interpharma

STUDY ON BEHALF OF INTERPHARMA

The Importance of the Pharmaceutical Industry for Switzerland

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Publication details

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In this publication, the masculine form is mainly used to refer to persons and functions instead of the dual form, whereby the masculine form is used to refer to both men and women.

Disponible en version française
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Foreword

Dr. René Buholzer
Managing Director and Delegate of the Board of Interpharma

90 years of Interpharma. In our anniversary year, the pharmaceutical industry in Switzerland can look back on a unique success story. Over the last 25 years, the pharmaceutical sector created over 30,000 new jobs and currently employs almost 50,000 people. With exports worth over 100 billion Swiss francs and a share of almost 40% of total exports, the pharmaceutical industry is Switzerland's most important export sector and economic engine. The latest figures from this study underline the outstanding importance of the pharmaceutical sector for Switzerland: the total value-added effect of the Swiss pharmaceutical sector is equal to 74.5 billion Swiss francs. As a percentage of GDP, almost one Swiss franc in ten was generated along the value chains of pharmaceutical companies' research, development and production activities. This means the pharmaceutical industry is the driving force of the Swiss economic centre.

The sharp increase in productivity in recent years came as the result of greater capital investment and automation, as well as high innovative strength. This innovative strength is the result of permanent investment in research and development of new medicines and therapies. In Switzerland, Interpharma member companies invest over 9.6 billion Swiss francs a year in research and development, and employ 12,600 researchers. That is almost double their revenue in Switzerland.

Nowadays, we live longer and healthier in Switzerland because the population has access to high-quality healthcare. The pharmaceutical sector makes a major contribution to the quality of life and prosperity of the population of Switzerland, and in return, Switzerland offers attractive framework conditions for innovative pharmaceutical companies. We are committed to ensuring that this remains the case in the future.

The development of new medication is risky, takes on average 12 years and requires investments of over 2 billion Swiss francs. Without reasonable protection of intellectual property, the willingness of venture capitalists to invest in research and development reduces. To keep the pole position compared to other countries, Switzerland needs to be strengthened as a research and production location.

For this, effort is required on several levels: firstly, patient access to highly innovative medication needs to be improved. Secondly, the relationship with the European Union needs to finally be put on a firm footing. And thirdly, in digitalisation the aim must be to take steps to improve the quality of treatment in Switzerland.

Despite the challenges, conditions are good for Switzerland to continue writing its success story. However, it must not rest on its laurels but rather develop strengths, work on weaknesses, and learn from competitors.

Interpharma
Dr. René Buholzer, Managing Director and Delegate of the Board of Directors

Medizinische Forschung ist kein Marathon.

Denn ein Marathon ist irgendwann vorbei.

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wir-forschen-weiter.ch

FACTS & FIGURES

2.3% p.a.
employment growth over the past 10 years

Innovation

The basis for high productivity and competitiveness

34,200
employees with a tertiary degree

10,900
scientists (FTE)

Employment

50,600 employees
work in the Swiss pharmaceutical industry
thereof 22,300 women

Multiplier effects:
total employment is
5.9 times higher

5 times higher productivity than the Swiss industry average

250,200
additional people are employed in other industries due to the activities of the pharmaceutical industry

12% p.a.
productivity growth over the past 10 years

Source: BAK Economics, FSO

PHARMACEUTICAL INDUSTRY

> CHF **9** bn
R&D expenditures

This makes the pharma industry the most research-intensive industry in Switzerland

14.8% p.a. value added growth over the past 10 years

contributing almost half to the aggregate GDP growth

Value added

CHF **44** bn
of value added is generated by the Swiss pharmaceutical industry

Productivity

CHF **922,500**
of value added per workplace

Multiplier effects:
total value added is
1.7 times higher

CHF **30** bn
of value added is generated in other industries due to the activities of the pharmaceutical industry

Data for 2022, except for number of scientists (2021)

Executive summary

The economic importance of the pharmaceutical industry manifests in many ways: over the past 25 years, its companies have created thousands of additional jobs, and now almost one Swiss franc in ten is generated along the value chains of their research, development and production activities. The real economic output of the pharmaceutical industry tripled in the last ten years and was responsible for over 40 percent of Swiss economic growth. The basis for this outstanding achievement is the enormous capacity for innovation and productivity, coupled with international competitiveness.

