

International

The Economic Impact between Bavaria and China

vbw

study

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Notice

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foreword

China is an important economic partner – under fair competition conditions

The economic relations between Bavaria and China are close. The Middle Kingdom is our largest trading partner and the second most important foreign location for Bavarian investments. With these investments, the Bavarian economy generates added value locally and secures jobs.

Likewise, Chinese investments in Bavaria create added value and employment. However, Chinese involvement in Bavaria is far less than vice versa. This is shown by the current vbw study, which was carried out by the Cologne Institute for Economic Research. Overall, the study makes it clear that open markets and cross-border investments are mutually beneficial.

However, this requires fair competitive conditions for all participants. Unfortunately, this so-called level playing field does not exist in China. China distorts competition in many ways in favor of its own companies. The European Union must demand equal competitive conditions in negotiations with the Chinese government. In doing so, it can point to the positive effects of European investments for China.

We must reduce our dependence on China, but decoupling is the wrong way to go. China will continue to be an important economic partner for Europe, Germany and Bavaria, but it must be a partnership on equal terms.

Bertram Brossardt
December 31, 2024

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1 Executive Summary

Economic Impact of Bavarian-Chinese Relations: A Look at Direct Investment Stocks and Their Economic Implications

Trade relations between Bavaria and China have grown considerably in importance in the years since the turn of the millennium. In 2023, Bavaria's trade volume with China reached a high of 53.1 billion euros, making it larger than with any other country. In addition to the exchange of goods, investment flows also play a key role. With direct investment stocks of 46.3 billion euros, China is Bavaria's second most important investment destination in 2022. In contrast, China is less important as a country of origin for investments in Bavarian companies; European countries in particular play a more important role here, while China's share is only 0.7 percent.

This study examines the economic effects of the existing direct investment stocks between Bavaria and China. In order to quantify the significance for the respective home markets, the production value, gross value added and number of employees that are directly generated by the investments are first determined. To do this, the economic key figures of the companies in China and of the companies in Bavaria in which Bavarian or Chinese companies hold more than 50 percent of the voting capital are determined. On the basis of these "direct" effects, additional indirect and induced effects can be calculated so that the overall economic impact of these companies in the respective country can then be determined.

The estimate based on the Bundesbank's direct investment statistics shows that there are around 413 Bavarian-controlled companies in China. However, this number represents a lower limit, as the Bundesbank only records companies with a balance sheet total of at least 3 million euros. The economic impact of these companies in China is as follows:

- The 413 companies employ around 130,000 people and generate a Production value of 53.6 billion euros and gross value added of 18.4 billion euros. Compared to the Chinese economy, Bavarian companies therefore require very few employees per value added.
- The Bavarian-controlled companies trigger an indirect production value effect of EUR 72.1 billion in the upstream value chain through the purchase of intermediate inputs. This results in an indirect gross value added effect of EUR 24.0 billion and an indirect employment effect of around 1.2 million jobs.
- The induced effect, which includes employees' consumption expenditure, amounts to EUR 3.6 billion in production value, EUR 1.6 billion in gross value added and 101,000 additional jobs.

[Executive Summary](#)

Overall, the Bavarian-controlled companies in China generate a production value of 129.3 billion euros, which corresponds to around 0.4 percent of the total in China. At 57.3 percent, the manufacturing industry accounts for the largest share of the total production value effect. Sectors that benefit particularly are the manufacture of electrical equipment and the production of IT devices and optical products. The total value added effect of Bavarian-controlled companies in China amounts to 44.0 billion euros (0.4 percent of the total value added), and the employment effect amounts to 1.4 million people (0.2 percent of the total value).

When looking at Chinese companies in Bavaria, it is also possible to determine how high the economic effects are. Estimates based on information from the Bundesbank and the Federal Statistical Office show that 151 companies in Bavaria are Chinese-controlled. The economic impact of these companies is as follows: - Chinese-controlled companies in Bavaria employ around 23,000 people, who together generate a production value of 8.1 billion euros and gross value added of 3.7 billion euros.

- The purchase of intermediate goods and services generates 3.5 billion Euro production value, 1.6 billion Euro gross value added and around 19,000 jobs.
- The wages paid to employees in Bavaria and the resulting consumer spending lead to an induced effect of EUR 0.7 billion in production value, EUR 0.4 billion in gross value added and around 5,000 employees.

Overall, the Chinese-controlled companies generate a production value of 12.3 billion euros. This corresponds to around 1.0 percent of the Bavarian production value. With a share of 49.9 percent, the production value effect comes predominantly from the manufacturing industry, with the M+E industry, including vehicle and mechanical engineering, being of particular importance. The total value added effect amounts to 5.8 billion euros (1.0 percent of the total value), and the employment effect amounts to 47,000 jobs (0.6 percent of total employment).

In summary, the study shows that the investment relations between Bavaria and China lead to significant economic effects in both countries. In addition to these effects, the direct investments provide non-quantifiable effects, such as the exchange of know-how, knowledge transfer and a stable, long-term connection between the two economies. On the other hand, current political differences and considerations about possible risks for the domestic industry also lead to concerns about close investment ties.

2 Introduction

Economic Interdependence of Bavaria with China in Times of Crisis

China has been an important trading partner for Bavaria for several years now. At 53.1 billion euros, Bavaria's trade volume with no other country was larger in 2023.

China's importance is not only evident in trade, but is also reflected in the strong presence of Bavarian companies that produce and invest in China. Their innovative and export-oriented approaches enable them to create new sales opportunities and build strategic partnerships on the Chinese market. At the same time, Chinese companies are increasingly becoming involved in Bavaria in order to benefit from its stable economic infrastructure and highly developed industry.

Most recently, companies have been making investment decisions against the backdrop of various crises. The COVID-19 pandemic and the subsequent energy crisis in Europe, triggered by the Russian war of aggression in Ukraine, have led to rising costs and risks for international supply chains. In addition, there are increasing trade and

geopolitical tensions between the US and China, the location decisions of the

The number of new German subsidiaries in China has been declining since 2017, which indicates a certain reluctance and could be a reaction to the changed geopolitical and economic conditions. At the same time, there are signs that little additional capital from foreign investors has flowed into Germany since 2022.

This study aims to shed light on the current mutual importance of Bavaria and China as investors by analyzing the economic implications of the existing direct investment stocks. In particular, the role of companies that are at least 50 percent owned by Bavarian or Chinese companies is considered. The required level of detail of the data is currently only available for 2021, which is why the analyses are based on this year and thus cannot fully reflect the latest developments. Each company examined has an impact on value creation and jobs, both directly and via upstream value creation stages. These effects are quantified so that the concrete importance of Chinese companies in Bavaria and Bavarian companies in China can be assessed.

[Proceed](#)

3 Procedure

Measuring the impact through direct, indirect and induced effects

Data on the extent, distribution and development of direct investment stocks can be used to analyse the involvement of the Bavarian economy in China and the Chinese economy in Bavaria. Direct investments are cross-border capital investments in companies that are often long-term in nature. Investments are included in the statistics if the share of the voting capital of the foreign corporate unit is at least ten percent. These provide a good overview of the volume of finance that flows from Bavaria into the world (see Chapter 4.1) or from abroad to Bavaria (see Chapter 5.1).

In order to quantify the "Bavarian economy" in China and the "Chinese economy" in Bavaria and to calculate their importance for the respective domestic market, it is sensible to set a higher threshold. The Bundesbank says that if the share of the voting capital exceeds 50 percent, the company is "controlled" by the country of origin of the investment. Those companies in China in which Bavarian investors hold more than 50 percent of the voting capital are therefore referred to in this study as Bavarian-controlled companies in China, since it can be assumed that these corporate units would no longer operate to the same extent if the Bavarian direct investment holdings were deducted. Accordingly, those companies in Bavaria in which Chinese investors hold more than 50 percent of the voting capital are referred to as Chinese-controlled companies.

controlled companies in Bavaria.

Unlike a similar study on the Bavarian impact in the USA, the economic indicators of these companies are not available at the state level and therefore have to be estimated. More detailed information on the estimation methodology can be found in the methodological appendix. It should also be noted that different data sources are used depending on the direction of the financial flows. The Bundesbank is responsible for collecting the indicators of domestically controlled corporate units abroad, while the indicators of foreign-controlled companies in Germany are collected by the Federal Statistical Office. The survey methods of both actors differ in several respects (among other things, the Bundesbank only surveys companies with a balance sheet total of 3 million euros or more, whereas the Federal Statistical Office has no such survey limit. For this reason, the key figures on production value, employment and gross value added of Bavarian companies in China shown in Chapter 4.2 should be understood as a lower limit and not comparable with the key figures on Chinese companies in Bavaria shown in Chapter 5.2. In both sources, the necessary data is currently only available

