Data Appendix: Towards Sustainable Integration into European Industrial Development: Diversities of Innovative Transformation

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Dieser Bericht wurde durch die Hans Böckler Stiftung gefördert (Projektnummer 2020-449-30)



Appendix - Table of Contents

Data Appendix: Towards Sustainable Integration into European Industrial Developm Diversities of Innovative Transformation	
Appendix - Table of Contents	
Appendix – List of Tables	
Appendix - List of Figures	
1. Appendix 1 – Trade Patterns of EU countries in select industries	9
2. Appendix 2 - Regions in Spain - Detailed Information	24
2.1. Madrid	
2.2. Andalusia	26
2.3. Catalonia	28
2.4. Basque Country	30
3. Appendix 3 – A CLOSER LOOK INTO ELECTRIC BATTERY PROJECTS IN SPAIN	32
4. Appendix 4 - Regional Industry Structure of German Regions	34
4.1. Regional Industry Structure of Bavaria	34
4.2. Regional Industry Structure of Baden-Württemberg	36
4.3. Regional Industry Structure of North Rhine Westphalia	39
4.4. Regional Industry Structure of Saxony	43
4.5. Regional Industry Structure of Thuringia	46
5. Appendix 5 - Education, skills and R&D in German States	49
5.1. Education, skills and R&D in Bavaria	49
5.2. Education, skills and R&D in Baden-Württemberg	50
5.3. Education, skills and R&D in North Rhine Westphalia	51
6. Appendix 6 – Statistical Data	53
6.1. Country Level or Cross Country Data	53
6.1.1. Employees by Sector	53
6.1.2. Number of Firms by Sector	63
6.1.3. Value Added, Productivity and Wages by Sector	67
6.1.4. Gross Investment in Tangible Goods by Sector	
6.1.5. Education and R&D	93
6.2. Regional Data	110
6.2.1. Baden Wuerttemberg	110
6.2.2. Bavaria	
6.2.3. North Rhine Westphalia	134

6.2.4.	Saxony	. 146
6.2.5.	Thuringia	158
6.2.6.	Madrid	170
6.2.7.	Basque Country	180
6.2.8.	Catalonia	188
6.2.9.	Andalucia	198
Append	dix 7 - Nomenclature	206
	6.2.5.6.2.6.6.2.7.6.2.8.6.2.9.	6.2.4. Saxony

Appendix – List of Tables

Table 1: Share of total European Exports/Imports in the Vehicle Industry in 201811
Table 2: Share of total European Exports/Imports in the Machinery Industry in 201814
Table 3: Share of total European Exports/Imports in the Chemical Industry in 201817
Table 4: Share of total European Exports/Imports in the Pharma Industry in 201820
Table 5: Share of total European Exports/Imports in the Food Products Industry in 2018.23
Table 6: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - Bavaria
34
Table 7: Largest Manufacturing Sectors by Wages in Million Euro - Bavaria35
Table 8: By Number of Business Units Largest Industry Sectors (Manufacturing) - Bavaria 35
Table 9: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - Baden-
Württemberg37
Table 10: Largest Manufacturing Sectors by Wages in Million Euro - Baden-Württemberg.38
Table 11: By Number of Business Units Largest Industry Sectors (Manufacturing) - Baden-
Württemberg38
Table 12: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - NRW
40
Table 13: Largest Manufacturing Sectors by Wages in Million Euro - NRW41
Table 14: By Number of Business Units Largest Industry Sectors (Manufacturing) - NRW42
Table 15: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - Saxony
44
Table 16: Largest Manufacturing Sectors by Wages in Million Euro - Saxony44
Table 17: By Number of Business Units Largest Industry Sectors (Manufacturing) - Saxony
45
Table 18: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) -
Thuringia47
Table 19: Largest Manufacturing Sectors by Wages in Million Euro - Thuringia47
Table 20: By Number of Business Units Largest Industry Sectors (Manufacturing) -
Thuringia48
Table 21: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) -
Germany
Table 22: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing), 2009-
2018 - Spain
Table 23: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing), 1995-
2018 - Spain
Table 24: Apparent Labour Productivity (GVA per employee in thousand Euro) by Industry
and Country (Main Countries EU), 201761
Table 25: Number of Firms by Sector (Manufacturing) - Germany
Table 26: Number of Firms by Sector (Manufacturing) - Spain
Table 27: Value Added by Sector (Manufacturing) - Germany
Table 28: Value Added by Sector (Manufacturing) at factor cost 2009-2018 – Spain
Table 29: Value Added at factor cost – thousand million Euro in Manufacturing Industries in
Spain, 1995-2018 – Spain
Table 30: Domestic vs Foreign Firms in Manufacturing Industries in Spain, Enterprises
number. Value Added and Employment. 2008-201876

Table 31: Enterprises, Value Added and Employees in Manufacturing Industries in Spa	in,
2018	
Table 32: Production- thousand million euro in Manufacturing Industries in Spain, 199) 5-
2018	
Table 33: Wages and salaries- thousand million euro in Manufacturing Industries in Sp	
1995-2018	
Table 34: Gross Operating Profit- thousand million euro in Manufacturing Industries in	
Spain, 1995-2018	
Table 35: Labour productivity in main EU regions – thousand euro	
Table 36: Gross Investment in Tangible Goods in Million Euro by Sector (Manufacturin	
Germany	87
Table 37: Gross Investment in Tangible Goods in Million Euro by Sector (Manufacturin	
Spain	
Table 38: Share of Population with Tertiary Degree - Germany	
Table 39: Share of Population with Tertiary Degree - Spain	95
Table 40: Share of Population with Tertiary Degree in Manufacturing at Total	
Manufacturing Employment - Germany	
Table 41: R&D Internal Expenses in Spain and Workers (FTE), by region, 2019	
Table 42: Business R&D Internal Expenses (thousand euro) in Spain by region, 2019	
Table 43: EPO Patents in 2018, by country and field of technology	102
Table 44: EPO Spanish Patents, 2010-2019 by field of technology	
Table 45: SMEs vs Large Firms in Spain, France, Germany and Italy, Employees and R&	ıD
Expenses, 2018	
Table 46: R&D Expenses in Manufacturing Industries in Spain, Large firms vs SMEs (le	
than 250 employees), 2019	
Table 47: Number of Firms by Sector (Manufacturing) - Baden Wuerttemberg	
Table 48: Number of Employees by Sector (Manufacturing) - Baden Wuerttemberg	
Table 49: Share of Sector at Manufacturing Employment - Baden Wuerttemberg	
Table 50: Wages by Sector (Manufacturing) in Million Euro - Baden Wuerttemberg	
Table 51: Number of Firms by Sector (Manufacturing) - Bavaria	
Table 52: Number of Employees by Sector (Manufacturing) - Bavaria	
Table 53: Share of Sector at Manufacturing Employment - Bavaria	
Table 54: Wages by Sector (Manufacturing) in Million Euro - Bavaria	
Table 55: Number of Firms by Sector (Manufacturing) - North Rhine Westphalia	
Table 56: Number of Employees by Sector (Manufacturing) - North Rhine Westphalia.	
Table 57: Share of Sector at Manufacturing Employment - North Rhine Westphalia	
Table 58: Wages by Sector (Manufacturing) in Million Euro - North Rhine Westphalia	
Table 59: Number of Firms by Sector (Manufacturing) - Saxony	
Table 60: Number of Employees by Sector (Manufacturing) - Saxony	149
Table 61: Share of Sector at Manufacturing Employment - Saxony	
Table 62: Wages by Sector (Manufacturing) in Million Euro - Saxony	
Table 63: Number of Firms by Sector (Manufacturing) - Thuringia	
Table 64: Number of Employees by Sector (Manufacturing) - Thuringia	
Table 65: Share of Sector at Manufacturing Employment - Thuringia	
Table 66: Wages by Sector (Manufacturing) in Million Euro - Thuringia	
Table 67: Number of Firms by Sector (Manufacturing) - Madrid	170

Table 68: Number of Employees by Sector (Manufacturing) - Madrid	172
Table 69: Tangible Investments in Thousand Euro - Madrid	174
Table 70: Revenue by Sector (Manufacturing) in Thousand Euro - Madrid	177
Table 71: Number of Firms by Sector (Manufacturing) - Basque Country	180
Table 72: Number of Employees by Sector (Manufacturing) - Basque Country	182
Table 73: Tangible Investments in Thousand Euro - Basque Country	184
Table 74: Revenue by Sector (Manufacturing) in Thousand Euro - Basque Country	186
Table 75: Number of Firms by Sector (Manufacturing) - Catalonia	188
Table 76: Number of Employees by Sector (Manufacturing) - Catalonia	190
Table 77: Tangible Investments in Thousand Euro - Catalonia	193
Table 78: Revenue by Sector (Manufacturing) in Thousand Euro - Catalonia	195
Table 79: Number of Firms by Sector (Manufacturing) - Andalucia	198
Table 80: Number of Employees by Sector (Manufacturing) - Andalucia	200
Table 81: Tangible Investments in Thousand Euro - Andalucia	202
Table 82: Revenue by Sector (Manufacturing) in Thousand Euro - Andalucia	204
Table 83: Nomenclature Used	206

Appendix - List of Figures

Figure 1: Temporal Changes in Intercountry Vehicle Industry Exports of EU Countries	
(2010-2018)	9
Figure 2: Temporal Changes in Intercountry Vehicle Industry Imports of EU Countries	
(2010-2018)	
Figure 3: Temporal Changes in Intercountry Machinery Industry Exports of EU Countries	S
(2010-2018)	12
Figure 4: Temporal Changes in Intercountry Machinery Industry Imports of EU Countries	S
(2010-2018)	13
Figure 5: Temporal Changes in Intercountry Chemical Industry Exports of EU Countries	
(2010-2018)	15
Figure 6: Temporal Changes in Intercountry Chemical Industry Imports of EU Countries	
(2010-2018)	16
Figure 7: Temporal Changes in Intercountry Pharma Industry Exports of EU Countries	
(2010-2018)	18
Figure 8: Temporal Changes in Intercountry Pharma Industry Imports of EU Countries	
(2010-2018)	
Figure 9: Temporal Changes in Intercountry Food Industry Exports of EU Countries (201	
2018)	21
Figure 10: Temporal Changes in Intercountry Food Industry Imports of EU Countries	
(2010-2018)	22
Figure 11: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) -	
Germany	
Figure 12: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - Sp	
Figure 13: Number of Firms by Sector (Manufacturing) - Germany	
Figure 14: Number of Firms by Sector (Manufacturing) - Spain	
Figure 15: Value Added by Sector (Manufacturing) - Germany	
Figure 16: Value Added by Sector - Spain	
Figure 17: Gross Investment in Tangible Goods in Million Euro by Sector (Manufacturing	
Germany	
Figure 18: Gross Investment in Tangible Goods in Million Euro by Sector (Manufacturing	
Spain	
Figure 19: Share of Population with Tertiary Degree - Germany	
Figure 20: Share of Population with Tertiary Degree - Spain	
Figure 21: Share of Population with Tertiary Degree in Manufacturing at Total	
Manufacturing Employment - Germany	99
Figure 22: Number of Firms by Sector (Manufacturing) - Baden Wuerttemberg	112
Figure 23: Number of Employees by Sector (Manufacturing) - Baden Wuerttemberg	
Figure 24: Share of Sector at Manufacturing Employment - Baden Wuerttemberg	
Figure 25: Wages by Sector (Manufacturing) in Million Euro - Baden Wuerttemberg	121
Figure 26: Number of Firms by Sector (Manufacturing) - Bavaria	
Figure 27: Number of Employees by Sector (Manufacturing) - Bavaria	127
Figure 28: Share of Sector at Manufacturing Employment - Bavaria	130
Figure 29: Wages by Sector (Manufacturing) in Million Euro - Bayaria	133

Figure 30: Number of Firms by Sector (Manufacturing) - North Rhine Westphalia	136
Figure 31: Number of Employees by Sector (Manufacturing) - North Rhine Westphalia.	139
Figure 32: Share of Sector at Manufacturing Employment - North Rhine Westphalia	142
Figure 33: Wages by Sector (Manufacturing) in Million Euro - North Rhine Westphalia	145
Figure 34: Number of Firms by Sector (Manufacturing) - Saxony	148
Figure 35: Number of Employees by Sector (Manufacturing) - Saxony	151
Figure 36: Share of Sector at Manufacturing Employment - Saxony	154
Figure 37: Wages by Sector (Manufacturing) in Million Euro - Saxony	157
Figure 38: Number of Firms by Sector (Manufacturing) - Thuringia	160
Figure 39: Number of Employees by Sector (Manufacturing) - Thuringia	163
Figure 40: Share of Sector at Manufacturing Employment - Thuringia	
Figure 41: Wages by Sector (Manufacturing) in Million Euro - Thuringia	169
Figure 42: Number of Firms by Sector (Manufacturing) - Madrid	
Figure 43: Number of Employees by Sector (Manufacturing) - Madrid	
Figure 44: Tangible Investments in Thousand Euro - Madrid	176
Figure 45: Revenue by Sector (Manufacturing) in Thousand Euro - Madrid	
Figure 46: Number of Firms by Sector (Manufacturing) - Basque Country	181
Figure 47: Number of Employees by Sector (Manufacturing) - Basque Country	183
Figure 48: Tangible Investments in Thousand Euro - Basque Country	185
Figure 49: Revenue by Sector (Manufacturing) in Thousand Euro - Basque Country	187
Figure 50: Number of Firms by Sector (Manufacturing) - Catalonia	
Figure 51: Number of Employees by Sector (Manufacturing) - Catalonia	192
Figure 52: Tangible Investments in Thousand Euro - Catalonia	
Figure 53: Revenue by Sector (Manufacturing) in Thousand Euro - Catalonia	197
Figure 54: Number of Firms by Sector (Manufacturing) - Andalucia	
Figure 55: Number of Employees by Sector (Manufacturing) - Andalucia	201
Figure 56: Tangible Investments in Thousand Euro - Andalucia	
Figure 57: Revenue by Sector (Manufacturing) in Thousand Euro - Andalucia	205

1. Appendix 1 – Trade Patterns of EU countries in select industries

Temporal Changes in Intercountry Vehicle Industry Exports (2010 - 2018)

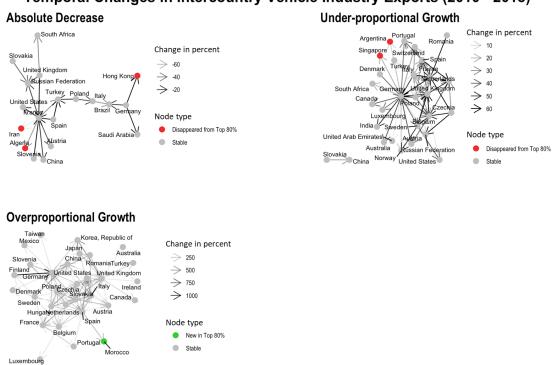


Figure 1: Temporal Changes in Intercountry Vehicle Industry Exports of EU Countries (2010-2018)

Temporal Changes in Intercountry Vehicle Industry Imports (2010 - 2018)

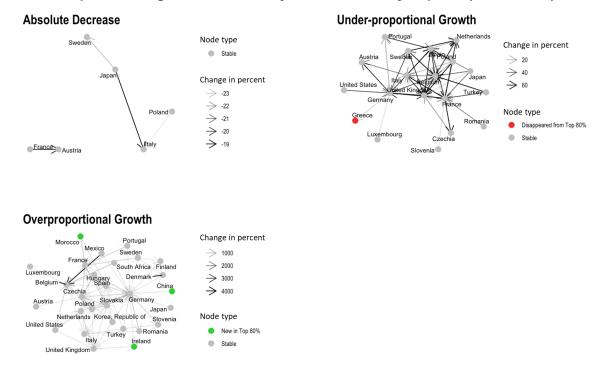


Figure 2: Temporal Changes in Intercountry Vehicle Industry Imports of EU Countries (2010-2018)

Table 1: Share of total European Exports/Imports in the Vehicle Industry in 2018

Export Ranking, Percentage of total EU Exports		Import, EU Percentage, Percentage of total EU Imports	
Germany	34.2	Germany	20.7
Spain	7.6	United Kingdom	11.1
France	7.5	France	11.0
United Kingdom	7.0	Belgium	8.5
Belgium	6.3	Spain	7.8
Italy	5.5	Italy	7.6
Czechia	5.4	Netherlands	4.8
Poland	4.2	Poland	4.1
Slovakia	3. 5	Czechia	3.4
Netherlands	3.4	Austria	3.2

Temporal Changes in Intercountry Machinery Industry Exports (2010 - 2018) Absolute Decrease Under-proportional Growth Change in percent Node type Disappeared from Top 80% Stable → 20 Change in percent -80 → -60 Node type Disappeared from Top 80% > -20 Stable Korea, Republic of **Overproportional Growth** Chile Bangladesh Morocco tugal Indonesia Change in percent Slovenia Portugal Canada Japan Indonesia Spain Switzerland → 100 Romaniay United Kingdon Ukraine Luxembourg \rightarrow 300 → 400 Croatia Bulgaria Denmark Whited States Netherlands Finland Netherlangs Poland Hungary Bengarea, Republic of Node type New in Top 80%

Figure 3: Temporal Changes in Intercountry Machinery Industry Exports of EU Countries (2010-2018)

Taiwan Turkey

Russian Federation Swe

Temporal Changes in Intercountry Machinery Industry Imports (2010 - 2018)

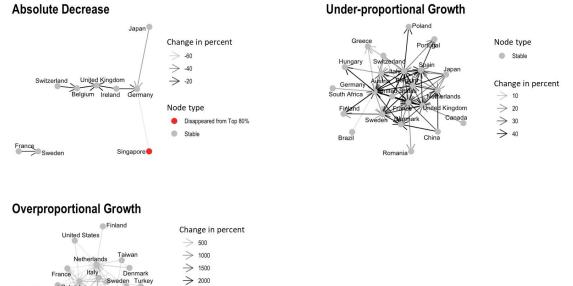


Figure 4: Temporal Changes in Intercountry Machinery Industry Imports of EU Countries (2010-2018)

Poland zechlawnster, Republic of

United Kingd Belgium
China Romania

Austria Spain India KSiea, ... Germany Slovenia

kia Lithuania

Malaysia

→ 2500

Node type

Stable

New in Top 80%

Table 2: Share of total European Exports/Imports in the Machinery Industry in 2018

Export Ranking, Percentage of total EU Exports		Import, EU Percentage, Percentage of total EU Imports	
Germany	33.5	Germany	21.3
Italy	14.3	France	10.9
Netherlands	9.0	United Kingdom	8.8
France	6.6	Netherlands	8.8
United Kingdom	6.0	Italy	7.6
Belgium	4.3	Belgium	5.7
Austria	3.6	Poland	5.0
Czechia	3.5	Spain	4.9
Spain	3.0	Austria	4.3
Poland	2.9	Czechia	3.5

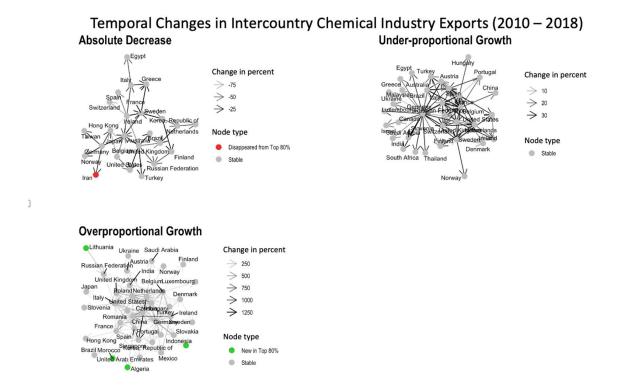


Figure 5: Temporal Changes in Intercountry Chemical Industry Exports of EU Countries (2010-2018)

Temporal Changes in Intercountry Chemical Industry Imports (2010 - 2018) Absolute Decrease Under-proportional Growth

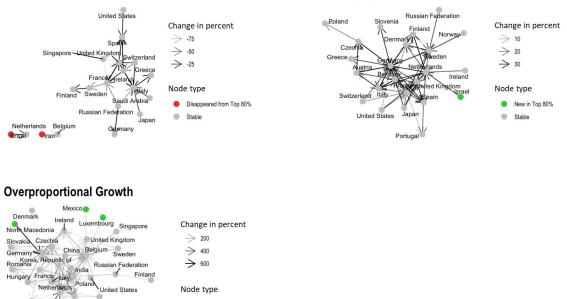


Figure 6: Temporal Changes in Intercountry Chemical Industry Imports of EU Countries (2010-2018)

Node type

New in Top 80% Stable

Spain Saudi Arabia

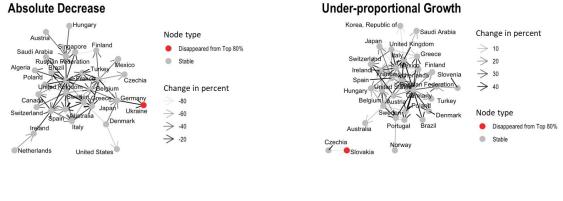
Austria Switzerland

Indonesia

Table 3: Share of total European Exports/Imports in the Chemical Industry in 2018

Export Ranking, Percentage of total EU Exports		Import, EU Percentage, Percentage of total EU Imports	
Germany	22.6	Germany	19.6
Belgium	15.2	Belgium	12.8
Netherlands	13.7	France	10.0
France	10.6	Netherlands	9.7
United Kingdom	6.2	Italy	8.6
Italy	6.1	United Kingdom	7.3
Ireland	5.7	Spain	6.5
Spain	5.6	Poland	4.8
Poland	2.9	Czechia	2.5
Sweden	1.6	Austria	2.2

Temporal Changes in Intercountry Pharma Industry Exports (2010 - 2018)



Overproportional Growth

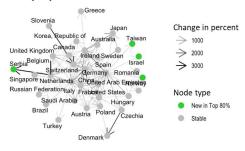


Figure 7: Temporal Changes in Intercountry Pharma Industry Exports of EU Countries (2010-2018)

Temporal Changes in Intercountry Pharma Industry Imports (2010 - 2018)

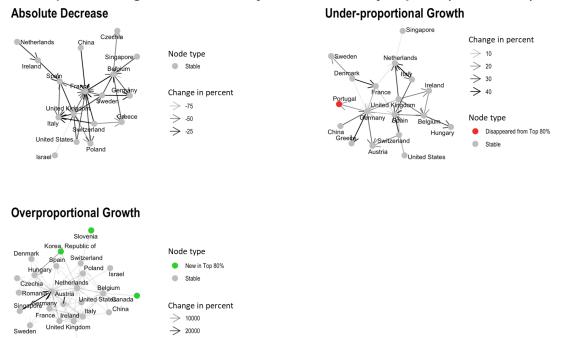


Figure 8: Temporal Changes in Intercountry Pharma Industry Imports of EU Countries (2010-2018)

Change in percent

 \rightarrow 20000

Table 4: Share of total European Exports/Imports in the Pharma Industry in 2018

Export Ranking, Percentage of total EU Exports		Import, EU Percentage, Percentage of total EU Imports	
Germany	23.5	Germany	20.6
Ireland	16.2	Belgium	13.8
Belgium	12.8	United Kingdom	9.9
Netherlands	9.2	Italy	9.5
France	8.5	France	9.3
United Kingdom	7.7	Netherlands	8.4
Italy	7.3	Spain	5.4
Spain	3.1	Ireland	4.6
Austria	2.5	Austria	3.1
Sweden	2.3	Poland	2.4

Temporal Changes in Intercountry Food Industry Exports (2010 - 2018)

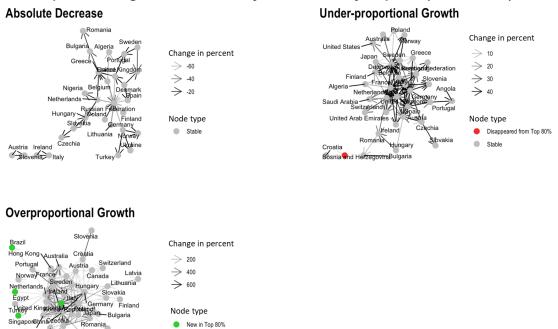


Figure 9: Temporal Changes in Intercountry Food Industry Exports of EU Countries (2010-2018)

Stable

Morocco Greece Denmark

Mexico Saudi Arabia Algeria

Temporal Changes in Intercountry Food Industry Imports (2010 - 2018)

Absolute Decrease Under-proportional Growth Node type Node type Stable Stable New Zealand Change in percent Change in percent > -50 → -40 \rightarrow 20 → -30 $\stackrel{>}{\Rightarrow} 30$ $\stackrel{>}{\Rightarrow} 40$ → -20 Austria Hungary New Zealand Slovenia Slovakiareland → -10 Romania Indor Hungary

Overproportional Growth

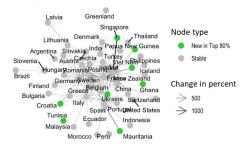


Figure 10: Temporal Changes in Intercountry Food Industry Imports of EU Countries (2010-2018)

Table 5: Share of total European Exports/Imports in the Food Products Industry in 2018

Export Ranking, Percentage of total EU Exports		Import, EU Percentage, Percentage of total EU Imports	
Germany	16.8	Germany	15.7
Netherlands	16.4	France	11.7
France	9.5	United Kingdom	11.1
Belgium	8.7	Netherlands	10.8
Spain	8.3	Italy	8.6
Italy	8.1	Spain	6.8
Poland	6.9	Belgium	6.6
United Kingdom	4.5	Poland	4
Denmark	4	Sweden	2.8
Ireland	3.3	Denmark	2.8

2. Appendix 2 - Regions in Spain - Detailed Information

2.1. Madrid

The Madrid region had 6.6 million inhabitants in 2019, slightly above the 6.3 million inhabitants in 2009. Active population in 2019 and 2009 were the same, with 3.5 million workers. The regional unemployment rate in 2019 was 10%, below the 14% observed in 2009. Like in the rest of Spain, the median age of the population has increased significantly, from 36 years in 2000 to 43 years in 2020.

Madrid is the fourth largest industrial region in Spain, with a total gross value added of manufacturing industries of 13.7 billion euros in 2019, slightly below the 14 billion euros in 2008. However, the manufacturing industry represents only 6% of the regional GDP. For this reason, historically regional economic policies have focussed more on service industries. However, indirectly, Madrid produces 45% of the value added of Spanish knowledge-based services and has a strong influence in the manufacturing industry of other Spanish regions through complementing services such as software, engineering, consulting and other professional services.

Madrid manufacturing industries recovered from the economic downturn in terms of production but not of employment. In 2008, manufacturing industries in Madrid had 243,600 jobs and a sector's bill wage of 8 billion, while in 2019 it had 182,000 jobs and a sector's bill wage of 6.9 billion euro.

Manufacturing firms in Madrid have the highest ratio value added-to income in Spain (29%), and the fourth highest apparent labour productivity (72,218 €) in Spain. This fact would imply that compared to labour capital, business models and managerial capabilities may play a more outstanding role in the success of manufacturing industries in Madrid.

The manufacturing industry in Madrid is a combination of very fragmented industries with a large number of micro-enterprises and concentrated industries with large multinationals.

On one hand, micro-enterprises represent an important part of the manufacturing industries in Madrid. For instance, Graphic arts and reproduction of recorded media is the manufacturing sector in Madrid with the highest number of companies (3,154 companies) but with very few employees (4.7 employees on average). Some other industries have the

same characteristics such as the Manufacture of metal products, except machinery and equipment (3,069 companies and 4.8 employees on average), Manufacture of wearing apparel (1,445 companies, 3.1 employees on average) and Manufacture of furniture (1,169 companies, 5.0 employees on average). Among the industries with the largest number of companies, only the Food industry stands out for an average number of employees above 10 (1,504 companies, 13.8 employees on average). Therefore, these industries with microenterprises have very scarce resources to innovate or enter international markets.

In terms of employment, in 2018 the five largest manufacturing industries in Madrid were the Food industry (20.8 thousand employees), Manufacture of metal products, except machinery and equipment (19.3 thousand employees), Graphic arts and reproduction of recorded media (14.7 thousand employees), Machinery Industry (14.6 thousand employees) and Manufacture of other transport equipment (12.6 thousand employees).

On the other hand, the industries with the highest revenues in Madrid differ from the industries with the highest number of employees. In terms of revenue, in 2018 the five largest manufacturing industries were Manufacture of motor vehicles, trailers and semi-trailers (5.6 billion euros), Manufacture of other transport equipment (5.2 billion euros), the Food industry (5.0 billion euros), Manufacture of pharmaceutical products (4.5 billion euros) and Machinery Industry (2.8 billion euros).

The exports value of the manufacturing industries in the region accounted for €26.0 billion in 2019, which represents a significant increase as regards to the €19.0 billion exports recorded in 2008. The industries with the highest exports in 2019 were: The Manufacture of other transport equipment, mostly aerospace products related to Airbus plants (€4.0 billion in 2019 vs. €1.2 billion in 2008); Pharmaceutical industry (€3.7 billion in 2109 vs. €3.5 billion in 2008) and the Manufacture of motor vehicles, trailers and semi-trailers (€2.7 billion in 2019 vs. €2.5 billion in 2008).

Madrid aerospace industry products were exported mainly to the countries with the presence of Airbus factories such as France (€ 755 million), Germany (€ 568 million) and the United Kingdom (€ 437 million). The imports of this industry came primarily from the United States (€ 1,309 million), the United Kingdom (€ 192 million), Germany (€ 137 million) and France (€ 101 million).

In 2019, the main destinations for the exports of the motor vehicles produced in Madrid were France (\in 512 million), Italy (\in 464 million) and Germany (\in 244 million). These numbers were explained by the presence of PSA Group plant in Madrid. Car components were mainly sold to France (\in 194 million) and Portugal (\in 137 million). Madrid has some plants of large suppliers of car components such as Bosch, Gestamp, Saargummi or Faurecia. The motor vehicles imported to Madrid came mainly from Germany (\in 871 million), Italy (\in 759 million), France (\in 496 million), Czechia (\in 395 million), Turkey (\in 246 million) and Poland (\in 161 million). Car components mainly came from Germany (\in 445 million), Italy (\in 332 million) and France (\in 223 million).

Pharmaceutical products made in Madrid were sold mainly in Germany (€ 798 million), United Kingdom (€ 268 million), France (€ 217 million) and Italy (€ 211 million). Most of the imports of pharmaceutical products came from the United States (€ 2,021 million), Germany (€ 1,249 million), France (€ 719 million), United Kingdom (€561 million) and Italy (€ 262 million). Large multinationals have plants in Madrid such as Merck, Teva, Astellas or GSK. Some of the main Spanish owned producers are also located in Madrid such as Normon, Rovi, Servier, Indas, Pharmamar or Synerlab.

2.2. Andalusia

Andalusia is the most populated region in Spain with 8.4 million inhabitants in 2019. The active population in 2019 and 2009 were the same: 3.9 million workers. Compared to 2009, the unemployment rate improved in 2019 from 24% to 21%. Andalusia used to be one of the regions in Spain with a younger population, however, the median age increased significantly from 34 years old in 2000 to 43 years old in 2020.

Andalusia is the fifth industrial region in Spain, with a gross value added of 11.6 billion euros in manufacturing industries, still below the 12.7 billion euros value added in 2008. Despite losing 60,000 jobs from 2008, Andalusia with 199,000 jobs was the third largest region in terms of industrial employment in Spain in 2019. On average, manufacturing firms in Andalusia are not very competitive in Spain, with a low ratio value added to income (19%) and a relatively low apparent labour productivity (58,305 €).