The pharmaceutical industry creates jobs

In 2022, the companies of the Swiss pharmaceutical industry employed around 50,600 people (47,800 FTE). Since the sector started to grow in the mid-90s, the number of employees has increased by over 30,000 people. In other industries in the same period, there was a decrease in jobs (-13,700 people).

Increasing intensity of research

The creation of new jobs is significantly driven by the successful orientation towards innovative products with a lot of research behind them. In 2021, almost 11,000 employees worked in research and development for new medicines and therapies. With the increasing focus on innovations, the need for a highly-qualified workforce continues to grow. Two in three employees now have higher-level vocational training or a university degree – in other industries it is only one in three.

The recipe for success: strength in innovation and growth in productivity

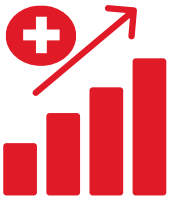
In parallel with the increase in the number of employees, there was a rise in research and development expenditure – over 9 billion Swiss francs in 2022. It was not only the intensity of research that increased, but also the performance of research. The Swiss pharmaceutical industry is at the absolute top of cutting-edge research. It is this innovative strength that forms the basis for a high level of

international competitiveness. This is demonstrated by exports of 109 billion Swiss francs in 2022 – around 40 percent of the total Swiss goods exports.

High value added

The Swiss pharmaceutical industry generates enormous value added in a comparably small area. The density of value added can also be seen in labour productivity: With 922,500 Swiss francs value added per FTE, productivity is five times as high as the average for the overall economy. Even in an international comparison, the Swiss pharmaceutical industry outstrips other countries in terms of productivity.

Pharmaceutical industry is Switzerland's most important growth driver

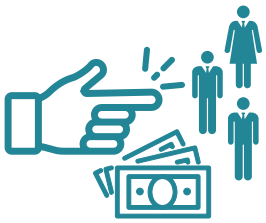


Without the robust growth of pharmaceutical value added, Swiss GDP growth in the last ten years would only have been a little more than half the current rate. During the Covid-19 pandemic, the sector made a positive contribution to economic growth. As a result, the Swiss economy was more resilient through the crisis than most other economies.

Other sectors also benefit from the success of the pharmaceutical industry

The pharmaceutical industry also generates effects for companies in other Swiss sectors, whether through investments in new buildings and equipment or through demand for raw materials, intermediate products, energy or services. Trade and industry also benefit from consumer spending by employees in the pharmaceutical companies. The impact analysis shows: for every Swiss franc of value added in the pharmaceutical industry, approximately 70 centimes are generated in businesses in other Swiss sectors. And more than four additional jobs in other sectors are connected with every job (in FTE) in the pharmaceutical industry.

Economic footprint of the pharmaceutical industry 2022



The value chains of the research, development and production activities of the Swiss pharmaceutical industry resulted in direct and indirect value creation of around 74.5 billion Swiss francs in 2022. This corresponds to 9.8 percent of Switzerland's total economic output. There are 300,800 employees behind this economic performance, with employee income of 24.5 billion Swiss francs.

Effect in …	the pharma industry	other industries	Total effect	Multiplier
Gross value added [CHF m]	44 100	30 400	74 500	1.7
in % of total economy	5.8	4.0	9.8	
Employees	50 600	250 200	300 800	5.9
in % of total economy	0.9	4.5	5.4	
Employees [FTE]	47 800	194 400	242 200	5.1
in % of total economy	1.1	4.5	5.6	
Hours worked [m hrs]	86	360	446	5.2
in % of total economy	1.1	4.7	5.8	
Gross wages and salaries [CHF m]	6 600	17 900	24 500	3.7
in % of total economy	1.6	4.3	5.9	
Exports [CHF m]	109 384			
in % of total exports	39.9			