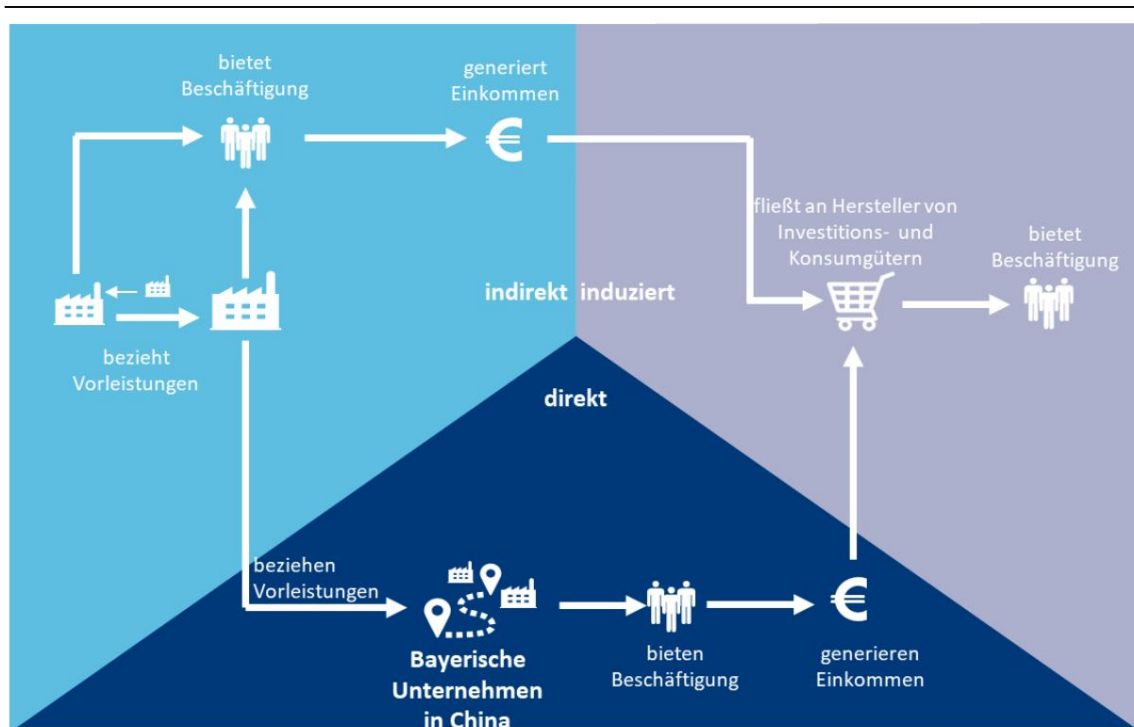
available until 2021.

Proceed

Based on the economic key figures of the Bavarian-controlled companies in China or the Chinese-controlled companies in Bavaria, the economic impact of these companies in the respective country can be calculated for 2021 (see the methodological appendix for a more detailed procedure). In addition to the "direct effects" that the companies in the respective country achieve with their sales and employees, they trigger other economic effects (see Figure 1). The "indirect effects" measure the economic activity that arises in upstream value chains through the intermediate inputs of the Bavarian companies in China or the Chinese companies in Bavaria. The consumption of the dependent employees leads to further, so-called "induced" effects. The economic footprint defined in this way, which is made up of the three partial effects mentioned, is analyzed in Chapter 4.3 (Bavaria in China) and Chapter 5.3 (China in Bavaria).

Figure 1

Schematic representation of the economic effects



Sources: own representation

4 The Bavarian Economy in China

Bavarian investments in China: high commitment with relevant economic footprint

4.1 Direct investments of Bavarian companies in China

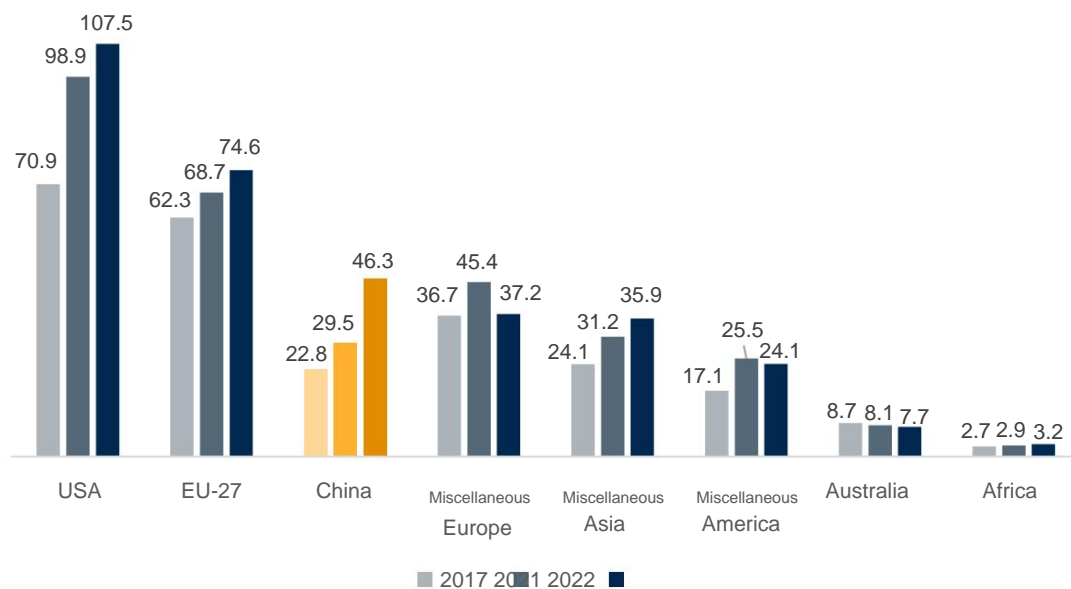
The global direct investment stocks of Bavarian companies amount to 336.8 billion euros in 2022, according to the current statistics. Almost a third of these direct investment stocks are in the USA. The EU-27 countries follow in second place.

States (excluding Germany) with 74.6 billion euros in direct investment stocks, followed by China with 46.3 billion euros. Since no single EU member state exceeds the investment stocks in China, the People's Republic of China is the second most important destination for investments by Bavarian companies (see Figure 2).

Figure 2

Worldwide Bavarian direct investment stocks

Figures in billions of euros



Source: Bundesbank; deviation from total due to rounding and missing allocation in statistics.

The Bavarian Economy in China

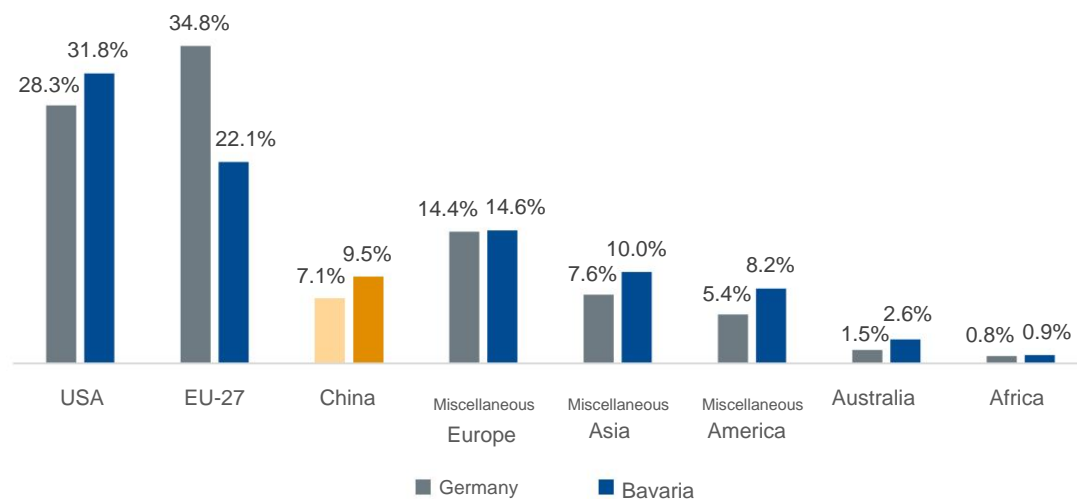
Between 2017 and 2021, the direct investment stocks of Bavarian companies in China rose by 29.4 percent. In 2022, growth picked up again with an increase of a further 56.6 percent. Overall, stocks in China grew by 23.4 billion euros in the period from 2017 to 2022, which corresponds to a doubling. No other region recorded such a percentage increase in Bavarian direct investments during this period. Only the stocks in the USA show a larger absolute increase, with an increase of 36.5 billion euros or 51.5 percent. In the EU-27 states, however, the increase in Bavarian direct investment stocks since 2017 was significantly lower, with an increase of 12.4 billion.

However, according to analyses by the Bundesbank, all three regions have a fairly constant number of foreign subsidiaries, so that the increases in direct investment stocks are in most cases not due to new companies or takeovers, but rather to reinvested profits. Studies of the latest developments based on the countries' balance of payments also show that since 2022, German equity capital has tended to be withdrawn from China, while the USA is gaining in importance as an investment destination for German investors. Overall, the global direct investment stocks of Bavarian companies grew by 91.2 billion euros, or 37.2 percent, between 2017 and 2022.

Figure 3

Worldwide Bavarian and German direct investment stocks

Figures in percent of total direct investment stocks, 2021



Source: Bundesbank

The relevance of China as an investment destination for Bavarian companies is also evident in comparison to the German average. In 2021, the year considered in this study, the share of Bavarian direct investments in China exceeds the German

Average value by 2.4 percentage points. Bavaria's relative direct investment stocks in the USA and in other non-EU countries and regions are also above the national average. In contrast, Bavarian direct investments in other EU countries are significantly below the German average (see Figure 3).

4.2 The Bavarian Economy in China

In order to assess Bavaria's economic influence in China, the economic indicators of Bavarian-controlled companies in China are first determined, i.e. companies in which Bavarian investors hold more than 50 percent of the voting capital. An estimate based on the Bundesbank's direct investment statistics shows that there are around 413 Bavarian-controlled companies in China.