Similarly to Madrid, most of the manufacturing industries in Andalusia are fragmented with a large number of micro-enterprises. For instance, the Food industry has 5854 companies in the region with an average size of 8.4 employees. The Manufacture of metal products, except machinery and equipment has 4911 companies, and 4.5 employees on average, Manufacture of furniture has 2132 companies and 4.4 employees on average, Manufacture of other non-metallic mineral products has 1817 companies and 6.1 employees on average and Graphic arts and reproduction of recorded media has 1656 companies and 3.2 employees on average.

In terms of employment, the Food industry with 49.3 thousand employees in 2018 was clearly the most important industry in Andalusia. Some other relevant industries were the Fabricated metal products, (22.2 thousand employees mainly in the manufacture of metallic carpentry), Manufacture of other non-metallic mineral products such as stone cutting, carving and finishing (11.1 thousand), Manufacture of other transport equipment (9.7 thousand employees mostly in Aerospace industries) and Manufacture of furniture (9.3 thousand).

In terms of revenue, the five largest manufacturing sectors in Andalusia in 2018 were the Food industry (14.3 billion euros with a huge proportion of Oil production), Chemical industry (6.0 billion euros), Metallurgy; manufacture of iron, steel and ferroalloy products (5.9 billion euros with a large volume of production of precious metals), Manufacture of other transport equipment, mainly aerospace (2.6 billion euros) and Manufacture of beverages (2.6 billion euros).

Product exports in Andalusia exceeded €20 billion in 2019, almost doubling the €11 billion exports in 2008. The industries with the higher exports in 2019 were the Food industries (4.5 billion euros), the Manufacture of coke and refined petroleum products (4.1 billion euros) and the Manufacture of other transport equipment, mostly aerospace products (2.2 billion euros).

Oil is the product with the highest exports in the Food industry. The main destinations of these exports were Italy (697 million euros) and Portugal (270 million euros). While olive oil production is concentrated in Jaen and Córdoba, exports are driven by the large firms located in Seville such as the Portuguese group Sovena or the Spanish owned groups Grupo Ybarra-Migasa or Acesur. The rest of the export activity of the food industry is explained by the

tractor effect of the strong agro-industrial cluster in Almeria. However, most of the exports of this cluster are related to low value products such as raw vegetable products or fruits.

The exports in aerospace are linked to the activity of Airbus and its suppliers in Andalusia. Aerospace products and components are mainly exported to Germany (1.081 million euro) and France (620 million euros). Finally, the exports of the Manufacture of coke and refined petroleum industry benefit from the proximity to Africa, which is the destination for a large proportion (840 million euro).

2.3. Catalonia

Catalonia in 2019 had 7.5 million inhabitants and the active population was 3.4 million workers. The unemployment rate significantly improved from 16% in 2008 to 11% in 2019. Catalonia is also ageing with a median age of the population, which increased significantly from 38 years in 2000 to 44 years in 2020.

Catalonia had in 2019 the largest manufacturing sector in Spain with 450,000 employees and a gross value added of 34.8 billion euros, which represents 15% of the regional GDP. Despite the production recovered to the levels of 2008, the region has destroyed and not recovered 140,000 jobs since 2008. The sector's wage bill stood at \in 17.6 billion in 2019, below the \in 20.7 billion observed in 2008. The manufacturing industry in this region has a high ratio value added to income (27%) and the highest apparent labour productivity in Spain (77,409 \in).

Also, Catalonia has a very fragmented manufacturing industry. Micro-enterprises are especially relevant in the Manufacture of metal products, except machinery and equipment with 6620 companies and 2.9 employees on average, the Food industry with 3500 companies and 5.9 employees on average, Graphic arts and reproduction of recorded media with 2957 companies and 5 employees on average and Manufacture of wearing apparel with 2368 companies and 1.9 employees on average.

Similarly to Andalusia, the main manufacturing industry in Catalonia is the Food industry (80.3 thousand employees in 2018, with almost 50% of these employees working in meat processing industries). However, differently from Andalusian firms, the products produced

by the food Catalonian firms have higher value added and require more complex production processes.

Some other relevant manufacturing sectors in Catalonia are the Manufacture of metal products, except machinery and equipment (54.4 thousand employees, with 25% producing metallic carpentry), Manufacture of motor vehicles, trailers and semi-trailers (39 thousand employees, with 21 thousand devoted to the production of components for the industry and 17 thousand to the production of motor vehicles), Chemical Industry (36.5 thousand) and Machinery Industry (27.1 thousand).

In terms of revenue volume, the five largest manufacturing industrial sectors in Catalonia were in 2018, Food industry (26.1 billion euros), Chemical Industry (18.5 billion euros), Manufacture of motor vehicles, trailers and semi-trailers (18 billion euros), Manufacture of metal products, except machinery and equipment (9.2 billion euros), Manufacture of pharmaceutical products (6.6 billion euros).

The exports of manufacturing industries were 65 billion euros in 2019. These numbers represent a strong growth compared to 45 billion euros exports in 2008. The manufacturing industries with the highest export volume were Automotive vehicles and their components (€10.2 billion in 2019 versus €8.3 billion in 2008), Chemical industry (€11.1 billion in 2109 versus €7.2 billion in 2008) and Food industry (close to €7.4 billion in 2019, compared to €3.9 billion in 2008).

The large markets of the European Union are the main trading partners for Catalonian products. For instance, Germany is the main market for motor vehicles produced (1.778 billion euro), followed by the United Kingdom (1.395 billion euro), France (1.132 billion euro) and Italy (806 million euro).

The main destinations of the exports of chemical products produced in Catalonia are France (893 million euro), Italy (719 million euro) and Germany (648 million euro). The exports of meat products went primarily to France (718 million euro), Italy (291 million euro) and Germany (135 million euro). Finally, the pharmaceutical products were exported to Germany (509 million euro), France (406 million euro) and Italy (255 million euro).

2.4. Basque Country

The Basque Country in 2008 and 2019 had the same population of 2.2 million inhabitants. The active population in 2019 and 2008 was the same with one million workers. The unemployment rate in 2019 stood at around 9%, slightly below the 11% recorded in 2009. The Basque population is one of the oldest in Spain and the median age has increased significantly from 40 years old in 2000 to 47 years old in 2020.

The region is the third largest industrial region in Spain with a gross value added of 14.4 billion euros in 2019, still below the 14.6 billion euros in 2008. The Basque Country is the Spanish region where the manufacturing industry represents the highest proportion of the GPD (19%). The total employment generated by this sector was 187,000 jobs in 2019, significantly below the level of 2008 with 243,000 jobs. The sector's wage bill stood at $\[\in \]$ 7.9 billion in 2019, reducing from $\[\in \]$ 9.4 billion in 2008. The manufacturing industry in this region has the second highest ratio value added to income in Spain (28%) and the second highest apparent labour productivity (75,029 $\[\in \]$).

The manufacturing industry in the Basque Country is not as fragmented as in the rest of Spain. The average size of Basque manufacturing firms is typically higher compared to the rest of Spain (18 employees in the Basque Country vs 10 employees in the rest of Spain), but still far away from the average size of German competitors (39 employees).

The Manufacture of metal products, except machinery and equipment, which is the manufacturing industry with the highest number of companies, has 2960 companies with 14.6 employees on average. The Food industry has 966 companies and 11.8 employees on average, and Manufacture of machinery and equipment n.e.c. has 606 companies with 33.1 employees on average.

The Basque Country is the main hub in Spain of the machine-tool industry and its supply chain. For this reason, the largest manufacturing industries in the Basque Country are the Manufacture of metal products, except machinery and equipment (43.2 thousand employees in 2018), the Manufacture of machinery and equipment n.e.c. had 20.1 thousand employees, and the Metallurgy; manufacture of iron, steel and ferroalloy products had 17.3 thousand

employees. The Manufacture of motor vehicles, trailers and semi-trailers had 14.9 thousand employees and Manufacture of electrical material and equipment 13.4 thousand employees.

In terms of revenue, the largest manufacturing industries were the Manufacture of metal products, except machinery and equipment (7.2 billion euros), Metallurgy; manufacture of iron, steel and ferroalloy products (6.5 billion euros), Manufacture of motor vehicles, trailers and semi-trailers (6.0 billion euros), Manufacture of machinery and equipment n.e.c. (4.5 billion euros) and Rubber and plastic industry (3.5 billion euros).

The exports of Basque industrial products were 23 billion euros in 2019 as compared to the 18.6 billion euros exports in 2008. Compared to other regions in Spain, the Basque Country was below the average growth of exports in the last decade in Spain, reflecting the fact that Basque Country exports aimed at more mature markets. The industries with the highest export volume in 2019 were Automotive vehicles and their components (about 5.4 billion euros in 2019 compared to 3.5 billion euros in 2008), Manufacture of machinery and equipment (about 3.2 billion euros in 2109 compared to 2.6 billion in 2008). One of the main export categories of the Basque Country, metallurgy and manufacture of basic metals, experienced a significant decrease between 2008 and 2019, from 4.1 to 3.1 billion euros.

Mercedes-Benz has one of its largest plants in the Basque Country (Vitoria), producing Class V and Vito vans (including their electric versions). For this reason, most of the exports of motor vehicles in the Basque Country went to Germany (1.5 billion euro) and to a much lesser extent to France (334 million euro) and the United Kingdom (292 million euro). The main destinations of Basque exports of machinery were Germany (182 million euro) and France (132 million euro). Basic metallic products were sold in European markets such as France (295 million euro), United Kingdom (196 million euro) and Germany (139 million euro). The Basque plants of trains manufacturers Alstom and CAF export primarily to the United Kingdom (782 million euro). Similarly to Catalonia, the Basque Country is one of the regions with higher exposure to trade with the United Kingdom, and therefore is going to be affected by the Brexit process more than other regions. Finally, it is interesting to notice that because of the growing maturity of other destination markets, the Basque Country is the region in Spain where the manufacturing industry has devoted more effort to develop commercial exchanges with Latin America.

3. Appendix 3 – A CLOSER LOOK INTO ELECTRIC BATTERY PROJECTS IN SPAIN

The current regional battle for electric batteries plants is an example of the regional lack of coordination of innovation policies.

For example, the nascent Phi4Tech group of companies with an R&D centre in Toledo is planning to open a cathode factory and a battery cell factory in Extremadura, in partnership with Spain's Lithium Iberia, which would exploit one of the lithium deposits in Extremadura. The promoters of Phi4Tech have already tried to promote the failed Grabat Energy project to develop graphene batteries in Murcia. The aim of this project would be to build medium-sized batteries that would serve various sectors, from automotive to data centres or renewable energy. There is a second project called Battchain and coordinated by EIT Innoenergy that would exploit another lithium mine in Extremadura. From Extremadura, the plan is to send lithium to two new plants in the Basque Country, one for the manufacture of Basquevolt cells (an initiative of Iberdrola, Petronor, Enagas, MCC, Irizar, Ingeteam, Ormazabal, CIE automotive, Solarpack) and another in Navarra for the assembly of Battery Packs Nabatt cells (initiative of Fagor Ederlan, Ingeteam, Sodena). Another firm participating in the Battchain consortium is the Sevillian company Scoobic, which currently produces in China together with the Chinese firm RAP SEV electric scooters equipped with batteries manufactured by North Volt in Sweden. The idea is to re-shore the manufacture of the scooter to Andalusia and perhaps replacing the Sweden batteries with the Battchain batteries. However, the Andalusian plant will be more than 800 km distant, increasing the logistic costs of transporting the batteries to Andalusia. In addition, the Navarra company, Beeplanet Factory, an SME specialized in the recycling of electric vehicle batteries, would also be involved in the project.

A third project is the Valencian Battery Alliance led by the large Valencian company Power Electronics, the world's leading manufacturer of energy conversion systems for energy storage, and involving several research groups from Valencian universities (the Instituto Tecnológico de la Energía, the Institute of Molecular Science and the Technological Institute of Chemistry) and several multinationals and Ford suppliers (Ford, Stadler, Iberdrola, Zeleros, UBE, CEV Technologies, IDOM, Ampere Energy, Nutai, Astondoa, Grupo Segura,

Endurance Motive, Fácil Solutions, Grupo Valautomoción, Grupo Gimeno, Inelcom Technology, ITERA Mobility Engineering, HESS, INFAMOL, Mettecno, Torrecid and Witrac). The objectives of this project are to create a Gigafactory and the development of competences in this field of knowledge through the creation of a research centre focused on electric storage systems research that would be transversal to several sectors. However, Ford will not manufacture electric cars in its plant in Valencia since it is currently concentrating its manufacturing in Cologne (Germany). Therefore, Ford will not have the expected traction effect on the project. A fourth project, promoted by the Volkswagen Group, proposes to locate a battery factory either in Catalonia or in Aragon (in the event that the factory would also supply batteries to VW's Navarre factory). This project, which is still undefined, is based on the competences of large companies such as Iberdrola, Schneider Electric (with a factory in Catalonia) or LG Energy Solution (a spinoff of LG Chem with no production in Spain). This project has received strong political support in order to compensate for the recent closures in Catalonia of the Nissan factory (closed due to the global redistribution of the activities of the Renault-Nissan-Mitsubishi alliance), the two Bosch factories (relocated to Poland and Serbia) or Continental (closed because of the technological obsolescence of the components being manufactured in the Catalonian plant). However, this project does not have the goal of building complex and advanced competencies, as is the case of the Valencian project, nor does it have a balanced approach in the development of competencies both between large companies and SMEs (for example, it does not take into account the competencies of the Catalonian chemical pole), nor does it have an integrative approach with several Spanish regions, as the projects proposed by Battchain or Phi4Tec. Moreover, the main objective of the initiative would be to achieve low-cost battery production mainly through economies of scale and the use and improvement of mature technologies, rather than through pioneering research in the field. A fifth project, with a very regional character, is the one proposed for the manufacture of batteries in Galicia in the surroundings of the Stellantis group factory, with the participation of Iberdrola and the Galician Automotive Technology Center.

4. Appendix 4 - Regional Industry Structure of German Regions

4.1. Regional Industry Structure of Bavaria

The gross value added of manufacturing in Bavaria was 144 billion Euro in 2018 (26.3% of GVA in Bavaria), which compares to 103 billion in 2010 (25.3% of total GVA) showing an absolute and relative increase. During the financial crisis GVA dropped from 99 billion in 2007 to 88 billion in 2009 but exceeded pre crisis levels again in 2010. Approximately 1.33 million were employed in manufacturing in 2018 compared to 1.13 in 2010.

Employment wise the largest manufacturing subsectors in Bavaria are Manufacture of machinery and equipment n.e.c. (265 thousand) and Manufacture of motor vehicles, trailers and semi-trailers (234 thousand). This is followed by Manufacture of electrical equipment (135 thousand) and Food products (129 thousand). Manufacture of fabricated metal products (126 thousand) and Manufacture of computer, electronic and optical products (105 thousand) follow. Rubber and plastic products, Food products and Manufacture of computer, electronic and optical products have all approximately 72 thousand employees. While all these sectors have experienced substantial employment growth, especially the Manufacture of fabricated metal products, except machinery and equipment (+45.8%) and Food products (43.2%) have grown strongly.

Table 6: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - Bavaria

Largest Industries by employment and Change in Percent between 2008 and 2018					
Industry	2008	2018	Change in %		
Manufacture of machinery and equipment n.e.c.	211,438	264,861	25.27		
Manufacture of motor vehicles, trailers and semi-trailers	177,047	233,852	32.08		
Manufacture of electrical equipment	105,434	135,401	28.42		
Manufacture of food products	90,221	129,195	43.2		
Manufacture of fabricated metal products, except machinery and	86,294	125,808	45.79		
equipment					
Manufacture of computer, electronic and optical products	80,634	104,509	29.61		

These sectors also contribute significantly to local salaries with Manufacture of motor vehicles, trailers and semi-trailers paying nearly 17 billion in salaries, followed by Manufacture of machinery and equipment n.e.c. with 14 billion. Wages in Manufacture of electrical equipment (8 billion) and Manufacture of computer, electronic and optical products (6.1 billion) follow. Manufacture of fabricated metal products contributes nearly 5 billion to local salaries.

Table 7: Largest Manufacturing Sectors by Wages in Million Euro - Bavaria

Largest Industries by Wages in million Euro and Change in Percent between 2008 and 2018				
Industry	2008	2018	Change in %	
Manufacture of motor vehicles, trailers and semi-trailers	9,829.7	16,794	70.85	
Manufacture of machinery and equipment n.e.c.	9,332.2	14,254	52.74	
Manufacture of electrical equipment	4,831.1	7,932	64.19	
Manufacture of computer, electronic and optical products	4,168.3	6,169	47.99	
Manufacture of fabricated metal products, except machinery and	2,822.4	4,936	74.9	
equipment				
Manufacture of food products	2,131.7	3,561	67.03	
Manufacture of chemicals and chemical products	2,237.4	3,547	58.55	

Manufacturing generated in 2018 a turnover of approximately 375 billion Euro. Especially the motor vehicle industry (106billion) and the Manufacture of machinery and equipment n.e.c. (54 billion) constitute large proportions of turnover generated. Manufacture of computer, electronic and optical products (32 billion) and manufacture of electrical equipment (27 billion) are further large sectors. The food industry follows with a turnover of nearly 27 billion. Except for the food industry (21%) all these sectors generate the majority of their turnover (over 60%) in foreign locations.

Measured by number of business units the largest sectors in Bavaria are Manufacture of fabricated metal products (5,116), except machinery and equipment, Manufacture of food products (4367), and Manufacture of machinery and equipment n.e.c. (4240). Manufacture of rubber and plastic products (2684), Manufacture of computer, electronic and optical products (1799), and Manufacture of electrical equipment (1721). The number of business units is decreasing in all those sectors with especially Manufacture of electrical equipment experiencing a significant decrease between 2010 and 2018 (-18.13%).

Table 8: By Number of Business Units Largest Industry Sectors (Manufacturing) - Bavaria

Largest Industries by Number of Business Units and Change in Percent between 2010 and 2018				
Industry	2010	2018	Change in %	
Manufacture of fabricated metal products, except machinery and	5,248	5,116	-2.52	
equipment				
Manufacture of food products	4,640	4,367	-5.88	
Manufacture of machinery and equipment n.e.c.	4,613	4,240	-8.09	
Manufacture of rubber and plastic products	2,933	2,684	-8.49	
Manufacture of computer, electronic and optical products	1,875	1,799	-4.05	
Manufacture of electrical equipment	2,102	1,721	-18.13	
Manufacture of motor vehicles, trailers and semi-trailers	1,261	1,099	-12.85	

Bavaria exported in 2019 products valued at 188 billion Euros. Main exports are "Motor cars and motor caravans" valued at 30.9 billion Euro (16.4%). Main export destinations are the US (15.2%), UK (14.9%), China (12.7%), and Italy (7.17%). "Chassis, bodies, engines etc. for motor vehicles" are the second largest export constituting 7.47% of exports. While the majority is exported to EU locations (10.5% Austria, 8.23% Poland, 6.56% UK), 13% are exported to the US and 10.4% are exported to China. This is followed by ""Machinery for electricity production, distribution" (6.88%), which are mostly traded in the EU (Czechia 9.22%, Italy 5.58%) though 14.5% of exports are destined to China and 9.1% towards the US. ""Other Machinery" (4.95%) and "Other Machinery" (3.74%) follow – in both industries over 50% of exports are directed towards extra EU locations, with the main destinations China and US.

Imports in Bavaria amounted in 2019 to approximately 184 billion Euro. Main imports are "Chassis, bodies, engines etc. for motor vehicles" valued at 15.2 billion Euro (7.96%). Main import origins are within the EU: Austria (21.4%, Hungary (16.8%), Czechia (13.9%), Poland (9.27%), and Italy (5.47%). Second largest imports are within the sector "Petroleum oil and petroleum gases." Main import origins are Russia (35.3%), Kazakhstan (17.1%), Libya (14%), and Austria (12%). "Machinery for electricity production, distribution" is the next largest import constituting 6.65% of imports. While the majority is imported from EU locations (10.8% Romania, 9.43% Hungary, 8.52% Czechia), 13.9% are imported from China. This is followed by "Electronic devices" (5.9%), which are mostly originating outside the EU (China 18.6%, Malaysia 13.3%, US 13.1%, Taiwan 11.7%). "Motor cars and motor caravans" (5.42%) follow with imports mostly originating from EU locations. Hungary (24.2%) and Slovakia (20.9% are the main origins followed by the US (13.4%) and South Africa (7.42%).

4.2. Regional Industry Structure of Baden-Württemberg

The gross value added of manufacturing in Baden-Württemberg was 152 billion Euro in 2018, which compares to 109 billion in 2008. showing an absolute and relative increase. During the financial crisis GVA dropped from 112 billion in 2007 to 86 billion in 2009 but exceeded pre-crisis levels again in 2011 with 117 billion. Approximately 1.32 million were employed in manufacturing in 2018 compared to 1.22 in 2008.

The largest manufacturing subsectors in Baden-Württemberg by employment are Manufacture of machinery and equipment n.e.c. (367 thousand) and Manufacture of motor vehicles, trailers and semi-trailers (257 thousand). This is followed by Manufacture of fabricated metal products, except machinery and equipment (180 thousand) and Manufacture of electrical equipment (118 thousand). Manufacture of rubber and plastic products, Manufacture of food products and Manufacture of computer, electronic and optical products have all approximately 75 thousand employees. Overall, these sectors grew by over 20% since 2008.

Table 9: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - Baden-Württemberg

Largest Industries by employment and and Change in Percent between 2008 and 2018			
Industry	2008	2018	Change in %
Manufacture of machinery and equipment n.e.c.	297,221	366,694	23.37
Manufacture of motor vehicles, trailers and semi-trailers	211,434	256,685	21.4
Manufacture of fabricated metal products, except machinery and	140,691	179,585	27.64
equipment			
Manufacture of electrical equipment	95,592	118,270	23.72
Manufacture of rubber and plastic products	59,657	74,914	25.57
Manufacture of food products	58,693	74,739	27.34
Manufacture of computer, electronic and optical products	66,404	74,209	11.75

These sectors also contribute significantly to local salaries with Manufacture of machinery and equipment n.e.c. paying over 21 billion in salaries, followed by Manufacture of motor vehicles, trailers and semi-trailers with 16 billion. Wages in Manufacture of fabricated metal products, except machinery and equipment amount to nearly 7.7 billion, while manufacture of electrical equipment amounts to 6 billion. Manufacture of computer, electronic and optical products contributes 4.2 billion but has the smallest growth rate among industries. Food products, though employment wise a large industry has due to low salaries a limited influence (2 billion).

Table 10: Largest Manufacturing Sectors by Wages in Million Euro - Baden-Württemberg

Largest Industries by Wages in million Euro and Change in Percent between 2008 and 2018			
Industry	2008	2018	Change in %
Manufacture of machinery and equipment n.e.c.	13,794.7	21,283	54.28
Manufacture of motor vehicles, trailers and semi-trailers	11,377.4	17,562	54.35
Manufacture of fabricated metal products, except machinery and	5,188.1	7,688	48.18
equipment			
Manufacture of electrical equipment	4,025.7	5,986	48.69
Manufacture of computer, electronic and optical products	3,136.8	4,225	34.68
Manufacture of rubber and plastic products	2,103.4	3,057	45.33
Other manufacturing	1,393.3	2,255	61.87

Turnover distributes unevenly across industries in Baden-Württemberg. Main drivers of turnover in manufacturing are Manufacture of motor vehicles, trailers and semi-trailers (29%) and Manufacture of machinery and equipment n.e.c. (22%). Manufacture of fabricated metal products, except machinery and equipment (7.6%) and Manufacture of electrical equipment (6.9%) are the next largest sectors followed by Manufacture of computer, electronic and optical products (4.5%). These sectors are heavily export oriented generating the majority of their turnover abroad except for Manufacture of fabricated metal products, except machinery and equipment which has an export quota of 33.8%.

Measured by number of business units the largest sectors in Baden-Württemberg are Manufacture of fabricated metal products, except machinery and equipment (6330), Manufacture of machinery and equipment n.e.c. (5936), and Manufacture of food products (3180). Manufacture of rubber and plastic products (2156) and Manufacture of electrical equipment (2058) follow. Common among all industries is a reduction in the number of local business units between 2010 and 2018 with Manufacture of rubber and plastic products and Manufacture of electrical equipment losing more than 10% of local business units.

Table 11: By Number of Business Units Largest Industry Sectors (Manufacturing) - Baden-Württemberg

Largest Industries by Number of Business Units and Change in Percent between 2010 and 2018			
Industry	2010	2018	Change in %
Manufacture of fabricated metal products, except machinery and	6,722	6,329	-5.85
equipment			
Manufacture of machinery and equipment n.e.c.	6,549	5,936	-9.36
Manufacture of food products	3,397	3,180	-6.39
Manufacture of rubber and plastic products	2,452	2,156	-12.07
Manufacture of electrical equipment	2,317	2,058	-11.18
Manufacture of computer, electronic and optical products	1,833	1,623	-11.46
Other manufacturing	1,509	1,453	-3.71

Baden-Württemberg exported in 2019 products valued at 203 billion Euro. Main exports are "Motor cars and motor caravans" valued at 29 billion Euro (14.3%). Main export destinations are China (15.3%), South Korea (9.68%), UK (7.85%), Japan (4.87%), and Italy (7.17%) – over 50% of exports go towards non-EU locations. "Pharmaceutical products" are the second largest export constituting 11.6% of exports. While the majority is exported to EU locations (19.4% Netherlands, 17.9% Switzerland, 4.14% France), 21.7% are exported to the US and 5.32% are exported to Japan. This is followed by "Chassis, bodies, engines etc. for motor vehicles" (7.44%), which are mostly traded in the EU (Hungary 6.27%, UK 6.11%) though 15% of exports are destined to the US and 8% towards China. "Other Machinery" (5.72%) and "Machinery for electricity production" (4.77%) follow –both industries export mostly towards EU locations, with the main destinations outside the EU being the US and US receiving approximately 10% of the export volume.

Imports in Baden-Württemberg amounted in 2019 to approximately 184 billion Euro. Main imports are "Pharmaceutical products" valued at 15.1 billion Euro (8.2%). Main import origins are the Netherlands (25.8%), Switzerland (18%), the US (16.7%), Singapore (10.5%), and Ireland (8.18%). "Motor cars and motor caravans" are the second largest import constituting 6.7% of imports. While the majority is imported from EU locations (19.5% Slovakia, 12.9% Italy, 5.21% Finland), 18.3% are imported from the US, 6.8% from South Africa, and 5.13% from South Korea. This is followed by "Chassis, bodies, engines etc. for motor vehicles" (6.03%), which are mostly originating in the EU (Romania 15.7%, Czechia 10.4%, France 10.4%, Italy 9.14%). "Other prefabricated chemicals" (5.12%) and "Machinery for electricity production" (4.95%) follow –both industries import mostly from EU locations. Spain is a marginal partner in these sectors rarely exceeding 3% of imports in one of these sectors.

4.3. Regional Industry Structure of North Rhine Westphalia

Overall North Rhine-Westphalia population has grown since 1990 from 17.3 million to nearly 18 million. The number of employees subject to social insurance contributions has increased from 5.9 million in 2009 to 7.1 million in 2019. The unemployment rate measured as

economically active population decreased from 8.1% in 2007 to 6.4% in 2019 showing overall a decreasing trend.

The gross value added of manufacturing in NRW was 356 billion Euro in 2018 which is at a similar level than the 351 billion in 2008. Approximately 1.25 million were employed in manufacturing in 2018 compared to 1.22 in 2008. During the global financial crisis GVA dropped significantly (277 billion in 2009) with a reduction in employment (e.g., 1.15 million employed in 2009) though measures like short-time work reduced overall employment losses. The manufacturing industry is overall at a similar level compared to the pre-crisis situation though structural changes within industries happened, as the following paragraphs show.

In terms of employment, the Manufacture of machinery and equipment n.e.c. sector is the largest manufacturing industry with nearly 236 thousand employees. This is followed by Manufacture of fabricated metal products, except machinery and equipment (205 thousand), Manufacture of basic metals (125 thousand), Manufacture of food products (118 thousand), and Manufacture of chemicals and chemical products (112 thousand). Other notable sectors are Manufacture of electrical equipment (105 thousand) and Manufacture of motor vehicles, trailers and semi-trailers (96 thousand). Employment has grown overall but especially food products, the manufacture of chemical products, and the manufacture of electrical equipment have grown by over 20%.

Table 12: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - NRW

Largest Industries by employment and and Change in Percent between 2008 and 2018			
Industry	2008	2018	Change in %
Manufacture of machinery and equipment n.e.c.	206,230	235,942	14.41
Manufacture of fabricated metal products, except machinery and	173,000	204,069	17.96
equipment			
Manufacture of basic metals	115,849	125,112	8
Manufacture of food products	85,892	118,176	37.59
Manufacture of chemicals and chemical products	88,215	111,734	26.66
Manufacture of electrical equipment	87,050	104,482	20.03
Manufacture of motor vehicles, trailers and semi-trailers	88,685	95,893	8.13

Except for food products these sectors also constitute the largest payrolls in the manufacturing industry: Manufacture of machinery and equipment n.e.c. sector 12.4 billion. This is followed by Manufacture of metal products, except machinery and equipment (8.7 billion), the chemical industry (7.2 billion). Manufacture of basic metals (6.3 billion), Manufacture of motor vehicles, trailers and semi-trailers (5.5 billion), and Manufacture of electrical equipment (5.3 billion) follow. Again, the contribution of food products is more limited with 3.7 billion. Aggregate wages have grown in all sectors substantially lead by the Manufacture of chemicals and chemical products and Manufacture of food products (both over 50%).

Table 13: Largest Manufacturing Sectors by Wages in Million Euro - NRW

Largest Industries by Wages in million Euro and Change in Percent between 2008 and 2018			
Industry	2008	2018	Change in %
Manufacture of machinery and equipment n.e.c.	9,376.5	12,418	32.43
Manufacture of fabricated metal products, except machinery and	6,341.8	8,654	36.46
equipment			
Manufacture of chemicals and chemical products	4,621.9	7,202	55.83
Manufacture of basic metals	5,107.8	6,273	22.81
Manufacture of motor vehicles, trailers and semi-trailers	4,084.7	5,515	35.01
Manufacture of electrical equipment	3,571.7	5,326	49.13
Manufacture of food products	2,432.2	3,740	53.77

These industries also constitute the largest sectors by turnover, though the ranking is different. Turnover is highest in the Manufacture of machinery and equipment n.e.c. sector with nearly 50 billion Euro. This is followed by the chemical industry with approximately 44 billion and Manufacture of basic metals (43 billion). Manufacture of food products (36 billion), Manufacture of motor vehicles, trailers and semi-trailers (34 billion), and Manufacture of fabricated metal products, except machinery and equipment (34 billion) follow. Though employment numbers are large, turnover is lower in Manufacture of electrical equipment (23 billion) and Manufacture of rubber and plastic products (16 billion).

Measured by number of companies, Manufacture of fabricated metal products, except machinery and equipment is the most prevalent industry. This is followed by Manufacture of machinery and equipment n.e.c. and food products. As in other West German states, the number of business units has decreased.