Note: possible rounding differences
Sources: BAK Economics, FSO

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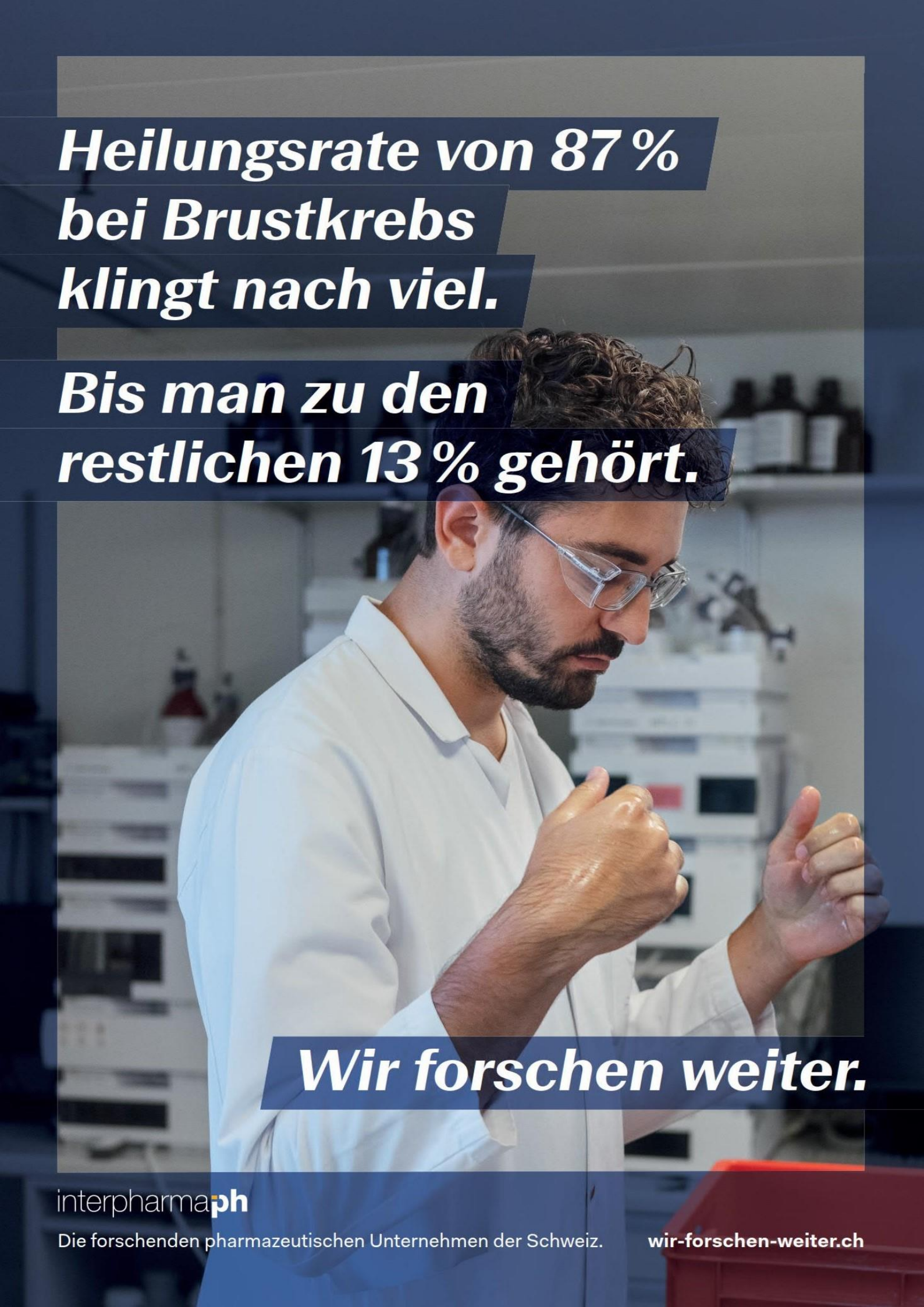
Heilungsrate von 87 % bei Brustkrebs klingt nach viel.
Bis man zu den restlichen 13 % gehört.
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1 The pharmaceutical industry as an employer

