|-----------------------------|-----------------|-----------------|
| Firm Category | Total values | Values per firm | Number of firms |
| Manufacturing | 1.924 | 1.956 | 0.984 |
| Wholesale | 0.601 | 0.733 | 0.819 |
| Retail | 0.403 | 0.890 | 0.452 |
| Vehicles | 0.423 | 0.297 | 1.583 |
| Other | 0.648 | 1.155 | 0.561 |
| Total | 1.252 | 1.604 | 0.781 |

- Overall trade surplus driven by an overproportionately large intensive margin surplus
- Strongest surplus found in manufacturing, driven entirely by the intensive margin
- All other sectors actually exhibit trade deficits

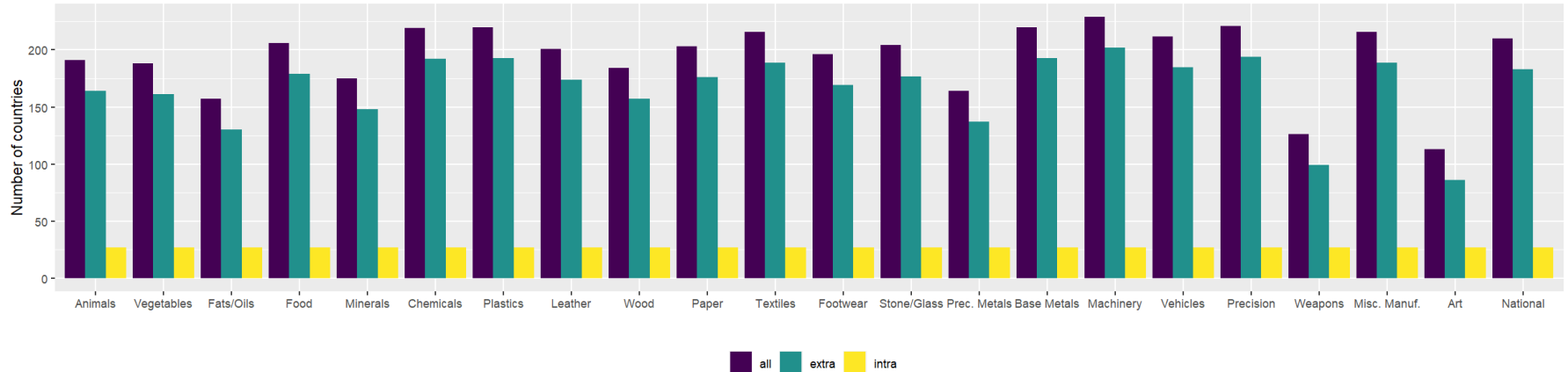
Trade by product types

- Focus now on the **traded products**
- We switch the scope of our analysis to the **HS section** level
 - 22 product sections (21 standard + 1 national categories)
- We count for each product group and trade direction:
 - the number of trading firms
 - the number of traded 8-digit products (within the HS section)
 - the number of partner countries

Trade by product types: Exports (2018)



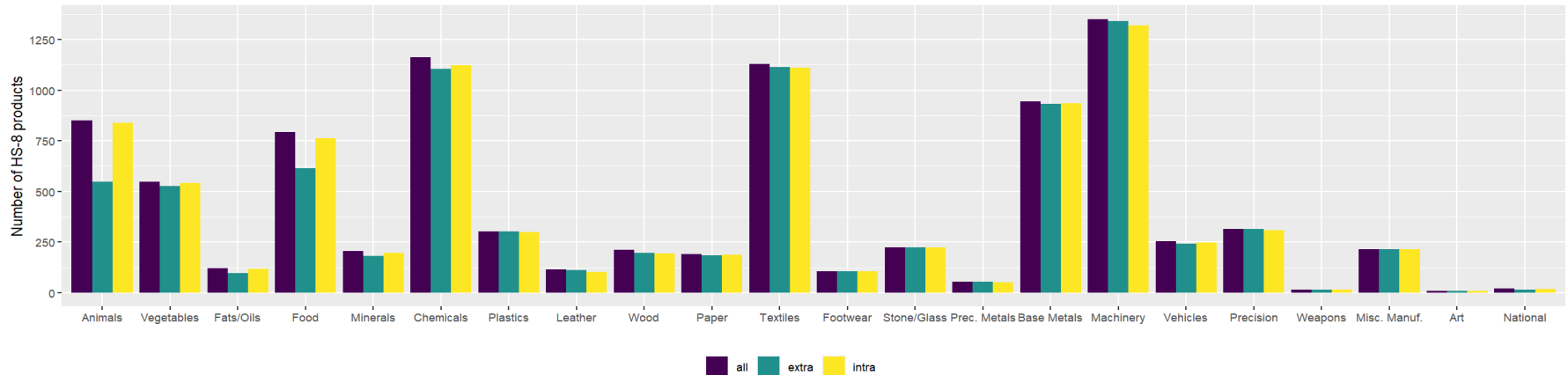
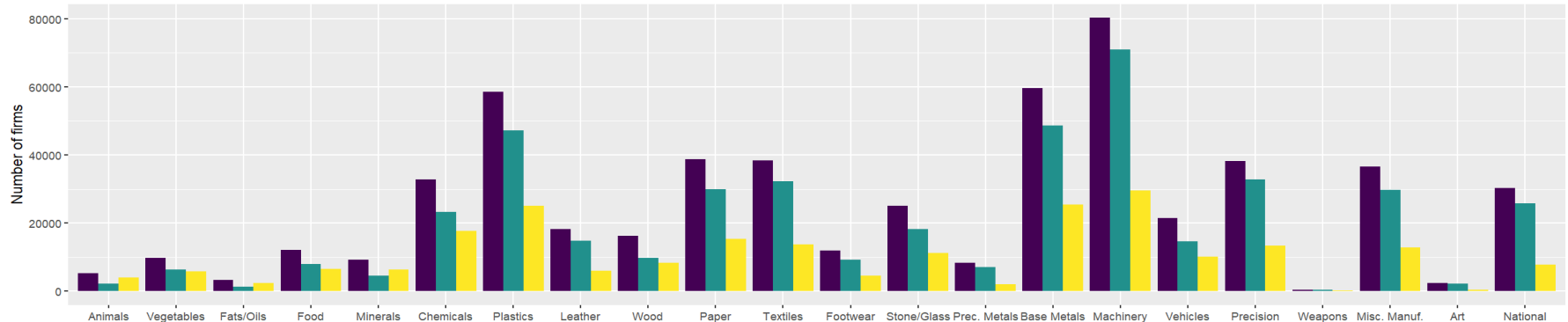
Trade by product types: Exports (2018)



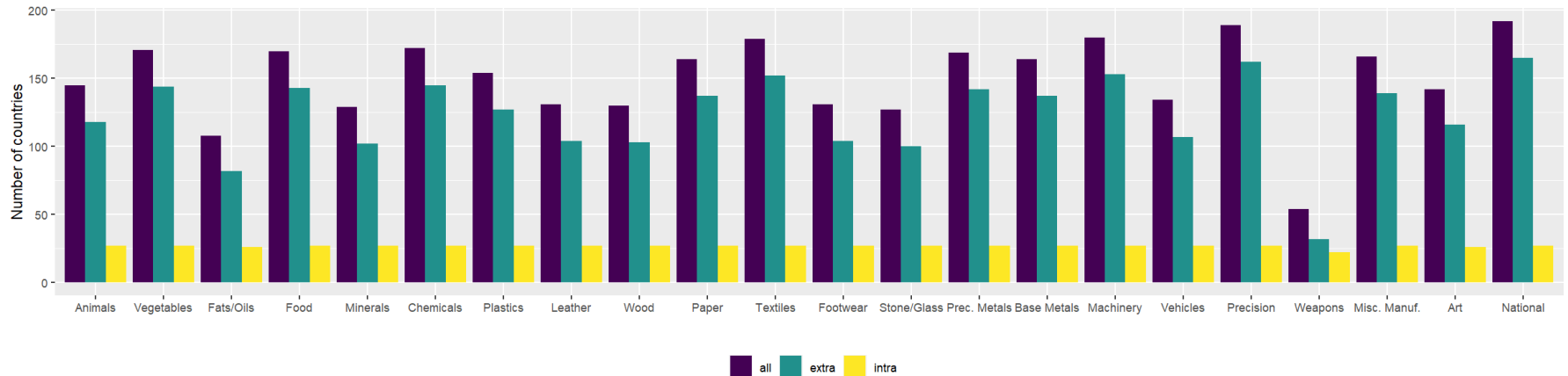
Trade by product types: Exports

| HS Section | Description | Number of firms | | | Number of products | | | | Number of countries | | |
|------------|-------------------------------------|-----------------|----------------|---------------|--------------------|--------------|--------------|--------------|---------------------|------------|-----------|
| | | Total | Extra-EU | Intra-EU | Maximum | Total | Extra-EU | Intra-EU | Total | Extra-EU | Intra-EU |
| | 1 Live Animals; Animal Products | 3,273 | 1,664 | 2,232 | 953 | 797 | 613 | 763 | 191 | 164 | 27 |
| | 2 Vegetable Products | 5,018 | 2,902 | 3,158 | 550 | 550 | 520 | 546 | 188 | 161 | 27 |
| | 3 Animal or Vegetable Fats and Oils | 2,076 | 1,054 | 1,438 | 129 | 118 | 106 | 115 | 157 | 130 | 27 |
| | 4 Food, Beverages, Tobacco | 8,979 | 6,218 | 4,784 | 864 | 781 | 702 | 772 | 206 | 179 | 27 |
| | 5 Mineral Products | 8,193 | 4,910 | 5,216 | 233 | 200 | 172 | 193 | 175 | 148 | 27 |
| | 6 Chemical Products | 24,734 | 18,522 | 13,050 | 1,225 | 1,172 | 1,142 | 1,142 | 219 | 192 | 27 |
| | 7 Plastics and Rubber | 38,410 | 30,738 | 19,233 | 301 | 300 | 297 | 300 | 220 | 193 | 27 |
| | 8 Leather | 10,056 | 7,439 | 5,035 | 130 | 108 | 98 | 102 | 201 | 174 | 27 |
| | 9 Wood | 11,576 | 7,394 | 6,549 | 233 | 210 | 199 | 202 | 184 | 157 | 27 |
| | 10 Paper | 23,504 | 18,212 | 11,276 | 195 | 191 | 189 | 190 | 203 | 176 | 27 |
| | 11 Textiles | 21,340 | 16,569 | 10,369 | 1,140 | 1,126 | 1,110 | 1,108 | 216 | 189 | 27 |
| | 12 Footwear and Headgear | 6,300 | 4,543 | 3,246 | 106 | 106 | 106 | 106 | 196 | 169 | 27 |
| | 13 Stone Products | 17,178 | 13,041 | 8,494 | 234 | 225 | 225 | 224 | 204 | 177 | 27 |
| | 14 Precious Metals | 3,495 | 2,619 | 1,618 | 56 | 51 | 50 | 51 | 164 | 137 | 27 |
| | 15 Base Metals | 40,695 | 33,070 | 19,708 | 950 | 943 | 925 | 940 | 220 | 193 | 27 |
| | 16 Machinery and Electronics | 56,015 | 48,853 | 23,089 | 1,362 | 1,361 | 1,349 | 1,344 | 229 | 202 | 27 |
| | 17 Vehicles | 24,117 | 19,985 | 8,884 | 268 | 262 | 258 | 251 | 212 | 185 | 27 |
| | 18 Precision Instruments | 27,754 | 23,285 | 11,687 | 313 | 312 | 311 | 310 | 221 | 194 | 27 |
| | 19 Weapons | 371 | 247 | 203 | 16 | 16 | 16 | 16 | 126 | 99 | 27 |
| | 20 Miscellaneous Manufacturing | 24,092 | 19,528 | 9,971 | 214 | 214 | 214 | 213 | 216 | 189 | 27 |
| | 21 Art | 1,230 | 1,158 | 147 | 7 | 7 | 7 | 7 | 113 | 86 | 27 |
| | 22 National Categories | 17,079 | 12,222 | 7,006 | NA | 44 | 44 | 39 | 210 | 183 | 27 |
| | Total | 119,108 | 106,018 | 46,366 | 9,479 | 9,094 | 8,653 | 8,934 | 243 | 216 | 27 |