Table 14: By Number of Business Units Largest Industry Sectors (Manufacturing) - NRW

Largest Industries by Number of Business Units and Change in Percent between 2010 and 2018			
Industry	2010	2018	Change in %
Manufacture of food products	4,462	3,878	-13.09
Manufacture of chemicals and chemical products	2,002	1,869	-6.64
Manufacture of rubber and plastic products	3,060	2,938	-3.99
Manufacture of basic metals	1,992	1,617	-18.83
Manufacture of fabricated metal products, except machinery and	8,480	7,508	-11.46
equipment			
Manufacture of electrical equipment	2,061	1,817	-11.84
Manufacture of machinery and equipment n.e.c.	6,343	5,712	-9.95

The manufacturing industry overall in NRW is characterised by SMEs. In 2018, only 10% of companies are larger than 250 employees. The sectors with the highest share of large companies are Manufacture of Coal and Petroleum products (47%), Manufacture of motor vehicles, trailers and semi-trailers (31%), Manufacture of basic metals (25%), and manufacture of pharmaceuticals (20%). Other vehicles, electrical equipment, and chemical industry have with 18% also relatively high shares of large corporations.

The production in employment and turnover wise important sectors is mostly export oriented. Overall, the manufacturing industry in NRW generates 44.4% of its turnover abroad in the pharmaceutical industry 73% of turnover is generated abroad. The vehicle industry (63%) and Manufacture of machinery and equipment n.e.c. follow (61%). The chemical industry (57%), Manufacture of computer, electronic and optical products (56%), and Other vehicle industry (55%) follow. Electrical equipment (51%) and textiles (48%) are also strongly export oriented.

North Rhine-Westphalia exported in 2019 products valued at 193 billion Euro. Main exports are "Pharmaceutical products" valued at 10 billion Euro (5.21%). Main export destinations are in the EU with the Netherlands receiving 15.4% of exports, followed by France (10.1%) and the UK (5.92%). China (10.7%) the US (15.2%), UK (14.9%), China (12.7%) and the US (6.55%) are the main non-EU destinations. "Chassis, bodies, engines etc. for motor vehicles" are the second largest export constituting 4.61% of exports. While the majority is exported to EU locations (7.27% Poland, 6.45% UK, 6.29% France), 12.6% are exported to the US and 6.98% are exported to China. This is followed by "Other articles of iron, iron sheet, metal" (4.53%), which are mostly traded in the EU (Netherlands 8%, 7.7% France, 7.3% Poland) though 5.9% of exports are destined towards the US and 5.5% towards China. "Plastics"

(4.31%) and "Machinery for electricity production" (3.84%) follow –both industries export mainly towards EU locations, with the main destinations China and US outside the EU. The export structure in North Rhine-Westphalia is diverse without dominant product categories.

Imports in North Rhine-Westphalia amounted in 2019 to approximately 222 billion Euro. "Petroleum oil and petroleum gases" (6.78%) are the main import in NRW worth 15.1 billion Euro. Imports mainly originate within the EU with nearly 75% of imports coming from the Netherlands. This is followed by "Office and automatic data processing machines" valued at 12.4 billion Euro (5.57%). Nearly 68% of imports come from China. "Pharmaceutical products" are the next largest import constituting 5.4% of imports. While the majority is imported from EU locations (26.4% Switzerland, 10.6% UK, 8.47% Ireland), 11.1% are imported from the US. This is followed by "Motor cars and motor caravans" (5.03%), which are mostly originating in the EU with Spain the main origin destination (21.7%). France, Belgium, and Czechia follow with nearly 10%. 11.2% of imports in this sector originate from Japan.

4.4. Regional Industry Structure of Saxony

Overall Saxony lost since 1990 significant population from approximately 4.8 million to 4.1 million in 2018. Since 2012 the numbers remain overall stable with intermittent periods of population growth. Saxony's labour force is slightly decreasing while overall employment is increasing. Unemployment is decreasing continuously over time.

The gross value added of manufacturing in Saxony was 22.5 billion Euro in 2018, which compares to 16.5 billion in 2008. During the financial crisis GVA dropped from 16.5 billion in 2008 to 14.2 billion in 2009 but exceeded pre-crisis levels again in 2011 with 16.8 billion.

Measured by employment the largest manufacturing industries in Saxony are Manufacture of fabricated metal products, except machinery and equipment (49 thousand) and Manufacture of machinery and equipment n.e.c. (48 thousand). This is followed by Manufacture of motor vehicles, trailers and semi-trailers (45 thousand), Manufacture of computer, electronic and optical products (22.8 thousand), and Manufacture of food products (22 thousand). While these sectors have experienced over 30% in employment growth since

2008, other sectors like the Manufacture of electrical equipment have lost nearly 20% of employment.

Table 15: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - Saxony

Largest Industries by employment and and Change in Percent between 2008 and 2018			
Industry	2008	2018	Change in %
Manufacture of fabricated metal products, except machinery and	37,176	49,307	32.63
equipment			
Manufacture of machinery and equipment n.e.c.	36,733	48,392	31.74
Manufacture of motor vehicles, trailers and semi-trailers	24,164	44,773	85.29
Manufacture of computer, electronic and optical products	17,388	22,800	31.12
Manufacture of food products	16,495	22,070	33.8
Manufacture of electrical equipment	24,476	19,824	-19.01
Manufacture of rubber and plastic products	11,784	16,519	40.18

These sectors also contribute significantly to local salaries with Manufacture of motor vehicles, trailers and semi-trailers paying over 2.1 billion in salaries, followed by Manufacture of machinery and equipment n.e.c. with 1.8 billion. Wages in Manufacture of fabricated metal products, except machinery and equipment amount to 1.4 billion, while Manufacture of computer, electronic and optical products contributes nearly 1 billion. The Manufacture of electrical equipment contributes 0.7 billion in wages to the regional economy though showing signs of decline.

Table 16: Largest Manufacturing Sectors by Wages in Million Euro - Saxony

Largest Industries by Wages in million Euro and Change in Percent between 2008 and 2018			
Industry	2008	2018	Change in %
Manufacture of motor vehicles, trailers and semi-trailers	797	2,149	169.66
Manufacture of machinery and equipment n.e.c.	1,153	1,848	60.25
Manufacture of fabricated metal products, except machinery and	888	1,426	60.5
equipment			
Manufacture of computer, electronic and optical products	655	975	48.94
Manufacture of electrical equipment	819	682	-16.8
Manufacture of food products	322.1	565	75.26
Manufacture of basic metals	306	500	63.18

Measured by number of business units the largest sectors in Saxony are Manufacture of fabricated metal products, except machinery and equipment (2201), Manufacture of machinery and equipment n.e.c. (1357), and Manufacture of food products (1426). Manufacture of rubber and plastic products (620) and Manufacture of electrical equipment (563).

Table 17: By Number of Business Units Largest Industry Sectors (Manufacturing) - Saxony

Largest Industries by Number of Business Units and Change in Percent between 2010 and 2018			
Industry	2010	2018	Change in %
Manufacture of fabricated metal products, except machinery and	2,362	2,201	-6.82
equipment			
Manufacture of machinery and equipment n.e.c.	1,606	1,357	-15.5
Manufacture of food products	1,426	1,286	-9.82
Manufacture of rubber and plastic products	693	620	-10.53
Manufacture of electrical equipment	601	563	-6.32
Manufacture of computer, electronic and optical products	460	463	0.65
Manufacture of motor vehicles, trailers and semi-trailers	492	450	-8.54

The size structure of companies within Saxony in manufacturing is strongly oriented towards smaller enterprises. Considering only enterprises with more than 20 employees, only 6.5% of businesses have 250 or more employees. 55.8% of enterprises have between 20 and 49 employees and 21.6% have between 50-99 employees.

Saxony exported in 2019 products valued at 40.2 billion Euros. Main exports are "Motor cars and motor caravans" valued at 12.3 billion Euro (30.5%). Main export destinations are China (23.8%%), UK (10.4%), Italy (6.09%), and France (5.41%). "Chassis, bodies, engines etc. for motor vehicles" are the second largest export constituting 11.5% of exports. While 24.4% are exported to China, other exports are sent mostly to European locations (16.2% Spain, 9.56% UK, 8.83% Czechia). This is followed by "Electronic Devices" (6.5%), which are mostly traded internationally (34.2% China, 27.9% Taiwan, and 17.6% Malaysia). "Machinery for electricity production, distribution" (4.59%) and "Other Machinery" (4.36%) follow – in both industries over 50% of exports are directed towards extra EU locations, with the main destination China.

Imports in Saxony amounted in 2019 to approximately 26.8 billion Euro. Main imports are "Chassis, bodies, engines etc. for motor vehicles" valued at 2.84 billion Euro (10.6%). Main import origins are within the EU with Austria (15.5%), Czechia (14.5%), Hungary (13.7%), and Poland (12.8%) being the main origins. "Motor cars and motor caravans" are the similarly important constituting 10.6% of imports. The majority (89.9% is imported from Czechia. This is followed by "Electronic devices" (6.03%), which are mostly originating outside Europe (33.5% US, 19.2% China, 10.4% Taiwan, 10.3% Thailand). "Aircraft" (5.12%) follows with main import origins being the US (78.9%) and Russia (11.2%). "Machinery for electricity production" (5.52%) follows. Imports originate mostly from EU locations (16.3%)

Czechia, 7.77% Poland, 5.84% Austria, 5.73% Hungary, 5.5% Romania). Other import origins of note are China (10.3%), South Korea (5.86%), and the US (5.7%).

4.5. Regional Industry Structure of Thuringia

Overall Thuringia has lost since 1991 continuously population. Thuringia has a population of 2.13 million in 2019 compared to 2.25 million in 2009 – a loss of 5.3%. In the same time frame, the labour force decreased by 10% from 1.2 million to 1.08 million. The median age increased from 41.9 years in 2000 to 47 years in 2016.

Thuringia's largest cities are Erfurt (capital) with a population of approximately 200000, followed by Jena and Gera with approximately 100000, and Weimar with a population of approximately 60000. Other cities are below 45000.

Migration trends within Thuringia show an ongoing urbanization trend with especially its larger cities gaining from internal migration. Overall migration trends show a net loss with population leaving for other states within Germany (especially Bavaria, Saxony, Hesse, and Berlin). International migration towards Thuringia is limited with origin destinations mainly from Eastern Europe (Poland, Romania, Serbia/Montenegro). The gross value added of manufacturing in Thuringia was 13.4 billion Euro in 2018, which compares to 9.9 billion in 2008. During the financial crisis GVA dropped from 9.9 billion in 2008 to 8.3 billion in 2009 but exceeded pre-crisis levels again in 2011 with 10.5 billion.

210,000 were employed in manufacturing in Thuringia in 2018 compared to 153,000 in 2009. Manufacturing employees received 7.1 billion Euro in wages and salaries in 2018. 15.8% of employees in manufacturing have a tertiary degree compared to 26.7% of Thuringia's population in 2019. Manufacturing lost between 1991-1997 significant numbers of employment but has continually added jobs since then – though overall only 57% of the 1991 manufacturing jobs exist today.

Employment wise, the 5 largest sectors in Thuringia are, ranked in decreasing size, Manufacture of fabricated metal products, except machinery and equipment (36.4 thousand), Manufacture of rubber and plastic products (22.9 thousand), Manufacture of food products (22.8 thousand), Manufacture of machinery and equipment n.e.c. (21.9 thousand), and

Manufacture of motor vehicles, trailers and semi-trailers (20.8 thousand). Especially the sectors of Manufacture of fabricated metal products, except machinery and equipment sector and Manufacture of rubber and plastic products show strong growth increasing both employment by approximately 48% from 2008 to 2018.

Table 18: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) Thuringia

Largest Industries by employment and and Change in Percent between 2008 and 2018			
Industry	2008	2018	Change in %
Manufacture of fabricated metal products, except machinery and	24,429	36,378	48.91
equipment			
Manufacture of rubber and plastic products	15,510	22,914	47.74
Manufacture of food products	16,008	22,815	42.52
Manufacture of machinery and equipment n.e.c.	17,695	21,864	23.56
Manufacture of motor vehicles, trailers and semi-trailers	15,839	20,773	31.15
Manufacture of computer, electronic and optical products	13,347	16,907	26.67
Manufacture of electrical equipment	9,672	12,815	32.5

Measured by wages and salaries in Euro these sectors are contributing the most to the local economy: Manufacture of fabricated metal products, except machinery and equipment (1.16 billion), Manufacture of motor vehicles, trailers and semi-trailers (826 million), Manufacture of machinery and equipment n.e.c. (796 million), Manufacture of rubber and plastic products (710 million), and Manufacture of computer, electronic and optical products (694 million).

Table 19: Largest Manufacturing Sectors by Wages in Million Euro - Thuringia

Largest Industries by Wages in million Euro and Change in Percent between 2008 and 2018			
Industry	2008	2018	Change in %
Manufacture of fabricated metal products, except machinery and	606.1	1,163	91.88
equipment			
Manufacture of motor vehicles, trailers and semi-trailers	445.6	826	85.41
Manufacture of machinery and equipment n.e.c.	502.4	796	58.42
Manufacture of rubber and plastic products	372.4	710	90.63
Manufacture of computer, electronic and optical products	436.7	694	58.8
Manufacture of food products	275	530	92.62
Manufacture of electrical equipment	272.1	456	67.59

Ranked by the number of firms (number of firms and average number of employees in brackets) the following sectors are the largest in Thuringia: Manufacture of fabricated metal products, except machinery and equipment (1336; 27.2), Manufacture of rubber and plastic products (721; 31.8), Manufacture of machinery and equipment n.e.c. (645; 34); Manufacture

of food products (627; 36.4), Manufacture of other non-metallic mineral products (536; 21.9).

Table 20: By Number of Business Units Largest Industry Sectors (Manufacturing) - Thuringia

Largest Industries by Number of Business Units and Change in Percent between 2010 and 2018			
Industry	2010	2018	Change in %
Manufacture of fabricated metal products, except machinery and	1,473	1,336	-9.3
equipment			
Manufacture of rubber and plastic products	752	721	-4.12
Manufacture of machinery and equipment n.e.c.	820	645	-21.34
Manufacture of food products	781	627	-19.72
Manufacture of other non-metallic mineral products	611	536	-12.27
Manufacture of computer, electronic and optical products	488	483	-1.02
Manufacture of electrical equipment	369	359	-2.71

Thuringia exported in 2019 products valued at 15.5 billion Euros. Main exports are "Chassis, bodies, engines etc. for motor vehicles" valued at 2.75 billion Euro (17.8%). Main export destinations are Hungary (22%), Spain (19.4%), and Finland (11.8%). "Articles of plastic" are the second largest export constituting 5.15% of exports which is mostly exported to European locations (9.57% UK, 8.75% France, 8.61% Poland). This is followed by "Machinery for electricity production, distribution" (4.41%). "Pharmaceutical products" (4.32%) and "Measuring and automatic control instruments" (3.8%) follow but their export structure differs from previous categories – in contrast to the previous groups, over 50% of exports are directed towards extra EU locations, mainly Asia and the US.

Imports in Thuringia amounted in 2019 to approximately 11.5 billion Euro. Main imports are "Aircraft" valued at 0.9 billion Euro (8%) which originate nearly exclusively in the UK (98.6%). "Chassis, bodies, engines etc. for motor vehicles" are the second largest import constituting 4.37% of imports. The vast majority is imported from EU locations (18.7% Poland, 9.28% Italy, 8.66% Czechia, 8.29% Austria, 6.33% Fance), 5.81% are imported from China. This is followed by "Furniture" (4.18%), which are mostly originating in the EU (27.9% Poland, 9.51% Italy, 7.91% Lithuania), though 18% are imported from China. "Other articles of iron, iron sheet, metal" (3.66%) and "Plastic articles" (3.66%) follow –both industries import mostly from EU locations.

5. Appendix 5 - Education, skills and R&D in German States

5.1. Education, skills and R&D in Bavaria

The share of 30–34-year-old with tertiary education levels exceeds 39.6% the national average of 35.5% in 2019. Overall, 4.8% of the Bavarian population worked in high-technology manufacturing and knowledge intensive services. Approximately 177,000 scientists and engineers were employed in 2018 in Bavaria representing 28.6% of all scientists and engineers employed in the state.

In Bavaria intramural R&D expenditures represent 3.15% of the regional GDP (€17.3b) equivalent to approximately 19.5% of Germany's total R&D expenditures. The private sector contributes significantly to R&D expenditures with approximately 77%. In 2012, the number of European Patent Office (EPO) patent applications (4631) (25.3% of the national total).

Bavaria has 15 universities (9 public) and 28 universities of applied sciences (17 public). In 2008/2009 Bavaria had overall nearly 260000 students. Data shows an increasing trend with Bavaria having in 2019/2020 over 394,000 students in total. In 2017, 32547 dual vocational training contracts were signed in Bavaria. STEM related occupations account for 35% of these, with the majority employed in production relevant occupations (27% of all vocational trainees).

Bavaria's university landscape is supplemented by 37 Fraunhofer locations, 13 Max Planck Institutes, 6 Leibniz association institutes, and 3 Helmholtz Centers, as well as several research centres and institutes closely aligned with universities and applied science universities.

Bavaria's innovation strategy is focused on fostering networks between businesses and research institutes/universities and fostering clusters. The strategies are embedded in the ERDF/ESF program and the Regional Innovation Smart Specialisation Strategy (RIS3). Focus areas receiving funding to increase competitiveness are the automotive industry, mechanical engineering, plant construction; cross-section technologies such as laser technology, microsystems technology, mechatronics, and new materials; innovative future technologies such as biotechnology, nanotechnology, aerospace technologies and information- and communication technologies; support of networks and clusters. Overall Bavaria received for

the program period 2014-2020 495 million Euro to promote growth and employment (EFRE), 298 million from the ESF to support education and employment, and 195 million for interregional cooperation (INTERREG).

5.2. Education, skills and R&D in Baden-Württemberg

Among the 30-34-year-old in Baden-Württemberg31.4% have attained tertiary education levels in 2019 compared to 35.5%. in Germany overall. In 2017, intramural R&D expenditures (GERD) amounted to approximately 27.9 billion Euro (or 5.7% of the GDP) with the majority (nearly 80%) originating from the private sector). 14608 national patents were filed in 2018 representing 31.3% of national patents (DPMA). 5.3% of the population are employed in high-tech industries and knowledge-intensive services in 2017 (Eurostat, 2020). Approximately 157,000 scientists and engineers were employed in 2018 in Baden-Württemberg representing 31.5% of all scientists and engineers employed in the state.

In 2019/2020 nearly 357,000 students studied in Baden-Württemberg – a slight decline can be observed since 2016. Of these, nearly 169 thousand are enrolled in universities and nearly 124,000 are enrolled in universities of applied sciences. Of the 169 thousand university students, nearly 30 thousand studied math or STEM subjects while 39 thousand studied engineering related subjects. Of the 124 thousand students at universities of applied sciences, 2500 study math or STEM and over 52 thousand study engineering. Beyond those numbers Baden-Württemberg has a dual training university combining vocational training and study with over 35 thousand enrolled students – over 15,500 of these are enrolled in engineering. Baden-Württemberg has nine public universities and numerous private institutions. Additionally, 24 public universities of applied sciences are located in the state as well as special university of applied sciences focusing on dual study programs (Duale Hochschule, combination of vocational training and university study). This is supplemented by public research institutions including 13 Fraunhofer institutes, 11 Max-Planck Institutes, 7 institutes of the Leibniz Association and two centres of the Helmholtz Society. The cooperation between these institutes and SMEs receives special focus – overall 12 of these institutes engage in an innovation alliance (innBW_innovation) making cross-sectoral technologies available to companies while the alliance provides businesses with additional support in developing products.

Technology and knowledge transfer is given special support via a comprehensive, decentralised and worldwide network of the Steinbeis Foundation transfer centres, which are spread over a range of universities of applied sciences (Fachhochschulen) and universities.

During the 2014-2020 program period Baden-Württemberg received 246.6 million from EFRE and 260 million Euro from the ESF. A core aspect of the EFRE program in BW was to support competitiveness, innovation and sustainability – to achieve these goals BW introduced a competition between regions in which regions developed together with partners from science academia business society and administration sustainable development concepts.

5.3. Education, skills and R&D in North Rhine Westphalia

Among the 30–34-year-old, 31.9% have obtained higher education levels. Approximately 113,000 scientists and engineers were employed in 2018 in North Rhine-Westphalia representing 17.9% of all scientists and engineers employed in the state. GERD expenditures in 2017 were 14.3 billion Euro – 2.11% of North Rhine Westphalian GDP. Private sector contributions amount to 59% of R&D expenditures. In 2017, 6856 national patents were filed in North Rhine Westphalia. 3.6% of NRWs employees are employed in high tech industries.

North Rhine-Westphalia had in 2017/2018 763,765 enrolled students with numbers slightly declining compared to the previous year. In 2017/2018 overall 492,000 students studied at universities – of these nearly 87000 pursued math or STEM programs with nearly 8800 doctoral students among these. Engineering related subjects were pursued by approximately 107,000 students of which over 5800 are doctoral students. Nearly 250,000 studied at universities of applied sciences – 7400 pursued math and STEM related subjects and nearly 100,000 pursued studies in engineering related subjects.

Aside of x universities, around 70 universities of applied sciences are located in NRW. The higher education system is supplemented by 14 Fraunhofer Institutes, 12 Max Planck

Institutes, 10 Leibniz Association institutes, and three Helmholtz centres. These institutes are supplemented by state funded research institutes including 15 Johannes Rau-Research Institutes and 14 other research facilities. To foster technology transfer, a broad infrastructure of technology transfer units has been established (around 30), supporting the translation of university research to business applications and patents.

NRW's ERDF program received 2.42 billion Euro (50% from the EU) in the program period 2014-2020, with nearly 1 billion allocated for strengthening R&D and innovation and 350 million allocated towards competitiveness programs for SMEs. NRW received 627 million from the ESF to promote poverty reduction, growth, and education of a skilled workforce. NRW's innovation strategy is embedded in the EFRE program and the Regional Innovation Smart Specialisation Strategy (RIS3). New materials, machinery and plant engineering, health, information- and communication technologies, mobility and logistics, energy and environmental industry, life sciences, and media and creative industries are the core sectors supported by the regional innovation strategy. Focus is the promotion of knowledge and technology transfer and the development of networks to link science institutions nationally and internationally with these industry sectors.

6. Appendix 6 – Statistical Data

6.1. Country Level or Cross Country Data

6.1.1. Employees by Sector

Table 21: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - Germany

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of machinery and equipment n.e.c.	1,053,377	990,473	995,499	1,018,455	1,033,003	1,044,796	1,057,032	1,067,095	1,072,032	1,089,834	1,218,032
Manufactu re of fabricated metal products, except machinery and equipment	777,748	713,647	748,367	787,171	781,202	801,734	801,537	798,527	815,330	816,127	900,642
Manufactu re of motor vehicles, trailers and semi- trailers	782,152	741,160	733,070	766,805	794,100	797,560	819,619	831,582	833,945	845,418	892,069
Manufactu re of food products	632,080	587,835	647,450	664,478	652,809	648,609	640,043	637,859	663,147	659,182	727,211
Manufactu re of electrical equipment	474,878	453,755	465,050	478,571	482,428	481,963	480,969	460,226	462,106	462,980	487,734

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of rubber and plastic products	375,034	359,522	365,749	379,917	383,561	389,404	393,800	399,164	403,842	412,201	445,703
Manufactu re of computer, electronic and optical products	309,815	284,692	284,114	294,716	299,481	302,145	303,042	317,264	330,320	327,774	364,854
Manufactu re of chemicals and chemical products	312,236	313,317	310,829	322,171	319,160	323,308	322,028	318,582	324,417	344,435	358,543
Manufactu re of basic metals	269,095	253,279	247,422	257,525	259,036	254,387	256,843	259,279	257,898	257,134	276,747

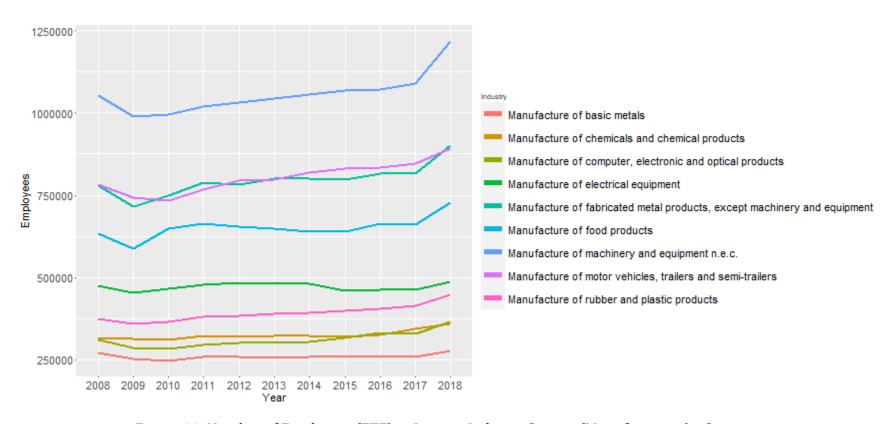


Figure 11: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - Germany

Table 22: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing), 2009-2018 - Spain

Industry	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of food products	298,222	296,149	291,085	284,456	274,050	280,028	287,596	308,543	322,010	344,827
Manufactu re of fabricated metal products, except machinery and equipment	262,521	248,871	233,261	205,134	194,367	188,952	195,244	203,630	214,749	227,601
Manufactu re of motor vehicles, trailers and semi- trailers	128,945	129,153	129,770	121,430	120,090	125,825	134,548	146,883	151,530	156,470
Manufactu re of machinery and equipment n.e.c.	107,206	99,845	96,143	93,610	91,556	92,198	94,531	97,679	100,716	107,411
Manufactu re of rubber and plastic products	95,186	92,377	90,082	84,476	83,565	81,939	85,892	88,714	91,952	96,600
Manufactu re of other non- metallic mineral products	138,453	122,946	111,438	93,109	82,357	78,157	78,375	82,812	85,007	91,682

Industry	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of chemicals and chemical products	82,309	81,521	78,970	77,651	77,060	76,751	79,603	83,567	86,173	89,989

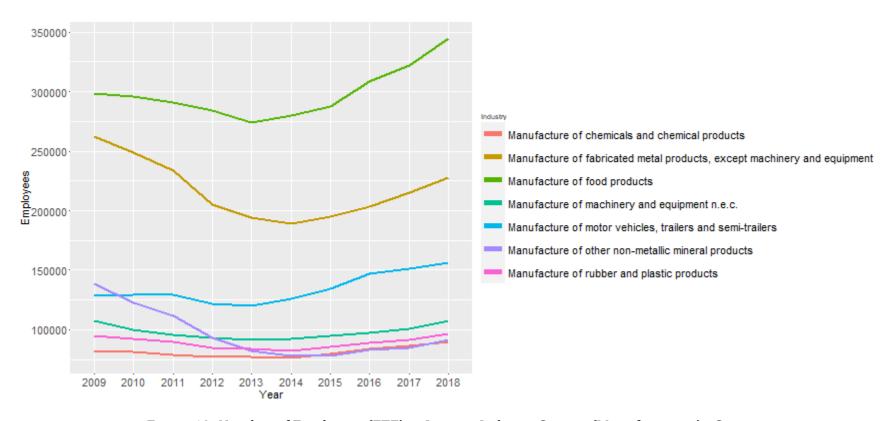


Figure 12: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing) - Spain

Table 23: Number of Employees (FTE) in Largest Industry Sectors (Manufacturing), 1995-2018 - Spain

Employment- thous	and perso	ons in Ma	nufacturi	ing Indus	tries in S	Spain, 19	995-2018	3															
Production	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
Food, Beverage, Tobacco	404	406	393	382	377	377	393	408	409	419	445	431	439	445	437	426	418	411	421	432	426	419	415
Apparel and Leather	129	129	129	128	124	125	130	143	148	153	186	205	229	254	273	296	314	337	356	369	368	359	344
Wood	54	53	48	47	46	48	55	63	69	79	102	103	110	111	115	113	113	112	112	109	107	102	101
Paper	46	46	44	43	43	46	47	48	49	50	54	55	56	57	57	57	57	55	55	55	55	53	51
Printing	58	58	60	59	58	60	66	72	87	89	100	101	103	100	97	92	91	86	88	80	79	75	69
Petroleum	9	9	9	9	9	9	10	10	9	9	9	9	8	8	8	8	8	8	8	8	9	10	ç
Chemicals	94	91	89	84	83	84	86	88	98	99	110	112	112	114	115	115	113	117	118	112	107	102	98
Pharma	43	43	41	40	40	38	38	39	41	39	41	41	41	41	41	40	38	37	37	37	36	35	34
Rubber and plastic	100	97	93	90	87	89	90	96	98	101	117	119	119	122	125	126	126	122	121	115	113	108	106
Other non- metallic mineral products	95	92	90	88	88	92	105	122	133	149	191	201	202	204	200	198	201	203	203	192	179	173	165
Metallurgy	62	60	59	59	60	63	70	77	82	82	92	97	97	99	104	107	109	112	117	103	92	83	77
Fabricated metal products	250	241	230	218	210	216	229	262	279	293	371	371	372	367	356	355	342	342	319	305	286	277	261
IT Equipment	26	27	26	25	27	31	33	36	37	39	44	49	50	54	55	58	66	83	86	79	77	72	67
Electrical equipment	71	68	65	63	60	59	65	72	81	82	93	95	98	97	98	101	104	107	107	102	100	94	90
Machinery	110	106	104	101	100	101	106	111	110	118	137	139	142	148	146	149	154	154	153	144	137	131	123
Vehicles	160	158	154	148	141	136	140	146	148	152	173	180	193	205	222	224	233	247	264	251	239	224	203

Other transport equipment	50	48	48	46	48	47	48	50	52	52	55	53	53	52	52	53	53	53	53	55	54	54	51
Furniture	103	102	100	95	95	100	110	127	144	170	207	204	212	217	218	216	213	213	210	199	187	175	162

Source: INE (2021)

Table 24: Apparent Labour Productivity (GVA per employee in thousand Euro) by Industry and Country (Main Countries EU), 2017