However, this figure represents a lower limit, as the Bundesbank only records companies with a balance sheet total of at least EUR 3 million. The 413 companies employ 130,000 people. This is roughly the same as the number of employees in Würzburg. A production value of EUR 53.6 billion is generated. The production value corresponds to the total value of the goods and services produced in the production process and differs only slightly from sales, so that the two figures are used synonymously in this study. This corresponds to an average production value of around EUR 130 million per company (see Figure 4). The Bavarian-controlled companies thus exceed the average annual sales of EUR 13.7 million of German companies (excluding micro-enterprises with sales of less than EUR 2 million) by several times.

Figure 4

Key figures of Bavarian-controlled companies in China



Source: Estimates based on data from the Bundesbank.

A key reason for this lies in the industry structure of Bavarian companies in China: The production value of Bavarian-controlled companies in China is

The Bavarian Economy in China

is generated largely in industry (see Figure 5). Of the 53.6 billion euros, 56.2 percent is accounted for by the manufacturing industry, where the average production value per company is generally higher. With a share of 49.9 percent of the total production value, the metal and electrical (M+E) industry not only generates half of the production value of Bavarian-controlled companies in China, but also dominates the manufacturing industry. The M+E industry can in turn be viewed according to the individual economic sectors it is made up of. Particularly important here is the "manufacture of electrical equipment", which accounts for 20.7 percent of the total production value. This is followed by

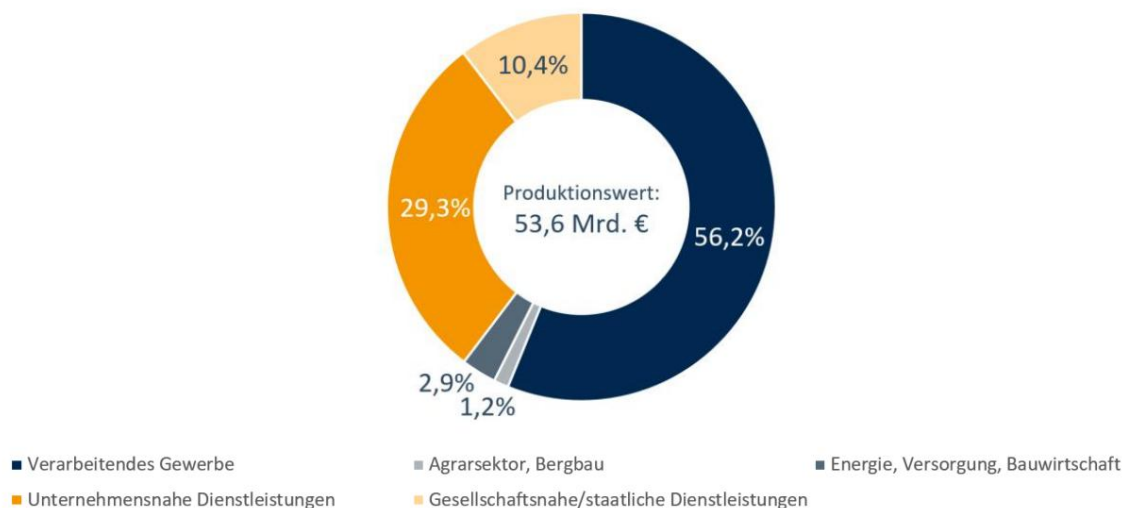
"Computer equipment, electrical and optical products", whose production value accounts for 12.1 percent. Mechanical engineering and vehicle construction account for 9.4 and 6.6 percent of the production value of Bavarian-controlled companies in China. The agricultural and mining sectors, on the other hand, account for a small share of the total production value. They account for 2.9 percent, followed by the energy, utilities and construction industries with a share of 1.2 percent. In total, around six

of ten euros of production value in the manufacturing sector.

Figure 5

Production value of Bavarian-controlled companies in China

Figures in percent of total production value, 2021



Sources: Estimates based on data from the Bundesbank;

Business-related services include economic sectors 49-53, 62-66, 69-75; corporate-related/ governmental services include economic sectors 45-47, 55-61, 68 and 77-98.

In addition to the manufacturing industry, business-related services also play a key role in the production value of Bavarian-controlled companies in China, accounting for 29.3 percent. Here, too, a distinction can be made between different sectors. The share of business-related services

The production value generated is mainly due to the provision of financial and insurance services, which accounts for 15.1 percent of the total production value. This is followed by the transport and storage sector, which accounts for 13.4 percent. About a tenth of the production value of Bavarian-controlled Companies in China are engaged in social and government services.

4.3 Impact of the Bavarian economy in China

The production value and jobs created by Bavarian companies in China make a direct contribution to the Chinese economy. In addition, they trigger other economic effects: economic activities resulting from intermediate inputs in upstream value chains ("indirect effects") and from employees' consumption ("induced effects"). These three partial effects make up the so-called economic footprint or impact of the Bavarian economy in China, which is analyzed in the following chapter.

4.3.1 Production value

In 2021, the 413 Bavarian-controlled companies in China generated a production value of 53.6 billion euros (see Chapter 4.2). In addition, the Chinese economy benefits indirectly through the purchase of the intermediate products required by these companies and through the consumption of the corresponding employees. The complete footprint of Bavarian-controlled companies can be shown as follows:

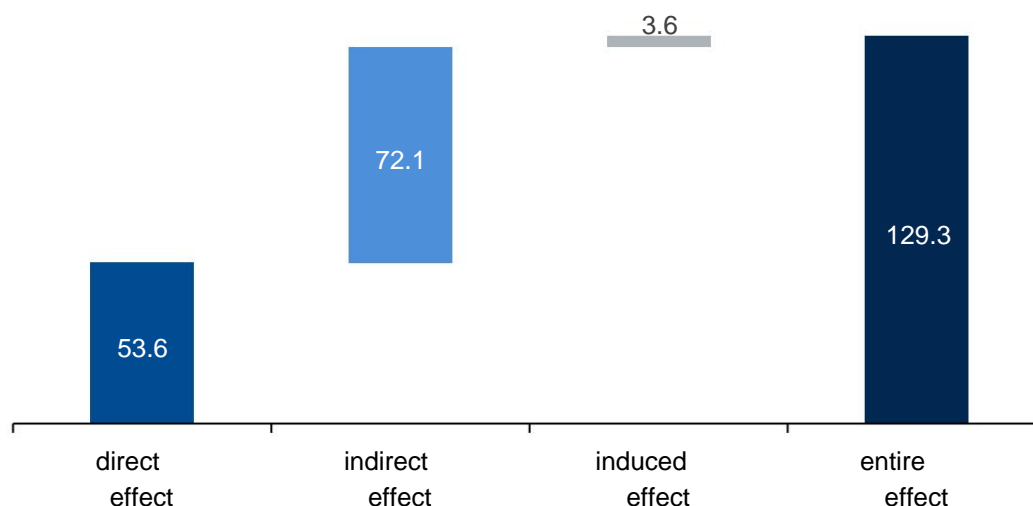
- The direct production value of Bavarian-controlled companies in China amounts to around 53.6 billion euros in 2021. It is generated within the companies themselves, for example in the production of a vehicle.
- The purchase of intermediate goods and services indirectly generates a production value of 72.1 billion euros in other companies in China. One of the beneficiaries is, for example, a manufacturer of car tires that supplies its products to the Bavarian vehicle manufacturer in China. The calculations also include upstream production stages. Accordingly, in the example of vehicle construction, the production value that is generated in the manufacture of the raw materials, like the rubber for car tires.
- The wages paid to employees and the contributions made thereon sum expenditure generates an induced effect of 3.6 billion euros. This not only takes into account the wages paid in the Bavarian-controlled companies, but also the wage payments along the upstream value chain. The induced effect calculated here is in comparison to

comparable impact calculations are quite small. This is because the wage level in China is much lower than in Germany or the USA, for example.

China also has a very high savings rate, which reduces spending per employee.

Figure 6
 Production value effects of Bavarian companies in China

Figures in billion euros, 2021



Sources: Calculations based on data from the Bundesbank and the OECD's AMNE-IOT.

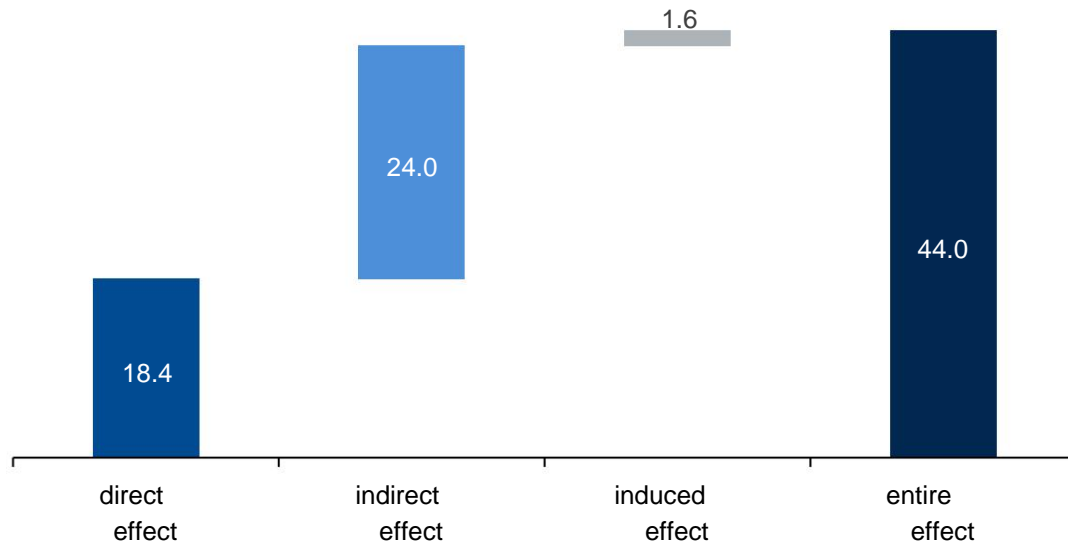
Overall, the Bavarian-controlled companies in China generate a production value of 129.3 billion euros (see Figure 6), which corresponds to around 0.4 percent of China's total production value. This results in a leverage effect of 2.4. For every euro of production value generated by Bavarian companies in China, an additional production value of 1.40 euros is created in China. This relatively high production value multiplier compared to other impact calculations is due on the one hand to the high proportion of Bavarian direct investment in the manufacturing industry, which tends to be more input-intensive and thus triggers higher indirect effects. On the other hand, China's import quota also contributes to the high leverage effect, which at less than eight percent is significantly lower than the comparable value in Germany at 20 percent. Companies in China therefore obtain a significantly higher proportion of the inputs they need from their own country.