Trade by product types: Imports (2018)



Trade by product types: Imports (2018)



Trade by product types: Imports

| HS Section | Description | Number of firms | | | Number of products | | | Number of countries | | | |
|------------|-------------------------------------|-----------------|----------------|---------------|--------------------|--------------|--------------|---------------------|------------|------------|-----------|
| | | Total | Extra-EU | Intra-EU | Maximum | Total | Extra-EU | Intra-EU | Total | Extra-EU | Intra-EU |
| | 1 Live Animals; Animal Products | 5,274 | 2,245 | 3,992 | 953 | 851 | 548 | 837 | 145 | 118 | 27 |
| | 2 Vegetable Products | 9,675 | 6,426 | 5,722 | 550 | 549 | 526 | 542 | 171 | 144 | 27 |
| | 3 Animal or Vegetable Fats and Oils | 3,312 | 1,353 | 2,411 | 129 | 122 | 97 | 117 | 108 | 82 | 26 |
| | 4 Food, Beverages, Tobacco | 12,028 | 7,876 | 6,525 | 864 | 793 | 614 | 762 | 170 | 143 | 27 |
| | 5 Mineral Products | 9,228 | 4,558 | 6,418 | 233 | 205 | 182 | 195 | 129 | 102 | 27 |
| | 6 Chemical Products | 32,763 | 23,243 | 17,598 | 1,225 | 1,162 | 1,106 | 1,124 | 172 | 145 | 27 |
| | 7 Plastics and Rubber | 58,502 | 47,216 | 25,112 | 301 | 301 | 301 | 298 | 154 | 127 | 27 |
| | 8 Leather | 18,218 | 14,752 | 5,893 | 130 | 116 | 112 | 101 | 131 | 104 | 27 |
| | 9 Wood | 16,159 | 9,804 | 8,355 | 233 | 210 | 197 | 193 | 130 | 103 | 27 |
| | 10 Paper | 38,740 | 29,968 | 15,310 | 195 | 191 | 183 | 188 | 164 | 137 | 27 |
| | 11 Textiles | 38,458 | 32,249 | 13,773 | 1,140 | 1,129 | 1,113 | 1,110 | 179 | 152 | 27 |
| | 12 Footwear and Headgear | 11,989 | 9,275 | 4,544 | 106 | 106 | 106 | 106 | 131 | 104 | 27 |
| | 13 Stone Products | 25,012 | 18,200 | 11,242 | 234 | 225 | 225 | 223 | 127 | 100 | 27 |
| | 14 Precious Metals | 8,334 | 7,135 | 1,979 | 56 | 54 | 54 | 51 | 169 | 142 | 27 |
| | 15 Base Metals | 59,530 | 48,556 | 25,353 | 950 | 946 | 931 | 936 | 164 | 137 | 27 |
| | 16 Machinery and Electronics | 80,266 | 70,939 | 29,615 | 1,362 | 1,351 | 1,341 | 1,321 | 180 | 153 | 27 |
| | 17 Vehicles | 21,387 | 14,671 | 10,205 | 268 | 254 | 241 | 249 | 134 | 107 | 27 |
| | 18 Precision Instruments | 38,122 | 32,726 | 13,307 | 313 | 313 | 313 | 309 | 189 | 162 | 27 |
| | 19 Weapons | 454 | 370 | 143 | 16 | 16 | 16 | 16 | 54 | 32 | 22 |
| | 20 Miscellaneous Manufacturing | 36,489 | 29,664 | 12,804 | 214 | 214 | 214 | 214 | 166 | 139 | 27 |
| | 21 Art | 2,358 | 2,140 | 341 | 7 | 7 | 7 | 7 | 142 | 116 | 26 |
| | 22 National Categories | 30,211 | 25,704 | 7,835 | NA | 21 | 15 | 19 | 192 | 165 | 27 |
| | Total | 152,599 | 137,110 | 54,752 | 9,479 | 9,136 | 8,442 | 8,918 | 243 | 216 | 27 |

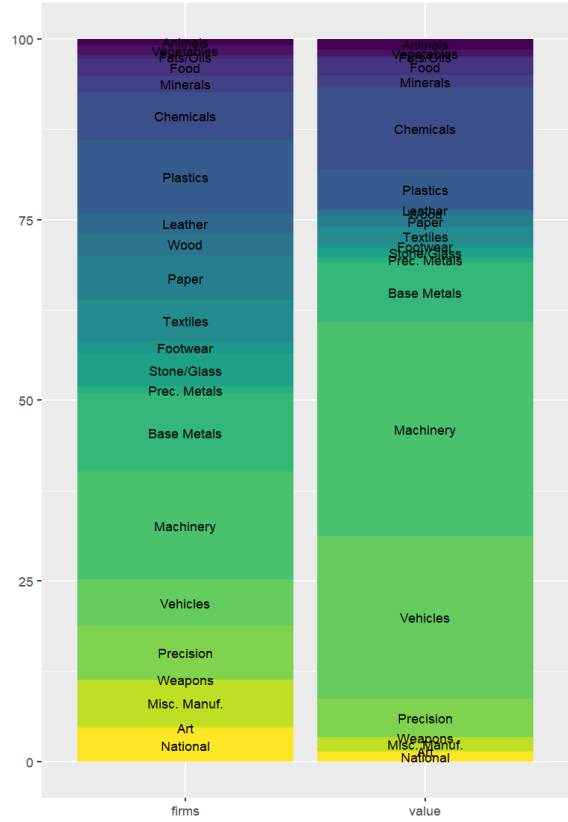
Trade by product types

- Almost half of all firms export **machinery and electronics** products
- There, as in most other product groups, the exported products are **well balanced** (almost all products are exported by at least one German firm) and have their destinations **all over the world**
- More than half of all importing firms also source machinery and electronics products, suggesting a strong presence of **intra-industry trade** and input-output linkages

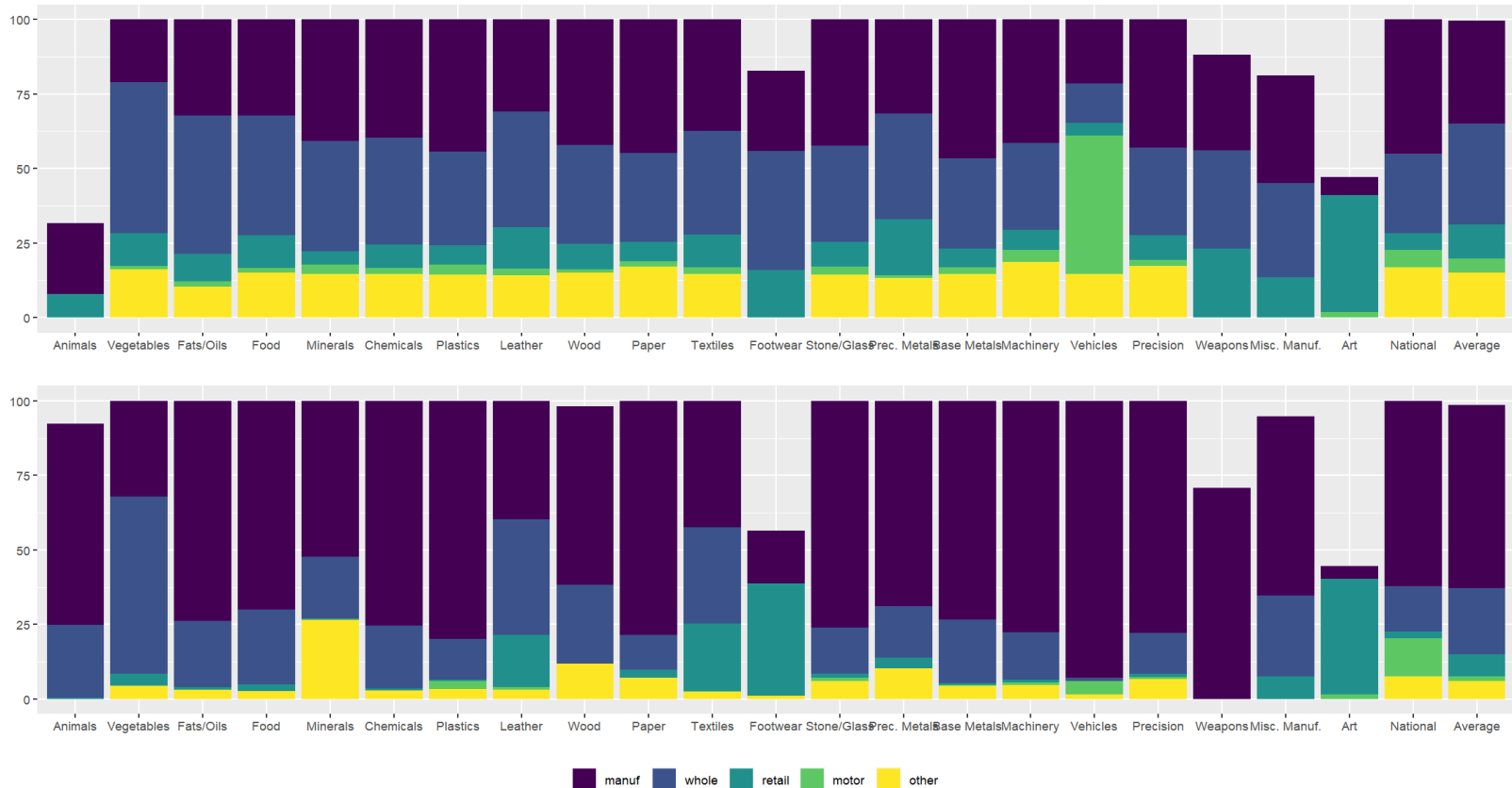
Trade by firm categories and product types