APPARENT	LABOUR	PRODUC	TIVITY	(GROS	S VALU	E ADDE	D PER E	MPLOY	EE-THOU	JSAND E	URO) BY	INDUSTR	Y AND C	COUNTRY	MAIN C	OUNTRII	ES IN TH	E EU), 20	17	
	Food products	Beverages	Textiles	Apparel	Leather	Wood	Paper	Printing	Chemicals	Pharma	Rubber and plastic	Non-metallic mineral products	Mettallurgy	Fabricated metal products	IT Equipment	Electrical equipment	Machinery	Vehicles	Other transport equipment	Furniture
Belgium	76.3	155.0	62.2	56.2	38.1	72.4	94.6	63.3	200.9	308.6	96.2	91.7	129.8	73.8	123.9	86.3	115.8	81.6	139.0	48.7
Bulgaria	10.4	19.6	10.3	6.0	5.8	8.1	18.6	13.8	30.3		13.3	20.0	41.9	14.9	23.4	16.0	16.2	10.5	14.8	7.5
Czechia	21.1	52.4	22.0	10.6	15.5	17.6	38.3	19.7	58.8	47.0	34.0	32.9	28.1	23.8	31.1	28.3	28.4	47.4	29.7	18.7
Denmark	75.7	112.7	80.4	74.2	:	68.6	85.4	62.7	195.1	299.5	91.5	97.9	77.4	69.8	129.7	103.1	99.1	85.0	80.3	82.8
Germany	45.0	81.9	53.9	55.6	53.2	50.7	74.0	49.2	124.4	130.5	64.4	71.1	79.9	60.9	93.7	83.7	83.4	120.5	123.1	52.5
Estonia	24.5	42.4	20.9	13.1	14.9	29.0	49.9	27.5	40.6	35.2	28.3	36.3	44.1	26.3	27.6	29.1	32.4	34.6	28.4	20.8
Ireland	144.7	:	49.4	44.1	99.2	63.5	62.3	73.2	:	:	69.5	91.0	128.9	80.1	:	96.2	:	74.7	101.0	:
Greece	25.1	51.9	26.7	13.4	15.6	7.1	38.7	22.5	51.8	58.8	43.8	36.7	73.0	24.5	44.3	39.4	27.9	19.5	30.8	11.8
Spain	46.4	83.8	37.8	26.5	29.8	35.5	75.1	35.9	99.5	109.1	61.8	59.4	84.0	45.7	55.0	60.3	59.9	71.4	76.3	30.0
France	55.6	142.7	49.9	40.2	74.8	53.2	71.4	51.2	115.6	127.0	72.4	70.5	78.0	63.3	98.5	82.1	74.2	87.2	114.0	49.5
Croatia	17.7	47.2	15.5	10.8	8.2	15.4	25.1	22.1	25.5	57.6	19.7	29.3	24.5	21.8	36.8	26.7	23.2	18.0	13.6	15.2
Italy	53.3	101.7	51.0	40.9	51.0	36.7	77.7	46.3	110.8	142.1	70.2	60.5	79.7	54.7	70.8	68.8	77.9	82.6	83.6	45.9
Latvia	15.1	27.2	12.2	7.3	8.8	23.8	21.2	20.9	17.2	40.3	18.6	30.6	9.8	18.2	:	25.0	19.8	27.5	10.3	11.5
Lithuania	19.0	36.1	15.0	9.8	8.7	14.1	30.3	17.1	70.0	:	24.5	19.7	16.7	18.3	36.8	19.2	24.4	23.1	21.2	16.1
Hungary	20.7	29.5	10.8	8.2	14.5	14.0	31.3	16.3	106.8	79.7	29.8	32.3	40.7	19.7	43.0	24.7	34.0	47.0	31.3	12.2
Netherlands	87.5	194.2	74.3	38.3	69.7	64.8	92.8	58.8	218.8	165.1	87.2	86.9	106.8	75.0	153.7	112.1	120.9	105.0	85.9	52.7
Austria	57.4	190.0	62.2	38.7	61.1	71.9	112.7	72.9	172.9	123.0	77.2	80.1	109.4	79.2	106.1	96.1	94.4	101.9	108.5	50.8
Poland	24.1	58.3	15.9	9.3	13.4	16.0	40.0	21.5	44.3	49.9	27.1	29.9	34.5	22.4	24.4	26.2	25.3	34.7	29.8	15.7
Portugal	24.9	55.1	23.2	14.2	16.6	26.6	76.8	27.7	67.0	65.8	47.5	33.1	56.8	27.2	37.1	38.3	36.7	36.4	33.9	18.2

Romania	8.0	36.1	12.2	7.4	8.1	9.9	17.7	:	23.4	35.1	21.3	21.6	25.4	13.4	15.8	16.7	21.1	23.0	16.9	8.6
Slovenia	28.6	:	40.3	:	20.6	27.4	40.4	32.6	60.2	:	41.1	43.2	51.5	34.3	48.3	39.5	42.1	47.4	39.1	25.3
Slovakia	18.2	33.5	15.9	9.1	15.8	11.1	42.8	17.0	38.3	29.9	35.0	30.1	46.0	20.2	39.1	25.1	28.3	40.6	26.3	18.0
Finland	60.2	112.1	51.3	44.9	57.9	55.7	152.4	52.9	170.4	281.5	77.9	78.2	132.0	59.6	128.0	90.1	83.1	62.5	52.5	:
Sweden	60.4	126.7	62.3	58.6	52.7	66.3	115.2	60.3	136.1	232.3	69.4	78.8	96.2	68.5	87.7	84.4	101.4	105.7	91.4	56.5

Source: Eurostat (2021)

6.1.2. Number of Firms by Sector *Table 25: Number of Firms by Sector (Manufacturing) - Germany*

Industry	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of fabricated metal products, except machinery and equipment	37,384	42,452	41,765	41,992	42,451	44,145	43,289	42,822	40,338	42,742
Manufactu re of food products	20,520	30,710	30,185	29,106	27,703	27,754	25,768	24,426	21,498	26,543
Other manufactu ring	15,053	18,778	18,873	18,225	18,449	19,922	19,797	19,226	19,096	19,520
Manufactu re of machinery and equipment n.e.c.	15,107	16,603	16,412	16,216	16,392	16,504	15,717	15,863	15,408	15,910
Repair and installation of machinery and equipment	9,688	11,891	12,274	12,433	12,347	14,218	13,769	14,918	14,084	15,252

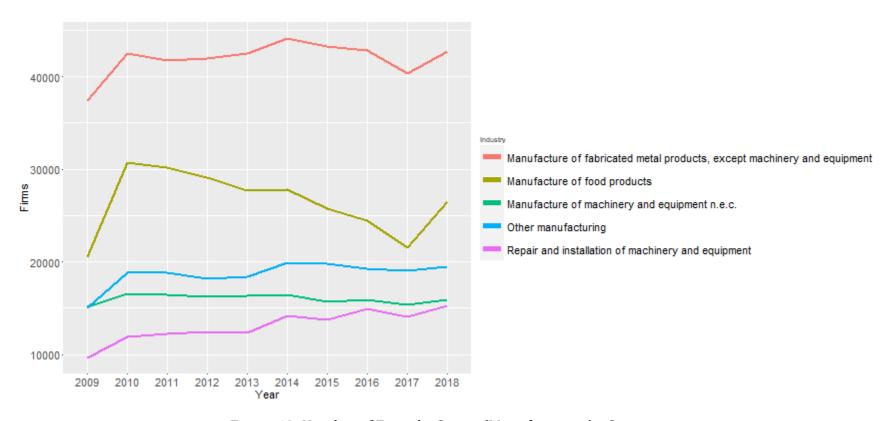


Figure 13: Number of Firms by Sector (Manufacturing) - Germany

Table 26: Number of Firms by Sector (Manufacturing) - Spain

Industry	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of fabricated metal products, except machinery and equipment	39,260	39,261	37,535	35,736	35,074	33,371	33,045	32,860	32,675	32,408
Manufactu re of food products	23,114	23,471	23,165	22,961	22,619	22,445	22,215	22,537	23,151	24,437
Repair and installation of machinery and equipment	11,771	10,629	10,536	10,107	10,576	10,782	10,890	11,446	12,633	13,698
Printing and reproducti on of recorded media	15,669	15,332	14,821	14,361	14,383	13,979	13,479	13,456	13,032	13,493
Manufactu re of furniture	15,155	15,577	14,758	14,058	12,611	12,355	11,882	11,802	11,668	11,554

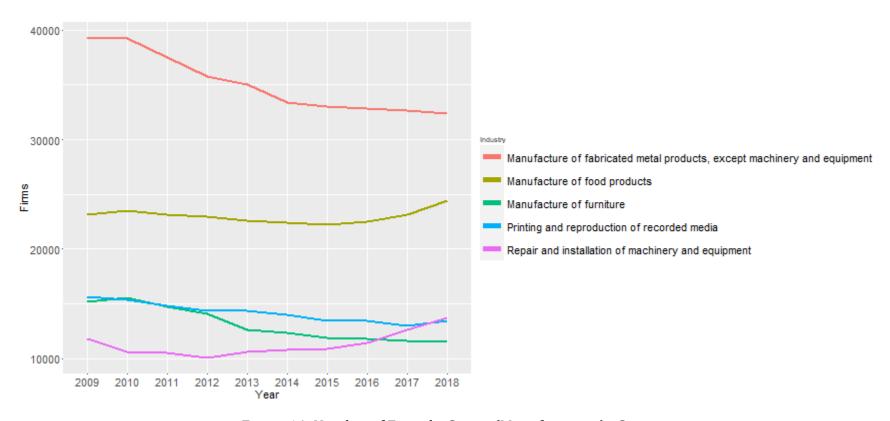


Figure 14: Number of Firms by Sector (Manufacturing) - Spain

6.1.3. Value Added, Productivity and Wages by Sector

Table 27: Value Added by Sector (Manufacturing) - Germany

Industry	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of motor vehicles, trailers and semi- trailers	43,639.2	66,839.4	76,700.2	76,648.6	78,339.4	89,378.9	94,811.4	105,638.7	104,418.2	108,655.8
Manufactu re of machinery and equipment n.e.c.	59,825.1	70,030.7	78,791.1	78,588.9	79,993.6	84,158	85,317.5	88,695.1	95,028.5	108,620.7
Manufactu re of fabricated metal products, except machinery and equipment	35,276	42,088.9	47,044.1	46,202.6	47,879.5	49,509.6	49,570.5	53,002.6	54,374.4	62,178.3
Manufactu re of electrical equipment	31,084.1	36,631.6	38,097.4	36,886.4	37,172.4	39,662	37,100.8	38,380.3	40,947.9	45,477.8
Manufactu re of chemicals and chemical products	29,790.5	36,650.3	37,192.8	34,726.7	35,461.6	36,857.1	39,526.6	41,855.6	45,070	44,912.5
Manufactu re of food products	27,911	29,586.2	29,600.2	29,637.2	30,701.4	31,349.2	33,014.5	35,541.3	36,625.8	39,701.2

Industry	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of computer, electronic and optical products	18,155.3	22,995.8	24,668.3	22,892.8	24,122.5	25,804.4	29,590.4	31,812.4	32,642.7	35,300.2
Manufactu re of rubber and plastic products	19,406.4	21,909.2	23,429.7	22,902	23,778.9	24,678.2	25,733.7	27,722.1	28,199.5	31,136.8

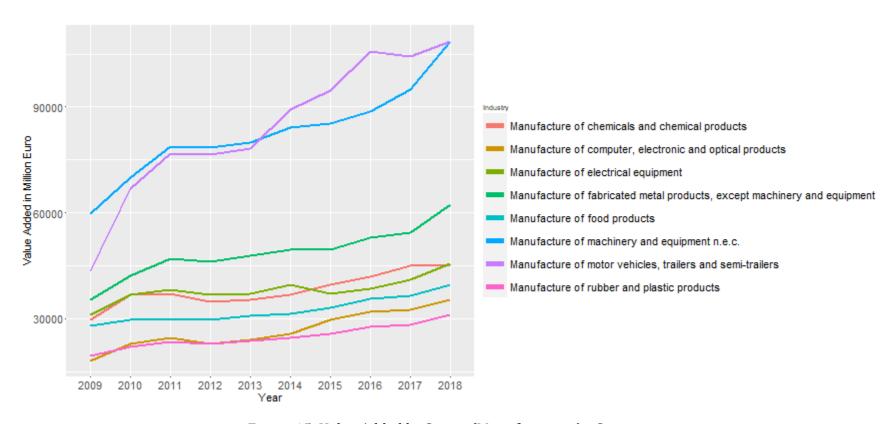


Figure 15: Value Added by Sector (Manufacturing) - Germany

Table 28: Value Added by Sector (Manufacturing) at factor cost 2009-2018 – Spain

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	CAGR
											2009-2018
Food products	14,819.4	15,539.6	15,991.8	15,052.9	15,083.5	15,710.5	15,199.8	15,654.4	16,375.9	17,753	2
Beverages	4,634.1	4,439.5	4,557.5	4,060.9	3,942.6	4,011	4,111.8	4,196.3	4,317.1	5,122.7	1
Textiles	1,454.2	1,547.2	1,410.3	1,365.9	1,382.6	1,420.6	1,492.3	1,549.8	1,700.3	1,723.8	2
Apparel	1,986.4	1,796	1,716.6	1,463.2	1,288.4	1,118.7	1,190.6	1,169.9	1,146.8	1,125	-6
Leather	984.4	1,013.4	1,035.4	971.6	1,066.3	1,161.9	1,183	1,117.2	1,158.1	1,217.6	2
Wood	2,199.3	2,047	1,831.2	1,583.7	1,471.6	1,455.7	1,607.2	1,645.1	1,887.8	2,010.2	-1
Paper	3,036.9	3,338	3,389.4	3,264.7	3,103.3	2,709.8	3,043.8	3,123.5	3,378.2	3,589.4	2
Printing	3,206.8	3,108.6	2,873	2,392.7	2,228.5	2,249.1	2,134.1	2,140.5	2,114.1	2,277.8	-4
Chemicals	5,986	7,318.7	7,791.9	7,072.5	6,687.8	7,073.5	7,876	8,466.8	8,942.7	8,889.6	4
Pharma	3,907.1	4,091.3	3,631.4	3,893.6	4,158.7	4,919.6	4,595.2	4,783.4	4,653.3	5,245.3	3
Rubber and plastic	4,921	5,373.9	5,200.9	5,039.8	5,278.4	5,368.5	5,716.6	5,725.5	5,961.6	6,287.1	3
Non-metallic mineral products	7,514.8	6,795.7	6,220.6	4,883.6	4,429.5	4,647.8	4,846.4	5,160	5,477.9	6,038.8	-2
Mettallurgy	3,244	4,798.3	4,431.4	3,908.4	3,802.4	4,301.8	4,432.8	4,502.5	4,978.9	5,085.8	:
Fabricated metal products	11,636.9	11,268.9	10,801	9,741	9,371.3	9,704.1	9,988.5	10,346	11,165.4	12,193.3	
IT Equipment	1,872.9	1,862.4	1,529.8	1,524.2	1,375.2	1,310.4	1,358.6	1,413.2	1,474.9	1,589.5	-
Electrical equipment	4,348.3	4,551.4	3,786.1	3,429.1	3,254.5	3,457.5	3,728	3,931.1	4,103.8	4,645.7	
Machinery	5,897.4	5,938.7	5,851.4	5,723.7	5,623.8	6,125.9	5,944.4	5,950	6,368.7	6,846.3	
Vehicles	7,071.4	8,110.7	8,463.1	7,637.8	8,348.8	9,881.8	10,179.9	10,772.2	11,263.6	11,759.9	
Other transport equipment	3,135	3,515.8	3,539.2	3,490.6	3,430.3	3,374.6	3,619.9	3,465.7	3,621.7	4,103.8	

Furniture	2,506.9	2,422	1,997.8	1,784.2	1,565.7	1,540.2	1,606	1,641.8	1,770.5	1,966.9	-3%
Other manufacturing	1,462.9	1,560	1,516.4	1,484.7	1,374.5	1,462.9	1,415.4	1,419.9	1,496.6	1,567.1	1%
Repair	3,021.7	3,112.2	3,075.2	2,979	2,993.3	3,121	3,318.7	3,317.9	3,674.5	4,074.3	3%
Source: INE (2021)											

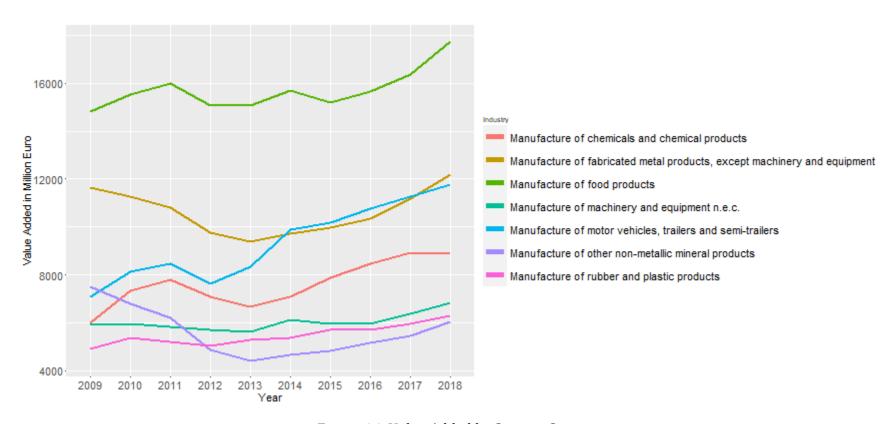


Figure 16: Value Added by Sector - Spain

Table 29: Value Added at factor cost – thousand million Euro in Manufacturing Industries in Spain, 1995-2018 – Spain

Value Added at fac	tor cost-	thousand	million e	uro in Ma	nufactu	ring Ind	ustries i	n Spain	, 1995-2	018													
Production	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
Food, Beverage, Tobacco	134	132	126	122	117	114	115	122	122	124	141	139	134	127	122	118	114	111	105	97	92	87	80
Apparel and Leather	25.2	25.8	25.0	24.5	24.3	24.4	24.8	25.4	24.5	24.2	24.4	23.3	21.1	20.5	18.4	17.4	16.1	15.3	14.5	14.5	13.7	13.4	12.9
Wood	8.6	9.3	9.0	8.7	8.2	8.2	8.0	8.8	7.9	7.8	8.8	8.7	8.6	8.3	8.3	8.6	8.2	8.1	7.6	7.4	7.3	6.9	6.4
Paper	2.0	1.9	1.7	1.6	1.5	1.5	1.6	1.8	2.0	2.2	3.0	3.0	3.0	2.8	2.6	2.6	2.6	2.6	2.5	2.4	2.3	2.1	2.0
Printing	3.9	3.7	3.5	3.4	3.0	3.4	3.5	3.7	3.6	3.3	3.6	3.6	3.3	3.2	3.2	3.2	3.2	3.2	3.0	2.8	2.8	2.7	2.6
Petroleum	2.2	2,2	2.2	2.2	2.4	2.4	2.6	3.2	3.5	3.5	4.0	4.1	4.2	4.1	3.7	3.7	3.6	3.4	3.4	2.8	2.6	2.4	2.1
Chemicals	3.2	3.5	3.4	2.9	0.9	1.5	2.3	2.6	1.9	1.3	1.9	2.7	3.3	3.8	3.5	3.3	2.8	2.9	2.7	1.7	2.3	2.3	2.0
Pharma	9.0	9.2	8.7	8.1	7.7	7.4	7.9	8.8	8.5	7.7	8.6	8.3	8.2	7.9	7.6	7.2	7.3	7.2	6.7	6.1	5.7	5.5	4.9
Rubber and plastic	7.2	7.2	7.0	6.8	6.9	6.1	5.1	4.9	5.4	6.6	6.9	6.3	5.8	5.3	4.8	4.5	4.2	3.9	3.5	3.1	2.9	2.8	2.6
Other non- metallic mineral products	6.4	6.1	5.9	5.8	5.6	5.5	5.1	5.4	5.5	5.3	5.9	5.3	5.1	5.2	5.2	5.2	5.1	4.9	4.8	4.5	4.3	4.0	3.9
Metallurgy	5.9	5.6	5.3	5.0	4.7	4.6	4.9	5.8	6.4	7.3	10.0	10.2	10.2	9.9	9.1	8.7	8.8	8.6	8.1	7.6	7.0	6.4	5.9
Fabricated metal products	6.6	6.6	6.0	5.9	5.6	5.1	5.4	5.6	5.8	4.6	6.0	6.6	7.0	6.1	6.4	6.2	6.6	6.8	6.6	5.4	4.7	4.3	3.6
IT Equipment	12.2	11.4	10.5	10.0	9.9	9.5	9.7	10.9	11.4	12.1	15.1	14.6	13.6	12.9	12.1	11.9	11.3	10.7	9.9	8.7	7.9	7.3	6.7
Electrical equipment	1.8	1.7	1.6	1.6	1.6	1.9	2.0	2.1	2.1	2.4	2.7	2.6	2.3	2.3	2.2	2.4	2.5	3.1	3.1	3.0	2.9	2.7	2.8
Machinery	4.8	4.3	4.2	4.0	3.8	3.7	3.7	4.0	4.8	5.0	5.9	5.6	5.5	4.6	4.7	4.5	4.3	4.2	4.0	3.7	3.5	3.3	3.2
Vehicles	7.3	6.9	6.4	6.5	6.9	6.5	6.5	6.4	6.2	6.6	7.4	7.1	6.9	6.6	6.5	6.2	6.2	6.0	5.6	4.9	4.6	4.3	4.0
Other transport equipment	12.4	11.7	11.2	10.7	9.8	8.5	7.4	8.5	8.9	9.2	10.7	11.9	11.6	10.9	11.4	11.1	10.5	10.0	9.8	9.6	9.4	8.8	7.7

Furniture	4.6	4.2	3.9	4.1	4.9	5.1	4.6	4.7	3.7	4.2	4.4	3.9	3.7	3.2	2.9	3.2	3.0	2.4	2.2	2.3	2.1	2.0	1.8
Repair	4.5	4.3	4.1	4.0	4.1	4.1	4.6	4.6	4.9	5.6	6.6	6.5	6.4	6.1	6.0	5.5	5.4	5.4	5.2	4.7	4.2	3.9	3.5

Table 30: Domestic vs Foreign Firms in Manufacturing Industries in Spain, Enterprises number, Value Added and Employment, 2008-2018

Year	Domestic/Foreign Firms	Enterprises - number	Value added at factor cost – million euro	Persons employed – number (thousand)	Average Value Added (thousand euro)	Average Firms Size (Employees)
2008	Domestic Firms	205,873	97,095	2,030	472	10
	Foreign Firms	1,626	29,609	378	18,210	233
2009	Domestic Firms	190,412	77,726	1,768	408	9
	Foreign Firms	1,560	23,098	326	14,806	209
2010	Domestic Firms	186,956	74,748	1,615	400	9
	Foreign Firms	1,786	31,406	399	17,584	224
2011	Domestic Firms	180,240	71,725	1,526	398	8
	Foreign Firms	1,922	32,145	402	16,725	209
2012	Domestic Firms	173,846	64,391	1,408	370	8
	Foreign Firms	2,073	31,260	397	15,079	192
2013	Domestic Firms	167,003	61,017	1,346	365	8
	Foreign Firms	1,932	32,117	391	16,623	202
2014	Domestic Firms	164,720	64,245	1,330	390	8
	Foreign Firms	1,869	33,332	394	17,834	211
2015	Domestic Firms	165,047	66,699	1,364	404	8
	Foreign Firms	1,889	35,229	405	18,650	214
2016	Domestic Firms	165,073	68,517	1,429	415	9
	Foreign Firms	1,911	36,793	426	19,253	223
2017	Domestic Firms	166,545	71,921	1,476	432	9

	Foreign Firms	2,172	38,921	442	17,919	203
2018	Domestic Firms	170,325	80,081	1,565	470	9
	Foreign Firms	1,669	40,795	455	24,443	273
CAGR 2008-2018	Domestic Firms	-2%	-2%	-3%	0%	-1%
	Foreign Firms	0%	3%	2%	3%	2%

Table 31: Enterprises, Value Added and Employees in Manufacturing Industries in Spain, 2018

ENTERPRISES, VALUE ADDED	AND EMPLOYEES IN M	ANUFACTURING INDUSTRIES IN SPAIN	, 2018
Enterprises, Value Added and Em	ployees in Manufacturing in	ndustries in Spain, 2018	
Industry	Enterprises - number	Value added at factor cost - million euro	Employees - number
Food products	24,437	17,753	360,545
Beverages	5,061	5,122.7	53,579
Textiles	6,435	1,723.8	42,048
Apparel	9,008	1,125	36,763
Leather	4,533	1,217.6	36,501
Wood	10,034	2,010.2	47,465
Paper	1,607	3,589.4	44,634
Printing	13,493	2,277.8	52,648
Chemicals	3,603	8,889.6	92,892
Pharma	330	5,245.3	47,341
Rubber and plastic	4,253	6,287.1	98,843
Non-metallic mineral products	7,924	6,038.8	94,687
Mettallurgy	1,304	5,085.8	60,305
Fabricated metal products	32,408	12,193.3	236,881
IT Equipment	2,228	1,589.5	26,574
Electrical equipment	1,957	4,645.7	70,466
Machinery	5,631	6,846.3	110,469
Vehicles	1,623	11,759.9	161,004
Other transport equipment	810	4,103.8	49,144
Furniture	11,554	1,966.9	53,395
Other manufacturing	10,002	1,567.1	34,673
Repair	13,698	4,074.3	86,057
Source: INE (2021)	•	•	•

Table 32: Production- thousand million euro in Manufacturing Industries in Spain, 1995-2018

Production- thousa	nd million	ı euro in l	Manufact	uring Ind	lustries	in Spain	, 1995-2	018															
Production	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
Food, Beverage, Tobacco	531	504	466	470	462	457	470	489	467	436	551	552	518	479	446	417	404	392	368	327	308	289	268
Apparel and Leather	122	120	112	112.0	110	108	110	111	104	101	110	103	97.2	94.2	88.2	79.8	75.8	72.6	64.8	63.3	61.4	60.4	57.9
Wood	19.6	20.1	19.6	19.3	18.6	18.6	18.4	20.8	19.1	18.6	22.0	24.2	24.9	24.5	24.4	25.5	25.5	25.4	24.5	23.9	23.9	23.5	21.4
Paper	7.5	6.8	6.0	5.9	5.3	5.1	5.6	6.5	6.7	7.2	10.0	11.4	11.0	10.4	9.9	9.7	9.5	9.2	8.7	7.7	7.2	6.5	6.1
Printing	13.8	13.4	12.4	12.5	11.8	12.5	12.6	13.2	12.2	10.8	12.9	12.9	12.1	11.3	11.0	10.9	11.0	10.8	10.2	8.7	8.5	8.1	8.0
Petroleum	5.9	5.7	5.8	5.8	6.0	6.0	6.5	7.8	8.7	8.9	10.0	10.9	10.7	10.2	9.4	8.9	8.8	8.1	8.0	6.8	6.6	5.9	5.5
Chemicals	41.1	33.8	27.6	31.6	41.9	45.0	48.5	41.3	32.1	24.7	40.5	34.1	34.0	30.2	22.1	19.4	18.9	19.8	21.1	12.4	10.6	11.8	10.5
Pharma	40.9	38.6	35.4	36.7	37.5	37.4	40.0	40.1	37.1	31.7	40.2	37.4	34.4	31.9	29.5	27.8	26.6	26.2	24.0	20.6	19.8	18.9	17.8
Rubber and plastic	15.8	15.3	15.2	15.2	14.9	14.9	14.0	13.9	14.3	14.3	14.6	13.5	12.5	11.6	10.7	10.1	9.7	9.6	8.8	7.5	7.3	6.9	6.5
Other non- metallic mineral products	21.0	19.9	18.4	18.8	17.6	17.5	17.1	18.4	17.4	15.3	19.7	19.2	18.2	18.2	16.6	16.2	15.9	15.3	13.9	12.3	11.9	10.8	10.2
Metallurgy	19.5	17.8	16.4	16.0	15.3	15.0	16.3	19.4	20.5	22.7	32.2	37.3	34.8	31.3	28.0	26.4	26.0	25.1	21.3	19.6	17.5	15.8	14.6
Fabricated metal products	32.9	31.2	26.2	29.1	30.3	30.6	33.5	36.8	35.1	26.1	40.8	42.1	37.4	30.4	28.5	23.9	23.3	22.4	21.9	17.9	17.1	16.0	14.
IT Equipment	38.1	35.0	30.9	30.3	28.5	27.3	28.8	32.2	32.6	32.1	44.3	46.3	42.5	39.1	35.6	32.6	31.4	29.1	27.2	24.6	21.1	19.5	17.9
Electrical equipment	4.7	4.4	4.2	4.2	3.9	4.2	4.6	5.4	6.4	6.0	8.5	9.3	8.9	8.7	8.6	9.3	10.5	12.1	11.3	10.0	9.4	8.7	8.4
Machinery	18.0	16.9	15.7	15.6	14.2	13.8	15.8	17.2	18.0	17.5	23.6	23.8	21.3	18.2	16.9	15.3	14.8	14.5	13.2	11.8	11.0	9.8	9.2
Vehicles	21.7	20.5	18.6	18.7	19.0	18.4	18.7	18.6	16.9	17.5	23.9	23.9	22.2	19.7	19.3	17.9	17.6	16.6	14.8	14.0	13.1	11.5	10.9
Other transport equipment	67.4	66.9	64.5	61.9	53.7	48.9	45.2	50.2	48.2	42.9	53.1	61.0	57.4	55.2	56.3	53.9	51.5	49.9	50.1	44.0	41.3	37.3	33.6

Furniture	16.7	15.7	15.4	15.4	14.9	14.4	13.6	14.2	14.4	15.0	17.1	13.3	12.8	10.5	9.4	9.7	9.2	7.7	7.4	6.8	6.3	5.6	4.7
Repair	10.9	10.4	9.9	9.6	9.6	9.4	10.5	11.5	12.6	13.9	17.2	18.5	17.7	16.9	16.1	14.5	13.9	13.6	12.7	11.6	10.8	9.8	9.0

Table 33: Wages and salaries- thousand million euro in Manufacturing Industries in Spain, 1995-2018

7. 1. 1.	2010		2016	0045	2011	2012	2012	2011	2010	****	2000	200=	2006	2007	2004	2002	****	2001	****	4000	1000	400	4004
Production	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
Food, Beverage, Tobacco	54.9	52.5	50.3	48.9	47.5	48.2	50.4	54.3	55.4	55.0	63.3	61.1	58.7	56.7	54.8	54.0	51.8	51.0	48.6	46.5	44.8	42.7	39.
Apparel and Leather	9.6	9.3	9.0	8.8	8.7	8.9	9.1	9.5	9.3	9.0	9.6	9.0	8.7	8.4	7.8	7.5	7.1	6.8	6.6	6.5	6.3	6.1	5.
Wood	2.4	2.2	2.1	2.1	2.0	2.1	2.2	2.4	2.4	2.5	2.9	3.2	3.3	3.5	3.6	3.9	3.9	4.1	3.9	3.9	4.0	3.9	3.
Paper	1.0	1.0	0.8	0.8	0.8	0.8	1.0	1.1	1.2	1.4	1.8	1.7	1.6	1.5	1.4	1.4	1.4	1.3	1.2	1.2	1.1	1.1	1.
Printing	1.4	1.4	1.3	1.4	1.3	1.4	1.4	1.5	1.4	1.4	1.6	1.5	1.5	1.5	1.4	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.
Petroleum	1.3	1.2	1.2	1.2	1.2	1.3	1.4	1.6	1.9	1.9	2.1	2.2	2.1	2.0	1.8	1.7	1.7	1.6	1.5	1.4	1.3	1.2	1.
Chemicals	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.
Pharma	3.5	3.3	3.2	3.1	3.1	3.1	3.2	3.2	3.5	3.3	3.8	3.7	3.6	3.4	3.3	3.3	3.1	3.2	3.0	2.9	2.9	2.8	2.
Rubber and plastic	1.8	1.8	1.8	1.7	1.6	1.6	1.7	1.7	1.8	1.6	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0	1.0	0.
Other non- metallic mineral products	2.8	2.8	2.6	2.5	2.3	2.4	2.4	2.5	2.5	2.5	3.0	2.9	2.7	2.6	2.6	2.7	2.5	2.5	2.4	2.2	2.1	2.0	1.
Metallurgy	2.5	2.5	2.4	2.4	2.4	2.5	2.9	3.3	3.6	3.8	4.9	4.8	4.5	4.3	4.0	3.9	3.8	3.7	3.4	3.2	3.0	2.8	2.
Fabricated metal products	2.3	2.1	2.0	1.9	2.0	2.1	2.4	2.7	2.7	2.4	2.9	2.8	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.1	1.9	1.8	1.
IT Equipment	6.2	6.1	5.5	5.3	5.0	5.1	5.4	6.2	6.4	6.6	8.4	7.9	7.3	6.9	6.5	6.3	5.8	5.6	5.2	4.8	4.4	4.1	3.
Electrical equipment	0.9	0.8	0.8	0.8	0.8	1.0	1.0	1.1	1.1	1.1	1.2	1.3	1.2	1.2	1.2	1.3	1.4	1.6	1.6	1.5	1.6	1.6	1.
Machinery	2.2	2.1	2.1	2.0	1.9	1.9	2.1	2.2	2.4	2.4	2.7	2.6	2.5	2.3	2.3	2.3	2.2	2.2	2.1	2.0	1.9	1.8	1.
Vehicles	3.7	3.3	3.1	3.1	3.0	3.0	3.2	3.3	3.2	3.2	3.7	3.6	3.4	3.4	3.3	3.3	3.2	3.1	2.9	2.7	2.5	2.4	2.
Other transport equipment	5.2	5.2	5.1	5.0	4.6	4.4	4.3	4.6	4.4	4.3	4.9	5.0	4.9	4.9	4.9	4.9	4.8	4.8	4.9	4.7	4.6	4.3	3.