Thanks to the pharmaceutical industry, the Swiss economy has net been deindustrialized. While the employment trend in other manufacturing industries has been negative overall since 1996, the number of employees in the pharmaceutical industry has grown strongly. In particular, the need for highly qualified workers has increased significantly. The proportion of women is comparable to the Swiss average, and significantly higher than the proportion of women in other manufacturing. As the pharmaceutical industry expanded, the indirect employment effects for companies from other sectors also grew steadily.

1.1 Number of employees

Steady increase in capacities since 1996

The first half of the 1990s was characterised by significant restructuring of the companies and a pronounced economic crisis. The lowest point was reached in 1996, when only 19,600 people were still employed in the Swiss pharmaceutical industry. From then on, the number of new jobs created accelerated and the number of people employed has been growing steadily to this day.

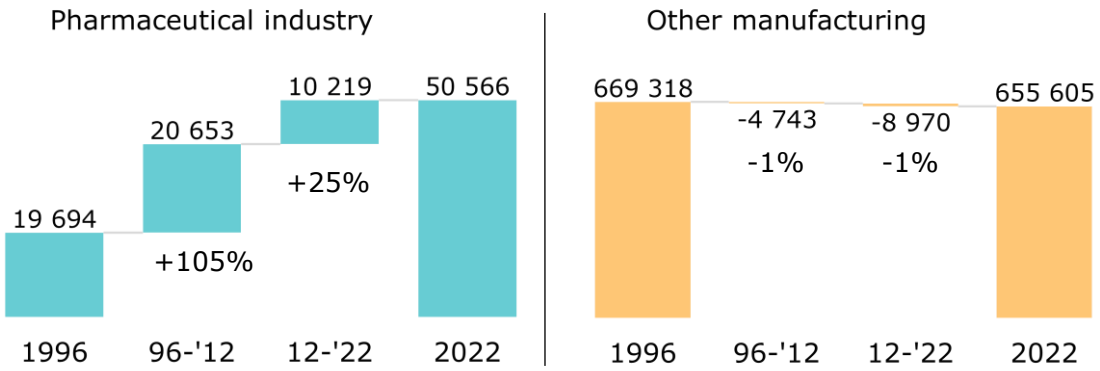
The most important drivers of this economic growth were investment in research and development, and a strategic focus on innovative technologies. In addition, structural factors such as demographic development and the growing middle class in emerging markets strengthened growth in the pharmaceutical industry. Further national aspects such as better institutional framework conditions (e.g. bilateral agreements with the EU) and the establishment of other companies have strengthened this dynamic and contributed to strong economic growth. Not even the various economic crises could slow down this trend.

In 2022, the number of employees rose above 50,000 people for the first time. Since 1996, the number of employees has increased by over 30,800, which amounts to growth of over 157 percent. In comparison, in the same period, the employment growth in the whole Swiss economy increased by 36 percent. Looking at just manufacturing, apart from the pharmaceutical industry, there was actually a decrease in employment.

While other manufacturing employed around 13,700 fewer people in 2022 than 1996, the pharmaceutical industry recorded strong growth in employment (+30,800) that prevented deindustrialisation of the Swiss workplace (+17,200 people or +2.5%).

Fig. 1-1 The number of employees has risen by over 30,800 since 1996

Number of employees, 1996–2022



Sources: BAK Economics, FSO

Development since the beginning of the Covid-19 pandemic

The Covid-19 pandemic led to a decrease in employment in Swiss manufacturing. The pharmaceutical industry was also negatively affected by the measures to combat the pandemic. Some treatments by doctors, and operations in hospitals were postponed, and demand for non-essential medicines and therapies decreased. In contrast to manufacturing as a whole, employment in the pharmaceutical industry grew in both 2020 and 2021 (cumulated +2.8%), continuing in 2022 (+2.4%).