4.3.2 Gross value added

In an economy, gross value added serves as a key measure of the real contribution to the economy. It indicates how much value is actually created through the production of goods and services. To determine gross value added, intermediate input costs are deducted from the production value. The total gross value added of a country is roughly equivalent to the gross domestic product.

Figure 7
Value Creation Effects of Bavarian Companies in China

Figures in billion euros, 2021



Sources: Calculations based on data from the Bundesbank and the OECD's AMNE-IOT.

- Bavarian-controlled companies in China will generate gross value added of 18.4 billion euros in 2021.
- The purchase of intermediate goods and services by Bavarian-controlled companies indirectly generates a further gross value added of EUR 24.0 billion.
- The wage payments to employees and the resulting consumer spending lead to an induced effect of 1.6 billion euros in added value.

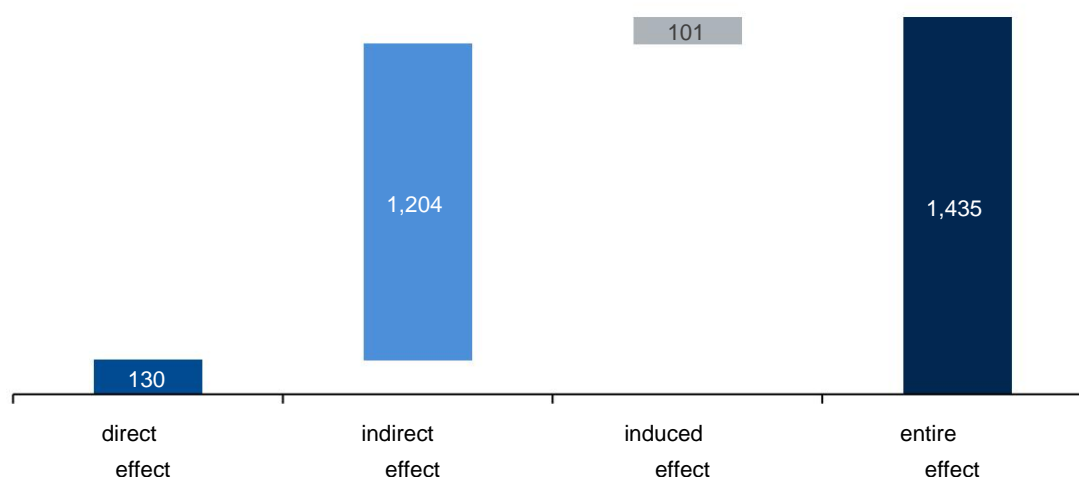
Bavarian-controlled companies in China generate gross value added totaling 44.0 billion euros (see Figure 7). This corresponds to a share of 0.4 percent. The gross value added generated by Bavarian companies in China thus exceeds the gross value added of Saarland, for example. The value added multiplier is 2.4. Consequently, for every euro of value added generated by Bavarian-controlled companies, an additional 1.40 euros of value added is generated.

4.3.3 Employment

The economic activity of Bavarian-controlled companies in China also creates jobs in the country:

Figure 8
 Employment Effects of Bavarian Companies in China

Figures in thousands, 2021



Sources: Calculations based on data from the Bundesbank, the ILO and the OECD's AMNE-IOT.

- The direct effect, i.e. employment in the Bavarian-controlled companies themselves, amounts to around 130,000 employees in 2021.
- The purchase of intermediate goods and services triggers an additional indirect effect in the companies that provide them. This creates around 1.2 million jobs.
- Wage payments to employees and the resulting consumer spending also trigger an employment effect. This induced effect results in 101,000 jobs.

The Bavarian-controlled companies in China are thus generating a total of more than 1.4 million jobs, which corresponds to 0.2 percent of China's total employment. The number of jobs created by these companies is therefore almost at the level of the number of employees in Schleswig-Holstein.

The proportion of employees is significantly lower than the contribution to the total value added in China. This is primarily due to the low direct employment effects (relative to the Chinese economy as a whole). This is due on the one hand to the above-average presence of Bavarian companies in value-added-intensive

Sectors such as manufacturing are so low. In these sectors, high economic performance is achieved with comparatively low personnel costs, which means that fewer workers are required to generate the same added value. On the other hand, the Chinese economy as a whole is very employment-intensive, which further increases the difference. Bavarian companies in China therefore need exceptionally few employees per produced added value compared to Chinese conditions, not only due to their industry structure

For the companies in China that supply goods and services to Bavarian-controlled companies and from which consumer goods are purchased, average Chinese employment intensities are assumed, which are very high compared to the Bavarian-controlled companies. For every employee of the Bavarian companies in China, there are therefore another ten employees in the companies in the upstream value chain and in the manufacturers of the consumer goods in demand.

4.3.4 Impact by economic sector

The Bavarian-controlled companies in China generate a total production value of 129.3 billion euros in the country, which is distributed to varying degrees across the individual sectors (see Figure 9). The largest share of this is again attributable to the manufacturing sector. At 57.3 percent of the total production value effect, the share is similar to the share of industry in the direct sales of Bavarian-controlled companies in China. The industrial production that has been generated

is again primarily made up of the M+E industry. This accounts for 41.4 percent of the total value added effect and can be further divided into the individual sectors. The largest effect here is generated in the "manufacture of electrical equipment" (11.6 percent) and in the "data processing equipment, electrical and optical products" (9.8 percent). With a share of 6.3 percent and 6.1 percent respectively,

Percent of production is also being initiated in mechanical engineering as well as in metal production and processing by the Bavarian-controlled companies in China.

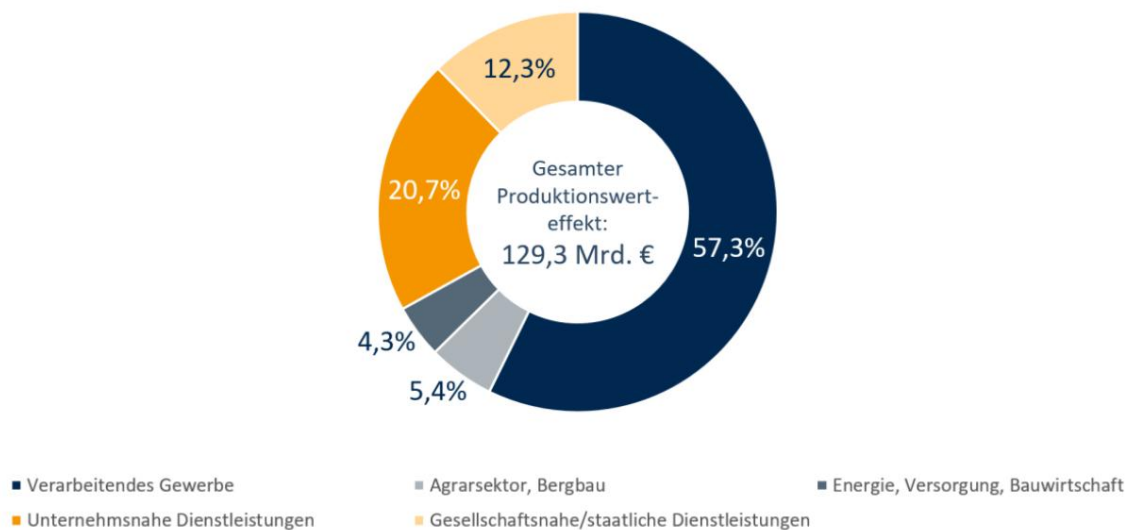
The agricultural sector, mining, energy supply and construction in particular benefit from the demand for intermediate goods and consumer goods. Although only a few of the Bavarian companies in these sectors are active in China itself, they play an important role as suppliers of intermediate goods and thus contribute almost 10 percent to the total production value generated.

One third of the total production value generated is generated in the service sector. This share is therefore somewhat lower than the distribution of direct sales.

With a share of 12.3 percent of the overall effect, it is primarily social and government services (such as retail) that are gaining in comparison to direct sales (which is due, among other things, to the consumption effects measured in the induced effect). Among business-related services, "financial and insurance services" stand out in particular with 9.1 percent.