Furniture	2.3	2.0	2.0	1.8	1.9	1.9	1.9	1.9	1.9	1.7	1.8	1.6	1.5	1.4	1.4	1.3	1.3	1.1	1.1	1.1	1.0	1.0	0.9
Repair	2.0	1.9	1.7	1.7	1.6	1.7	1.9	2.3	2.5	2.9	3.4	3.3	3.2	3.1	3.0	2.8	2.7	2.6	2.5	2.3	2.2	2.0	1.8

Table 34: Gross Operating Profit- thousand million euro in Manufacturing Industries in Spain, 1995-2018

Gross Operating Pr																							
Production	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
Food, Beverage, Tobacco	63.6	63.4	60.3	58.7	54.6	51.5	49.6	52.9	50.5	5 51.2	58.6	59.0	56.8	53.4	50.6	48.9	47.1	45.2	42.2	37.7	34.7	32.0	30.
Apparel and Leather	13.0	13.6	13.3	13.0	12.9	12.8	13.2	13.3	3 12.5	12.2	12.0	11.6	9.8	9.7	8.3	8.0	7.0	6.6	6.1	6.2	5.7	5.7	5.
Wood	5.6	6.5	6.2	6.0	5.7	5.5	5.2	5.7	4.9	4.6	5.0	4.6	4.3	3.8	3.8	3.7	3.1	2.9	2.6	2.4	2.2	1.9	1.
Paper	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	3 0.4	0.4	0.7	0.9	0.9	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.8	0.7	0.
Printing	2.0	1.9	1.8	1.7	1.3	1.6	1.7	1.8	3 1.8	3 1.4	1.5	1.6	1.4	1.4	1.4	1.4	1.5	1.5	1.4	1.3	1.3	1.3	1.
Petroleum	0.6	0.6	0.6	0.6	0.8	0.8	0.8	1.1	1.0	1.1	1.3	1.3	1.4	1.6	1.4	1.5	1.5	1.5	1.4	1.1	0.9	0.8	0.
Chemicals	2.4	2.7	2.6	2.1	-0.1	0.6	1.5	1.8	3 1.2	2 0.6	1.3	2.1	2.7	3.2	2.9	2.8	2.3	3 2.4	2.2	1.2	1.8	1.8	1.5
Pharma	4.7	5.0	4.6	4.1	3.7	3.5	3.8	4.7	7 3.9	3.2	3.6	3.5	3.5	3.4	3.3	3.0	3.2	3.1	2.8	2.4	2.0	2.0	1.0
Rubber and plastic	4.9	4.9	4.8	4.7	4.8	4.0	3.0	2.8	3.0	4.5	4.7	4.3	3.9	3.5	3.1	2.8	2.6	3 2.4	2.1	1.8	1.6	1.5	1.4
Other non- metallic mineral products	2.7	2.5	2.5	2.6	2.4	2.3	1.9	2.2	2 2.2	2 2.0	2.0	1.6	1.7	1.8	1.9	1.7	1.9	1.7	1.7	1.6	1.5	1.4	1.
Metallurgy	2.4	2.3	2.0	1.8	1.5	1.2	0.9	1.4	1.6	3 2.1	3.5	3.8	4.1	4.2	3.7	3.5	3.7	3.7	3.6	3.4	3.0	2.6	2.
Fabricated metal products	3.8	3.9	3.4	3.4	3.0	2.4	2.3	3 2.2	2 2.4	1.3	3 2.2	2.8	3.4	2.7	3.1	2.9	3.4	3.7	3.7	2.8	2.3	2.1	1.
IT Equipment	4.0	3.5	3.3	3.2	3.2	2.8	3 2.6	2.8	3.0	3.5	4.4	4.5	4.1	4.0	3.7	3.9	3.8	3.4	3.2	2.7	2.4	2.1	2.
Electrical equipment	0.8	0.6	0.6	0.6	0.5	0.6	0.7	0.7	7 0.7	7 0.9	1.1	0.9	0.8	0.8	0.7	0.8	0.7	1.1	1.0	1.0	0.9	0.8	1.
Machinery	1.9	1.6	1.5	1.4	1.3	1.2	1.0	1.1	1.6	3 1.8	2.3	2.2	2.2	1.5	1.7	1.5	1.4	1.2	1.2	1.1	1.0	0.9	1.
Vehicles	2.7	2.5	2.3	2.6	3.0	2.6	2.5	2.2	2.2	2 2.3	2.5	2.3	2.3	2.1	2.1	1.9	2.1	2.0	1.8	1.5	1.4	1.2	! 1
Other transport equipment	5.5	5.0	4.6	4.3	3.7	2.8	1.8	2.5	3.0	3.3	4.2	5.3	4.9	4.4	4.8	4.6	4.0	3.6	3.2	3.4	3.5	3.1	2

Furniture	1.9	1.7	1.5	1.9	2.5	2.7	2.3	2.5	1.4	2.0	2.2	1.9	1.9	1.6	1.3	1.6	1.5	1.1	1.0	1.1	0.9	0.8	0.7
Source: INF (2021)																							

Table 35: Labour productivity in main EU regions – thousand euro

Labour productivity	in main F	EU regions – thous	and euro										
Region	Productivity (000 €)	Region	Productivity (000 €)	Region	Productivity (000 €)	Region	Productivity (000 €)	Region	Productivity (000 €)	Region	Productivity (000 €)	Region	Productivity (000 €)
Southern Ireland	843	Salzburg	110	Niederösterreich	95	Nord-Pas-de-Calais	86	Bretagne	77	Kassel	72	Valle d'Aosta	66
Eastern and Midland Ireland	319	Prov. Vlaams- Brabant	109	Overijssel	95	Mittelfranken	86	Schleswig-Holstein	77	Peloponnisos	71	Sachsen- Anhalt	66
Hovedstaden	223	Rheinhessen- Pfalz	108	Luxembourg	94	Auvergne	85	Arnsberg	77	La Rioja	71	Sterea Ellada	65
Prov. Brabant wallon	202	Haute- Normandie	108	Rhône-Alpes	94	Friesland (NL)	85	Lombardia	77	Navarra	71	Dresden	65
Prov. Antwerpen	162	Darmstadt	107	Steiermark	93	Centre - Val de Loire	83	Bourgogne	76	Languedoc- Roussillon	71	Basilicata	64
Braunschweig	143	Midi-Pyrénées	107	Drenthe	92	Poitou-Charentes	83	Prov. Namur	75	Basse-Normandie	71	Toscana	63
Sjælland	137	Syddanmark	105	Karlsruhe	91	Prov. West-Vlaanderen	82	Gießen	75	Leipzig	70	Comunitat Valenciana	62
Helsinki-Uusimaa	129	Gelderland	103	Köln	90	Lorraine	82	País Vasco	75	Trier	70	Mayotte	62
Oberbayern	125	Midtjylland	103	Nordjylland	90	Aquitaine	82	Detmold	75	Trento	70	Martinique	61
Hamburg	125	Provence-Alpes- Côte d'Azur	102	Groningen	90	Prov. Luxembourg (BE)	82	Franche-Comté	75	Friuli-Venezia Giulia	69	Thüringen	60
Île de France	122	Utrecht	102	Prov. Limburg	90	Oberpfalz	81	Lüneburg	74	Koblenz	69	Castilla-la Mancha	60
Limburg (NL)	121	Etelä-Suomi	101	Düsseldorf	89	Prov. Hainaut	80	Münster	74	Limousin	69	Galicia	60
Noord-Brabant	118	Prov. Oost- Vlaanderen	100	Berlin	89	Unterfranken	79	Burgenland (AT)	74	Castilla y León	68	Región de Murcia	59
Zuid-Holland	116	Oberösterreich	100	Picardie	89	Emilia-Romagna	79	Pays-de-la-Loire	74	Veneto	68	Andalucía	58

Northern and Western	115	Bruxelles- Capitale	100	Flevoland	88	Liguria	79	Åland	74	Lazio	68	La Réunion	58
Noord-Holland	113	Bremen	99	Tübingen	88	Freiburg	79	Cantabria	73	Oberfranken	67	Abruzzo	58
Kärnten	113	Prov. Liège	99	Champagne- Ardenne	88	Niederbayern	79	Weser-Ems	73	Guyane	66	Chemnitz	58
Wien	113	Vorarlberg	98	Länsi-Suomi	88	Saarland	78	Piemonte	72	Brandenburg	66	Umbria	58
Zeeland	113	Tirol	96	Hannover	87	Schwaben	78	Bolzano/Bozen	72	Asturias	66	Ceuta	58
Stuttgart	112	Alsace	96	Pohjois- ja Itä-	87	Cataluña	77	Madrid	72	Aragón	66	Corse	57

Source: Eurostat (2021)

6.1.4. Gross Investment in Tangible Goods by Sector Table 36: Gross Investment in Tangible Goods in Million Euro by Sector (Manufacturing) - Germany

Industry	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of motor vehicles, trailers and semi- trailers	9,318.7	10,482.5	12,502.5	13,642.7	13,867.1	13,633.5	14,328.8	15,428	15,666.2	17,065.1
Manufactu re of machinery and equipment n.e.c.	5,722.4	4,876.1	5,960.1	6,566.9	6,461.1	6,844.3	7,058.5	7,495.8	7,610.3	9,367.8
Manufactu re of chemicals and chemical products	4,935.4	4,456.4	4,983.7	4,855.2	5,504.1	5,257.2	5,183.4	5,085.9	5,810.7	6,846.5
Manufactu re of fabricated metal products, except machinery and equipment	3,653.4	3,593.4	4,787.9	4,756.4	4,581.4	4,783.3	5,009.8	5,274.1	5,241.1	6,315.6
Manufactu re of food products	3,773.6	3,766.3	3,941.7	4,192.4	4,266.3	4,591.1	4,890.5	5,343.8	5,014.7	5,414
Manufactu re of rubber and plastic products	2,204.1	2,339.7	2,771.1	2,937.4	2,733.8	3,084.8	3,553.6	3,293.7	3,337.9	3,978.2

Industry	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of computer, electronic and optical products	1,905.5	2,982.4	4,325.8	3,455.5	2,661.6	2,303.8	2,542.9	2,685.7	3,245.9	3,761.8
Manufactu re of electrical equipment	2,572	2,590.8	3,245.8	3,431.8	3,041.6	2,873	2,779.8	2,843.9	3,152.9	3,634.7

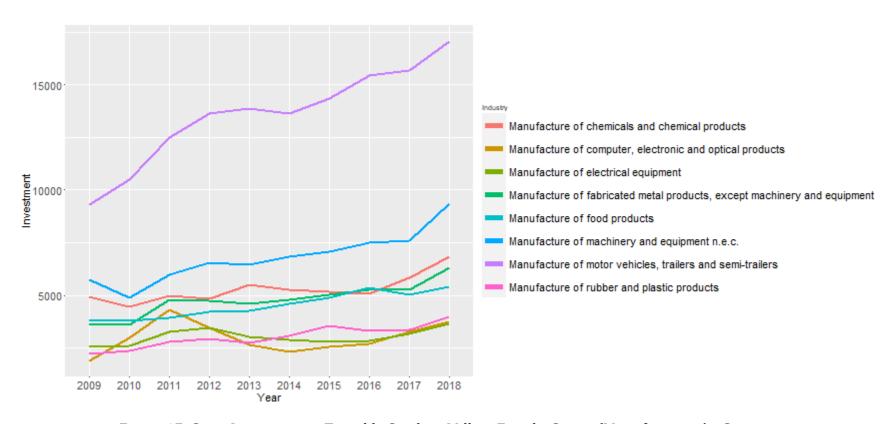


Figure 17: Gross Investment in Tangible Goods in Million Euro by Sector (Manufacturing) - Germany

Table 37: Gross Investment in Tangible Goods in Million Euro by Sector (Manufacturing) - Spain

Industry	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of food products	2,844.2	2,728.4	2,712	2,476	2,275	2,578.5	2,699	2,843	3,249.5	3,539.4
Manufactu re of motor vehicles, trailers and semi- trailers	1,785.3	1,257.4	1,339.6	2,030.6	2,580.8	2,358.4	2,694.6	2,562.8	2,763.4	3,069.3
Manufactu re of fabricated metal products, except machinery and equipment	1,109	935.8	931.3	850.1	828	1,073.9	1,391.3	1,254.6	1,455	1,599.5
Manufactu re of chemicals and chemical products	1,176	833.3	876.5	955.5	1,244.7	1,408.3	1,208.8	1,239.1	1,340.8	1,407.1
Manufactu re of rubber and plastic products	686.1	586.7	687.9	665.9	691	783.4	964.9	903.7	1,070.3	1,185.8
Manufactu re of beverages Manufactu re of other	745.6	796.2	676.6	786.5	733.5	800.6	990.6	1,011	1,135.8	1,114.9
non- metallic mineral products	1,335.5	1,007.9	951.7	625.7	629	499.5	550.9	691	792.3	1,106.2

Industry	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of basic metals	931.9	801.7	673.5	981.9	571.5	565.4	592.7	646.8	927.2	1,005

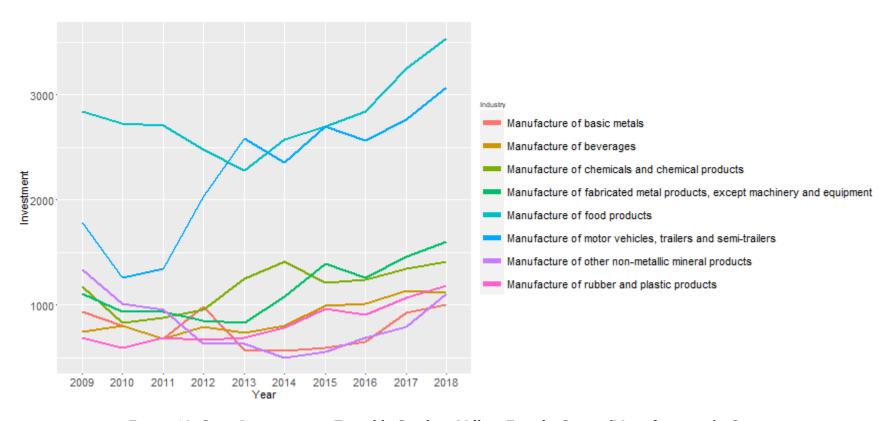


Figure 18: Gross Investment in Tangible Goods in Million Euro by Sector (Manufacturing) - Spain

6.1.5. Education and R&DTable 38: Share of Population with Tertiary Degree - Germany

Region	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Baden- Württemb erg	23.7	23.9	24.8	25.5	26.1	24.6	25.6	26.6	26.3	26.3	27.9
Bayern	22.5	23.2	23.9	24.7	25.2	24.4	24.8	25.3	26.2	26.7	27.3
Berlin	30.1	30.9	31.6	32.1	31.9	31.6	32.0	34.6	36.0	37.4	38.2
Brandenb urg	26.9	27.1	27.6	27.4	28.0	26.1	26.5	26.0	25.6	26.7	27.1
Bremen	19.2	20.5	23.2	22.2	21.6	21.9	21.4	23.6	24.8	24.6	24.2
Hamburg	23.9	24.8	26.5	25.8	26.2	28.1	29.6	30.4	30.2	31.3	31.3
Hessen	22.3	23.0	24.1	25.1	25.7	24.3	25.0	25.7	26.8	26.3	27.2
Mecklenbu rg- Vorpomm ern	24.1	24.7	25.5	25.3	25.1	23.4	24.5	24.9	26.1	25.1	25.1
Niedersac hsen	17.9	18.5	19.4	20.0	20.5	19.3	20.1	19.5	20.4	21.4	22.3
Nordrhein- Westfalen	18.7	18.8	19.7	20.4	20.8	19.9	20.7	22.0	21.9	22.0	22.6
Rheinland- Pfalz	18.9	19.7	21.0	21.7	21.9	20.8	21.3	21.7	22.0	23.0	24.1
Saarland	16.1	17.4	18.2	19.0	19.0	17.0	16.9	19.5	19.3	21.2	21.7
Sachsen	28.8	29.3	29.0	28.9	30.5	26.9	27.3	27.0	27.1	27.9	27.9
Sachsen- Anhalt	22.0	22.8	23.3	23.9	24.0	22.5	22.7	21.9	21.3	21.0	21.8
Schleswig- Holstein	18.8	18.8	20.1	20.6	20.5	19.7	19.9	20.6	20.5	20.8	21.1
Thüringen	24.7	25.4	27.7	28.4	28.4	26.2	25.6	25.7	25.6	26.5	26.7

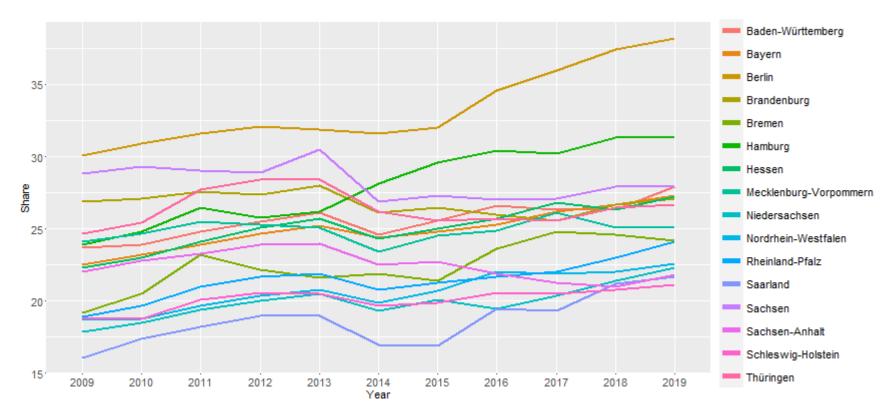


Figure 19: Share of Population with Tertiary Degree - Germany

Table 39: Share of Population with Tertiary Degree - Spain

Region	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Galicia	24.4	24.6	25.0	25.8	26.1	26.6	27.8	29.0	29.7	30.1	30.2	31.3
Principado de Asturias	26.4	27.4	27.9	30.2	30.7	32.1	32.7	33.4	34.2	35.0	35.5	35.9
Cantabria	28.3	28.6	30.4	30.4	31.0	32.0	32.0	32.5	33.4	34.1	34.4	35.0
País Vasco	36.2	37.4	37.7	38.2	39.4	39.7	39.6	40.2	40.8	41.2	41.3	42.3
Comunida d Foral de Navarra	30.9	31.2	33.2	33.9	33.9	34.6	35.6	34.8	36.9	37.4	37.7	39.0
La Rioja	26.0	29.4	29.4	27.8	29.0	29.5	31.1	32.8	31.2	30.8	31.5	32.6
Aragón	26.5	26.7	28.2	29.5	29.6	29.5	30.3	29.9	30.8	30.7	32.0	33.1
Comunida d de Madrid	33.7	33.5	35.9	37.5	38.1	39.3	40.4	40.0	39.7	39.9	40.0	41.6
Castilla y León	25.0	25.5	26.3	27.6	28.5	28.2	28.7	29.0	28.6	29.5	30.2	31.9
Castilla-la Mancha	18.1	19.6	20.0	21.2	21.3	22.0	22.8	22.9	22.7	23.0	23.6	24.9
Extremadu ra	18.0	18.2	19.2	20.3	19.7	20.3	22.1	22.1	20.8	22.1	22.4	22.5
Cataluña	25.0	25.5	26.6	27.3	27.8	29.3	30.9	31.4	32.4	33.0	34.3	35.3
Comunida d Valencian a	22.9	22.8	24.2	25.2	25.5	26.2	27.2	27.5	28.0	27.9	29.7	30.9
Illes Balears	17.4	18.8	19.3	20.8	21.6	23.3	23.8	23.6	24.8	26.4	25.6	27.3
Andalucía	20.4	20.9	21.5	21.7	22.1	22.8	23.0	23.7	24.5	24.9	25.5	26.1
Región de Murcia	20.8	20.2	21.0	21.5	22.4	23.9	23.0	23.5	24.1	24.9	26.3	26.7

Region	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ciudad Autónoma de Ceuta (ES)	17.0	19.5	17.1	16.0	18.7	19.2	18.4	23.5	24.1	22.4	22.3	19.4
Ciudad Autónoma de Melilla (ES)	18.9	20.6	18.9	22.7	21.2	22.4	23.5	22.7	22.5	24.0	24.8	25.0
Canarias (ES)	19.7	20.1	20.5	20.6	22.4	23.7	22.9	22.7	25.0	25.3	26.3	28.5

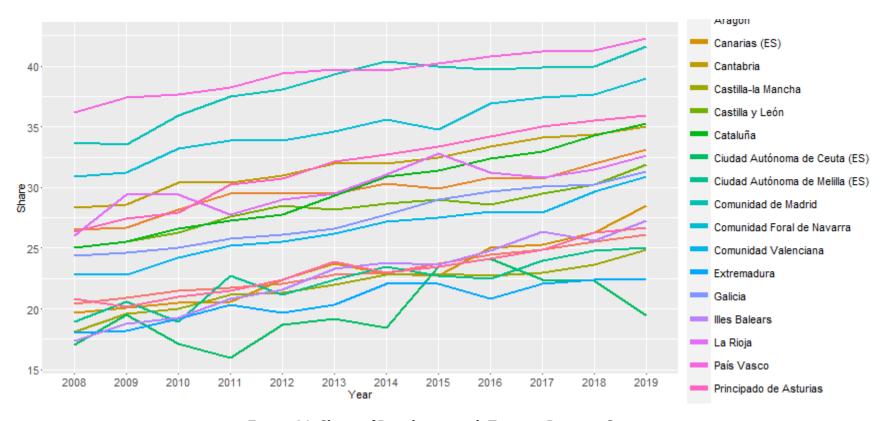


Figure 20: Share of Population with Tertiary Degree - Spain

Table 40: Share of Population with Tertiary Degree in Manufacturing at Total Manufacturing Employment - Germany

Region	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Baden- Württemb erg	26.7	26.0	25.7	24.5	25.2	25.2	26.6	27.1	27.4	27.1	27.2	27.6
Bayern	21.6	21.6	21.5	20.7	20.7	21.4	22.9	22.9	22.2	22.7	23.2	22.7
Berlin	7.5	6.8	6.8	6.8	6.7	7.2	7.1	6.7	7.0	5.9	6.7	6.9
Brandenb urg	9.8	9.5	9.4	9.2	9.0	8.5	9.7	9.9	10.0	8.2	8.6	7.8
Bremen	12.9	13.2	12.6	13.4	10.1	9.7	11.2	12.5	11.9	13.8	11.6	13.8
Hamburg	11.0	11.0	10.6	10.5	9.3	9.6	10.6	10.5	9.9	9.6	10.6	11.0
Hessen	16.0	15.7	16.3	15.2	15.7	14.6	15.8	14.3	15.6	14.7	13.8	13.8
Mecklenbu rg- Vorpomm ern	6.6	7.2	7.9	7.2	7.7	7.7	8.6	9.2	7.3	7.3	8.1	8.0
Niedersac hsen	16.7	16.6	15.6	15.5	15.1	15.1	16.0	16.9	16.8	17.1	17.3	17.8
Nordrhein- Westfalen	16.5	17.0	16.3	15.4	15.2	15.1	16.5	15.5	15.1	15.4	14.9	14.8
Rheinland- Pfalz	19.0	17.4	17.5	15.7	16.1	15.9	18.8	18.4	17.0	17.7	17.1	18.4
Saarland	12.9	15.7	14.6	16.4	15.9	14.3	18.1	17.6	15.9	17.2	16.7	17.0
Sachsen	13.7	12.8	13.1	12.9	13.2	11.7	14.1	14.6	14.3	15.6	15.5	14.7
Sachsen- Anhalt	10.6	11.1	11.0	11.2	9.9	10.9	12.1	11.7	11.9	10.8	12.4	11.4
Schleswig- Holstein	11.1	11.1	11.6	11.6	10.8	11.3	11.3	12.1	12.0	12.1	11.5	12.8
Thüringen	14.6	15.2	14.3	13.4	14.4	13.8	15.1	14.8	15.2	16.3	14.8	15.8

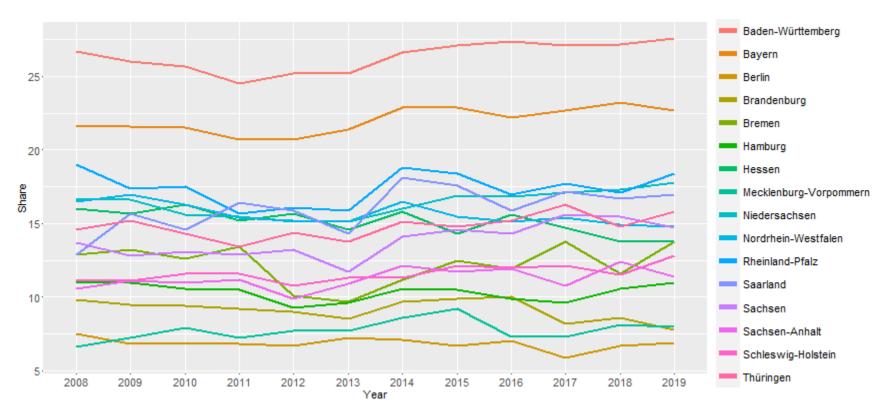


Figure 21: Share of Population with Tertiary Degree in Manufacturing at Total Manufacturing Employment - Germany

Table 41: R&D Internal Expenses in Spain and Workers (FTE), by region, 2019

1			F	R&D Internal Exp	penses in Spain a	nd Workers (Fu)	l Time Equivaler	nt), by region, 20	19			
1		Total			Business Sector			Public Sector			Higher Education	/n
	R&D Internal Expenses (000 €)	% as of Total in Spain	R&D Workers (FTE)	R&D Internal Expenses (000 €)	% as of Total in Spain	R&D Workers (FTE)	R&D Internal Expenses (000 €)	% as of Total in Spain	R&D Workers (FTE)	R&D Internal Expenses (000 €)	% as of Total in Spain	R&D Workers (FTE)
Spain	14,945,692	100.0	225,696.4	8,445,362	100.0	104,474.1	2,515,228	100.0	40,332.4	3,946,201	100.0	80,3
Andalucía	1,479,417	9.9	24,731.9	549,298	6.5	7,934.5	282,779	11.2	5,220.6	644,585	16.3	11,5
Aragón	339,741	2.3	6,124.4	189,379	2.2	2,703.6	73,613	2.9	1,241.4	76,725	1.9	2,1
Asturias,	188,453	1.3	3,331.1	113,363	1.3	1,379.1	23,794	1.0	499.8	51,222	1.3	
Balears	128,558	0.9	2,685.4	43,802	0.5	681.5	33,950	1.4	510.7	50,522	1.3	1,4
Canarias	214,965	1.4	3,605.7	43,146	0.5	730.3	77,460	3.1	1,145.5	94,183	2.4	1,7
Cantabria	117,858	0.8	1,847.4	46,700	0.6	653.4	19,348	0.8	387.7	49,170	1.3	
Castilla y León	762,659	5.1	9,975.9	499,868	5.9	4,295.9	50,746	2.0	966.2	211,731	5.4	4,7
Castilla - La Mancha	219,039	1.5	3,166.3	129,542	1.5	1,498.4	30,155	1.2	512.7			
Cataluña	3,512,716	23.5	51,830.4	2,146,070	25.4	26,758.0	617,632	24.6	10,082.7	732,526	18.6	
Comunitat Valenciana	1,174,248	7.9	19,305.9	535,262	6.3	8,043.3	127,795	5.1	2,203.9	509,692	12.9	9,0
Extremadur a	121,950	0.8	2,191.9	30,449	0.4	596.8	26,678	1.1	587.6			
Galicia	590,727	4.0	10,630.6	296,149	3.5	4,791.2	84,914	3.4	1,625.2	207,066	5.3	4,1
Madrid	3,922,792	26.2	54,221.7	2,305,794	27.3	25,128.0	887,682	35.3	12,666.8	719,440	18.2	16,2
Murcia	303,097	2.0	6,148.6	144,574	1.7	2,266.1	33,340	1.3	549.6	125,038	3.2	3,
Navarra	344,439	2.3	4,941.6	233,160	2.8	2,641.3	32,432	1.3	478.0			
País Vasco	1,451,319	9.7	19,570.7	1,104,332	13.1	13,842.8	95,922	3.8	1,375.2	249,791	6.3	4,
Rioja, La	69,507	0.5	1,285.5	33,163	0.4	528.0	16,990	0.7	278.8	19,308	0.5	,
Source: INE (20	.021)	•	•		•			,				*

Table 42: Business R&D Internal Expenses (thousand euro) in Spain by region, 2019

Business R&D Internal Ex region, 2019	penses (thousand euro) in Spain by
Region	Business R&D Internal Expenses (thousand euro)
Andalucía	558,928
Aragón	200,365
Asturias, Principado de	113,577
Balears, Illes	47,647
Canarias	40,042
Cantabria	45,215
Castilla y León	523,351
Castilla - La Mancha	150,003
Cataluña	2,151,665
Comunitat Valenciana	599,737
Extremadura	32,032
Galicia	329,997
Madrid, Comunidad de	2,398,809
Murcia, Región de	153,869
Navarra, Comunidad	237,796
Foral de	
País Vasco	1,125,100
Rioja, La	32,300
Source: INE (2021)	

Table 43: EPO Patents in 2018, by country and field of technology

	Austria	Belgium	rland	Czechia	Germany	Denmark	Spain	Finland	France	United Kingdom	Ireland	Italy	lands	Norway	Poland	Portugal	Sweden	Turkey	Australia	Canada	hina	Israel	Japan	R. Korea
	At	Bel	Switzerland	Cz	Gen	Den		II	丘 	U. King	Irc		Netherlands	N	P.	Por	Sw	Τι	Aus	Ca	P.R. China	I	ſ	R. K
Electrical machinery, apparatus, energy	251	110	569	22	1987	118	99	59	675	268	75	213	561	16	15	4	107	36	27	57	688	45	1906	809
Audio-visual technology	62	41	66	0	305	169	14	75	165	111	27	31	117	4	7	3	66	17	21	23	422	20	703	412
Telecommunications	13	20	41	1	263	18	21	83	192	106	12	22	106	3	3	4	233	8	11	29	620	29	546	358
Digital communication	15	21	133	5	659	11	32	347	493	224	38	57	228	10	7	5	1164	21	15	139	2270	45	1346	904
Basic communication processes	18	14	25	0	123	2	1	4	60	20	7	10	47	1	1	1	33	1	1	13	95	6	119	16
Computer technology	43	94	165	6	993	28	46	121	605	375	87	62	389	33	20	10	202	32	35	128	1142	99	1223	780
IT methods for management	12	22	72	2	220	10	26	28	89	86	29	33	47	9	2	0	18	9	44	39	131	28	289	117
Semiconductors	60	80	72	0	290	5	10	7	207	51	11	35	133	7	4	2	18	1	3	10	271	8	585	325
Optics	26	63	78	4	345	14	9	15	294	85	8	50	396	5	6	3	22	7	9	19	305	54	956	225
Measurement	107	101	757	16	1659	91	82	72	541	319	29	159	403	49	17	11	122	22	35	86	327	58	1227	189
Analysis of biological materials	19	36	81	5	223	18	34	7	149	69	7	18	46	6	3	1	22	2	15	6	23	6	173	23
Control	43	22	150	1	729	29	30	18	158	86	13	70	72	22	8	1	72	9	12	26	138	25	463	81
Medical technology	91	121	761	17	1314	229	116	80	557	425	133	242	824	21	29	12	201	27	156	158	297	416	1172	342
Organic fine chemistry	19	97	474	21	1101	47	103	13	431	360	36	118	333	7	31	11	56	6	20	52	241	34	498	247