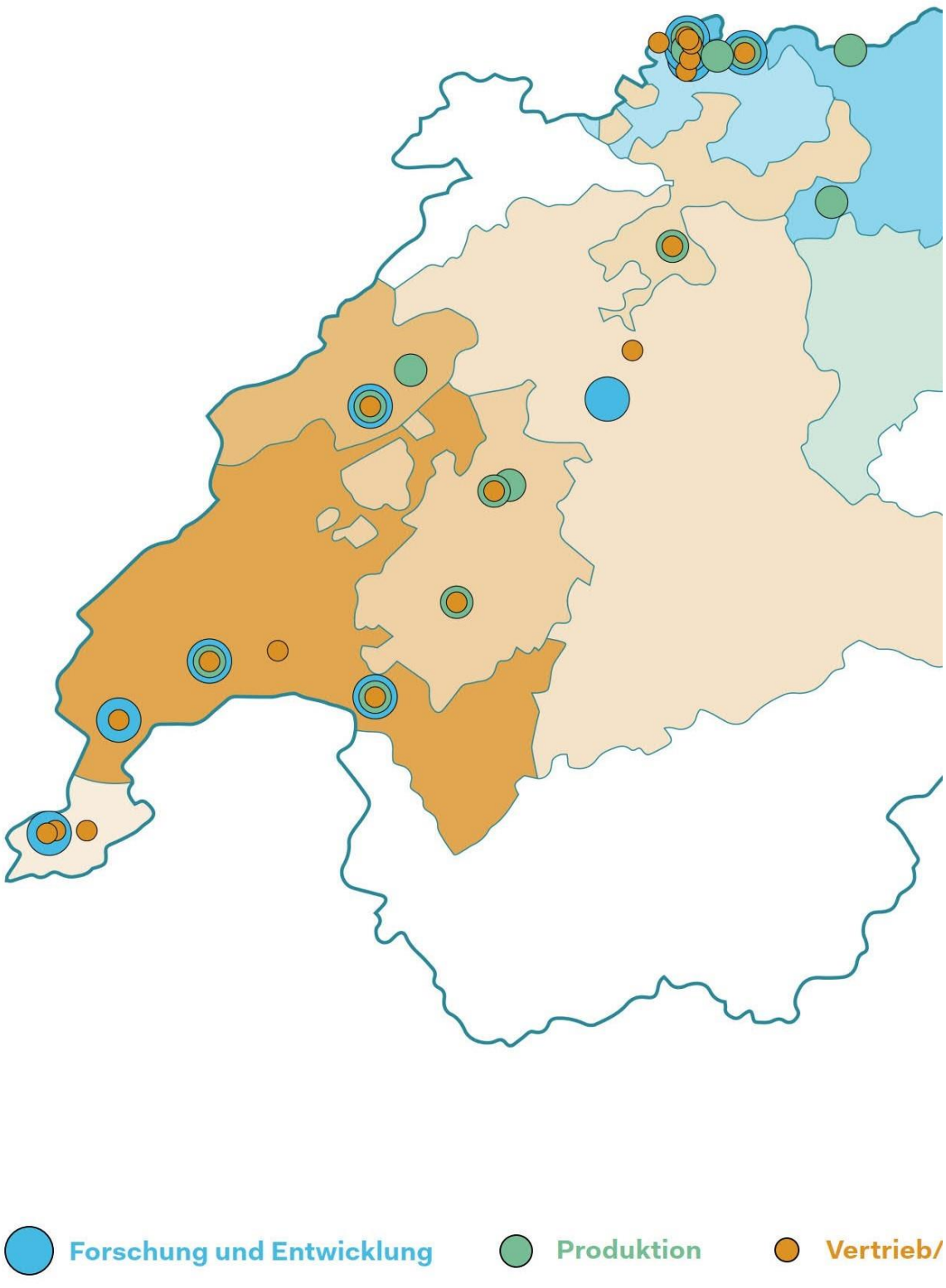
During the Covid-19 pandemic, the pharmaceutical industry once again proved to be more resilient to crises than the rest of the economy. The sector's enormous resilience is also evident in statistics on short-time work. While many manufacturing sectors relied heavily on this tool in 2020, only a small number of pharmaceutical companies introduced short-time work. The reported number of hours not worked in 2020 was equivalent to merely 0.4 percent of the total volume of work performed in 2019. In the overall economy, this figure was significantly higher at 4.7 percent.