- Focus now simultaneously on both dimensions: **Who** (firms in their categories) trades **what** (products in their HS sections)?
- We compute for each product group and trade direction:
 - the relative composition of trade (number of firms and value) **across all firm categories** (first two columns, columns sum to 100%)
 - the relative composition of trade (number of firms and value) **within the firm categories** (remaining columns, rows sum to 100%)

Trade by firm categories and product types: Exports (2018)



Trade by firm categories and product types: Exports (2018)



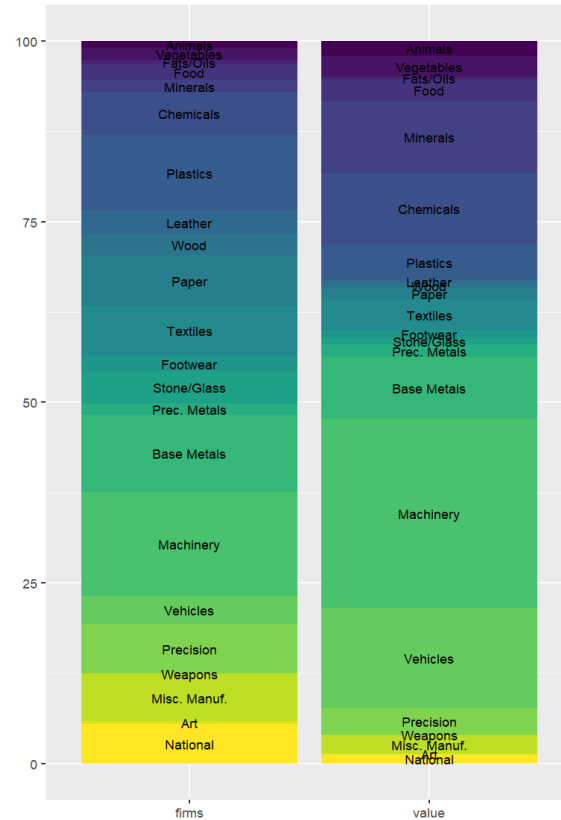
Trade by firm categories and product types: Exports

| HS Section | Description | Total | | Manufacturing | | Wholesale | | Retail | | Motor Vehicles | | Other | |
|------------|-----------------------------------|---------------|---------------|---------------|--------------|--------------|--------------|--------------|-------------|----------------|-------------|--------------|-------------|
| | | Exporters | Exports | Exporters | Exports | Exporters | Exports | Exporters | Exports | Exporters | Exports | Exporters | Exports |
| 1 | Live Animals; Animal Products | 0.87 | 1.49 | 23.95 | 67.43 | 45.22 | 24.48 | 7.79 | 0.33 | NA | NA | NA | NA |
| 2 | Vegetable Products | 1.34 | 0.90 | 20.92 | 32.16 | 50.82 | 59.32 | 11.04 | NA | 1.00 | NA | 16.22 | 4.47 |
| 3 | Animal or Vegetable Fats and Oils | 0.55 | 0.15 | 32.27 | 73.89 | 46.44 | 22.09 | 9.10 | 0.91 | 1.78 | 0.00 | 10.40 | 3.11 |
| 4 | Food, Beverages, Tobacco | 2.39 | 2.52 | 32.26 | 69.98 | 40.06 | 25.08 | 11.08 | 2.25 | 1.44 | 0.03 | 15.16 | 2.65 |
| 5 | Mineral Products | 2.18 | 1.64 | 40.69 | 52.23 | 37.13 | 20.85 | 4.46 | 0.14 | 3.19 | 0.37 | 14.54 | 26.41 |
| 6 | Chemical Products | 6.59 | 11.36 | 39.65 | 75.28 | 35.92 | 21.20 | 7.86 | 0.56 | 1.97 | 0.06 | 14.60 | 2.91 |
| 7 | Plastics and Rubber | 10.23 | 5.48 | 44.32 | 79.80 | 31.49 | 13.76 | 6.34 | 0.54 | 3.39 | 2.54 | 14.46 | 3.37 |
| 8 | Leather | 2.68 | 0.24 | 30.93 | 39.62 | 38.77 | 38.80 | 13.78 | 17.55 | 2.36 | 0.95 | 14.16 | 3.08 |
| 9 | Wood | 3.08 | 0.67 | 42.02 | 59.94 | 33.22 | 26.32 | 8.47 | NA | 1.19 | NA | 15.10 | 11.91 |
| 10 | Paper | 6.26 | 1.62 | 44.81 | 78.49 | 29.89 | 11.66 | 6.50 | 2.65 | NA | NA | NA | NA |
| 11 | Textiles | 5.68 | 2.41 | 37.39 | 42.31 | 34.74 | 32.31 | 10.97 | 22.80 | 2.34 | 0.25 | 14.56 | 2.34 |
| 12 | Footwear and Headgear | 1.68 | 0.45 | 26.98 | 17.62 | 39.78 | 42.73 | 16.00 | 37.66 | 2.86 | 0.85 | 14.38 | 1.14 |
| 13 | Stone Products | 4.57 | 1.17 | 42.25 | 75.94 | 32.43 | 15.57 | 8.23 | 1.37 | 2.72 | 1.08 | 14.37 | 6.04 |
| 14 | Precious Metals | 0.93 | 0.86 | 31.50 | 68.83 | 35.57 | 17.23 | 18.77 | 3.73 | 0.97 | NA | 13.19 | NA |
| 15 | Base Metals | 10.84 | 8.17 | 46.68 | 73.36 | 30.15 | 21.41 | 6.29 | 0.57 | 2.17 | 0.24 | 14.71 | 4.42 |
| 16 | Machinery and Electronics | 14.92 | 29.66 | 41.50 | 77.60 | 28.97 | 15.88 | 6.93 | 1.01 | 3.93 | 0.85 | 18.67 | 4.66 |
| 17 | Vehicles | 6.42 | 22.50 | 21.49 | 92.90 | 13.29 | 1.05 | 4.18 | 0.14 | 46.43 | 4.29 | 14.61 | 1.62 |
| 18 | Precision Instruments | 7.39 | 5.33 | 43.01 | 77.91 | 29.42 | 13.53 | 8.21 | 1.26 | 1.99 | 0.55 | 17.37 | 6.76 |
| 19 | Weapons | 0.10 | 0.04 | 32.08 | 70.72 | 32.88 | NA | 23.18 | NA | NA | NA | NA | NA |
| 20 | Miscellaneous Manufacturing | 6.42 | 1.89 | 36.17 | 59.97 | 31.47 | 27.19 | 13.56 | 7.55 | 2.52 | NA | 16.28 | NA |
| 21 | Art | 0.33 | 0.07 | 5.93 | 4.11 | 9.67 | NA | 39.27 | NA | NA | NA | NA | NA |
| 22 | National Categories | 4.55 | 1.37 | 44.93 | 62.20 | 26.82 | 15.26 | 5.52 | 2.10 | 5.82 | 12.85 | 16.92 | 7.58 |
| | Total/Mean | 100.00 | 100.00 | 34.63 | 61.47 | 33.96 | 22.26 | 11.25 | 7.31 | 4.79 | 1.51 | 15.07 | 6.10 |

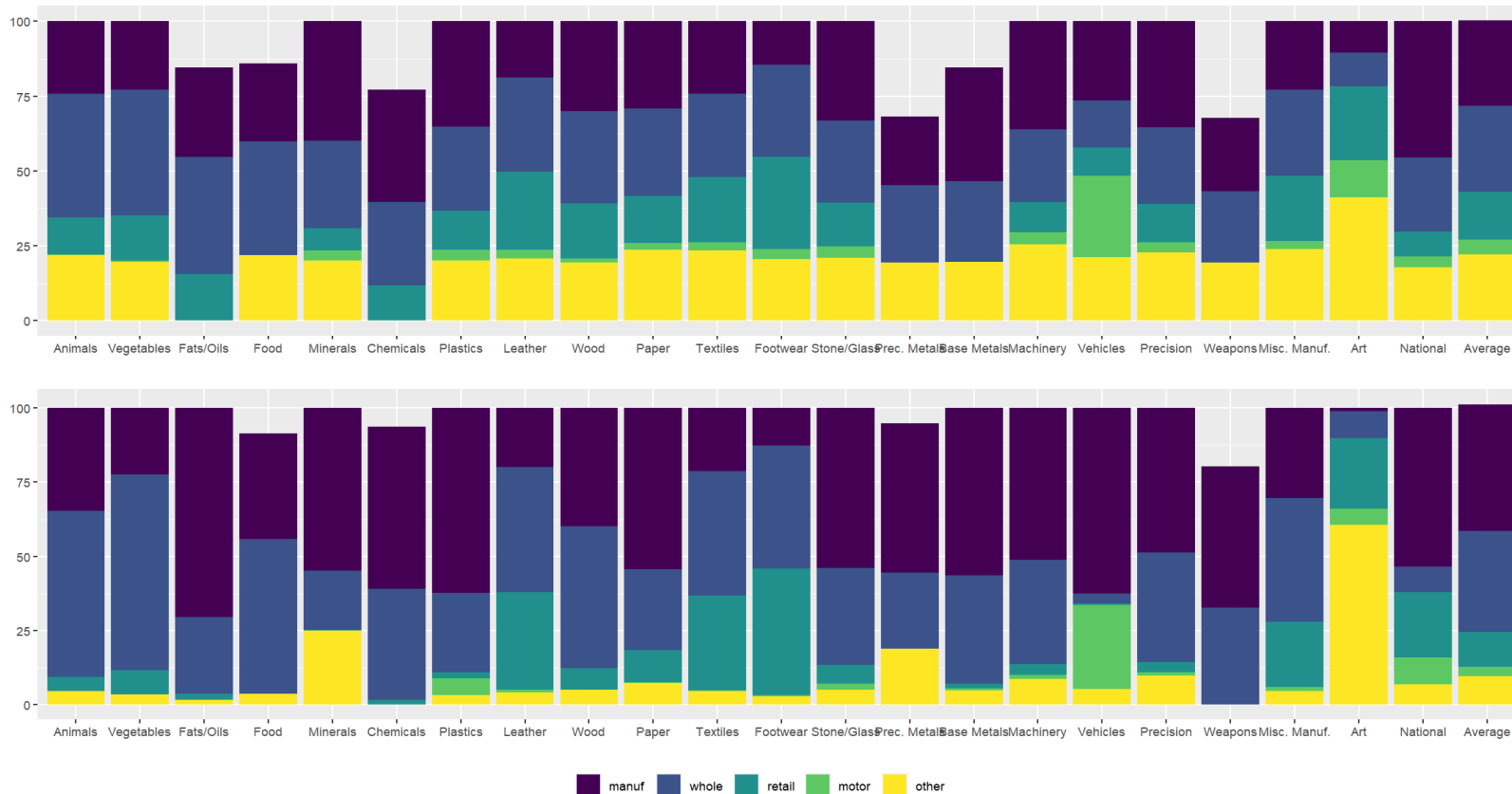
Trade by firm categories and product types: Exports