	Austria	Belgium	Switzerland	Czechia	Germany	Denmark	Spain	Finland	France	United Kingdom	Ireland	Italy	Netherlands	Norway	Poland	Portugal	Sweden	Turkey	Australia	Canada	P.R. China	Israel	Japan	R. Korea
Biotechnology	81	164	473	5	771	282	126	27	436	274	31	93	385	25	27	7	93	3	61	62	156	68	440	15
Pharmaceuticals	61	151	442	18	572	179	161	16	482	268	78	163	205	33	24	14	87	26	86	127	289	128	482	22
Macromolecular chemistry, polymers	146	43	126	4	752	19	22	29	210	54	4	132	345	2	8	4	12	6	8	14	64	8	793	20
Food chemistry	13	39	236	2	146	96	30	15	73	47	10	62	301	13	5	8	22	12	27	8	11	26	119	4
Basic materials chemistry	39	96	170	5	1044	68	49	38	246	248	12	65	312	21	23	5	19	11	25	29	45	33	580	8
Materials, metallurgy	65	101	127	5	588	33	45	18	261	102	2	62	70	21	13	6	66	7	21	30	92	11	797	16
Surface technology, coating	42	55	116	1	441	20	23	33	197	55	5	59	103	5	9	5	28	3	11	22	83	7	607	7
Micro-structural and nano-technology	3	7	6	0	18	1	2	1	16	4	4	1	4	0	1	0	2	0	2	2	4	2	23	
Chemical engineering	43	67	204	7	835	47	46	54	281	162	13	135	141	33	16	7	85	9	37	50	107	17	454	9
Environmental technology	24	37	81	5	361	18	26	43	133	94	3	64	97	19	12	3	56	3	15	33	64	7	218	4
Handling	104	38	567	4	1006	58	73	128	204	147	8	320	131	28	10	8	90	8	14	29	65	11	473	3
Machine tools	104	36	148	10	925	22	41	31	100	67	4	180	74	11	11	5	90	8	7	16	87	32	599	5
Engines, pumps, turbines	72	64	107	9	1104	289	35	39	322	241	30	163	41	13	15	3	99	12	14	68	125	4	842	14
Textile and paper machines	65	72	135	10	403	16	29	59	69	65	10	142	130	1	2	5	46	33	3	5	42	23	760	2
Other special machines	132	180	204	13	1304	109	72	41	454	161	22	259	346	35	19	8	104	13	39	70	108	53	746	12

EPO Patents in 2018	8, by co	untry ar	nd field o	of techno	ology																			
	Austria	Belgium	Switzerland	Czechia	Germany	Denmark	Spain	Finland	France	United Kingdom	Ireland	Italy	Netherlands	Norway	Poland	Portugal	Sweden	Turkey	Australia	Canada	P.R. China	Israel	Japan	R. Korea
Thermal processes and apparatus	34	20	58	13	492	55	40	30	174	68	7	124	69	1	45	10	100	34	5	17	112	7	471	171
Mechanical elements	52	49	141	6	1234	47	32	31	329	170	11	162	69	33	11	7	103	19	17	28	106	9	680	49
Transport	142	84	161	8	2119	29	118	46	1071	321	22	397	128	25	32	14	305	60	34	90	299	36	1508	219
Furniture, games	62	29	214	9	591	27	39	17	157	136	7	233	115	18	11	12	94	38	40	33	194	15	196	174
Other consumer godos	54	34	557	1	551	22	35	14	220	230	18	162	116	4	12	2	74	48	29	23	316	21	258	276
Civil engineering	157	128	209	12	1029	128	92	76	362	250	8	269	178	74	38	18	123	20	61	40	122	28	262	43

Source: EPO (2021)

Table 44: EPO Spanish Patents, 2010-2019 by field of technology

EPO Spanish Patents, 2010-2019 by field of technology	ogy									
Field of Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Electrical machinery, apparatus, energy	34	50	69	67	61	50	78	122	99	117
Audio-visual technology	12	11	13	12	9	18	19	15	14	12
Telecommunications	23	18	25	30	26	24	23	18	21	25
Digital communication	20	30	47	91	44	40	31	22	32	20
Basic communication processes	3	2	3	1	1	2	0	4	1	4
Computer technology	29	37	46	40	35	40	39	42	46	42
IT methods for management	8	8	11	12	13	12	13	15	26	13
Semiconductors	11	4	4	9	11	16	5	10	10	6
Optics	13	9	10	14	10	16	18	14	9	16
Measurement	22	29	47	36	32	49	53	57	82	61
Analysis of biological materials	17	22	27	26	27	29	32	31	34	46
Control	39	16	25	16	23	26	32	28	30	39
Medical technology	80	71	72	74	90	95	86	116	116	128
Organic fine chemistry	154	113	112	101	72	95	91	138	103	95
Biotechnology	105	86	94	98	94	105	99	106	126	105
Pharmaceuticals	133	135	145	121	132	121	117	127	161	165
Macromolecular chemistry, polymers	9	9	16	17	16	20	16	14	22	19
Food chemistry	25	33	33	21	29	20	27	34	30	33
Basic materials chemistry	27	19	33	36	33	47	47	42	49	48
Materials, metallurgy	21	33	38	40	44	44	49	43	45	48

Field of Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Surface technology, coating	20	17	11	19	23	9	18	16	23	36
Micro-structural and nano-technology	2	3	0	3	1	2	0	1	2	1
Chemical engineering	19	22	26	19	26	33	43	42	46	61
Environmental technology	10	18	24	15	16	20	22	23	26	29
Handling	50	64	75	71	62	98	90	68	73	71
Machine tools	20	33	27	28	49	34	36	38	41	51
Engines, pumps, turbines	59	73	98	74	66	43	47	35	35	43
Textile and paper machines	23	16	18	22	19	18	15	24	29	23
Other special machines	78	66	51	80	76	67	69	77	72	103
Thermal processes and apparatus	46	47	48	49	39	38	30	28	40	59
Mechanical elements	32	23	31	28	26	29	31	31	32	21
Transport	97	99	103	88	107	112	122	117	118	146
Furniture, games	47	40	39	38	37	38	38	37	39	53
Other consumer goods	40	39	39	24	35	30	31	22	35	42
Civil engineering	93	97	63	61	73	69	96	105	92	92

A106

Table 45: SMEs vs Large Firms in Spain, France, Germany and Italy, Employees and R&D Expenses, 2018

	Total Employees – thousand	Employees Large Firms – thousand	Employees SMEs – thousand	R&D Expenses Large Firms – million euro	R&D Expenses SMEs – million euro	Total Business R&D – million euro	Total Internal Funds R&D Large Firms (% of total R&D Expenses)	R&D Expenses/ Employee Large Firms	R&D Expenses/ Employee Small Firms
Spain	12,574	3,938	8,636	4,486	3,959	8,445	3,648 (81%)	1,139	458
France	15,794	7,454	8,340	24,123	9,823	33,946	19,704 (82%)	3,236	1,178
Italy	15,112	3,108	12,004	9,780	6,154	15,934	7,459 (76%)	3,147	513
Germany	31,121	12,787	18,334	66,378	5,723	72,101	57,977 (87%)	5,191	312

Table 46: R&D Expenses in Manufacturing Industries in Spain, Large firms vs SMEs (less than 250 employees), 2019

Industry	SMEs/ Large Firms	R&D Internal Expenses - million euro	Internal R&D Funds - million euro	External R&D Funds - million euro	EU Funds - million euro	Extra-EU Funds - million euro	Basic Research	Applied Research (%)	Development (%)
Food and Beverages	SMEs	144	130	14	2	0	1	57	41
	Large	121	110	11	0	0	2	54	45
Apparel and Leather	SMEs	38	35	3	0	0	1	53	46
	Large	35	34	1	0	0	0	6	93
Wood, paper, printing	SMEs	21	19	2	0	0	3	54	43
	Large	26	26	1	0	0	2	31	67
Chemicals	SMEs	194	173	21	4	0	3	61	36
	Large	111	106	5	1	1	4	46	50
Pharma	SMEs	80	73	7	0	0	3	64	33
	Large	706	641	65	0	38	9	76	15
Rubber and plastics	SMEs	49	46	3	0	0	1	56	43
	Large	46	30	16	1	0	2	34	64
Non-metallic products	SMEs	30	26	4	1	0	2	49	49
	Large	27	18	8	0	0	0	52	47
Metallurgy	SMEs	28	22	6	0	0	2	46	53
	Large	39	32	6	1	0	3	39	58
Metallic products	SMEs	103	87	15	2	0	1	45	53
	Large	49	44	5	0	0	2	31	67

IT Equipment	SMEs	157	134	23	6	1	3	41	56
	Large	54	51	3	1	0	0	13	87
Electric material	SMEs	87	81	6	2	0	3	46	51
	Large	110	104	6	0	1	1	56	43
Machinery	SMEs	202	180	22	4	0	2	42	56
	Large	68	58	11	1	0	0	49	51
Vehicles	SMEs	60	54	6	0	2	2	60	38
	Large	484	430	53	0	16	0	29	71
Aerospace	SMEs	15	12	2	0	0	0	68	32
	Large	460	240	220	13	78	0	27	73
Other Transportation Equipment	SMEs	12	12	0	0	0	1	51	48
	Large	115	88	27	2	0	4	13	82
Furniture	SMEs	11	11	0	0	0	1	56	43
	Large	4	4	0	0	0	5	42	53
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Source: INE (2021)

6.2. Regional Data

6.2.1. Baden WuerttembergTable 47: Number of Firms by Sector (Manufacturing) - Baden Wuerttemberg

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of fabricated metal products, except machinery and equipment	1,460	1,492	6,722	6,539	6,454	6,570	6,494	6,390	6,363	6,375	6,329
Manufactu re of machinery and equipment n.e.c.	1,473	1,468	6,549	6,365	6,193	6,100	6,097	6,038	5,960	5,948	5,936
Manufactu re of food products	716	716	3,397	3,459	3,389	3,376	3,358	3,244	3,238	3,267	3,180
Manufactu re of rubber and plastic products	542	547	2,452	2,404	2,379	2,305	2,304	2,297	2,256	2,219	2,156
Manufactu re of electrical equipment	528	535	2,317	2,287	2,244	2,246	2,240	2,222	2,146	2,093	2,058
Manufactu re of computer, electronic and optical products	403	402	1,833	1,813	1,779	1,797	1,727	1,703	1,690	1,650	1,623

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Other manufactu ring	345	332	1,509	1,480	1,457	1,445	1,437	1,451	1,460	1,450	1,453

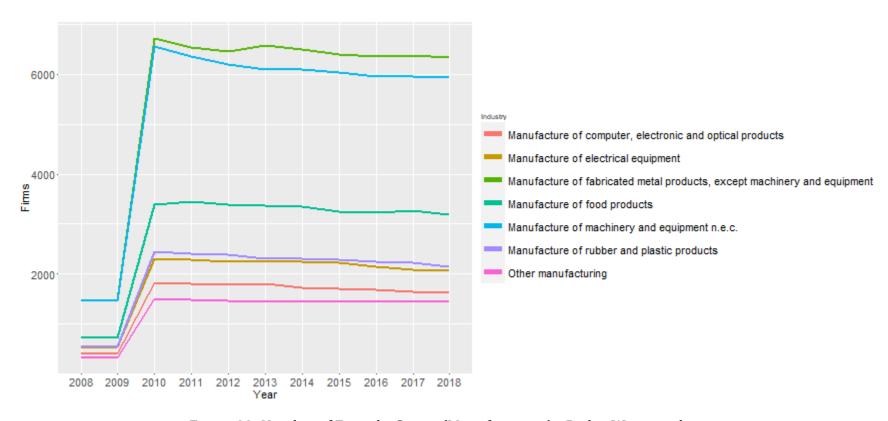


Figure 22: Number of Firms by Sector (Manufacturing) - Baden Wuerttemberg

Table 48: Number of Employees by Sector (Manufacturing) - Baden Wuerttemberg

	-	-	_	_	_	_	-	_	_	-	_
Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of machinery and equipment n.e.c.	297,221	284,957	317,983	326,880	332,006	333,979	339,603	342,508	343,404	353,176	366,694
Manufactu re of motor vehicles, trailers and semi- trailers	211,434	196,417	222,939	227,731	231,402	235,205	240,299	243,789	249,379	252,348	256,685
Manufactu re of fabricated metal products, except machinery and equipment	140,691	128,608	149,464	157,552	158,906	161,816	164,565	166,196	166,860	171,866	179,585
Manufactu re of electrical equipment	95,592	92,066	105,869	110,141	112,077	111,801	111,770	113,154	112,799	115,274	118,270
Manufactu re of rubber and plastic products	59,657	56,480	65,549	67,954	68,579	68,043	70,001	70,932	71,553	73,938	74,914
Manufactu re of food products	58,693	59,091	69,045	71,310	71,725	71,290	70,833	71,479	73,119	74,627	74,739

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of computer, electronic and optical products	66,404	61,201	69,165	70,585	71,226	71,771	69,747	71,551	72,302	72,317	74,209
Other manufactu ring	37,428	35,324	41,263	42,185	42,972	44,362	44,977	46,355	47,671	49,124	50,856

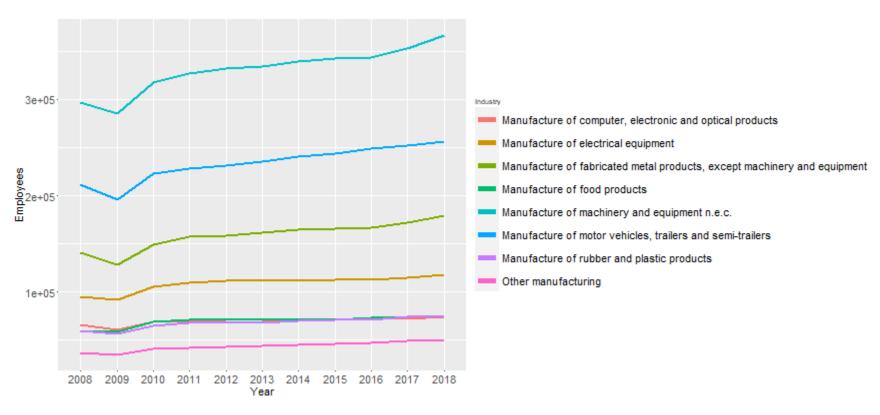


Figure 23: Number of Employees by Sector (Manufacturing) - Baden Wuerttemberg

Table 49: Share of Sector at Manufacturing Employment - Baden Wuerttemberg

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of machinery and equipment n.e.c.	24.3	24.7	24.3	24.3	24.5	24.5	24.7	24.7	24.5	24.8	25.1
Manufactu re of motor vehicles, trailers and semi- trailers	17.3	17.0	17.0	17.0	17.1	17.3	17.5	17.6	17.8	17.7	17.6
Manufactu re of fabricated metal products, except machinery and equipment	11.5	11.1	11.4	11.7	11.7	11.9	12.0	12.0	11.9	12.0	12.3
Manufactu re of electrical equipment	7.8	8.0	8.1	8.2	8.3	8.2	8.1	8.2	8.1	8.1	8.1
Manufactu re of food products	4.8	5.1	5.3	5.3	5.3	5.2	5.2	5.2	5.2	5.2	5.1
Manufactu re of rubber and plastic products	4.9	4.9	5.0	5.1	5.1	5.0	5.1	5.1	5.1	5.2	5.1

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of computer, electronic and optical products	5.4	5.3	5.3	5.3	5.3	5.3	5.1	5.2	5.2	5.1	5.1
Other manufactu ring	3.1	3.1	3.1	3.1	3.2	3.3	3.3	3.3	3.4	3.4	3.5

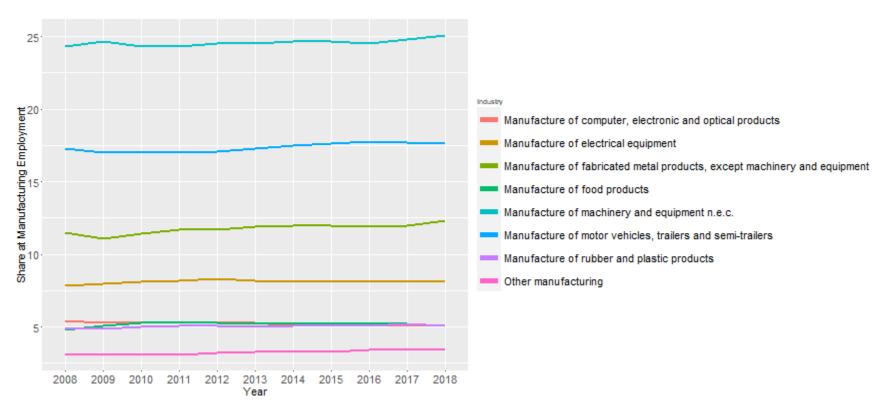


Figure 24: Share of Sector at Manufacturing Employment - Baden Wuerttemberg

Table 50: Wages by Sector (Manufacturing) in Million Euro - Baden Wuerttemberg

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of machinery and equipment n.e.c.	13,794.7	12,548.4	14,199	15,464.5	16,254.9	16,783.2	17,596.5	18,294.9	18,875.5	19,908.5	21,283
Manufactu re of motor vehicles, trailers and semi- trailers	11,377.4	9,984.4	11,248	12,394.6	13,185	13,775.8	14,429.7	15,270.6	15,858.1	16,489.4	17,561.5
Manufactu re of fabricated metal products, except machinery and equipment	5,188.1	4,465.1	5,285.3	5,790.5	5,999	6,261	6,487.2	6,707.9	6,821.6	7,161.8	7,687.6
Manufactu re of electrical equipment	4,025.7	3,817.4	4,283	4,609	4,893.2	5,056.2	5,128.4	5,354.8	5,441.7	5,673.8	5,986
Manufactu re of computer, electronic and optical products	3,136.8	2,893.3	3,281.9	3,366.3	3,518.5	3,666.6	3,634.2	3,834.6	3,938.4	4,047	4,224.5
Manufactu re of rubber and plastic products	2,103.4	1,965	2,282.8	2,438.7	2,526.2	2,568	2,667.5	2,749.3	2,834.1	3,015.9	3,056.9

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Other manufactu ring	1,393.3	1,306.5	1,525.5	1,627.2	1,696.7	1,766.6	1,829	1,926.7	2,016.2	2,120.8	2,255.4
Manufactu re of food products	1,406.9	1,413	1,582.5	1,645.8	1,698.2	1,742	1,771.2	1,810.2	1,876.9	1,953.3	2,016.5

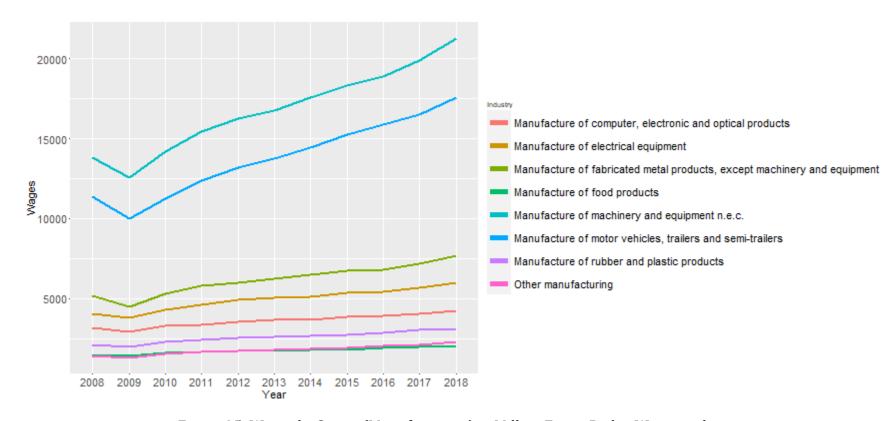


Figure 25: Wages by Sector (Manufacturing) in Million Euro - Baden Wuerttemberg

6.2.2. Bavaria Table 51: Number of Firms by Sector (Manufacturing) - Bavaria

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of fabricated metal products, except machinery and equipment	923	974	5,248	5,039	5,103	5,096	5,103	5,097	5,133	5,101	5,116
Manufactu re of food products	804	839	4,640	4,505	4,414	4,348	4,411	4,299	4,432	4,383	4,367
Manufactu re of machinery and equipment n.e.c.	855	872	4,613	4,534	4,449	4,418	4,434	4,424	4,299	4,259	4,240
Manufactu re of rubber and plastic products	547	552	2,933	2,835	2,855	2,871	2,815	2,719	2,690	2,706	2,684
Manufactu re of computer, electronic and optical products	333	344	1,875	1,788	1,745	1,733	1,764	1,815	1,849	1,815	1,799
Manufactu re of electrical equipment	381	381	2,102	2,017	1,915	1,861	1,789	1,782	1,743	1,733	1,721

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of motor vehicles, trailers and semi- trailers	219	228	1,261	1,199	1,165	1,146	1,105	1,132	1,114	1,098	1,099
Manufactu re of chemicals and chemical products	227	219	1,225	1,178	1,163	1,163	1,154	1,123	1,113	1,115	1,085

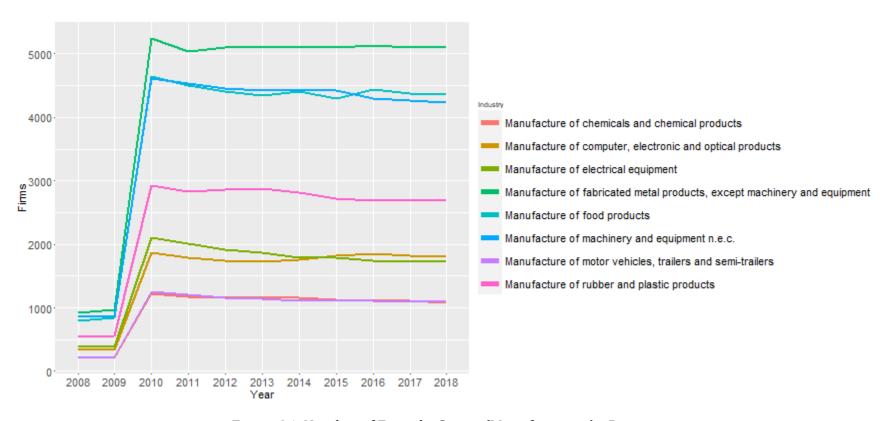


Figure 26: Number of Firms by Sector (Manufacturing) - Bavaria

Table 52: Number of Employees by Sector (Manufacturing) - Bavaria

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of machinery and equipment n.e.c.	211,438	195,765	226,695	235,060	246,421	246,610	252,469	252,395	252,657	255,794	264,861
Manufactu re of motor vehicles, trailers and semi- trailers	177,047	168,593	195,229	200,232	204,956	208,496	213,975	225,252	228,485	232,313	233,852
Manufactu re of electrical equipment	105,434	95,603	110,333	116,165	114,442	115,593	125,050	123,818	124,288	134,449	135,401
Manufactu re of food products	90,221	94,420	112,884	114,310	114,642	115,172	119,848	121,013	125,771	127,277	129,195
Manufactu re of fabricated metal products, except machinery and equipment	86,294	86,268	101,282	104,675	107,481	108,490	110,715	113,184	118,048	120,120	125,808
Manufactu re of computer, electronic and optical products	80,634	73,200	84,482	86,372	87,929	88,232	90,733	92,881	95,102	97,720	104,509

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of rubber and plastic products	:	69,161	81,192	85,217	87,459	87,011	87,380	84,375	85,059	88,012	91,927
Manufactu re of chemicals and chemical products	:	48,051	55,550	56,902	57,092	58,653	59,594	59,565	60,400	62,256	63,960

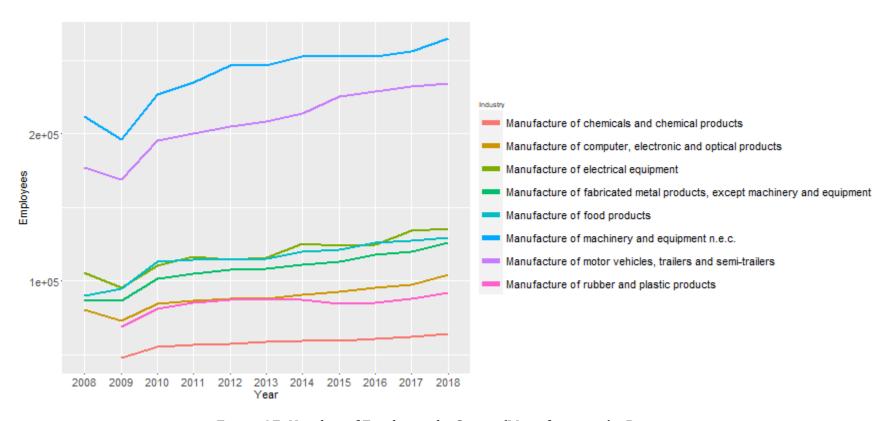


Figure 27: Number of Employees by Sector (Manufacturing) - Bavaria

Table 53: Share of Sector at Manufacturing Employment - Bavaria

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of machinery and equipment n.e.c.	17.9	17.3	17.2	17.4	18.0	18.0	18.2	17.9	17.7	17.6	17.8
Manufactu re of motor vehicles, trailers and semi- trailers	15	14.9	14.8	14.8	15.0	15.2	15.4	16.0	16.0	16.0	15.7
Manufactu re of electrical equipment	8.9	8.5	8.4	8.6	8.4	8.4	9.0	8.8	8.7	9.3	9.1
Manufactu re of food products	7.6	8.3	8.6	8.5	8.4	8.4	8.6	8.6	8.8	8.8	8.7
Manufactu re of fabricated metal products, except machinery and equipment	7.3	7.6	7.7	7.8	7.9	7.9	8.0	8.0	8.3	8.3	8.4
Manufactu re of computer, electronic and optical products	6.8	6.5	6.4	6.4	6.4	6.4	6.5	6.6	6.7	6.7	7.0

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of rubber and plastic products	:	6.1	6.2	6.3	6.4	6.4	6.3	6.0	6.0	6.1	6.2
Manufactu re of chemicals and chemical products	:	4.2	4.2	4.2	4.2	4.3	4.3	4.2	4.2	4.3	4.3

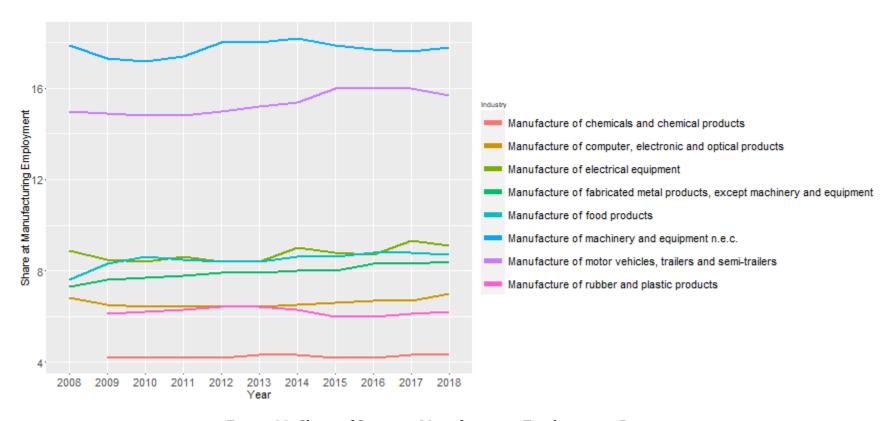


Figure 28: Share of Sector at Manufacturing Employment - Bavaria

Table 54: Wages by Sector (Manufacturing) in Million Euro - Bavaria

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of motor vehicles, trailers and semi- trailers	9,829.7	8,866.2	10,131.9	11,115.2	11,531.4	12,642.2	13,566.8	14,713.9	15,397.9	15,974.6	16,794.2
Manufactu re of machinery and equipment n.e.c.	9,332.2	8,326.3	9,506.7	10,361.6	11,356.2	11,715.2	12,259.3	12,552.4	12,866.2	13,369.4	14,254
Manufactu re of electrical equipment	4,831.1	4,376.8	4,878	5,257.9	5,411	5,613.1	6,560.3	6,633.7	6,804.1	7,679.2	7,932.2
Manufactu re of computer, electronic and optical products	4,168.3	3,732.1	4,200.9	4,409.4	4,569.4	4,647.3	4,891.5	5,181.9	5,476.5	5,670.1	6,168.7
Manufactu re of fabricated metal products, except machinery and equipment	2,822.4	2,743.6	3,202	3,429.8	3,652.1	3,790.2	3,940.2	4,124.7	4,422.4	4,591	4,936.3
Manufactu re of food products	2,131.7	2,258.3	2,609.8	2,697.4	2,741.6	2,836.5	2,950.7	3,086.5	3,265.8	3,402	3,560.6

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of chemicals and chemical products	÷	2,237.4	2,527.5	2,690.7	2,763.7	2,831.9	3,004.5	3,069.3	3,166.1	3,357.4	3,547.4
Manufactu re of rubber and plastic products	:	2,253	2,572.9	2,759.3	2,900.7	2,938.5	3,010.3	2,954.8	3,118.7	3,273	3,467

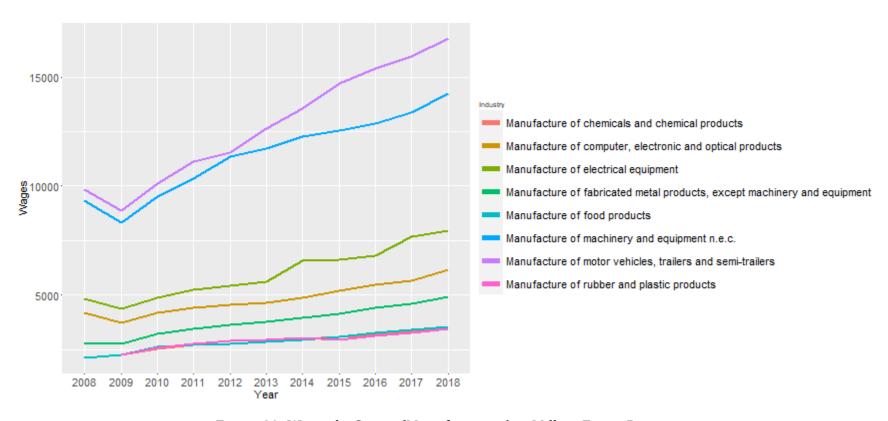


Figure 29: Wages by Sector (Manufacturing) in Million Euro - Bavaria

6.2.3. North Rhine WestphaliaTable 55: Number of Firms by Sector (Manufacturing) - North Rhine Westphalia

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of food products	937	949	4,462	4,351	4,277	4,078	3,939	3,900	3,872	3,868	3,878
Manufactu re of chemicals and chemical products	412	412	2,002	1,942	1,916	1,880	1,862	1,858	1,874	1,855	1,869
Manufactu re of rubber and plastic products	705	685	3,060	3,056	2,987	2,993	2,931	2,918	2,946	2,958	2,938
Manufactu re of basic metals	469	458	1,992	1,941	1,886	1,872	1,820	1,819	1,759	1,700	1,617
Manufactu re of fabricated metal products, except machinery and equipment	1,904	1,887	8,480	8,286	8,317	8,178	8,425	8,269	8,107	7,977	7,508
Manufactu re of electrical equipment	474	472	2,061	2,029	2,070	2,052	2,022	2,000	1,922	1,855	1,817
Manufactu re of machinery and equipment n.e.c.	1,418	1,403	6,343	6,327	6,383	6,361	6,280	6,097	5,882	5,726	5,712