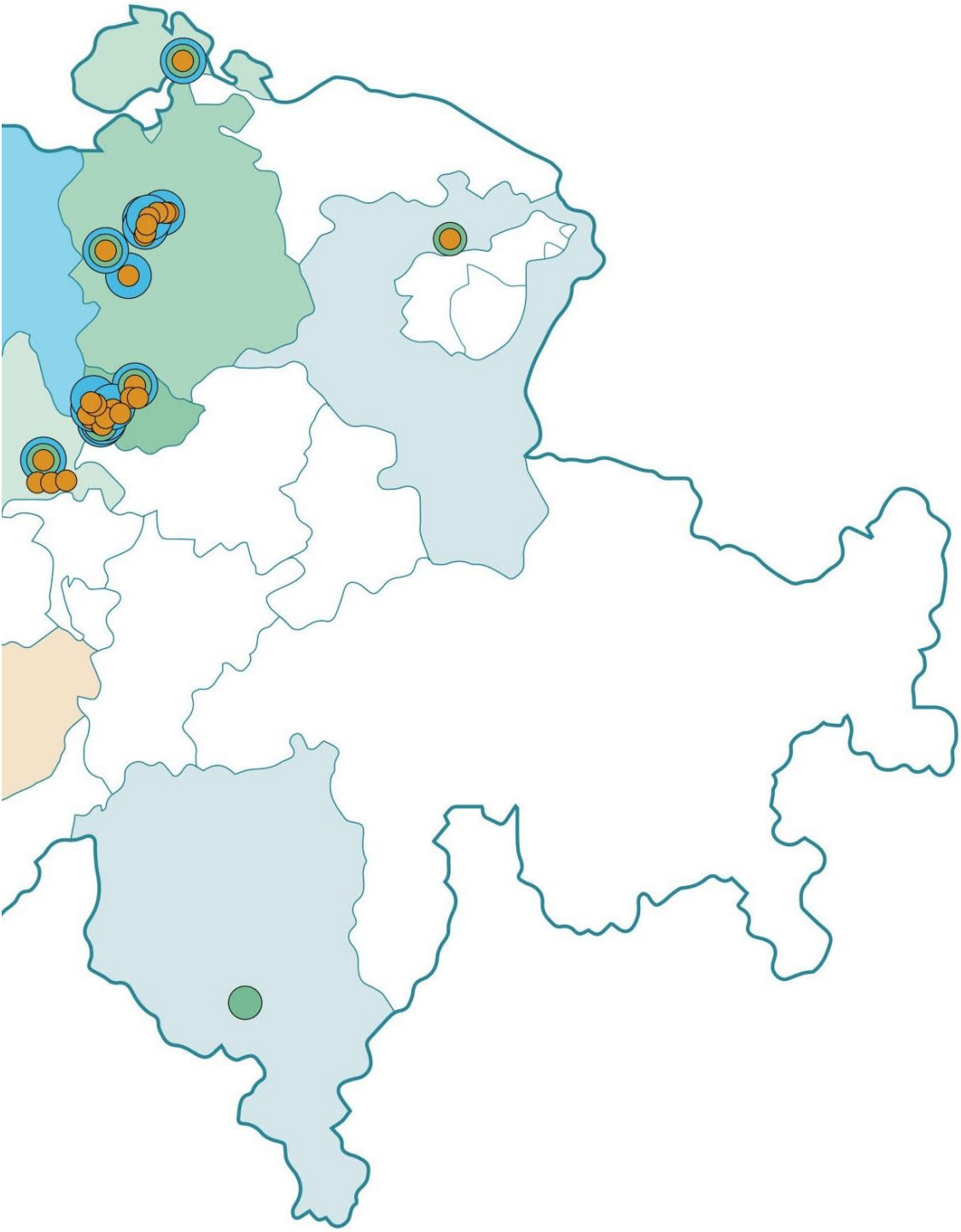
A reason for this resilience in 2020 and 2021 is the participation of the pharmaceutical sector in the fight against Covid-19. Many Swiss companies were involved in this, whether in drug development, along vaccine production chains, or in the development and production of testing methods.