Figure 9
 Industry Structure of the Effects of Bavarian Companies in China

Figures in percent of the total production value effect, 2021



Sources: Calculations based on data from the Bundesbank and the OECD's AMNE-IOT

Business-related services include economic sectors 49-53, 62-66, 69-75; corporate-related/
 governmental services include economic sectors 45-47, 55-61, 68 and 77-98.

The financial and insurance services sector is also one of the economic sectors that is, relatively speaking, most dependent on Bavarian-controlled companies. While, in the economy as a whole, 0.41 percent of the production value in China depends on Bavarian-controlled companies, in this sector the figure is 1.06 percent. The dependency is even higher in the manufacture of electrical equipment, where the share of dependent production is 1.77 percent.

5 The Chinese Economy in Bavaria

Chinese investments in Bavaria: relevant economic impact despite low investment share

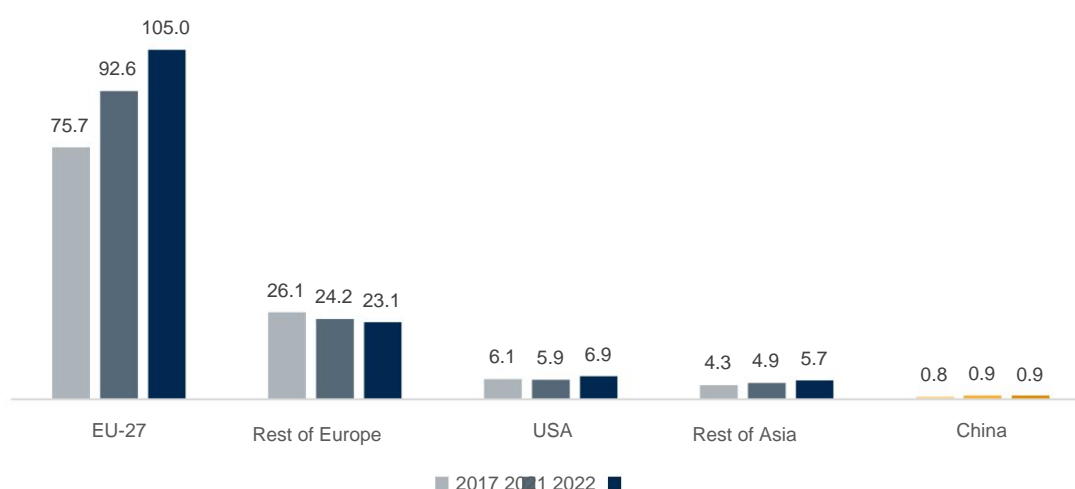
5.1 Direct investments by Chinese companies in Germany

While the previous chapter examined the investments that Bavarian companies make abroad, the focus is now on foreign investments in Bavaria. In 2022, the current edge of the statistics, direct investment stocks from abroad in Bavaria amounted to 141.2 billion euros. With a share of almost 80 percent, these come primarily from other European countries. The EU-27 states (excluding Germany) account for by far the largest share of investment stocks with 105.0 billion euros, followed by European non-EU states with an investment sum of 23.1 billion euros. The USA is the largest non-European investor in Bavaria with 6.9 billion euros. This is followed by the rest of Asia with direct investment stocks of 5.7 billion euros. China ranks 15th among the countries of origin for investments by foreign companies in Bavaria with an investment volume of 0.9 billion euros (see Figure 10).

Figure 10

Foreign direct investment stocks in Bavaria

Figures in billions of euros



Sources: Bundesbank; deviation from total due to rounding and missing allocation in the statistics; Africa, Australia and other Americas are not listed because they are involved in Bavaria with less than 300 million euros of direct investment.

In the period between 2017 and 2022, foreign direct investment in Bavaria increased by 28.0 billion euros. This is largely due to the EU-27 states. Here, an increase of 29.3 billion euros or 38.8 percent of direct investment stocks was recorded. Investments from the rest of Europe, on the other hand, fell by 11.41 percent to 3.0 billion euros, while slight increases were observed in the USA, China and the rest of Asia. While the direct investment stocks of companies from the rest of Asia recorded an increase of 33.2 percent in the five years under review, this was lower for investments from China, with an increase of 19.8 percent.

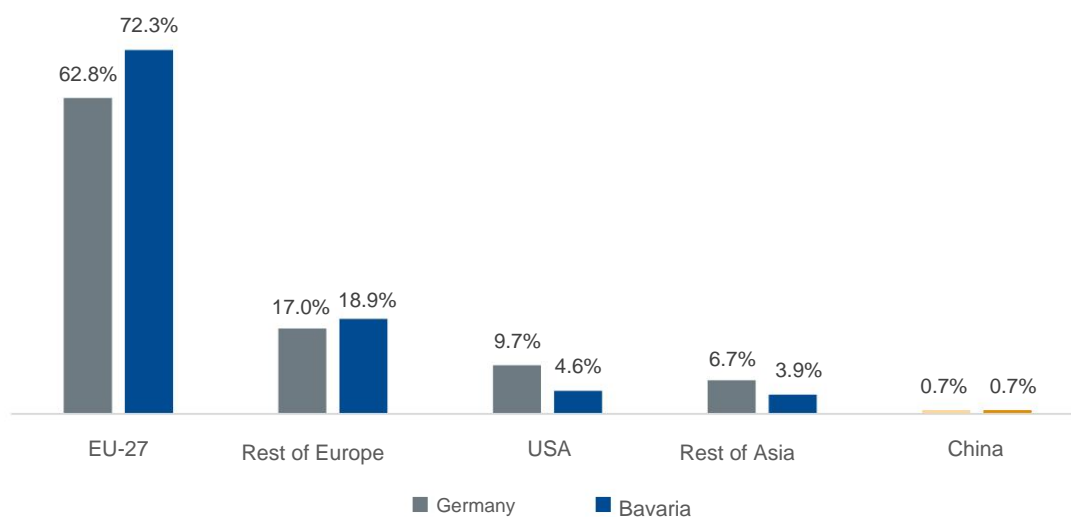
The central importance of EU countries for direct investment in Bavaria is further underlined by the comparison with foreign direct investment stocks in Germany. Although the EU is by far the largest investor in both regions, in Bavaria its share exceeds the German share by almost ten percentage points.

The rest of Europe also accounts for a larger share of direct investment stocks in Bavaria than in Germany, whereas the USA and the rest of Asia are of comparatively lesser importance for the Free State. Direct investment stocks from China account for a similarly low share in Bavaria as the national average (see Figure 11).

Figure 11

Foreign direct investment stocks in Bavaria and Germany

Figures in percent of total direct investment stocks, 2021



Sources: Bundesbank; Africa, Australia and other Americas are not listed because they are involved in Bavaria with less than 300 million euros of direct investment.

5.2 The Chinese Economy in Bavaria

The foreign direct investments are distributed among various companies in Bavaria.

The following looks at companies in which the capital share or voting rights of Chinese investors exceed 50 percent. These are also referred to as Chinese-controlled.

Estimates based on information from the Bundesbank and the Federal Statistical Office show that 151 companies in Bavaria are Chinese-controlled. Unlike the inward analysis (impact of Bavarian-controlled companies in China), this now also includes companies with a balance sheet total of less than 3 million euros. This means that 17 percent of Chinese-controlled companies are in

Germany in the Free State, which roughly corresponds to Bavaria's economic share in the federal comparison. These companies employ around 23,000 people, who together generate a production value of 8.1 billion euros (see Figure 12).

This means that Chinese-controlled companies in Bavaria have a relatively low employment intensity. However, this can largely be explained by the high share of manufacturing in the production value (see Figure 13).

Figure 12

Key figures of Chinese-controlled companies in Bavaria



Source: Estimates based on data from the Federal Statistical Office and the Bundesbank.

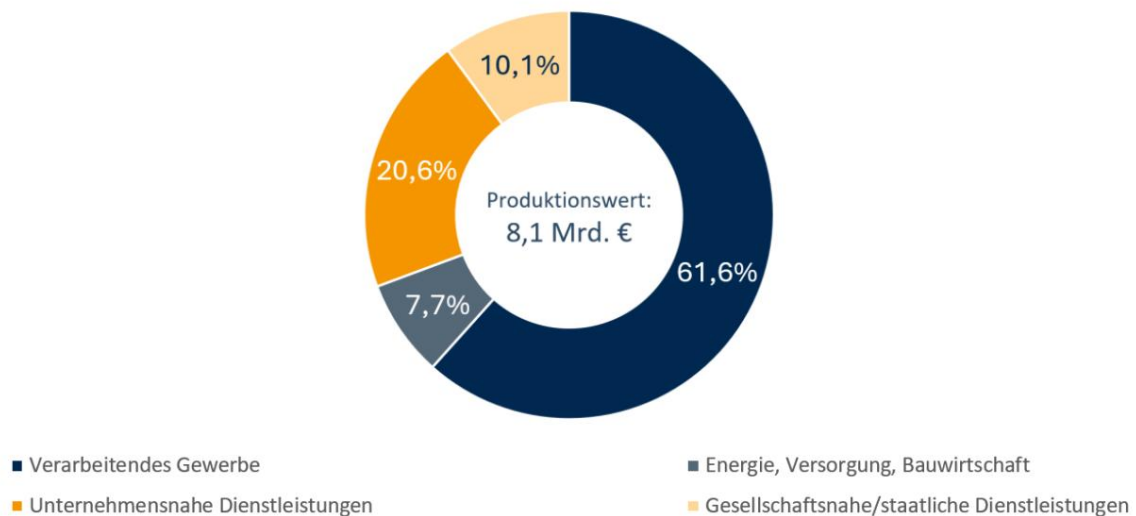
Chinese-controlled companies in Bavaria generate more than six out of ten euros in the manufacturing sector. Industry thus accounts for by far the largest share of production value (see Figure 13). In the Bavarian economy as a whole, industry accounts for only half of this value. The M+E industry is particularly present among Chinese-controlled companies, with vehicle and mechanical engineering in particular contributing to this. The second most important sector for Chinese investors is business-related services, which account for 20.6 percent of the total.

of the production value. This includes wholesale trade, transport and warehousing, as well as the provision of financial and insurance services. 7.7 percent of the production value of Chinese-controlled companies in Bavaria is generated in the energy, utilities and construction industries. Social and government services play a similarly subordinate role with a share of 10.1 percent.