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of motor vehicles, trailers and semi- trailers	237	240	1,111	1,082	1,041	987	979	935	945	935	945

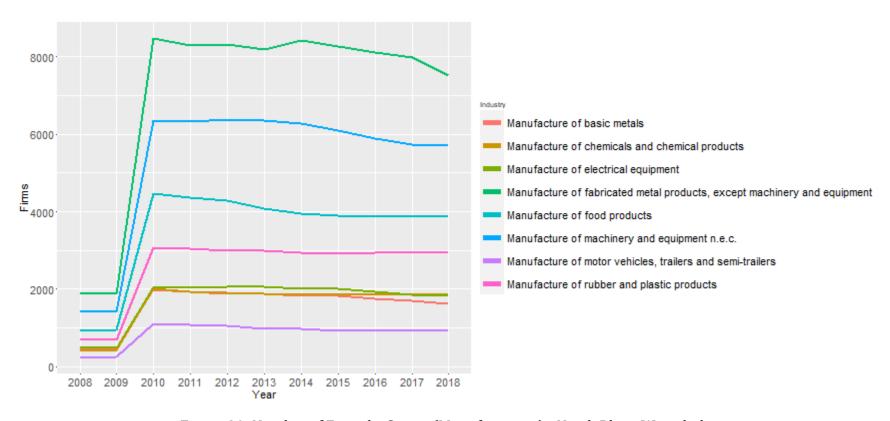


Figure 30: Number of Firms by Sector (Manufacturing) - North Rhine Westphalia

Table 56: Number of Employees by Sector (Manufacturing) - North Rhine Westphalia

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of machinery and equipment n.e.c.	206,230	197,354	226,127	234,743	238,326	239,024	237,223	234,310	228,554	229,669	235,942
Manufactu re of fabricated metal products, except machinery and equipment	173,000	159,386	186,661	193,527	195,557	196,218	200,304	201,950	203,405	203,511	204,069
Manufactu re of basic metals	115,849	109,704	125,726	126,642	128,040	126,118	124,609	125,626	123,302	123,462	125,112
Manufactu re of food products	85,892	85,942	102,188	102,212	102,740	101,916	101,283	105,453	107,769	114,422	118,176
Manufactu re of chemicals and chemical products	88,215	85,202	106,072	106,406	106,062	106,784	107,828	109,903	108,152	108,943	111,734
Manufactu re of electrical equipment	87,050	83,849	96,997	100,047	101,425	101,467	101,911	99,542	100,208	101,448	104,482
Manufactu re of motor vehicles, trailers and semi- trailers	88,685	81,983	97,029	98,628	99,254	96,632	97,327	94,510	94,566	95,334	95,893

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of rubber and plastic products	73,123	67,028	80,930	83,282	84,260	85,695	87,378	88,460	90,460	92,207	94,869

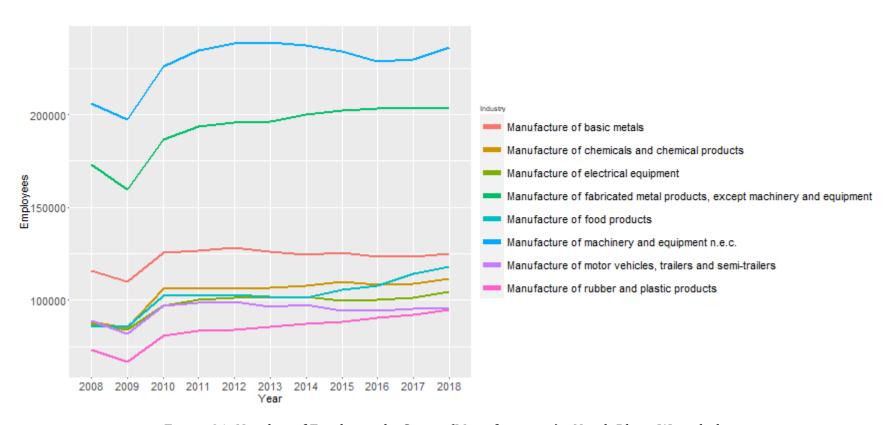


Figure 31: Number of Employees by Sector (Manufacturing) - North Rhine Westphalia

Table 57: Share of Sector at Manufacturing Employment - North Rhine Westphalia

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of machinery and equipment n.e.c.	16.9	17.1	16.7	17.0	17.2	17.3	17.1	16.9	16.6	16.5	16.6
Manufactu re of fabricated metal products, except machinery and equipment	14.2	13.8	13.8	14.0	14.1	14.2	14.5	14.6	14.7	14.6	14.4
Manufactu re of basic metals	9.5	9.5	9.3	9.2	9.2	9.1	9.0	9.1	8.9	8.9	8.8
Manufactu re of food products	7.0	7.4	7.5	7.4	7.4	7.4	7.3	7.6	7.8	8.2	8.3
Manufactu re of chemicals and chemical products	7.2	7.4	7.8	7.7	7.6	7.7	7.8	7.9	7.8	7.8	7.9
Manufactu re of electrical equipment	7.1	7.2	7.2	7.3	7.3	7.3	7.4	7.2	7.3	7.3	7.4
Manufactu re of motor vehicles, trailers and semi- trailers	6.0	5.8	6.0	6.0	6.1	6.2	6.3	6.4	6.6	6.6	6.7

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of rubber and plastic products	7.3	7.1	7.2	7.2	7.2	7.0	7.0	6.8	6.9	6.8	6.7

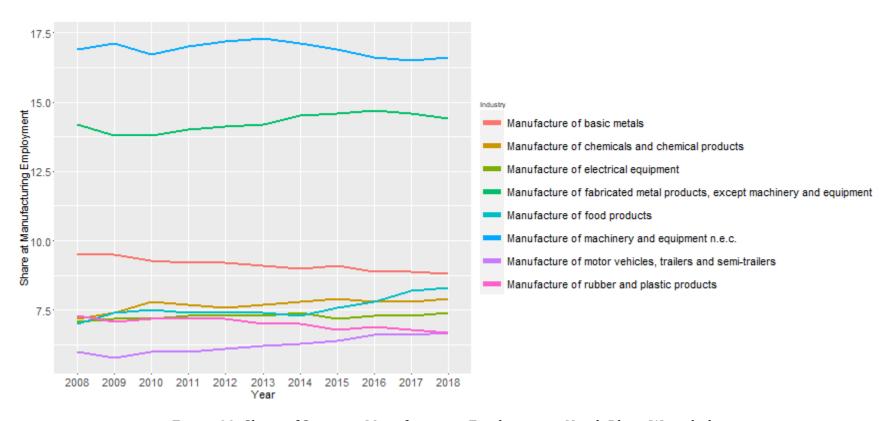


Figure 32: Share of Sector at Manufacturing Employment - North Rhine Westphalia

Table 58: Wages by Sector (Manufacturing) in Million Euro - North Rhine Westphalia

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of machinery and equipment n.e.c.	9,376.5	8,815.9	9,880.7	10,685.3	11,100.4	11,381	11,565.3	11,688.9	11,609.3	11,854.4	12,417.5
Manufactu re of fabricated metal products, except machinery and equipment	6,341.8	5,683.8	6,607.7	7,088.1	7,327	7,569.3	7,902.4	8,113	8,227.4	8,424.7	8,654.2
Manufactu re of chemicals and chemical products	4,621.9	4,415.1	5,462.7	5,839.3	5,970.8	6,235.9	6,301.8	6,522.6	6,643.7	6,886.5	7,202.1
Manufactu re of basic metals	5,107.8	4,545.3	5,238.3	5,484.7	5,665.3	5,674.3	5,746.4	5,940.6	5,936	6,079	6,272.8
Manufactu re of motor vehicles, trailers and semi- trailers	4,084.7	3,535	4,248	4,512.5	4,697.8	4,795.8	4,943.9	5,007.6	5,122.8	5,241.6	5,514.6
Manufactu re of electrical equipment	3,571.7	3,433.8	3,927.7	4,152.3	4,358.3	4,460.6	4,632.3	4,677.2	4,849.4	4,999.2	5,326.4
Manufactu re of food products	2,432.2	2,481.5	2,862.6	2,938.8	3,015.2	3,054	3,062.8	3,237.8	3,339.8	3,541.6	3,740.1

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of rubber and plastic products	2,565	2,356.4	2,796.8	2,893.7	2,997.1	3,114.7	3,207.1	3,307.2	3,461.2	3,566.4	3,725

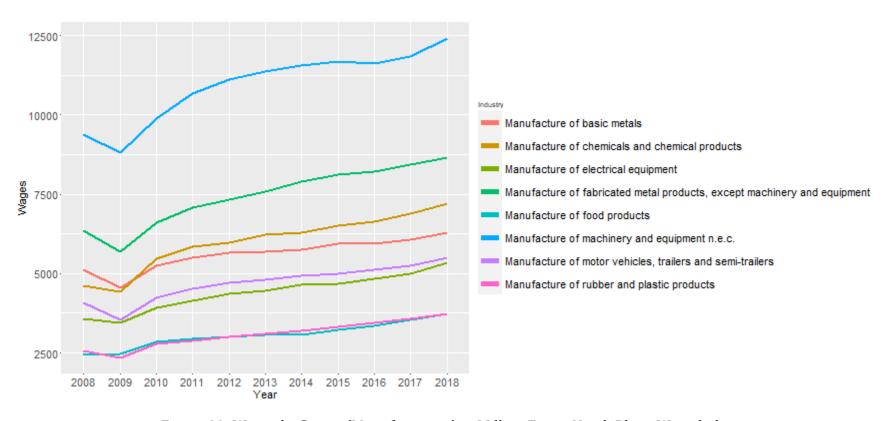


Figure 33: Wages by Sector (Manufacturing) in Million Euro - North Rhine Westphalia

6.2.4. SaxonyTable 59: Number of Firms by Sector (Manufacturing) - Saxony

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of fabricated metal products, except machinery and equipment	515	541	2,362	2,341	2,365	2,396	2,343	2,277	2,262	2,252	2,201
Manufactu re of machinery and equipment n.e.c.	355	363	1,606	1,614	1,577	1,558	1,497	1,474	1,442	1,373	1,357
Manufactu re of food products	319	315	1,426	1,471	1,448	1,425	1,377	1,327	1,329	1,332	1,286
Manufactu re of rubber and plastic products	157	156	693	687	676	681	669	647	621	633	620
Manufactu re of electrical equipment	109	128	601	596	615	598	629	601	589	591	563
Manufactu re of computer, electronic and optical products	96	96	460	447	430	426	460	460	460	467	463

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of motor vehicles, trailers and semi- trailers	:	113	492	460	427	428	454	468	471	460	450
Manufactu re of basic metals	68	68	311	312	301	302	298	302	282	258	253

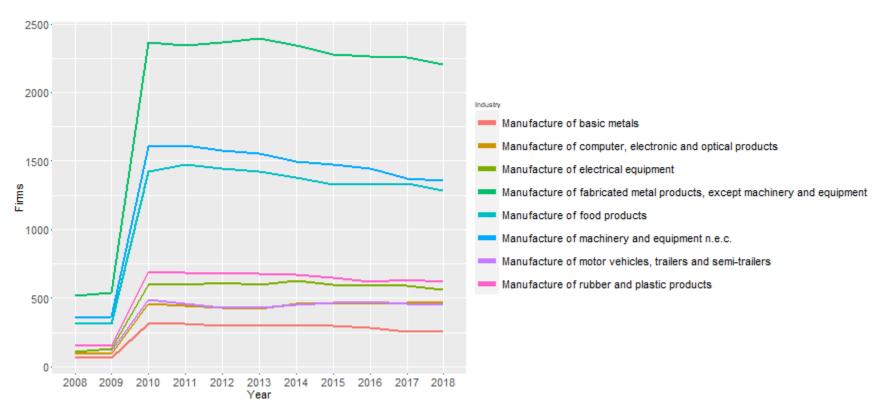


Figure 34: Number of Firms by Sector (Manufacturing) - Saxony

Table 60: Number of Employees by Sector (Manufacturing) - Saxony

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of fabricated metal products, except machinery and equipment	37,176	35,449	45,198	47,290	48,524	49,526	47,636	47,062	47,503	48,751	49,307
Manufactu re of machinery and equipment n.e.c.	36,733	34,496	43,533	46,353	47,040	46,448	46,447	46,026	46,580	46,952	48,392
Manufactu re of motor vehicles, trailers and semi- trailers	:	24,164	31,052	32,566	33,756	34,917	39,737	43,006	43,588	44,775	44,773
Manufactu re of computer, electronic and optical products	17,388	13,627	18,296	19,845	19,930	20,824	20,555	22,722	22,841	22,152	22,800
Manufactu re of food products	:	16,495	21,261	21,535	21,567	21,527	21,426	21,438	21,617	21,976	22,070
Manufactu re of electrical equipment	24,476	12,004	16,120	17,705	18,613	18,507	18,912	18,587	18,802	19,317	19,824

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of rubber and plastic products	11,784	11,218	14,800	15,793	15,693	16,039	16,936	16,874	16,857	16,381	16,519

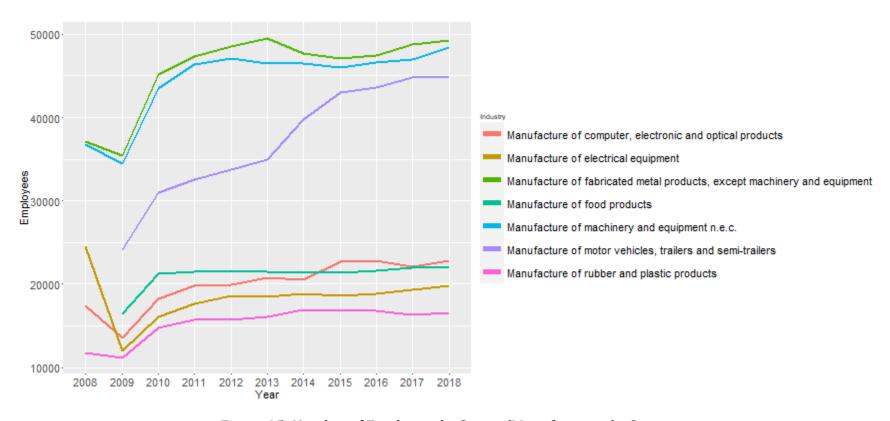


Figure 35: Number of Employees by Sector (Manufacturing) - Saxony

Table 61: Share of Sector at Manufacturing Employment - Saxony

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of fabricated metal products, except machinery and equipment	15.2	15.3	15.2	15.2	15.4	15.6	14.8	14.5	14.5	14.8	14.7
Manufactu re of machinery and equipment n.e.c.	15	14.9	14.6	14.9	14.9	14.7	14.4	14.2	14.3	14.2	14.5
Manufactu re of motor vehicles, trailers and semi- trailers	:	10.4	10.4	10.5	10.7	11.0	12.3	13.2	13.3	13.6	13.4
Manufactu re of computer, electronic and optical products	7.1	5.9	6.1	6.4	6.3	6.6	6.4	7.0	7.0	6.7	6.8
Manufactu re of food products	:	7.1	7.1	6.9	6.8	6.8	6.7	6.6	6.6	6.7	6.6
Manufactu re of electrical equipment	10	5.2	5.4	5.7	5.9	5.8	5.9	5.7	5.8	5.8	5.9

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of rubber and plastic products	4.8	4.8	5.0	5.1	5.0	5.1	5.3	5.2	5.2	5.0	4.9

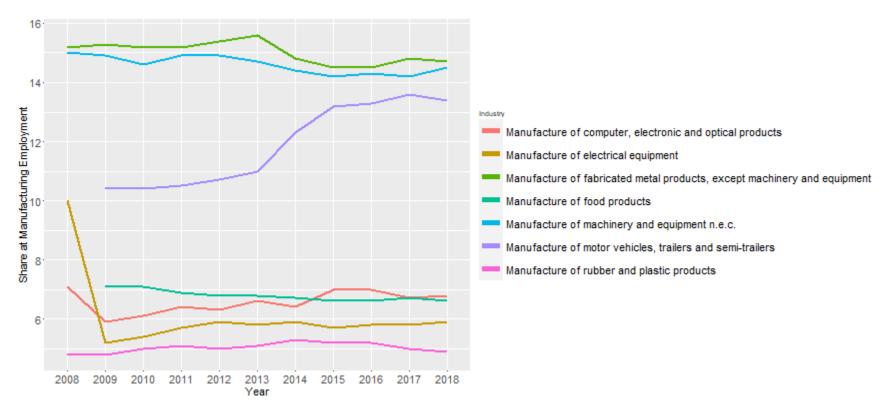


Figure 36: Share of Sector at Manufacturing Employment - Saxony

Table 62: Wages by Sector (Manufacturing) in Million Euro - Saxony

				0 0	,	0)					
Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of motor vehicles, trailers and semi- trailers	:	797	1,050	1,172.8	1,338	1,520	1,767.2	1,892.4	2,000.1	2,044.8	2,149.2
Manufactu re of machinery and equipment n.e.c.	1,153.2	1,067.1	1,309.7	1,451.5	1,528.4	1,546.9	1,595.4	1,623.1	1,679.9	1,743	1,848
Manufactu re of fabricated metal products, except machinery and equipment	888.4	826.2	1,039.7	1,142.3	1,209.8	1,266.1	1,225.8	1,239.3	1,281.4	1,362.4	1,425.9
Manufactu re of computer, electronic and optical products	654.7	461.2	619.2	704.1	746.2	806.6	819.9	931.2	939.9	942.4	975.1
Manufactu re of electrical equipment	819.2	327.3	424.5	485.9	542	557.7	576.2	591.3	603.7	637.6	681.6
Manufactu re of food products	:	322.1	391.2	409.5	417.8	429.9	437.9	477.4	508.6	537.9	564.5
Manufactu re of basic metals	306.1	268.2	340.2	373.1	396.6	396.2	432.5	460.6	457.9	490.3	499.5

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of rubber and plastic products	265.5	253.5	323.7	357.1	368.1	389	421.2	437.7	453.9	458.7	481

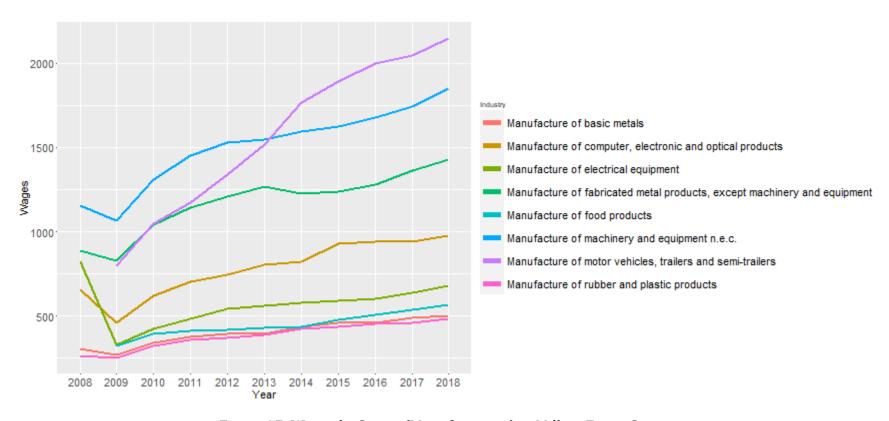


Figure 37: Wages by Sector (Manufacturing) in Million Euro - Saxony

6.2.5. ThuringiaTable 63: Number of Firms by Sector (Manufacturing) - Thuringia

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of fabricated metal products, except machinery and equipment	327	354	1,473	1,407	1,397	1,445	1,384	1,411	1,360	1,360	1,336
Manufactu re of rubber and plastic products	183	184	752	749	746	741	732	734	729	735	721
Manufactu re of machinery and equipment n.e.c.	180	187	820	745	722	729	704	738	694	655	645
Manufactu re of food products	180	184	781	761	722	745	716	697	674	655	627
Manufactu re of other non- metallic mineral products	153	146	611	572	571	592	583	572	564	542	536
Manufactu re of computer, electronic and optical products	109	116	488	494	511	523	498	539	501	496	483

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of electrical equipment	83	89	369	383	371	382	396	422	398	379	359
Manufactu re of motor vehicles, trailers and semi- trailers	88	88	382	358	315	326	316	324	300	292	298

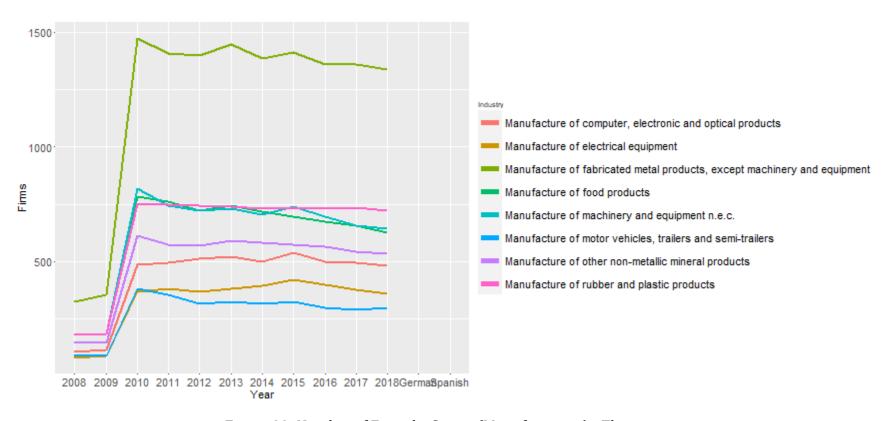


Figure 38: Number of Firms by Sector (Manufacturing) - Thuringia

Table 64: Number of Employees by Sector (Manufacturing) - Thuringia

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of fabricated metal products, except machinery and equipment	24,429	23,731	30,670	30,916	32,218	32,071	32,151	33,018	34,211	35,582	36,378
Manufactu re of rubber and plastic products	15,510	14,310	18,670	19,594	19,512	19,716	21,078	21,686	22,117	22,881	22,914
Manufactu re of food products	16,008	16,574	21,347	21,251	21,300	21,395	21,010	21,427	21,896	21,647	22,815
Manufactu re of machinery and equipment n.e.c.	17,695	16,767	21,332	20,700	21,887	22,021	21,506	22,050	21,663	21,464	21,864
Manufactu re of motor vehicles, trailers and semi- trailers	15,839	14,592	18,768	19,318	18,331	19,356	20,125	21,167	20,875	20,875	20,773
Manufactu re of computer, electronic and optical products	13,347	12,887	16,293	17,857	19,228	18,058	17,024	17,400	16,956	16,509	16,907

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Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of electrical equipment	9,672	9,065	11,669	12,728	12,908	12,722	13,053	13,352	12,475	12,650	12,815
Manufactu re of other non- metallic mineral products	9,889	9,026	12,009	12,377	12,287	12,234	11,993	11,686	11,257	11,369	11,714

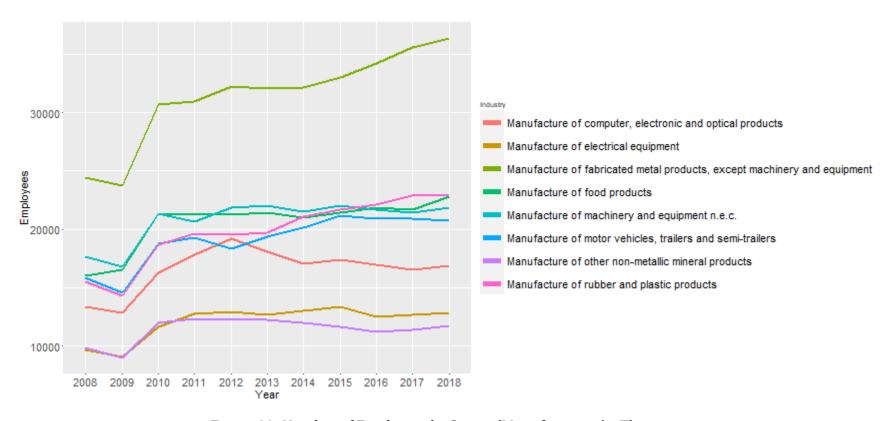


Figure 39: Number of Employees by Sector (Manufacturing) - Thuringia

Table 65: Share of Sector at Manufacturing Employment - Thuringia

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of fabricated metal products, except machinery and equipment	15.5	15.6	15.7	15.2	15.8	15.7	15.7	15.9	16.6	17.2	17.3
Manufactu re of rubber and plastic products	10.2	10.9	10.9	10.5	10.4	10.5	10.3	10.3	10.7	10.5	10.9
Manufactu re of food products	9.8	9.4	9.6	9.7	9.5	9.6	10.3	10.4	10.8	11.1	10.9
Manufactu re of machinery and equipment n.e.c.	11.2	11.0	10.9	10.2	10.7	10.8	10.5	10.6	10.5	10.4	10.4
Manufactu re of motor vehicles, trailers and semi- trailers	10.1	9.6	9.6	9.5	9.0	9.5	9.8	10.2	10.2	10.1	9.9
Manufactu re of computer, electronic and optical products	8.5	8.4	8.3	8.8	9.4	8.8	8.3	8.4	8.3	8.0	8.0

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of electrical equipment	6.1	5.9	6.0	6.3	6.3	6.2	6.4	6.4	6.1	6.1	6.1
Manufactu re of other non- metallic mineral products	6.3	5.9	6.1	6.1	6.0	6.0	5.9	5.6	5.5	5.5	5.6

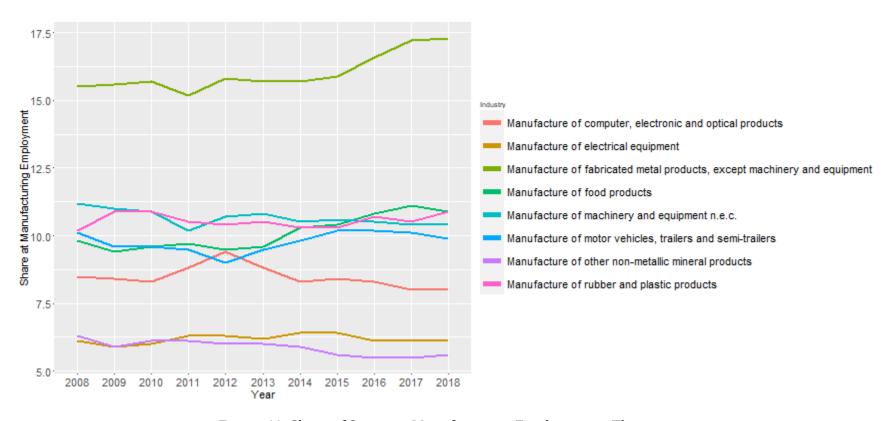


Figure 40: Share of Sector at Manufacturing Employment - Thuringia

Table 66: Wages by Sector (Manufacturing) in Million Euro - Thuringia

Manufactu re of fabricated metal products, edoc. 1													
re of flabricated metal products, ed. 1	Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
re of motor vehicles, trailers and semi-trailers and semi-trailers Manufactu re of machinery and equipment n.e.c. Manufactu re of rubber and plastic products Manufactu re of computer, electronic and optical products Manufactu re of computer, electronic and optical products Manufactu re of computer, which is a semi-trailer and optical products Manufactu re of computer, electronic and computer and	re of fabricated metal products, except machinery and	606.1	555.3	725.9	776.5	850.8	874.6	893.2	949.5	1,029.2	1,096.9	1,163	
re of machinery and 502.4 472.5 600.6 607.7 670.2 691.6 699.1 743.1 747.4 768.1 795.5 equipment n.e.c. Manufactu re of rubber and plastic products Manufactu re of computer, electronic and optical products Manufactu re of food 275.0 288.6 368.5 380.0 392.0 410.9 419.4 451.9 477.5 489.2 529.7	re of motor vehicles, trailers and semi-	445.6	396.5	520.7	560.7	573.7	619.6	683.4	745.7	770.9	789.6	826.2	
re of rubber and 372.4 345.9 451.1 488.8 510.6 534.4 573.0 600.1 639.2 681.5 709.9 plastic products Manufactu re of computer, electronic and optical products Manufactu re of food 275.0 288.6 368.5 380.0 392.0 410.9 419.4 451.9 477.5 489.2 529.7	re of machinery and equipment	502.4	472.5	600.6	607.7	670.2	691.6	699.1	743.1	747.4	768.1	795.9	
re of computer, electronic and optical products Manufactu re of food 275.0 288.6 368.5 380.0 589.5 642.8 639.5 597.5 636.0 647.2 659.5 693.5 69	re of rubber and plastic	372.4	345.9	451.1	488.8	510.6	534.4	573.0	600.1	639.2	681.5	709.9	
re of food 275.0 288.6 368.5 380.0 392.0 410.9 419.4 451.9 477.5 489.2 529.7	re of computer, electronic and optical	436.7	405.2	515.6	589.5	642.8	639.5	597.5	636.0	647.2	659.5	693.5	
	re of food	275.0	288.6	368.5	380.0	392.0	410.9	419.4	451.9	477.5	489.2	529.7	

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Manufactu re of electrical equipment	272.1	253.8	323.4	370.2	382.1	388.0	408.5	429.0	415.1	435.2	456
Manufactu re of other non- metallic mineral products	246.5	221.3	300.3	319.8	332.1	340.1	347.9	343.5	348	346.4	376.3

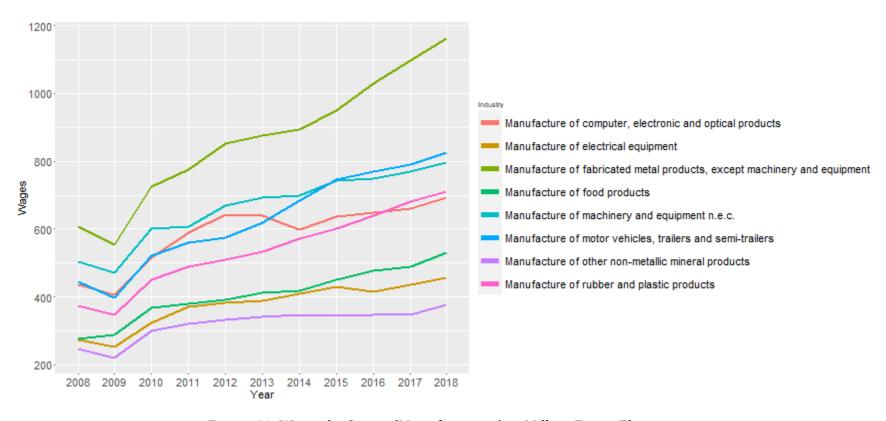


Figure 41: Wages by Sector (Manufacturing) in Million Euro - Thuringia

6.2.6. MadridTable 67: Number of Firms by Sector (Manufacturing) - Madrid

	_	_	_
Industry	2018	2017	2016
Printing and reproducti on of recorded media	3,154	2,842	3,018
Manufactu re of fabricated metal products, except machinery and equipment	3,069	3,110	2,999
Manufactu re of food products	1,504	1,357	1,289
Manufactu re of wearing apparel	1,445	1,322	1,273
Repair and installation of machinery and equipment	1,344	1,245	1,172