- About half of all exports are **machinery and electronics** or **vehicles**
- Here, firms export **overproportionately large trade volumes**, while this is reversed for most other product groups (except chemicals)
- For **vehicles**, 93% of volume is exported by manufacturing firms, although 46% of active firms are vehicles traders (only 4% of volume)

Trade by firm categories and product types: Imports (2018)



Trade by firm categories and product types: Imports (2018)



Trade by firm categories and product types: Imports

| HS Section | Description | Total | | Manufacturing | | Wholesale | | Retail | | Motor Vehicles | | Other | |
|------------|-----------------------------------|---------------|---------------|---------------|--------------|--------------|--------------|--------------|--------------|----------------|-------------|--------------|-------------|
| | | Importers | Imports | Importers | Imports | Importers | Imports | Importers | Imports | Importers | Imports | Importers | Imports |
| 1 | Live Animals; Animal Products | 0.95 | 2.06 | 24.16 | 34.67 | 41.39 | 56.09 | 12.31 | 4.66 | NA | NA | NA | NA |
| 2 | Vegetable Products | 1.74 | 2.91 | 22.80 | 22.37 | 42.12 | 66.12 | 14.96 | NA | 0.44 | NA | 19.68 | 3.44 |
| 3 | Animal or Vegetable Fats and Oils | 0.60 | 0.33 | 29.92 | 70.46 | 39.19 | 25.93 | 15.52 | 2.14 | 0.42 | 0.01 | 14.95 | 1.45 |
| 4 | Food, Beverages, Tobacco | 2.16 | 3.04 | 26.06 | 35.75 | 38.08 | 52.25 | 13.42 | 8.41 | 0.68 | 0.07 | 21.76 | 3.52 |
| 5 | Mineral Products | 1.66 | 9.93 | 39.89 | 54.87 | 29.28 | 19.95 | 7.40 | 0.17 | 3.46 | 0.02 | 19.97 | 25.00 |
| 6 | Chemical Products | 5.89 | 9.88 | 37.49 | 54.62 | 28.00 | 37.45 | 11.63 | 1.61 | 2.07 | 0.11 | 20.80 | 6.21 |
| 7 | Plastics and Rubber | 10.51 | 4.88 | 35.27 | 62.31 | 28.04 | 26.77 | 13.12 | 2.16 | 3.52 | 5.54 | 20.05 | 3.22 |
| 8 | Leather | 3.27 | 0.46 | 18.86 | 19.79 | 31.41 | 42.43 | 26.01 | 32.84 | 2.90 | 0.94 | 20.81 | 4.01 |
| 9 | Wood | 2.90 | 0.78 | 30.16 | 39.88 | 30.68 | 47.82 | 18.45 | NA | 1.25 | NA | 19.46 | 4.87 |
| 10 | Paper | 6.96 | 1.42 | 29.07 | 54.47 | 29.40 | 27.12 | 15.53 | 10.97 | NA | NA | NA | NA |
| 11 | Textiles | 6.91 | 4.36 | 24.26 | 21.36 | 27.74 | 41.90 | 21.93 | 32.07 | 2.55 | 0.27 | 23.52 | 4.40 |
| 12 | Footwear and Headgear | 2.15 | 0.94 | 14.52 | 12.69 | 30.89 | 41.42 | 30.78 | 42.73 | 3.26 | 0.49 | 20.55 | 2.68 |
| 13 | Stone Products | 4.49 | 1.06 | 33.28 | 53.87 | 27.41 | 32.86 | 14.47 | 6.22 | 3.98 | 2.05 | 20.87 | 4.99 |
| 14 | Precious Metals | 1.50 | 1.65 | 22.88 | 50.33 | 25.85 | 25.76 | 30.05 | 5.14 | 1.76 | NA | 19.46 | NA |
| 15 | Base Metals | 10.70 | 8.55 | 38.03 | 56.36 | 26.95 | 36.74 | 12.24 | 1.57 | 3.19 | 0.54 | 19.59 | 4.79 |
| 16 | Machinery and Electronics | 14.42 | 26.28 | 36.04 | 51.16 | 24.42 | 35.35 | 10.06 | 3.45 | 3.96 | 1.49 | 25.52 | 8.55 |
| 17 | Vehicles | 3.84 | 13.71 | 26.46 | 62.48 | 15.77 | 3.48 | 9.30 | 0.43 | 27.33 | 28.43 | 21.12 | 5.17 |
| 18 | Precision Instruments | 6.85 | 3.79 | 35.38 | 48.62 | 25.65 | 37.22 | 12.95 | 3.21 | 3.29 | 1.30 | 22.73 | 9.65 |
| 19 | Weapons | 0.08 | 0.02 | 24.45 | 47.52 | 23.79 | NA | 30.18 | NA | NA | NA | NA | NA |
| 20 | Miscellaneous Manufacturing | 6.56 | 2.60 | 22.88 | 30.30 | 28.82 | 41.81 | 21.81 | 22.04 | 2.65 | NA | 23.84 | NA |
| 21 | Art | 0.42 | 0.05 | 10.39 | 0.96 | 11.41 | NA | 24.64 | NA | NA | NA | NA | NA |
| 22 | National Categories | 5.43 | 1.29 | 45.51 | 53.40 | 24.83 | 8.63 | 8.19 | 22.01 | 3.56 | 9.15 | 17.91 | 6.80 |
| | Total/Mean | 100.00 | 100.00 | 28.53 | 42.65 | 28.69 | 34.05 | 16.06 | 11.97 | 4.82 | 3.18 | 22.15 | 9.42 |

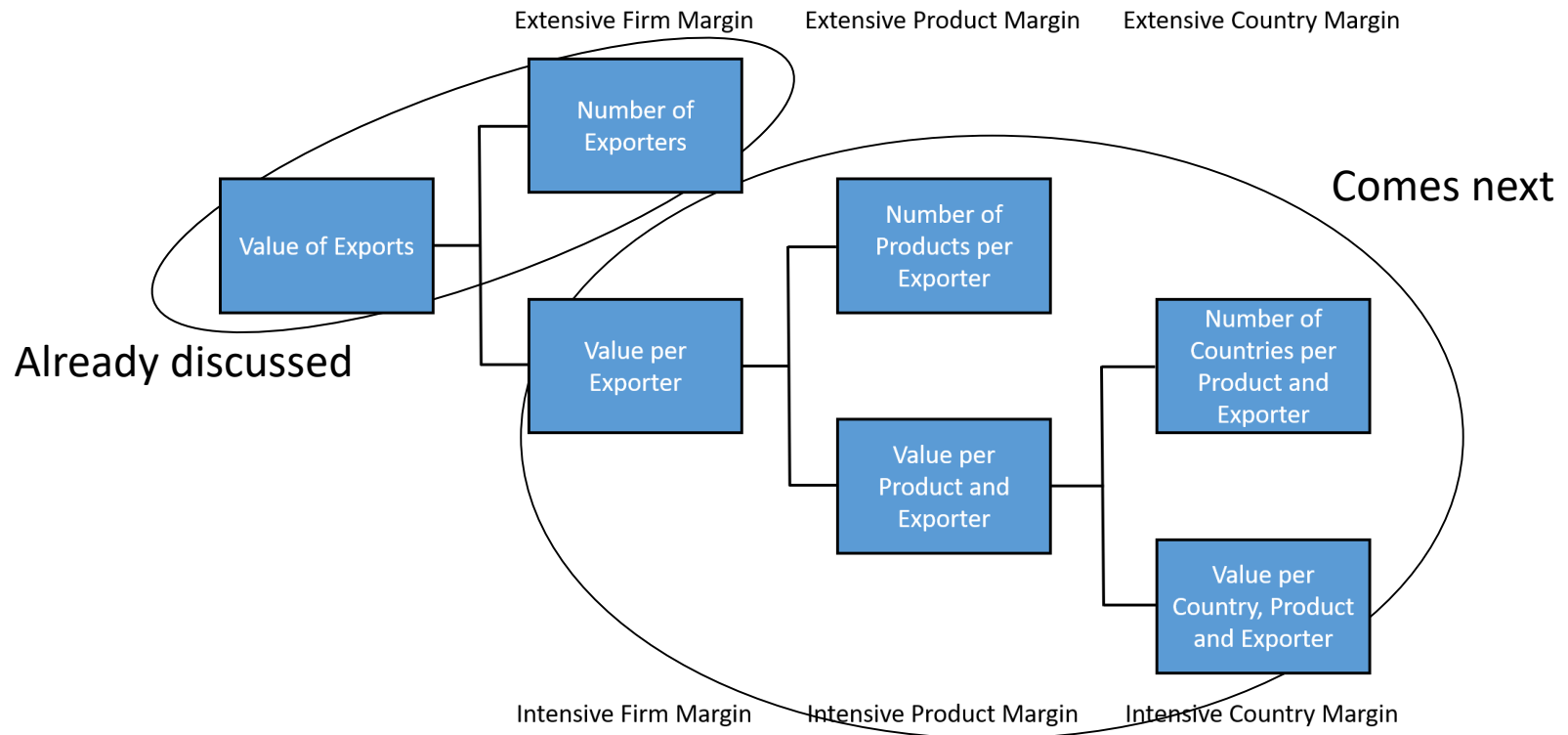
Trade by firm categories and product types: Imports

- Similar pattern for **imports**, dominating sectors exhibit significantly larger value shares than firm shares, but the difference is somewhat less pronounced
- Manufacturing firms are slightly less prominent compared to exports, many product groups where **wholesalers** are more important
- **Inter-industry** trade e.g. for import-heavy minerals, but many groups with high levels of **intra-industry** trade