Figure 13

Production value of Chinese-controlled companies in Bavaria

Figures in percent of total production value, 2021



Sources: Estimates based on data from the Federal Statistical Office and the Bundesbank

Business-related services include economic sectors 45-46, 49-53, 62-66, 69-75; public-related/government-related services include economic sectors 47, 55-61, 68 and 77-98.

5.3 Impact of the Chinese economy in Bavaria

Through the production value achieved in Bavaria and the jobs created, Chinese-controlled companies contribute directly to the Bavarian economy. In addition, further economic effects are triggered by the purchase of intermediate inputs ("indirect effects") and the consumption expenditure of employees ("induced effects"). Together, the three partial effects form the economic footprint or impact of the Chinese economy in Bavaria. This is analyzed in the following chapter.

5.3.1 Production value

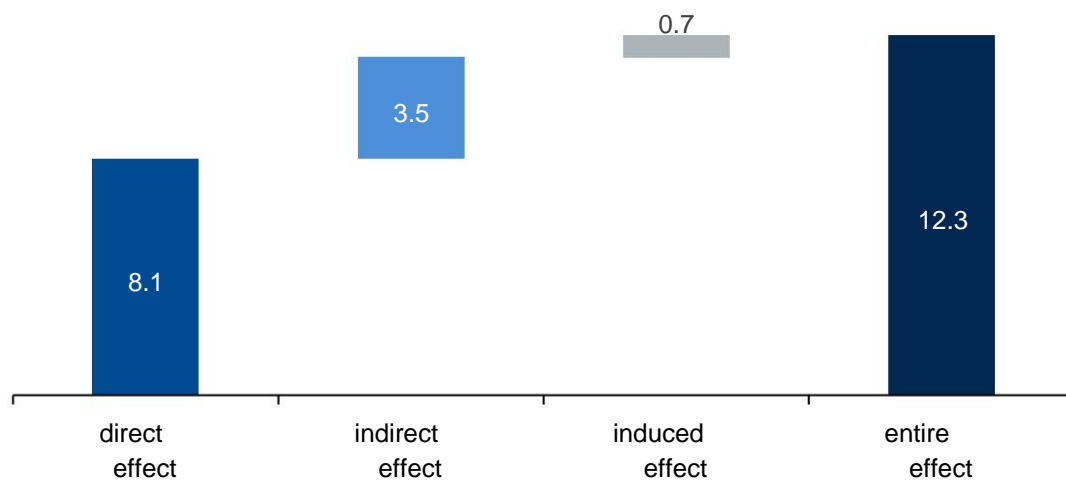
The 151 Chinese-controlled companies in Bavaria achieved a production value of 8.1 billion euros in 2021 (see Chapter 5.2). In addition to this direct

The contribution of Chinese companies can also be used to determine the other economic impulses that Chinese companies are providing in Bavaria:

Figure 14

Production Value Effects of Chinese Companies in Bavaria

Figures in billion euros, 2021



Sources: Calculations based on data from the Bundesbank, Destatis and the IWC BY-IOT.

- In 2021, the production value of Chinese-controlled companies in Bavaria amounts to 8.1 billion euros. The direct production value is generated in the companies themselves.
- The purchase of intermediate goods and services indirectly generates a product production value of 3.5 billion euros. Upstream production stages are also taken into account in the calculation.
- The consumption expenditure of employees, which is made with the wages paid, leads to an induced effect of 0.7 billion euros. In addition to the wages paid in Chinese-controlled companies, the calculation also includes wage payments along the upstream value chain.

The Chinese-controlled companies generate a total production value of 12.3 billion euros (see Figure 14). This corresponds to 1.0 percent of the Bavarian production value. The production value of Chinese-controlled companies in Bavaria has a leverage of 1.5. Accordingly, for each of

For every Euro production value generated by Chinese-controlled companies in Bavaria, a total production value of 1.50 Euros was created. The comparatively low leverage arises from the fact that Bavaria, as part of Germany, obtains almost a quarter of its intermediate inputs from other federal states and around 20 percent from abroad, meaning that part of the indirect effect occurs outside Bavaria.

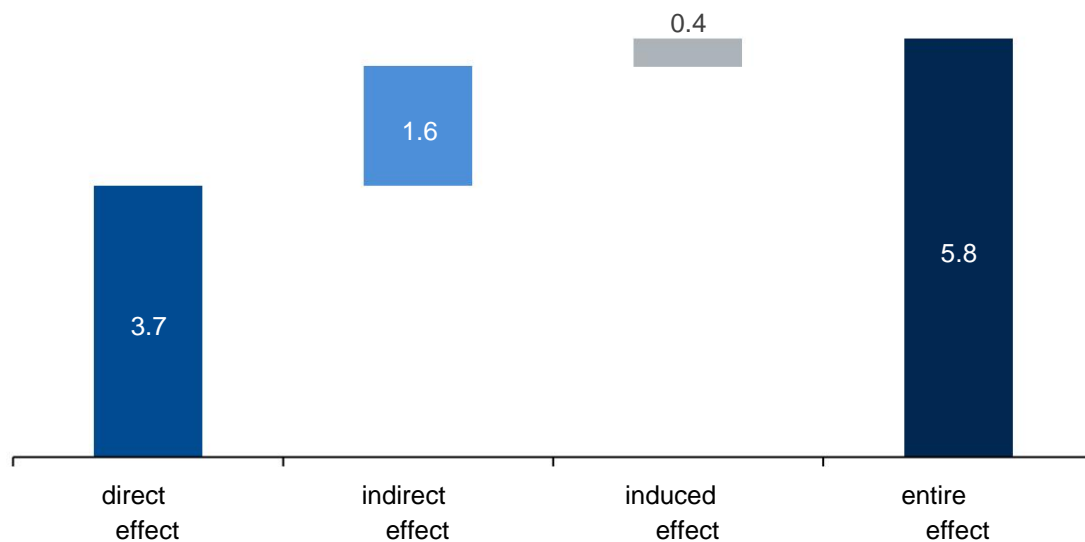
5.3.2 Gross value added

Gross value added serves as a core criterion for the real contribution to the economy in the national economy, as it measures the additional value created in the production of goods and services are actually created. The total value added of a region corresponds roughly to its gross domestic product. To determine the gross value added, intermediate inputs must be deducted from the production value.

Figure 15

Value Creation Effects of Chinese Companies in Bavaria

Figures in billion euros, 2021



Sources: Calculations based on data from the Bundesbank, Destatis and the IWC BY-IOT.

- In 2021, Chinese-controlled companies in Bavaria will generate gross value added of 3.7 billion euros.
- The purchase of intermediate goods and services by Chinese-controlled registered companies in Bavaria indirectly contribute 1.6 billion euros in gross value added.

- The wages paid to employees in Bavaria and the resulting consumer spending lead to an induced effect of EUR 0.4 billion.

In 2021, Chinese-controlled companies generated gross value added totaling EUR 5.8 billion in Bavaria (see Figure 15), which corresponds to slightly less than one percent of Bavaria's total value added. The gross value added generated by Chinese-controlled companies in Bavaria is thus slightly higher than the gross value added of the city of Bamberg. Compared to the economy as a whole, Chinese-controlled companies require more intermediate inputs per value produced than the Bavarian economy as a whole, but this can be explained by the high share of manufacturing in the Chinese portfolio. The value added multiplier is 1.5, as was the case with production value. Every euro of value added generated by Chinese-controlled companies in Bavaria generates additional value added of EUR 0.5.

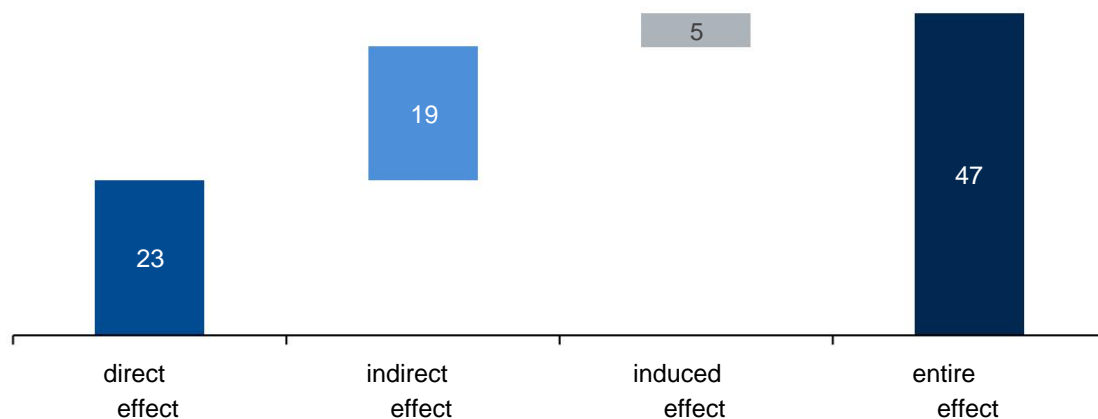
5.3.3 Employment

The entrepreneurial activities of Chinese-controlled companies in Bavaria also generate and secure employment in the Free State.