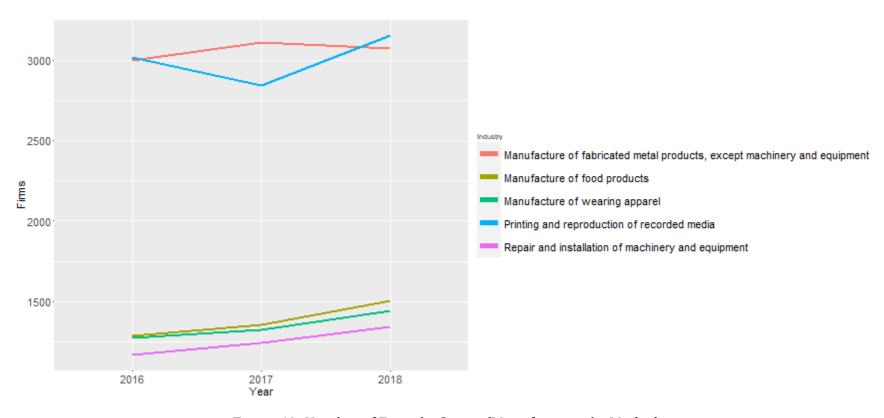


Figure 42: Number of Firms by Sector (Manufacturing) - Madrid

 $Table\ 68: Number\ of\ Employees\ by\ Sector\ (Manufacturing)\ -\ Madrid$

Industry	2018	2017	2016
Manufactu re of food products	20,811	19,351	17,745
Manufactu re of fabricated metal products, except machinery and equipment	19,332	19,653	18,369
Printing and reproducti on of recorded media	14,709	14,584	15,009
Manufactu re of machinery and equipment n.e.c.	14,602	13,970	11,934
Repair and installation of machinery and equipment	13,938	12,779	13,382
Manufactu re of other transport equipment	12,590	12,614	11,789

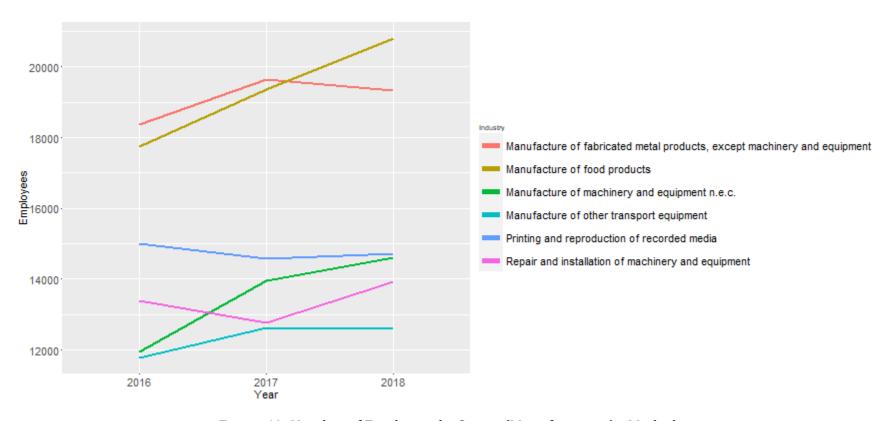


Figure 43: Number of Employees by Sector (Manufacturing) - Madrid

Table 69: Tangible Investments in Thousand Euro - Madrid

Industry	2018	2017	2016	
Manufactu re of motor vehicles, trailers and semi- trailers	171,944	311,951	169,801	
Manufactu re of food products	168,591	158,236	145,551	
Manufactu re of basic pharmace utical products and pharmace utical preparatio ns	139,402	133,888	105,489	
Printing and reproducti on of recorded media	79,354	72,429	105,707	
Manufactu re of fabricated metal products, except machinery and equipment	72,475	95,588	94,544	

Industry	2018	2017	2016
Manufactu re of chemicals and chemical products	63,380	78,513	51,852

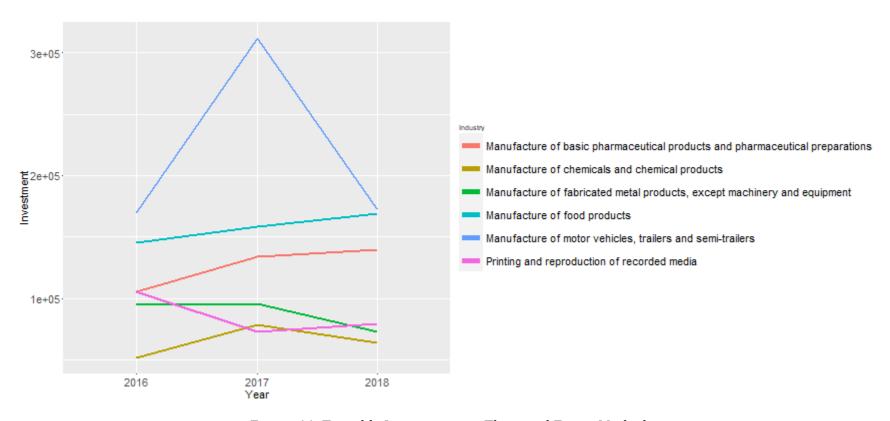


Figure 44: Tangible Investments in Thousand Euro - Madrid

Table 70: Revenue by Sector (Manufacturing) in Thousand Euro - Madrid

		_	_
Industry	2018	2017	2016
Manufactu re of motor vehicles, trailers and semi- trailers	5,645,225	4,194,025	3,830,666
Manufactu re of other transport equipment	5,171,716	5,544,337	5,100,298
Manufactu re of food products	4,984,939	4,243,724	4,331,491
Manufactu re of basic pharmace utical products and pharmace utical preparatio ns	4,538,530	4,443,679	4,554,693
Manufactu re of machinery and equipment n.e.c.	2,811,932	2,573,210	2,406,332
Manufactu re of fabricated metal products, except machinery and equipment	2,702,387	2,577,963	2,440,956

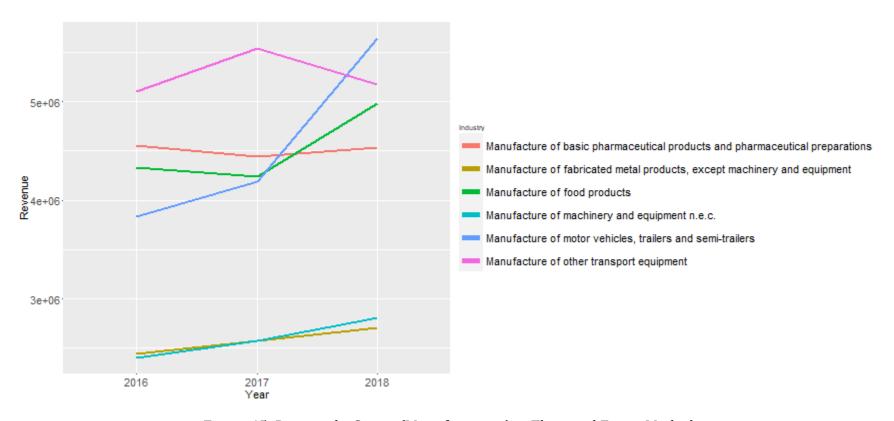


Figure 45: Revenue by Sector (Manufacturing) in Thousand Euro - Madrid

6.2.7. Basque CountryTable 71: Number of Firms by Sector (Manufacturing) - Basque Country

Industry	2018	2017	2016
Manufactu re of fabricated metal products, except machinery and equipment	2,960	2,954	2,939
Repair and installation of machinery and equipment	981	950	914
Manufactu re of food products	966	914	829
Printing and reproducti on of recorded media	654	724	761
Manufactu re of machinery and equipment n.e.c.	606	619	654

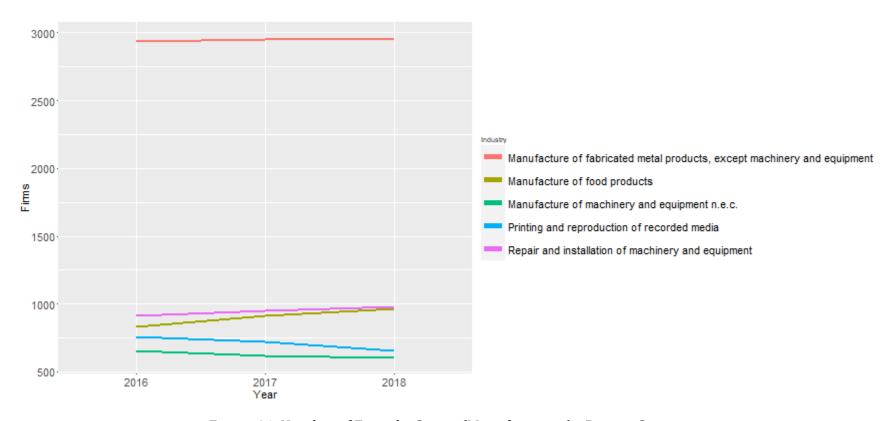


Figure 46: Number of Firms by Sector (Manufacturing) - Basque Country

Table 72: Number of Employees by Sector (Manufacturing) - Basque Country

Industry	2018	2017	2016
Manufactu re of fabricated metal products, except machinery and equipment	43,175	42,253	40,569
Manufactu re of machinery and equipment n.e.c.	20,057	20,153	20,095
Manufactu re of basic metals	17,279	17,375	17,310
Manufactu re of motor vehicles, trailers and semi- trailers	14,852	14,169	13,975
Manufactu re of electrical equipment	13,439	12,353	11,109
Manufactu re of rubber and plastic products	13,354	13,552	13,046
Manufactu re of food products	11,446	10,919	10,608

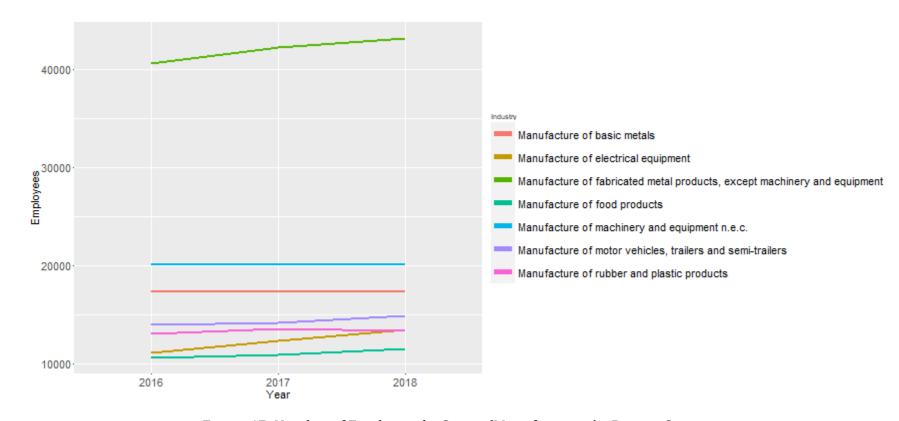


Figure 47: Number of Employees by Sector (Manufacturing) - Basque Country

Table 73: Tangible Investments in Thousand Euro - Basque Country

Industry	2018	2017	2016
Manufactu re of fabricated metal products, except machinery and equipment	360,398	395,198	315,503
Manufactu re of basic metals	308,562	256,152	166,073
Manufactu re of motor vehicles, trailers and semi- trailers	287,860	226,165	255,344
Manufactu re of rubber and plastic products	174,136	163,437	151,094
Manufactu re of machinery and equipment n.e.c.	111,321	155,816	116,936

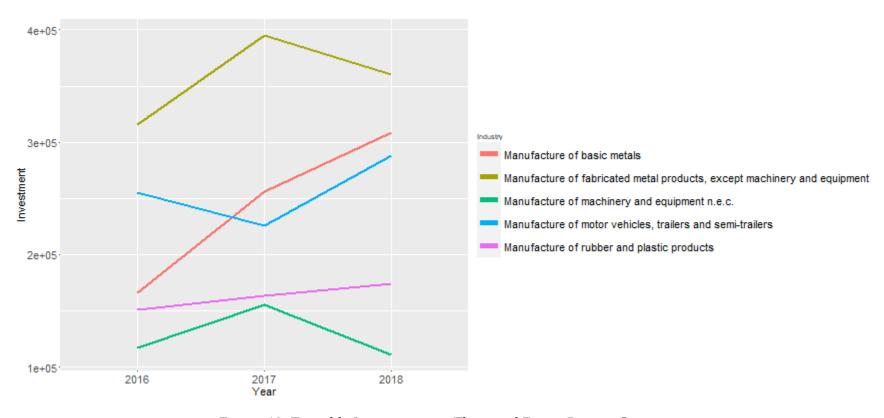


Figure 48: Tangible Investments in Thousand Euro - Basque Country

Table 74: Revenue by Sector (Manufacturing) in Thousand Euro - Basque Country

Industry	2018	2017	2016
Manufactu re of fabricated metal products, except machinery and equipment	7,200,222	6,888,156	6,296,572
Manufactu re of basic metals	6,495,552	6,096,360	5,454,370
Manufactu re of motor vehicles, trailers and semi- trailers	5,984,071	7,844,120	7,112,821
Manufactu re of machinery and equipment n.e.c.	4,455,563	4,307,031	4,132,221
Manufactu re of rubber and plastic products	3,504,231	3,375,714	2,880,404
Manufactu re of food products	3,130,639	2,646,989	2,600,690

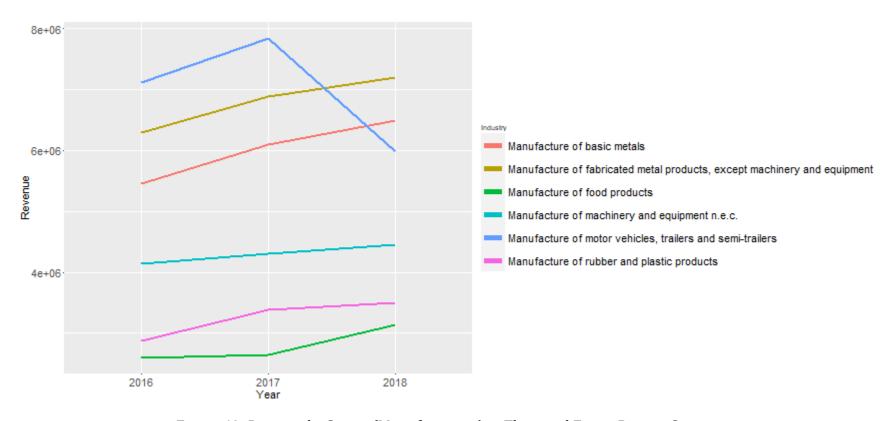


Figure 49: Revenue by Sector (Manufacturing) in Thousand Euro - Basque Country

6.2.8. Catalonia Table 75: Number of Firms by Sector (Manufacturing) - Catalonia

Industry	2018	2017	2016
Manufactu re of fabricated metal products, except machinery and equipment	6,620	6,672	6,683
Manufactu re of food products	3,499	2,984	2,702
Repair and installation of machinery and equipment	3,276	2,892	2,715
Printing and reproducti on of recorded media	2,957	2,805	2,971

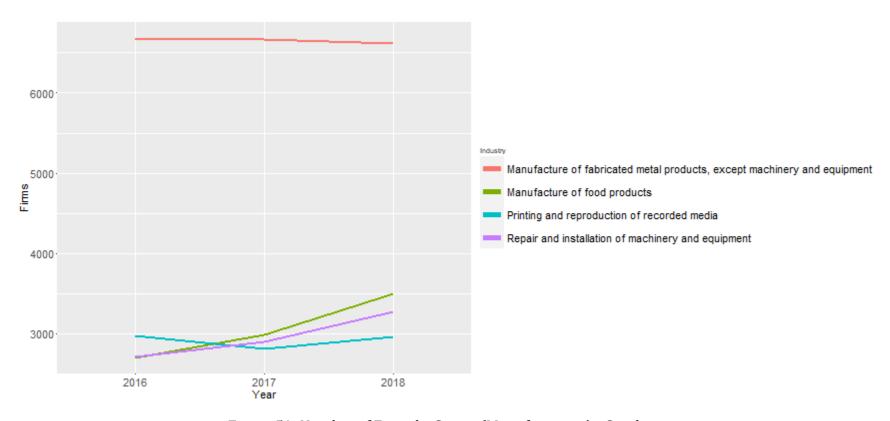


Figure 50: Number of Firms by Sector (Manufacturing) - Catalonia

Table 76: Number of Employees by Sector (Manufacturing) - Catalonia

Industry	2018	2017	2016
Manufactu re of food products	20,811	19,351	17,745
Manufactu re of fabricated metal products, except machinery and equipment	19,332	19,653	18,369
Printing and reproducti on of recorded media	14,709	14,584	15,009
Manufactu re of machinery and equipment n.e.c.	14,602	13,970	11,934
Repair and installation of machinery and equipment	13,938	12,779	13,382
Manufactu re of other transport equipment	12,590	12,614	11,789

Industry	2018	2017	2016
Manufactu re of basic pharmace utical products and pharmace utical preparatio ns	11,847	10,595	9,624

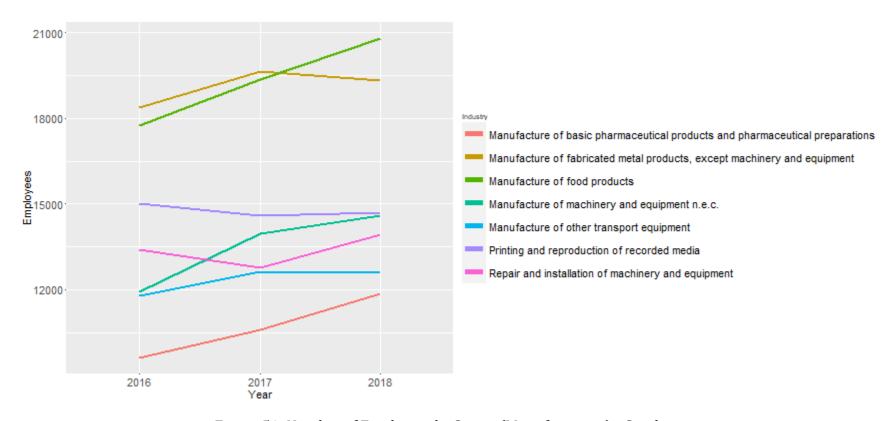


Figure 51: Number of Employees by Sector (Manufacturing) - Catalonia

Table 77: Tangible Investments in Thousand Euro - Catalonia

Industry	2018	2017	2016
Manufactu re of food products	762,106	780,661	715,567
Manufactu re of motor vehicles, trailers and semi- trailers	723,630	618,586	772,303
Manufactu re of chemicals and chemical products	522,498	511,796	450,412
Manufactu re of basic pharmace utical products and pharmace utical preparatio ns	479,767	379,451	301,695
Manufactu re of fabricated metal products, except machinery and equipment	315,634	382,159	399,140

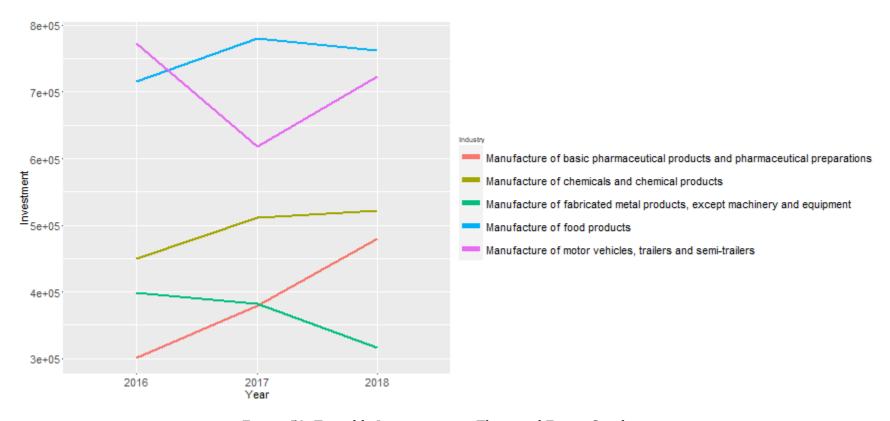


Figure 52: Tangible Investments in Thousand Euro - Catalonia

Table 78: Revenue by Sector (Manufacturing) in Thousand Euro - Catalonia

Industry	2018	2017	2016
Manufactu re of motor vehicles, trailers and semi- trailers	5,645,225	4,194,025	3,830,666
Manufactu re of other transport equipment	5,171,716	5,544,337	5,100,298
Manufactu re of food products	4,984,939	4,243,724	4,331,491
Manufactu re of basic pharmace utical products and pharmace utical preparatio ns	4,538,530	4,443,679	4,554,693
Manufactu re of machinery and equipment n.e.c.	2,811,932	2,573,210	2,406,332
Manufactu re of fabricated metal products, except machinery and equipment	2,702,387	2,577,963	2,440,956

Industry	2018	2017	2016
Manufactu re of chemicals and chemical products	2,544,449	2,585,008	1,940,021

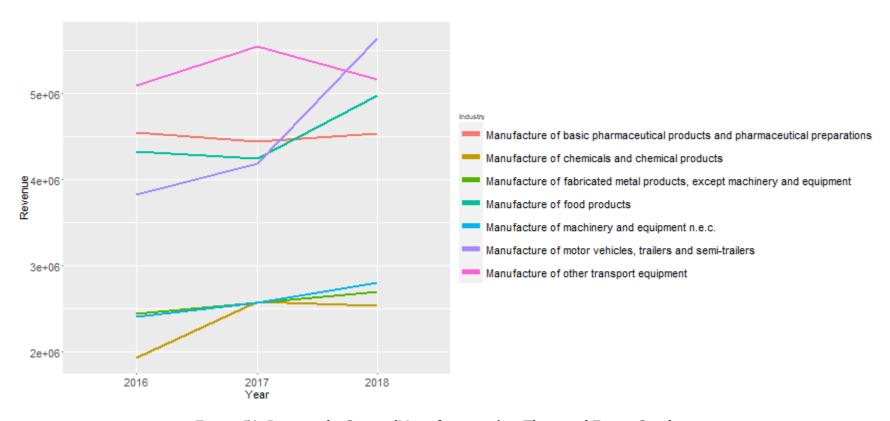


Figure 53: Revenue by Sector (Manufacturing) in Thousand Euro - Catalonia

6.2.9. Andalucia Table 79: Number of Firms by Sector (Manufacturing) - Andalucia

Industry	2018	2017	2016
Manufactu re of food products	5,854	5,215	5,164
Manufactu re of fabricated metal products, except machinery and equipment	4,911	4,767	4,813
Manufactu re of furniture	2,132	2,074	2,035
Manufactu re of other non- metallic mineral products	1,817	1,724	1,745
Other manufactu ring	1,806	1,776	1,825
Repair and installation of machinery and equipment	1,787	1,581	1,285

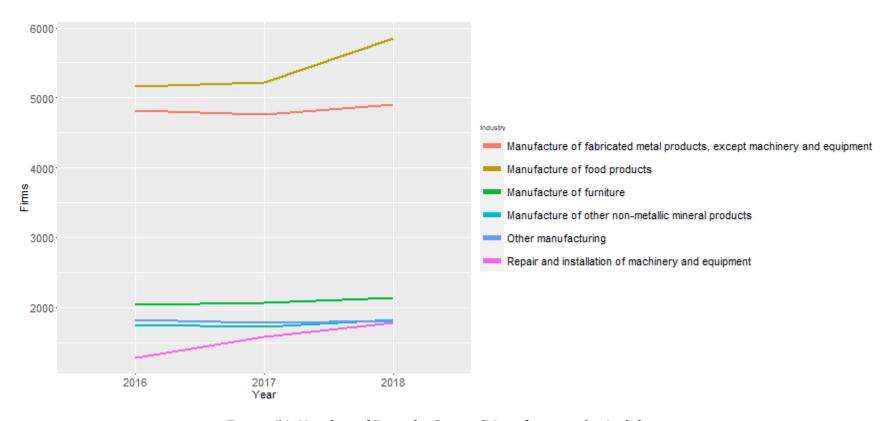


Figure 54: Number of Firms by Sector (Manufacturing) - Andalucia

Table 80: Number of Employees by Sector (Manufacturing) - Andalucia

Industry	2018	2017	2016
Manufactu re of food products	49,283	47,059	46,303
Manufactu re of fabricated metal products, except machinery and equipment	22,231	21,406	21,132
Repair and installation of machinery and equipment	15,379	14,128	10,711
Manufactu re of other non- metallic mineral products	11,143	10,871	10,449
Manufactu re of other transport equipment	9,665	8,908	9,153
Manufactu re of furniture	9,347	8,963	8,565

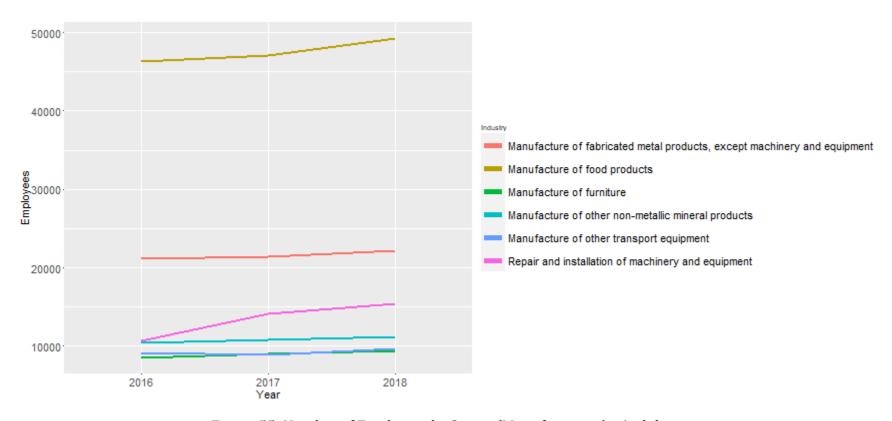


Figure 55: Number of Employees by Sector (Manufacturing) - Andalucia

Table 81: Tangible Investments in Thousand Euro - Andalucia

	_	_	-
Industry	2018	2017	2016
Manufactu re of food products	465,765	357,813	310,465
Manufactu re of basic metals	181,391	182,912	83,555
Manufactu re of beverages	140,282	147,308	82,232
Manufactu re of chemicals and chemical products	138,779	120,853	135,437
Manufactu re of other non- metallic mineral products	102,507	100,687	71,157

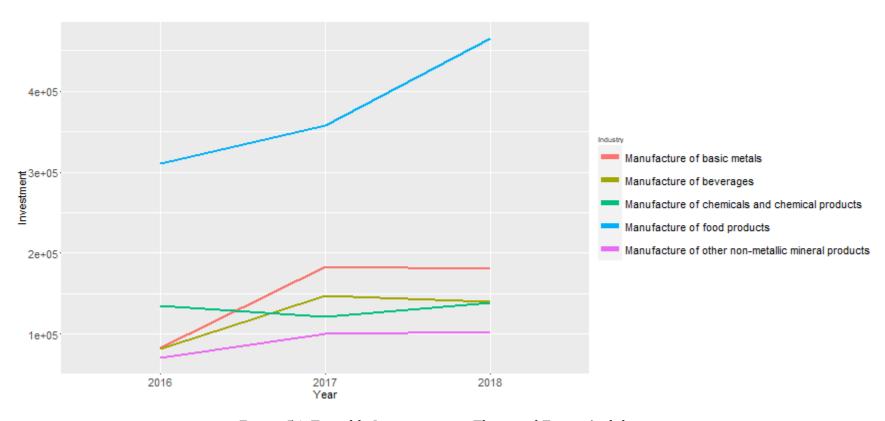


Figure 56: Tangible Investments in Thousand Euro-Andalucia

Table 82: Revenue by Sector (Manufacturing) in Thousand Euro - Andalucia

Industry	2018	2017	2016
Manufactu re of food products	14,302,08 6	15,445,94 7	14,191,41 4
Manufactu re of chemicals and chemical products	6,017,433	5,518,762	4,750,195
Manufactu re of basic metals	5,861,325	5,649,731	4,764,613
Manufactu re of other transport equipment	2,649,467	2,585,889	2,263,692
Manufactu re of beverages	2,594,716	2,746,239	2,416,943
Manufactu re of fabricated metal products, except machinery and equipment	2,295,105	2,094,471	1,824,726

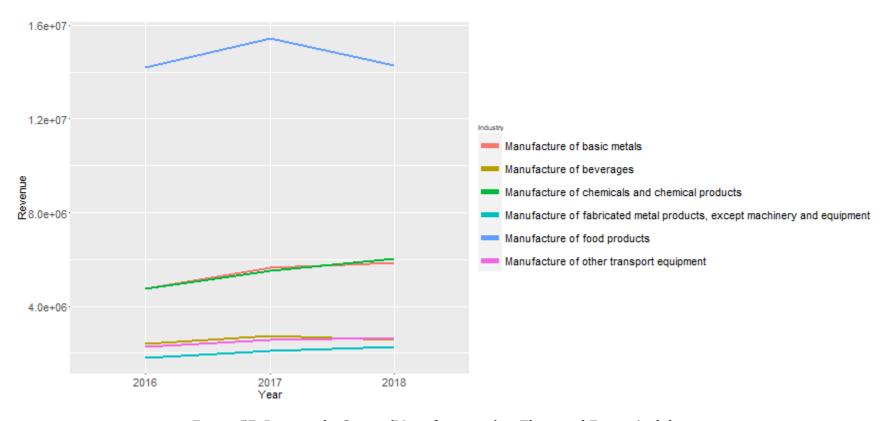


Figure 57: Revenue by Sector (Manufacturing) in Thousand Euro - Andalucia

7. Appendix 7 - Nomenclature

For the ease of reading the nomenclature of NACE industries was situationally adapted according to the following table:

Table 83: Nomenclature Used

NACE Industry	Adjusted Name
Manufacturing Overall	Manufacturing
Manufacture of food products	Food products
Manufacture of beverages	Beverages
Manufacture of tobacco products	Tobacco industry
Manufacture of textiles	Textiles; textile industry
Manufacture of wearing apparel	Apparel industry
Manufacture of leather and related products	Leather industry
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	Wood and other products
Manufacture of paper and paper products	Paper industry
Printing and reproduction of recorded media	Printing industry
Manufacture of coke and refined petroleum products	Petroleum industry

Manufacture of chemicals and chemical products	Chemical industry
Manufacture of basic pharmaceutical products and pharmaceutical preparations	Pharma industry
Manufacture of rubber and plastic products	Rubber and plastic industry
Manufacture of other non-metallic mineral products	Non-metallic mineral products
Manufacture of basic metals	Metallurgy
Manufacture of fabricated metal products, except machinery and equipment	Fabricated metal products
Manufacture of computer, electronic and optical products	Information Technology products
Manufacture of electrical equipment	Electrical equipment
Manufacture of machinery and equipment n.e.c.	Machinery industry
Manufacture of motor vehicles, trailers, and semi-trailers	Vehicle industry
Manufacture of other transport equipment	Aerospace, train and ships
Manufacture of furniture	Furniture industry
Other manufacturing	Other
Repair and installation of machinery and equipment	Repair industry