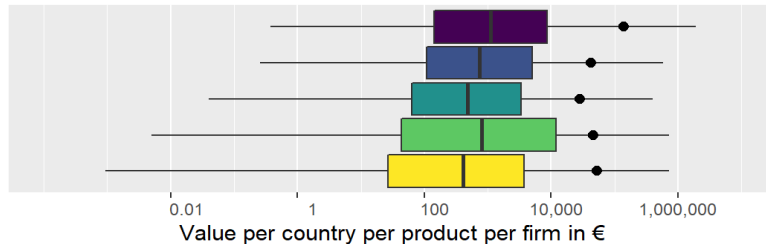
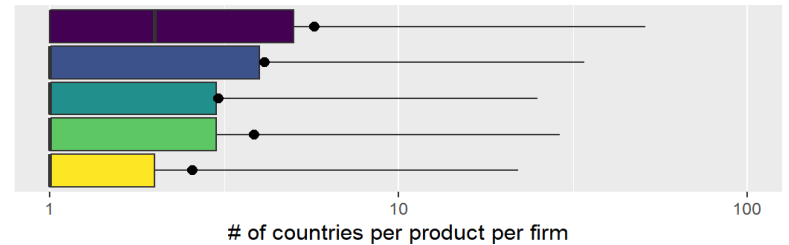
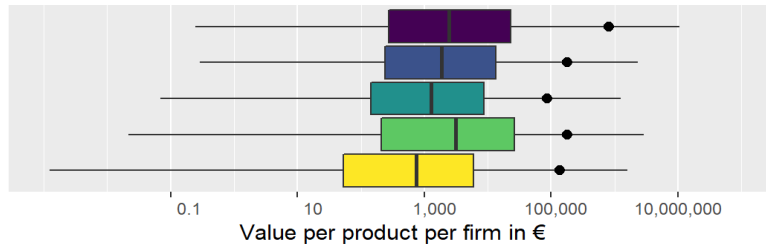
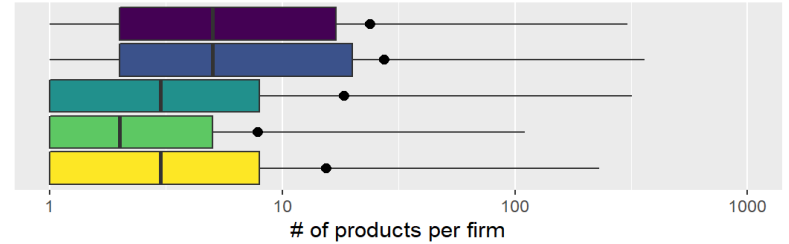
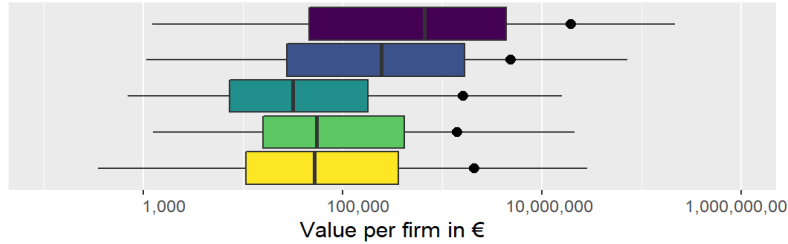
Margin decompositions

Margin decompositions

Mayer and Ottaviano (2008)



Margin decomposition for total exports (2018)



■ Manufacturing
 ■ Wholesale
 ■ Retail
 ■ Motor Vehicles
 ■ Other

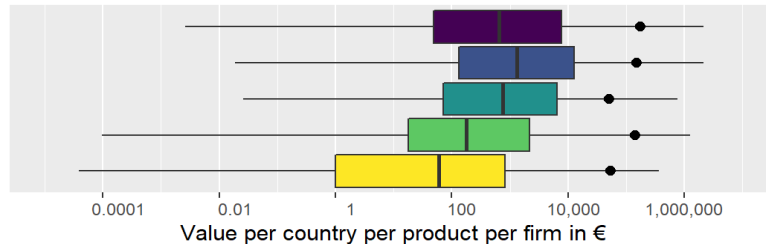
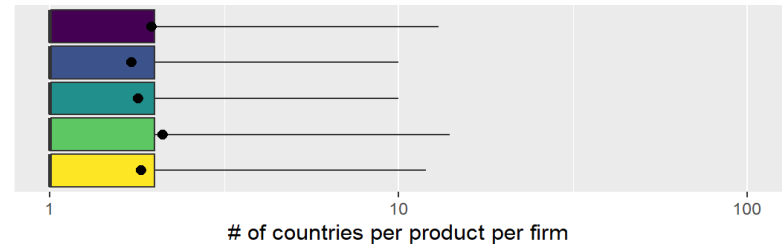
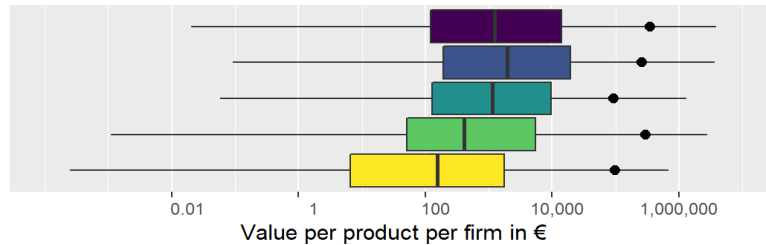
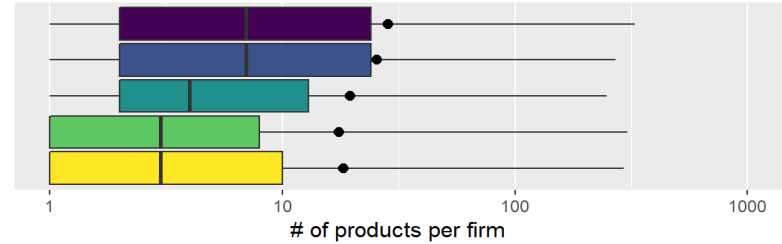
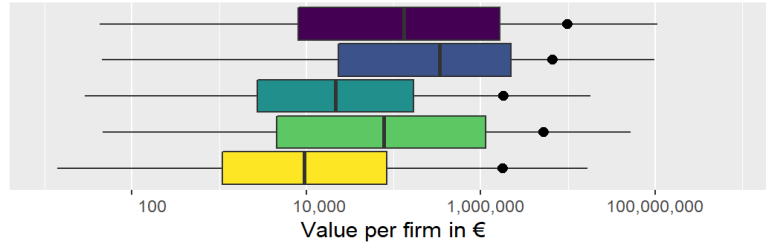
Margin decomposition for total exports

| Margin | Firm Category | Mean | Std. Dev. | P1 | P25 | P50 | P75 | P99 |
|---|----------------|------------|-------------|-------|--------|---------|-----------|-------------|
| Value per firm | Manufacturing | 19,312,758 | 466,455,577 | 1,238 | 46,360 | 654,461 | 4,350,107 | 214,945,207 |
| | Wholesale | 4,853,957 | 50,981,476 | 1,066 | 27,504 | 241,645 | 1,681,189 | 72,265,616 |
| | Retail | 1,611,315 | 38,447,890 | 695 | 7,345 | 31,750 | 177,984 | 15,830,258 |
| | Motor Vehicles | 1,394,436 | 9,589,693 | 1,251 | 15,908 | 54,703 | 414,705 | 21,039,573 |
| | Other | 2,081,470 | 39,218,885 | 350 | 10,729 | 52,100 | 364,238 | 28,213,194 |
| # of products per firm | Manufacturing | 23.9 | 63.3 | 1 | 2 | 5 | 17 | 305 |
| | Wholesale | 27.5 | 76.6 | 1 | 2 | 5 | 20 | 360 |
| | Retail | 18.5 | 80.6 | 1 | 1 | 3 | 8 | 318 |
| | Motor Vehicles | 7.9 | 39.9 | 1 | 1 | 2 | 5 | 110 |
| | Other | 15.4 | 63.4 | 1 | 1 | 3 | 8 | 231 |
| Value per product per firm | Manufacturing | 808,282 | 33,584,734 | 0 | 273 | 2,456 | 22,916 | 10,677,176 |
| | Wholesale | 176,817 | 6,546,193 | 0 | 242 | 1,859 | 13,417 | 2,331,660 |
| | Retail | 87,067 | 1,374,757 | 0 | 145 | 1,280 | 8,700 | 1,257,474 |
| | Motor Vehicles | 177,132 | 1,930,131 | 0 | 208 | 3,163 | 25,998 | 2,859,507 |
| | Other | 134,874 | 4,007,334 | 0 | 53 | 755 | 6,031 | 1,604,956 |
| # of countries per product per firm | Manufacturing | 5.7 | 10.1 | 1 | 1 | 2 | 5 | 51 |
| | Wholesale | 4.1 | 6.8 | 1 | 1 | 1 | 4 | 34 |
| | Retail | 3.1 | 4.7 | 1 | 1 | 1 | 3 | 25 |
| | Motor Vehicles | 3.9 | 6.3 | 1 | 1 | 1 | 3 | 29 |
| | Other | 2.6 | 4.3 | 1 | 1 | 1 | 2 | 22 |
| Value per country per product per firm | Manufacturing | 140,660 | 6,365,609 | 0 | 141 | 1,100 | 8,731 | 1,885,958 |
| | Wholesale | 42,726 | 2,130,101 | 0 | 110 | 750 | 5,080 | 580,830 |
| | Retail | 28,521 | 557,335 | 0 | 64 | 477 | 3,348 | 395,161 |
| | Motor Vehicles | 45,916 | 525,228 | 0 | 44 | 805 | 11,900 | 720,764 |
| | Other | 52,526 | 1,477,676 | 0 | 27 | 410 | 3,696 | 720,004 |

Margin decomposition for total exports

- Export value per firm: On average highest for manufacturing firms, but huge variance
- The average wholesaler exports more products than the average manufacturing firm, but the former have a much lower value per product
- Manufacturing firms tend to export their products in more countries than wholesalers and retailers and account for much larger export revenues per product and country
- In general: high levels of variance within and across firm categories, especially for intensive margins

Margin decomposition for total imports (2018)