Figure 16

Employment Effects of Chinese Companies in Bavaria

Figures in thousands, 2021



Sources: Calculations based on data from the Bundesbank, Destatis and the IWC BY-IOT.

- Employment in the Chinese-controlled companies themselves is the direct effect. In 2021, this amounts to around 23,000 employees.

- By purchasing intermediate goods and services, Chinese-controlled companies also trigger an indirect effect. Around 19,000 jobs are created in the companies that provide these intermediate goods and services.
- The wage payments to employees and the resulting consumer spending create the induced employment effect, which amounts to around 5,000 jobs.

Overall, Chinese-controlled companies in Bavaria create around 47,000 jobs. This corresponds to around 0.6 percent of total employment in Bavaria. The number of jobs created by the economic activities of Chinese-controlled companies in Bavaria is thus equal to the number of employees in the Garmisch-Partenkirchen district.

The share of total employment in Bavaria is therefore significantly lower than the share of value added. This can be explained by the fact that Chinese-controlled companies are more strongly represented in sectors with high value added intensity, such as manufacturing, compared to the Bavarian average. This means that they can achieve comparable value added with a smaller number of employees. The employment lever is 2.1. For every job created by Chinese-controlled companies, 1.1 additional jobs are therefore generated in Bavaria.

5.3.4 Impact by economic sector

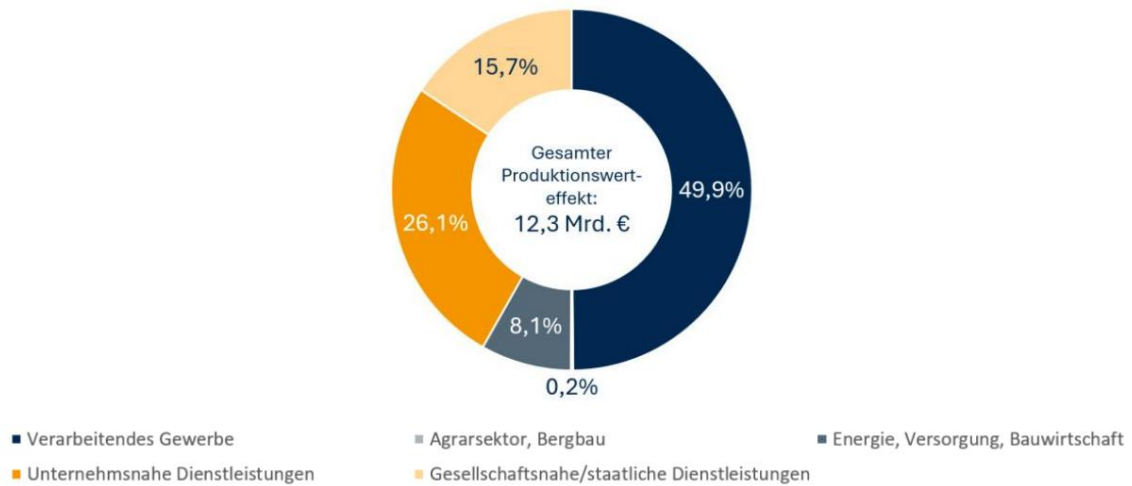
The Chinese-controlled companies in Bavaria generate a total production value effect of 12.3 billion euros, which is distributed across various sectors (see Figure 17). With a share of 49.9 percent, the production value effect comes primarily from the manufacturing industry. Here, as with the distribution of the direct contributions of the Chinese companies, the M+E industry with vehicle and mechanical engineering is of particular relevance.

This is followed by business-related services, which account for 26.1 percent of the production value effect. Wholesale trade in particular plays a key role here. Social and government services, which include retail, also contribute 15.7 percent to the production value effect. The energy, utilities and construction sectors account for 8.1 percent. The agricultural and mining sectors, on the other hand, play a subordinate role with a share of 0.2 percent.

Figure 17

Industry Structure of the Effects of Chinese Companies in Bavaria

Figures in percent of the total production value effect, 2021



Sources: Calculations based on data from the Bundesbank, Destatis and the IWC BY-IOT

Business-related services include economic sectors 45-46, 49-53, 62-66, 69-75; corporate-related/governmental services include economic sectors 47, 55-61, 68 and 77-98.

In relative terms, it is mainly the other vehicle construction sectors, but also the rubber and plastics industry, that benefit from the investments of Chinese companies. While around one percent of the production value in Bavaria depends directly, indirectly or induced on Chinese-controlled companies, the share in these sectors is more than three times as high.

6 Summary and classification

The impact of direct investment relations goes beyond the determined economic impact

The analyses in this study illustrate the important role of foreign direct investment for the respective national economy. Both Bavarian investments in China and Chinese investments in Bavaria lead to significant economic effects in the target countries. These include, on the one hand, the direct value creation and employment by the foreign-controlled companies themselves and, on the other hand, the indirect effects along upstream value chains that are triggered by the investments. In addition, consumption effects are triggered by employees, who also contribute to economic stability and dynamism through their purchasing power.

Looking at Bavarian investments in China, the direct investment stock shows that China is the second most important investment destination for Bavarian companies after the USA and also plays a larger role than the Germany-wide average. In recent years, especially from 2021 to 2022, commitment to China has increased sharply, although estimates suggest that this trend may reverse in the future. Bavarian companies in China are characterized by a high production value per company, which is partly due to their belonging to the manufacturing sector. It should also be emphasized that the number of employees is relatively low in relation to the production value. This is particularly noticeable when comparing the employment intensity of Bavarian companies in China with the average number of employees in the Chinese economy, where even in the manufacturing sector there are significantly more employees per production value. In addition, the leverage that Bavarian companies generate in China through the upstream value chain is relatively large, since both Chinese companies and Bavarian companies in China source many of the required inputs from their own country.

In contrast, the direct investment stocks of Chinese companies in Bavaria show that they are relatively low, especially compared to European investors. This observation also applies to the past years since 2017. Among the

The share of manufacturing in the Chinese companies in Bavaria is particularly high – about twice as high as in the Bavarian economy as a whole. However, the additional production value created by these companies in the upstream value chain is limited, since Bavaria, as part of Germany, has a considerable

part of its inputs from other federal states. As is usual in Germany, business-related services in particular benefit indirectly from Chinese-controlled industrial companies, which underlines the strong industrial-services network in the country.

[Summary and Classification](#)

Studies show that cross-border direct investment has positive effects for the domestic economy and the investment country beyond these purely economic indicators. For example, parent and subsidiary companies benefit from knowledge and technology transfers, as Ambos et al. show. In addition, studies by Aurangzeb and Stengos show that a higher direct investment rate strengthens the productivity of exporting companies. A positive correlation between gross domestic product growth and direct investment intensity has also been demonstrated (Agrawal/Khan). On the other hand, however, there are also arguments against close investment networking, particularly with regard to current considerations on technology migration, political differences and views, and potential risks for domestic industry.

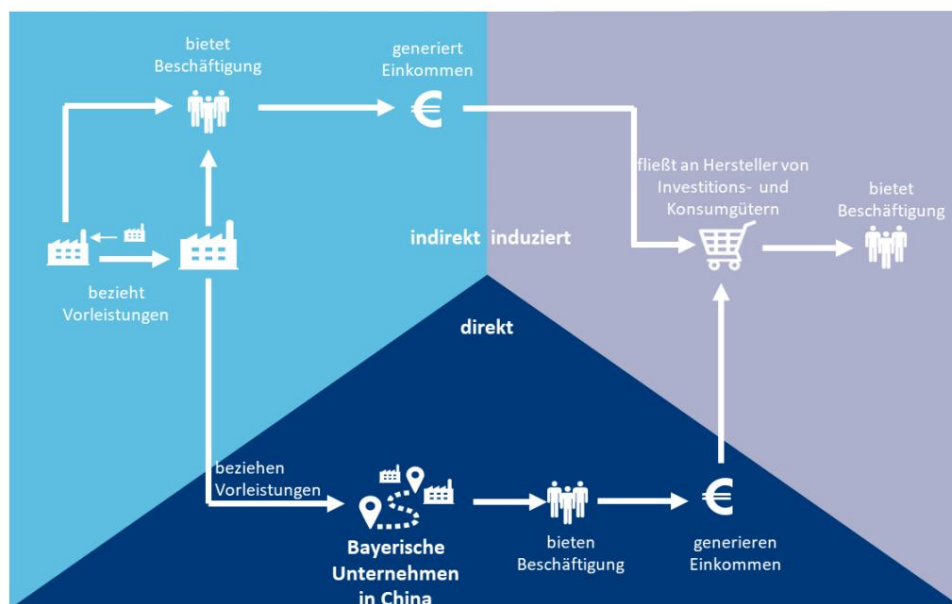
Appendix: Methods in Detail

Methodological approach of impact analysis

The aim of the study is to record the economic footprint of the Bavarian economy in China and the Chinese economy in Bavaria. The commitment abroad is analyzed based on the direct investment stocks. The amount of Bavarian direct investment in China (see Chapter 4.1) and Chinese direct investment in Bavaria (see Chapter 5.1) provide an initial overview of the economic ties between Bavaria and China. Direct investments refer to cross-border corporate investments in which the investor holds at least ten percent of the voting capital. This threshold indicates a long-term commitment by the investor. If the share is over 50 percent, however, this is referred to as cross-border control by the foreign investor. These companies are defined in this study as "Bavarian-controlled companies in China" or "Chinese-controlled companies in Bavaria". The economic indicators of these companies are analyzed in Chapters 4.2 and 5.2. However, the overall economic effect goes beyond the production value, gross value added and the number of employees of these companies. When calculating the economic footprint, a distinction is made between direct, indirect and induced effects:

Figure 18

 Methodological approach of the impact analysis, schematic representation of the three effects


 Source: own illustration IW Consult

[Appendix: Methods in Detail](#)

The direct effects are understood to mean the economic activity which the Bavarian-controlled companies generate directly through their activities in China (or the Chinese companies in Bavaria) in the context of their ongoing operations.

The indirect effects are the value creation and employment effects that the Bavarian-controlled companies in China or the Chinese-controlled companies in Bavaria trigger through the purchase of intermediate goods or services there.

The induced effects are the circular effects from the additional demand resulting from the consumption of the previously calculated employees of the controlled companies and their suppliers in the respective region.

The economic footprint corresponds to the sum of the three effects. It is determined in relation to production value, value added and employment.

data estimation of the baseline values

As a basis for the impact calculations, the economic indicators of those companies in China in which Bavaria holds more than 50 percent of the capital and of those companies in Bavaria in which China holds more than 50 percent are required at the industry level. Unlike in the previous study on the impact of Bavarian companies in the USA, these figures for China cannot be provided by the Bundesbank. The indicators must therefore be estimated.

To estimate the Bavaria key figures with 50 percent participation, three additional statistics are used (both in the outward and inward view), each of which contains the number of companies, turnover or production value and employees of the participating companies at the economic sector level and refers to the following groups:

- German companies in China/Chinese companies in Germany that hold more than 50 percent of the voting capital.
- German companies in China/Chinese companies in Germany that hold more than 10 percent of the voting capital.
- Bavarian companies in China/ Chinese companies in Bavaria that have more than hold 10 percent of the voting capital.

The estimation is carried out in two steps. First, it is assumed for each economic sector that the relationship between the German figures with 10 percent and 50 percent participation also applies to Bavaria. This means that it is checked how many companies, employees and sales are lost proportionally if the threshold value at which participation is measured is increased. These shares are then applied to the known Bavaria figures with 10 percent participation.¹ In this way

¹ Example: In a Chinese industry, 100 people are employed in companies in which Germany holds more than 10 percent of the capital. This figure shrinks to 90 if one only considers those companies in which Germany holds more than 50 percent of the capital. The ratio of 0.9 is now also applied to the known number of employees in companies in China in the corresponding industry in which Bavaria holds more than 10 percent of the capital.

[Appendix: Methods in Detail](#)

the Bavaria-specific sum of the economic indicators for a 50 percent shareholding is also determined. However, this rule of three is not possible in all cases, as there are also cases of secrecy in some sectors of the economy in the data sources mentioned above. Cases of secrecy are particularly common in the key figures of Chinese companies in Bavaria (inward view). In these cases, in the second step, the share of the respective sector of the economy is determined on the basis of the existing data.

of the total sum and applied to the previously calculated sum of the Bayern key figures with a 50 percent participation.² Which data basis is used for this depends on the direction of the financial flow being considered:

- Outward (Bavaria in China): Where possible, the economic indicators of the Companies in China in which Bavaria holds more than 10 percent of the capital are used; otherwise, the information from those companies in China in which Germany holds more than 50 percent of the capital serves as the basis.
- Inwards (China in Bavaria): There are particularly many cases of confidentiality in the key figures of companies in Bavaria in which China holds at least 10 percent of the voting capital. Therefore, the key figures of companies in Germany in which China holds more than 50 percent of the capital are primarily used.

In order to increase the accuracy of the estimate, this information on the Germany-wide distribution is combined with information on the Bavarian economic structure.

If China is particularly active in a particular economic sector in Germany, and this economic sector is also very important in Bavaria, the estimated weight of this economic sector in the Bavarian distribution is therefore all the higher. The lower accuracy of the inwards compared to the outwards resulting from the secrecy suggests a more cautious view of the figures. In Chapter 5, we therefore refrain from providing specific figures at the industry level.

The approach described can be used to create a reliable estimate of the level and distribution of the economic indicators of Bavarian companies in China and Chinese companies in Bavaria. However, especially when evaluating the results in detail at the industry level, it must always be taken into account that these are estimates and that specific constellations of Bavarian companies in China or Chinese companies in Bavaria, which deviate significantly from the German average, cannot be fully captured.

² Example: For a specific industry, the required value cannot be determined directly using the rule of three. However, it is known that 20 percent of the employees in this industry work in companies in China in which Bavaria holds more than 10 percent of the capital. The 20 percent share is now applied to the previously determined total of employees who work in companies in China in which Bavaria holds more than 50 percent of the capital.

data sources

All key figures for companies in which more than 10 percent of the capital is held can be obtained from the Bundesbank. For the key figures with a threshold of 50 percent, different actors are responsible for collecting the data depending on the direction considered. The key figures for domestically controlled corporate units abroad are collected by the, while the Federal Statistical Office is responsible for collecting the key figures for foreign-controlled companies in Germany. As described in the section "Data estimation of the initial values", the direct effects of Bavarian companies in China and Chinese companies in Bavaria for 2021 can be estimated from the information provided by the Bundesbank and the Federal Statistical Office:

- For the inward calculations (China in Bavaria), information on the production values of Chinese companies in Germany is available. The Bundesbank statistics, on the other hand, contain information on sales. Since the production value (the total value of the goods and services produced in the production process) differs only slightly from sales, the two figures are equated in this study. For both perspectives, it is therefore assumed that the sales or production value of the dependent companies determined in the estimate directly corresponds to the production value triggered.
- The employees associated with the investments can be directly derived from the estimate be taken over.
- Gross value added is determined as a proportion of the production value.
In the inward view (Bavaria in China), it is assumed that the value added ratio in an economic sector corresponds to the average ratio of all foreign companies in China in this economic sector. The data for this is taken from the AMNE. In the inward view (China in Bavaria), the survey of the Federal Statistical Office provides information on the value added ratio of Chinese companies in Germany.

The results of the two directions (China in Bavaria and Bavaria in China) are unfortunately not directly comparable due to the different data sources. This is because the survey methods of both institutions differ in several respects (for example, the Bundesbank only records companies with a balance sheet total of at least 3 million euros, while the Federal Statistical Office does not set such a limit). Therefore, the key figures on production value, employees and gross value added of Bavarian companies in China presented in Chapter 4.2 should be viewed as a lower limit and not directly comparable with the key figures for Chinese companies in Bavaria shown in Chapter 5.2.

Using input-output tables (IOT), which show the economic interrelationships between industries, the next step is to calculate which production value effects arise from the intermediate inputs purchased by the dependent companies (indirect effects).

- In the outward view (Bavaria in China), a special OECD IOT can be used, in which the economic links of foreign companies in

[Appendix: Methods in Detail](#)

China is shown separately (AMNE database). If foreign companies in the country have different intermediate input structures than the average, this is taken into account in the calculations. The AMNE is published with a delay, so that the current version is for 2019. Since no absolute figures are used here, but only the relative information on economic interdependencies, which tend to be quite stable, this does not pose a major problem.

- For the inward analysis (China in Bavaria) a model developed by IW Consult is used. The Bavaria-IOT for 2021 is used, in which the intermediate inputs of Bavarian companies are shown separately and regionalized. This makes it possible to calculate which indirect effects arise from the intermediate inputs in Bavaria itself and which ones arise in the rest of Germany. The Bavaria-IOT is created on the basis of various official statistics, and the regionalization of economic interdependencies is carried out using the FLQ method.

In the two IOTs used, the economic sectors are grouped differently, which leads to different levels of detail in the results in the outward and inward analysis. As a result, the definitions of “business-related services” also differ slightly from one another.

The indirect gross value added and job creation effects are determined as a proportion of the production value. For the outward analysis, data from the AMNE on gross value added in China and from the International Labour Organization on the number of people employed there are used. For the inward analysis, data from the national accounts of the countries are used.

In order to calculate the consumption effects (induced effects), it is first necessary to determine how high the wages of the previously calculated employees are. Then, based on the Chinese or Bavarian consumption rate, it is determined what proportion of these wages are spent on consumption and thus contribute to further economic activity in the respective country. The wages are determined based on the average wage share of the respective country and according to the number of employees in the direct and indirect effect. The Chinese wage shares are calculated using ILO data, while for Bavaria the national accounts of the states are used.

Contact/Imprint

Volker Leinweber

Managing Director, Head of the Department of Economics and Foreign Trade

Telephone 089-551 78-133

volker.leinweber@vbw-bayern.de

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information in this publication refers to all genders without any intention of discrimination.

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vbw

Association of the Bavarian Economy
e. V.

Max-Joseph-Straße 5
80333 Munich

www.vbw-bayern.de

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authors

Maren Müller Dr.

Marco Wysietzki Benita
Zink

German Economic Institute
Köln Consult GmbH

Telephone 0221 49 81-819

zink@iwkoeln.de