■ Manufacturing
 ■ Wholesale
 ■ Retail
 ■ Motor Vehicles
 ■ Other

Margin decomposition for total imports

| Margin | Firm Category | Mean | Std. Dev. | P1 | P25 | P50 | P75 | P99 |
|---|----------------|-----------|-------------|----|--------|---------|-----------|-------------|
| Value per firm | Manufacturing | 9,875,453 | 200,265,425 | 43 | 8,090 | 131,854 | 1,665,258 | 106,523,525 |
| | Wholesale | 6,621,141 | 66,603,319 | 45 | 23,177 | 338,778 | 2,236,827 | 97,752,638 |
| | Retail | 1,804,906 | 54,900,612 | 29 | 2,726 | 21,368 | 170,812 | 18,114,518 |
| | Motor Vehicles | 5,219,341 | 67,101,222 | 46 | 4,548 | 76,921 | 1,144,002 | 52,110,809 |
| | Other | 1,801,596 | 49,633,525 | 14 | 1,094 | 9,394 | 83,304 | 16,784,216 |
| # of products per firm | Manufacturing | 28.5 | 78.6 | 1 | 2 | 7 | 24 | 328 |
| | Wholesale | 25.6 | 61.2 | 1 | 2 | 7 | 24 | 272 |
| | Retail | 19.6 | 57.7 | 1 | 2 | 4 | 13 | 249 |
| | Motor Vehicles | 17.5 | 59.6 | 1 | 1 | 3 | 8 | 306 |
| | Other | 18.3 | 80.0 | 1 | 1 | 3 | 10 | 293 |
| Value per product per firm | Manufacturing | 346,843 | 13,908,057 | 0 | 120 | 1,239 | 13,996 | 3,822,322 |
| | Wholesale | 258,789 | 8,781,011 | 0 | 192 | 1,948 | 19,430 | 3,660,729 |
| | Retail | 91,879 | 2,775,857 | 0 | 128 | 1,136 | 9,514 | 1,294,265 |
| | Motor Vehicles | 298,671 | 9,069,717 | 0 | 51 | 409 | 5,403 | 2,804,858 |
| | Other | 98,322 | 10,728,687 | 0 | 7 | 154 | 1,739 | 677,348 |
| # of countries per product per firm | Manufacturing | 2.0 | 2.5 | 1 | 1 | 1 | 2 | 13 |
| | Wholesale | 1.7 | 1.8 | 1 | 1 | 1 | 2 | 10 |
| | Retail | 1.8 | 2.0 | 1 | 1 | 1 | 2 | 10 |
| | Motor Vehicles | 2.1 | 2.6 | 1 | 1 | 1 | 2 | 14 |
| | Other | 1.8 | 2.2 | 1 | 1 | 1 | 2 | 12 |
| Value per country per product per firm | Manufacturing | 177,001 | 6,907,832 | 0 | 49 | 654 | 7,803 | 2,131,812 |
| | Wholesale | 150,879 | 6,084,062 | 0 | 134 | 1,320 | 12,800 | 2,121,206 |
| | Retail | 51,171 | 1,734,767 | 0 | 71 | 754 | 6,418 | 770,400 |
| | Motor Vehicles | 141,761 | 5,567,281 | 0 | 18 | 178 | 2,165 | 1,270,779 |
| | Other | 53,639 | 7,737,558 | 0 | 1 | 61 | 823 | 362,357 |

Margin decomposition for total imports

- Average import value per firm: Wholesalers much closer to manufacturing firms than for exports, manufacturing more right-skewed while non-manufacturing is less right-skewed
- Wholesalers import on average fewer products than manufacturing firms and tend to spend less per product, but especially the extensive country margins are very similar across firm categories

Joint country-product distributions

Joint country-product distributions

- For each trade direction, we count:
 - the share of firms that trades a certain number of HS 8-digit products with a certain number of partner countries
 - the trade value share handled by these firms
- The share of firms that export/import just one or two products to/from at least five countries is very small and thus anonymized

Total exports

| Share of Firms in % | Number of Countries | | | | | | | |
|---------------------|---------------------|-------|------|------|------|-------|--------------|--------|
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 20.72 | 2.71 | 1.06 | 0.64 | 0.40 | 0.87 | 0.79 | 27.19 |
| 2 | 5.76 | 3.44 | 1.25 | 0.68 | 0.43 | 1.01 | 0.99 | 13.55 |
| 3 | 2.73 | 1.57 | 1.07 | 0.63 | 0.38 | 0.95 | 1.05 | 8.38 |
| 4 | 1.63 | 0.95 | 0.63 | 0.47 | 0.35 | 0.95 | 1.02 | 5.99 |
| 5 | 1.09 | 0.65 | 0.41 | 0.32 | 0.26 | 0.76 | 0.96 | 4.45 |
| 6-10 | 2.53 | 1.47 | 0.96 | 0.78 | 0.66 | 2.14 | 3.90 | 12.45 |
| 11+ | 2.85 | 1.83 | 1.34 | 1.04 | 0.95 | 3.75 | 16.22 | 27.98 |
| Total | 37.31 | 12.61 | 6.73 | 4.57 | 3.42 | 10.43 | 24.93 | 100.00 |

| Share of Value in % | Number of Countries | | | | | | | |
|---------------------|---------------------|------|------|------|------|------|--------------|-------|
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 1.33 | 0.31 | 0.57 | 0.15 | NA | NA | NA | NA |
| 2 | 0.27 | 0.45 | 0.11 | 0.13 | NA | NA | NA | NA |
| 3 | 0.14 | 0.26 | 0.13 | 0.07 | 0.09 | 0.28 | 0.71 | 1.67 |
| 4 | 0.09 | 0.18 | 0.09 | 0.05 | 0.07 | 0.36 | 0.65 | 1.48 |
| 5 | 0.07 | 0.10 | 0.07 | 0.19 | 0.08 | 0.27 | 0.73 | 1.50 |
| 6-10 | 0.15 | 0.20 | 0.21 | 0.18 | 0.19 | 0.86 | 3.58 | 5.38 |
| 11+ | 0.39 | 0.50 | 0.40 | 0.59 | 0.51 | 3.28 | 79.32 | 84.98 |
| Total | 2.44 | 2.00 | 1.57 | 1.35 | NA | NA | NA | NA |

- Ca. 21% of exporters export one product to one country... and account for 1.33% of export volume
- 16% of exporters export 11+ products in 11+ countries... and account for ca. 80% of export volume!
- Relatively few small and many large firms compared to US/French data, driven by intra-EU trade (cutoff problem)

Total imports

| Share of Firms in % | | Number of Countries | | | | | | |
|---------------------|--------------|---------------------|------|------|------|-------|--------------|--------|
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 21.02 | 1.09 | 0.27 | 0.13 | 0.08 | 0.14 | 0.03 | 22.76 |
| 2 | 6.60 | 4.11 | 0.62 | 0.19 | 0.11 | 0.20 | 0.03 | 11.87 |
| 3 | 3.16 | 2.62 | 1.26 | 0.34 | 0.15 | 0.23 | 0.05 | 7.81 |
| 4 | 1.89 | 1.72 | 1.13 | 0.50 | 0.21 | 0.26 | 0.05 | 5.77 |
| 5 | 1.20 | 1.24 | 0.91 | 0.51 | 0.26 | 0.33 | 0.06 | 4.51 |
| 6-10 | 2.61 | 2.93 | 2.51 | 1.81 | 1.22 | 2.15 | 0.41 | 13.66 |
| 11+ | 1.91 | 2.46 | 2.42 | 2.30 | 2.16 | 8.51 | 13.86 | 33.62 |
| Total | 38.40 | 16.18 | 9.12 | 5.78 | 4.20 | 11.83 | 14.51 | 100.00 |
| Share of Value in % | | Number of Countries | | | | | | |
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 0.67 | 0.17 | 0.06 | 0.04 | NA | NA | NA | NA |
| 2 | 0.25 | 0.26 | 0.12 | 0.07 | NA | NA | NA | NA |
| 3 | 0.12 | 0.16 | 0.16 | 0.08 | 0.04 | 0.13 | 0.05 | 0.75 |
| 4 | 0.09 | 0.13 | 0.12 | 0.09 | 0.12 | 0.12 | 0.07 | 0.74 |
| 5 | 0.07 | 0.08 | 0.20 | 0.07 | 0.06 | 0.18 | 0.12 | 0.78 |
| 6-10 | 0.17 | 0.24 | 0.35 | 0.34 | 0.31 | 1.23 | 0.78 | 3.43 |
| 11+ | 0.24 | 0.39 | 0.42 | 0.71 | 1.13 | 6.13 | 83.14 | 92.15 |
| Total | 1.61 | 1.44 | 1.44 | 1.39 | NA | NA | NA | NA |

- 21% of importing firms source one product from a single country... and account for less than 1% of import volume
- Ca. 14% of importers source 11+ products from 11+ origin countries... and thereby account for more than 83% of import volume!

Concluding remarks

Summary and further results

- Summary
 - We use novel micro-data to conduct a descriptive analysis of German firms in international trade
 - We dissect the data along several dimensions: firms, products and countries and find that all dimensions matter
 - Firm heterogeneity in trade needs to be taken into account in quantitative trade modeling
- Further results
 - Systematic differences between intra-EU and extra-EU trade and across firm categories (manufacturing, wholesale, retail, others)

Further research

- Use AH-Steuer to address selection bias among smaller intra-EU firms
- Shed light on the two-way-trader status among firms, thus highlighting the prevalence of intra-industry trade on the firm level
- Add the time dimension and examine salient dynamic features of the different margins over the recent years, or even different months
- Adding firm size (e.g. employees or revenues)
- Examine how firm-level covariates correlate with the margins (exporter/importer premia)
- Allow for simple gravity regressions (e.g. with standard country-level covariates)
- Explore relationship between goods trade and services trade
- ...

Thank you for your attention!

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Backup Slides

Margin Decomposition for Extra-EU Exports

| Margin | Firm Category | Mean | Std. Dev. | P1 | P25 | P50 | P75 | P99 |
|---|----------------|------------|-------------|-------|--------|---------|-----------|-------------|
| Value per firm | Manufacturing | 10,105,720 | 289,831,737 | 1,225 | 28,890 | 204,826 | 1,499,691 | 108,687,364 |
| | Wholesale | 1,639,358 | 24,670,169 | 1,053 | 16,695 | 81,495 | 430,839 | 23,915,632 |
| | Retail | 613,461 | 23,514,484 | 915 | 6,643 | 25,875 | 105,296 | 5,826,676 |
| | Motor Vehicles | 460,115 | 4,629,829 | 1,287 | 14,200 | 40,294 | 142,900 | 7,838,576 |
| | Other | 827,091 | 7,637,343 | 400 | 9,081 | 37,990 | 178,474 | 13,360,693 |
| # of products per firm | Manufacturing | 17.9 | 52.2 | 1 | 1 | 4 | 11 | 251 |
| | Wholesale | 18.2 | 53.4 | 1 | 2 | 4 | 13 | 235 |
| | Retail | 12.3 | 56.7 | 1 | 1 | 2 | 7 | 179 |
| | Motor Vehicles | 5.4 | 22.5 | 1 | 1 | 2 | 4 | 63 |
| | Other | 10.9 | 38.1 | 1 | 1 | 2 | 7 | 155 |
| Value per product per firm | Manufacturing | 565,192 | 27,669,484 | 3 | 344 | 2,578 | 20,042 | 6,711,136 |
| | Wholesale | 90,312 | 3,754,467 | 4 | 321 | 1,911 | 10,537 | 1,054,115 |
| | Retail | 49,909 | 1,004,307 | 5 | 262 | 1,478 | 7,302 | 587,853 |
| | Motor Vehicles | 85,710 | 1,117,043 | 5 | 453 | 4,150 | 22,260 | 1,140,730 |
| | Other | 75,798 | 1,903,286 | 3 | 240 | 1,426 | 7,600 | 951,760 |
| # of countries per product per firm | Manufacturing | 4.0 | 7.4 | 1 | 1 | 1 | 4 | 39 |
| | Wholesale | 2.4 | 4.2 | 1 | 1 | 1 | 2 | 22 |
| | Retail | 1.5 | 2.2 | 1 | 1 | 1 | 1 | 10 |
| | Motor Vehicles | 2.1 | 3.8 | 1 | 1 | 1 | 2 | 17 |
| | Other | 1.8 | 3.0 | 1 | 1 | 1 | 1 | 14 |
| Value per country per product per firm | Manufacturing | 140,465 | 6,997,496 | 2 | 200 | 1,380 | 9,364 | 1,762,534 |
| | Wholesale | 37,282 | 1,477,563 | 3 | 195 | 1,122 | 5,862 | 473,461 |
| | Retail | 33,842 | 750,247 | 5 | 227 | 1,242 | 5,700 | 409,697 |
| | Motor Vehicles | 40,851 | 427,793 | 3 | 250 | 2,794 | 14,377 | 608,962 |
| | Other | 41,400 | 1,186,726 | 3 | 183 | 1,100 | 5,710 | 568,348 |

Margin Decomposition for Extra-EU Exports

- Export value per firm: on average for manufacturing firms 7 times as high as for wholesalers (ratio is much higher than for total exports)!
- Average number of exported products similar for manufacturing and wholesaling firms
- Stark differences between manufacturing and wholesale in the average export value per product and per product and country

Margin Decomposition for Intra-EU Exports

| Margin | Firm Category | Mean | Std. Dev. | P1 | P25 | P50 | P75 | P99 |
|---|----------------|------------|-------------|-------|---------|-----------|-----------|-------------|
| Value per firm | Manufacturing | 19,645,227 | 288,979,715 | 3,684 | 827,117 | 2,203,512 | 7,781,111 | 205,268,137 |
| | Wholesale | 7,580,750 | 56,173,007 | 1,571 | 486,800 | 1,289,713 | 3,788,558 | 102,992,356 |
| | Retail | 5,922,845 | 72,801,102 | 173 | 80,450 | 635,978 | 1,700,777 | 85,822,571 |
| | Motor Vehicles | 3,644,852 | 12,831,912 | 2,900 | 369,674 | 996,904 | 2,431,313 | 54,710,323 |
| | Other | 6,082,292 | 79,124,934 | 280 | 150,812 | 810,341 | 2,266,947 | 84,835,696 |
| # of products per firm | Manufacturing | 28.6 | 65.3 | 1 | 2 | 7 | 25 | 308 |
| | Wholesale | 38.4 | 93.9 | 1 | 3 | 10 | 33 | 499 |
| | Retail | 57.0 | 157.9 | 1 | 1 | 7 | 42 | 882 |
| | Motor Vehicles | 14.5 | 67.4 | 1 | 2 | 4 | 7 | 305 |
| | Other | 30.7 | 110.9 | 1 | 1 | 4 | 15 | 540 |
| Value per product per firm | Manufacturing | 686,015 | 21,515,281 | 0 | 207 | 2,059 | 23,457 | 10,134,809 |
| | Wholesale | 197,567 | 6,430,307 | 0 | 176 | 1,630 | 15,320 | 2,765,374 |
| | Retail | 103,932 | 1,477,368 | 0 | 63 | 882 | 9,479 | 1,611,998 |
| | Motor Vehicles | 252,034 | 2,167,556 | 0 | 78 | 1,989 | 40,879 | 4,205,045 |
| | Other | 198,060 | 5,044,198 | 0 | 2 | 140 | 3,596 | 2,531,494 |
| # of countries per product per firm | Manufacturing | 4.9 | 5.7 | 1 | 1 | 2 | 6 | 24 |
| | Wholesale | 4.3 | 5.2 | 1 | 1 | 2 | 5 | 24 |
| | Retail | 3.9 | 4.9 | 1 | 1 | 2 | 5 | 24 |
| | Motor Vehicles | 5.2 | 5.9 | 1 | 1 | 2 | 7 | 26 |
| | Other | 3.2 | 4.1 | 1 | 1 | 1 | 4 | 21 |
| Value per country per product per firm | Manufacturing | 140,837 | 5,732,360 | 0 | 102 | 862 | 8,108 | 1,991,554 |
| | Wholesale | 45,418 | 2,387,774 | 0 | 83 | 593 | 4,642 | 634,453 |
| | Retail | 26,342 | 455,364 | 0 | 41 | 295 | 2,411 | 386,504 |
| | Motor Vehicles | 48,529 | 568,982 | 0 | 16 | 342 | 9,550 | 786,244 |
| | Other | 61,487 | 1,675,626 | 0 | 3 | 109 | 1,962 | 859,669 |

Margin Decomposition for Intra-EU Exports

- Average export value per manufacturing firm twice as high in intra-EU trade compared to extra-EU trade (careful: sample bias)
 - Mainly driven by the number of products: average values per product and per product and country and their distributions are very similar
- The role of wholesalers is more pronounced compared to total or extra-EU trade (smaller differences for the intensive margins)
- Wholesalers and retailers clearly dominate manufacturing firms at the extensive product margin

Margin Decomposition for Extra-EU Imports

| Margin | Firm Category | Mean | Std. Dev. | P1 | P25 | P50 | P75 | P99 |
|---|----------------|-----------|------------|----|-------|--------|---------|------------|
| Value per firm | Manufacturing | 4,313,271 | 80,718,223 | 26 | 4,299 | 41,626 | 371,848 | 45,420,097 |
| | Wholesale | 3,761,042 | 50,057,554 | 20 | 8,815 | 82,623 | 695,298 | 51,347,164 |
| | Retail | 927,364 | 21,195,226 | 21 | 2,226 | 14,591 | 82,069 | 7,047,549 |
| | Motor Vehicles | 1,744,774 | 26,957,360 | 31 | 1,554 | 15,110 | 106,395 | 21,694,514 |
| | Other | 1,055,913 | 32,758,231 | 4 | 808 | 5,929 | 40,369 | 7,248,663 |
| # of products per firm | Manufacturing | 17.5 | 43.3 | 1 | 2 | 5 | 16 | 191 |
| | Wholesale | 17.7 | 39.1 | 1 | 2 | 6 | 17 | 180 |
| | Retail | 12.9 | 37.1 | 1 | 1 | 4 | 10 | 142 |
| | Motor Vehicles | 13.6 | 34.9 | 1 | 1 | 3 | 9 | 169 |
| | Other | 11.5 | 56.2 | 1 | 1 | 3 | 8 | 151 |
| Value per product per firm | Manufacturing | 246,343 | 12,632,058 | 0 | 133 | 974 | 8,405 | 2,300,659 |
| | Wholesale | 212,389 | 8,602,681 | 1 | 174 | 1,499 | 14,193 | 2,726,473 |
| | Retail | 71,750 | 2,847,048 | 0 | 120 | 887 | 6,795 | 991,701 |
| | Motor Vehicles | 127,860 | 4,643,180 | 0 | 69 | 362 | 3,172 | 973,915 |
| | Other | 91,850 | 8,652,148 | 0 | 40 | 300 | 2,332 | 495,457 |
| # of countries per product per firm | Manufacturing | 1.5 | 1.5 | 1 | 1 | 1 | 1 | 8 |
| | Wholesale | 1.4 | 1.2 | 1 | 1 | 1 | 1 | 7 |
| | Retail | 1.4 | 1.3 | 1 | 1 | 1 | 1 | 7 |
| | Motor Vehicles | 1.5 | 1.3 | 1 | 1 | 1 | 2 | 7 |
| | Other | 1.5 | 1.7 | 1 | 1 | 1 | 1 | 8 |
| Value per country per product per firm | Manufacturing | 159,583 | 7,732,223 | 0 | 94 | 700 | 6,049 | 1,598,244 |
| | Wholesale | 148,376 | 6,389,440 | 0 | 144 | 1,188 | 11,049 | 1,957,982 |
| | Retail | 49,563 | 2,179,437 | 0 | 89 | 706 | 5,593 | 751,644 |
| | Motor Vehicles | 82,550 | 3,151,112 | 0 | 44 | 234 | 1,973 | 608,459 |
| | Other | 61,089 | 6,778,760 | 0 | 24 | 204 | 1,498 | 334,836 |

Margin Decomposition for Extra-EU Imports

- Average import value: Wholesalers and manufacturers go head to head (wholesalers' import value at the 99th percentile even exceeds that of manufacturing firms)
- Also only minor differences for the remaining margins
- The means for each margin lie below those for total exports

Margin Decomposition for Intra-EU Imports

| Margin | Firm Category | Mean | Std. Dev. | P1 | P25 | P50 | P75 | P99 |
|---|----------------|------------|-------------|----|---------|-----------|-----------|-------------|
| Value per firm | Manufacturing | 13,050,163 | 205,792,710 | 34 | 227,124 | 1,213,451 | 4,409,644 | 126,750,377 |
| | Wholesale | 7,583,774 | 56,029,209 | 91 | 322,997 | 1,223,744 | 3,678,661 | 108,805,058 |
| | Retail | 4,291,433 | 101,884,290 | 42 | 34,504 | 577,295 | 1,558,481 | 41,343,745 |
| | Motor Vehicles | 8,627,597 | 89,324,004 | 40 | 204,646 | 1,000,633 | 2,821,916 | 69,140,719 |
| | Other | 3,494,156 | 75,944,889 | 7 | 3,677 | 143,625 | 1,045,443 | 38,275,390 |
| # of products per firm | Manufacturing | 35.8 | 95.2 | 1 | 3 | 11 | 30 | 457 |
| | Wholesale | 29.6 | 71.0 | 1 | 2 | 9 | 27 | 337 |
| | Retail | 47.5 | 88.4 | 1 | 3 | 9 | 60 | 412 |
| | Motor Vehicles | 21.7 | 75.3 | 1 | 1 | 3 | 7 | 368 |
| | Other | 41.1 | 115.2 | 1 | 2 | 6 | 26 | 747 |
| Value per product per firm | Manufacturing | 364,301 | 10,242,009 | 0 | 79 | 1,449 | 20,672 | 4,596,566 |
| | Wholesale | 256,374 | 7,676,705 | 0 | 201 | 2,401 | 24,011 | 3,903,659 |
| | Retail | 90,268 | 2,193,777 | 0 | 81 | 1,140 | 10,661 | 1,270,695 |
| | Motor Vehicles | 397,795 | 10,793,443 | 0 | 23 | 336 | 7,099 | 3,833,582 |
| | Other | 85,102 | 11,547,734 | 0 | 1 | 24 | 737 | 758,150 |
| # of countries per product per firm | Manufacturing | 1.9 | 2.0 | 1 | 1 | 1 | 2 | 11 |
| | Wholesale | 1.7 | 1.5 | 1 | 1 | 1 | 2 | 8 |
| | Retail | 1.7 | 1.5 | 1 | 1 | 1 | 2 | 8 |
| | Motor Vehicles | 2.1 | 2.2 | 1 | 1 | 1 | 2 | 12 |
| | Other | 1.8 | 1.8 | 1 | 1 | 1 | 2 | 10 |
| Value per country per product per firm | Manufacturing | 191,089 | 6,160,874 | 0 | 22 | 606 | 9,868 | 2,553,922 |
| | Wholesale | 153,408 | 5,759,046 | 0 | 122 | 1,482 | 14,820 | 2,286,797 |
| | Retail | 52,737 | 1,146,786 | 0 | 52 | 814 | 7,294 | 788,018 |
| | Motor Vehicles | 185,399 | 6,820,200 | 0 | 6 | 132 | 2,380 | 1,711,382 |
| | Other | 47,040 | 8,496,991 | 0 | 0 | 7 | 305 | 386,995 |

Margin Decomposition for Intra-EU Imports

- Average import value: Once again wholesalers are less prominent than manufacturers
- Mirroring the case for extra-EU imports, the average values of all margins lie above those for total imports, even for the intensive country margin
 - Unlike for exports, where the intensive country margin is similar between intra-EU and extra-EU trade, the average imports per product and country are higher for EU origin countries than for non-EU countries

Extra-EU Exports

| Share of Firms in % | | Number of Countries | | | | | | |
|---------------------|--------------|---------------------|------|------|------|-------|--------------|--------|
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 24.04 | 3.01 | 1.10 | 0.60 | 0.36 | 0.61 | 0.26 | 29.98 |
| 2 | 6.93 | 4.26 | 1.52 | 0.75 | 0.46 | 0.87 | 0.37 | 15.15 |
| 3 | 3.31 | 2.01 | 1.32 | 0.75 | 0.45 | 0.89 | 0.46 | 9.19 |
| 4 | 1.98 | 1.20 | 0.80 | 0.61 | 0.41 | 0.93 | 0.45 | 6.38 |
| 5 | 1.35 | 0.80 | 0.56 | 0.39 | 0.31 | 0.75 | 0.45 | 4.62 |
| 6-10 | 3.01 | 1.89 | 1.32 | 1.02 | 0.79 | 2.16 | 1.88 | 12.06 |
| 11+ | 3.15 | 2.14 | 1.61 | 1.34 | 1.17 | 4.28 | 8.92 | 22.61 |
| Total | 43.77 | 15.31 | 8.23 | 5.46 | 3.94 | 10.49 | 12.78 | 100.00 |
| Share of Value in % | | Number of Countries | | | | | | |
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 2.29 | 0.56 | 0.18 | 0.05 | NA | NA | NA | NA |
| 2 | 0.67 | 0.89 | 0.18 | 0.08 | NA | NA | NA | NA |
| 3 | 0.28 | 0.48 | 0.21 | 0.24 | 0.10 | 0.27 | 0.47 | 2.05 |
| 4 | 0.18 | 0.26 | 0.13 | 0.15 | 0.15 | 0.23 | 0.36 | 1.45 |
| 5 | 0.15 | 0.89 | 0.36 | 0.12 | 0.06 | 0.34 | 0.35 | 2.29 |
| 6-10 | 0.39 | 0.44 | 0.60 | 0.29 | 0.36 | 1.29 | 2.13 | 5.50 |
| 11+ | 0.87 | 1.01 | 0.77 | 0.79 | 1.15 | 6.32 | 72.04 | 82.95 |
| Total | 4.83 | 4.53 | 2.43 | 1.72 | NA | NA | NA | NA |

- In extra-EU trade, the 9% of exporters that export 11+ products in 11+ countries make up 72% of exports
- In contrast, the share of firms that only export one product to one country is higher than in total trade

Intra-EU Exports

| Share of Firms in % | | Number of Countries | | | | | | |
|---------------------|-------------|---------------------|------|------|------|-------|--------------|--------|
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 5.57 | 1.84 | 1.29 | 1.14 | 0.92 | 3.43 | 4.98 | 19.17 |
| 2 | 1.21 | 1.26 | 0.83 | 0.69 | 0.62 | 2.39 | 2.98 | 9.98 |
| 3 | 0.62 | 0.61 | 0.67 | 0.50 | 0.43 | 1.73 | 2.24 | 6.81 |
| 4 | 0.45 | 0.41 | 0.38 | 0.37 | 0.35 | 1.50 | 1.86 | 5.33 |
| 5 | 0.26 | 0.31 | 0.27 | 0.31 | 0.27 | 1.23 | 1.78 | 4.42 |
| 6-10 | 0.79 | 0.65 | 0.64 | 0.70 | 0.81 | 3.46 | 6.85 | 13.91 |
| 11+ | 1.64 | 1.24 | 1.13 | 1.17 | 1.19 | 6.46 | 27.56 | 40.40 |
| Total | 10.54 | 6.32 | 5.21 | 4.89 | 4.60 | 20.19 | 48.26 | 100.00 |
| Share of Value in % | | Number of Countries | | | | | | |
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 1.06 | 0.38 | 0.93 | 0.29 | NA | NA | NA | NA |
| 2 | 0.27 | 0.24 | 0.16 | 0.14 | NA | NA | NA | NA |
| 3 | 0.16 | 0.18 | 0.11 | 0.11 | 0.09 | 0.64 | 1.22 | 2.51 |
| 4 | 0.08 | 0.06 | 0.08 | 0.07 | 0.29 | 0.56 | 1.08 | 2.22 |
| 5 | 0.07 | 0.08 | 0.05 | 0.07 | 0.09 | 0.42 | 0.91 | 1.69 |
| 6-10 | 0.17 | 0.17 | 0.25 | 0.18 | 1.27 | 1.28 | 4.39 | 7.71 |
| 11+ | 0.49 | 0.39 | 0.49 | 0.73 | 0.65 | 4.62 | 69.94 | 77.31 |
| Total | 2.30 | 1.52 | 2.08 | 1.59 | NA | NA | NA | NA |

- In intra-EU trade, the share of exporters that make up about the same 70% of export volume is much larger (28%)

Extra-EU Imports

| Share of Firms in % | | Number of Countries | | | | | | |
|---------------------|--------------|---------------------|-------|------|------|-------|--------------|--------|
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 24.32 | 0.98 | 0.15 | 0.05 | 0.02 | 0.02 | 0.01 | 25.55 |
| 2 | 7.59 | 4.80 | 0.53 | 0.12 | 0.03 | 0.04 | 0.01 | 13.11 |
| 3 | 3.59 | 3.12 | 1.39 | 0.27 | 0.07 | 0.06 | 0.01 | 8.52 |
| 4 | 2.12 | 2.05 | 1.27 | 0.50 | 0.15 | 0.09 | 0.01 | 6.19 |
| 5 | 1.35 | 1.45 | 1.05 | 0.56 | 0.21 | 0.14 | 0.01 | 4.79 |
| 6-10 | 2.75 | 3.45 | 3.05 | 2.04 | 1.23 | 1.36 | 0.11 | 13.99 |
| 11+ | 1.80 | 2.66 | 2.80 | 2.77 | 2.65 | 8.17 | 6.99 | 27.86 |
| Total | 43.53 | 18.52 | 10.24 | 6.32 | 4.37 | 9.88 | 7.15 | 100.00 |
| Share of Value in % | | Number of Countries | | | | | | |
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 0.85 | 0.10 | 0.02 | 0.01 | NA | NA | NA | NA |
| 2 | 0.35 | 0.33 | 0.10 | 0.02 | NA | NA | NA | NA |
| 3 | 0.17 | 0.23 | 0.26 | 0.06 | 0.02 | 0.06 | 0.02 | 0.82 |
| 4 | 0.12 | 0.18 | 0.16 | 0.21 | 0.06 | 0.06 | 0.02 | 0.82 |
| 5 | 0.13 | 0.12 | 0.15 | 0.15 | 0.06 | 0.08 | 0.29 | 1.00 |
| 6-10 | 0.22 | 0.37 | 0.62 | 0.63 | 0.48 | 1.65 | 0.34 | 4.30 |
| 11+ | 0.29 | 0.66 | 0.79 | 1.28 | 1.80 | 11.11 | 75.02 | 90.96 |
| Total | 2.14 | 2.00 | 2.10 | 2.37 | NA | NA | NA | NA |

- In extra-EU trade, 7% of all importers are responsible for 75% of the import volume

Intra-EU Imports

| Share of Firms in % | Number of Countries | | | | | | | |
|---------------------|---------------------|-------|------|------|------|--------------|--------------|--------|
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 12.21 | 1.74 | 0.85 | 0.59 | 0.45 | 1.13 | 0.38 | 17.36 |
| 2 | 2.93 | 2.93 | 0.97 | 0.52 | 0.37 | 0.75 | 0.23 | 8.69 |
| 3 | 1.38 | 1.37 | 1.43 | 0.66 | 0.33 | 0.73 | 0.16 | 6.06 |
| 4 | 0.99 | 0.85 | 1.04 | 0.82 | 0.41 | 0.67 | 0.13 | 4.92 |
| 5 | 0.70 | 0.57 | 0.72 | 0.76 | 0.51 | 0.79 | 0.12 | 4.15 |
| 6-10 | 1.98 | 1.30 | 1.63 | 1.93 | 1.89 | 4.34 | 0.59 | 13.65 |
| 11+ | 1.97 | 1.73 | 2.02 | 2.45 | 3.08 | 18.04 | 15.88 | 45.17 |
| Total | 22.15 | 10.47 | 8.66 | 7.73 | 7.04 | 26.45 | 17.49 | 100.00 |
| Share of Value in % | Number of Countries | | | | | | | |
| Number of Products | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ | Total |
| 1 | 1.20 | 0.38 | 0.25 | 0.14 | NA | NA | NA | NA |
| 2 | 0.38 | 0.53 | 0.20 | 0.15 | NA | NA | NA | NA |
| 3 | 0.23 | 0.24 | 0.25 | 0.23 | 0.09 | 0.29 | 0.17 | 1.50 |
| 4 | 0.11 | 0.36 | 0.17 | 0.21 | 0.19 | 0.25 | 0.18 | 1.47 |
| 5 | 0.12 | 0.13 | 0.12 | 0.24 | 0.14 | 0.33 | 0.14 | 1.24 |
| 6-10 | 0.25 | 0.27 | 0.54 | 0.49 | 0.63 | 2.10 | 0.75 | 5.02 |
| 11+ | 0.55 | 1.24 | 0.77 | 0.70 | 2.31 | 13.81 | 66.44 | 85.82 |
| Total | 2.85 | 3.15 | 2.30 | 2.16 | NA | NA | NA | NA |

- In intra-EU trade, 16% of all importers are responsible for 66% of the import volume
- 18% of intra-EU importers import 11+ products from 6-10 countries, accounting for almost 14% of imports