These activities created new jobs. It must be noted that Lonza, an important supplier for pharmaceutical companies that was involved in the production of the Moderna vaccine, is not classified as being in the pharmaceutical industry (NOGA section 21) but in the chemical industry (NOGA section 20), instead. If the increase in Lonza' production capacity in Visp were included, the impact on employment in the pharmaceutical industry would have been even more positive.

Fig. 1-2 Regional distribution of Interpharma members

The members of Interpharma employ almost 40,000 people at 51 sites across Switzerland





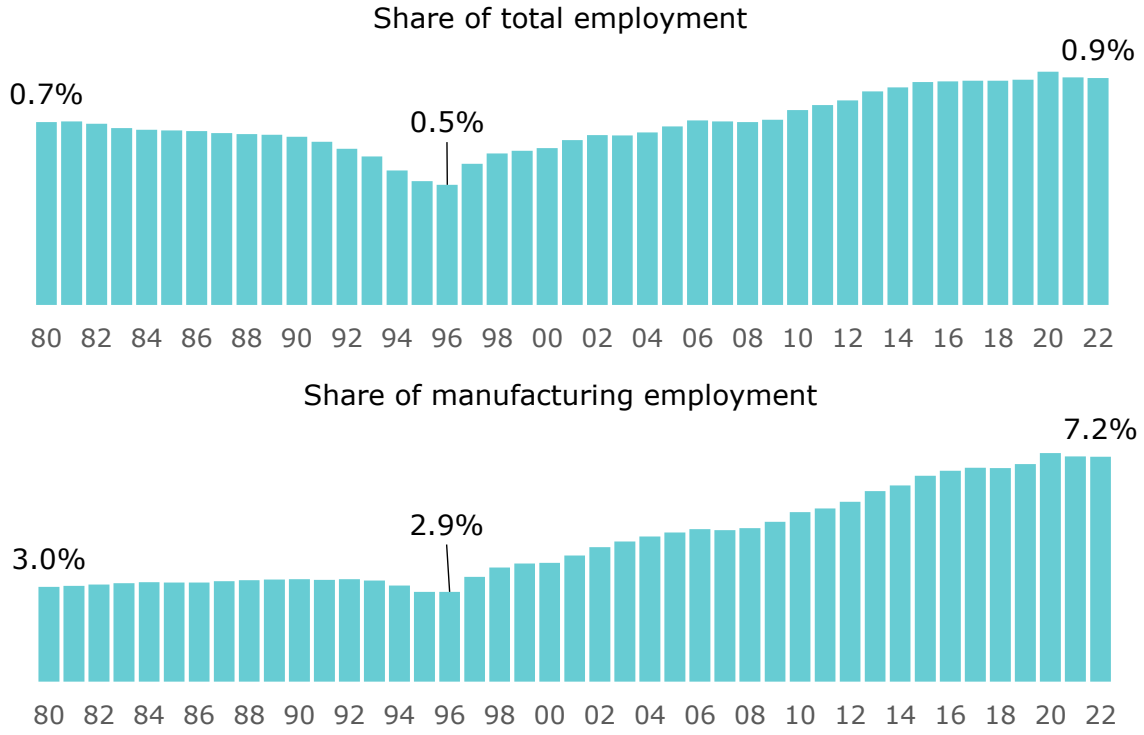
Services

Importance for the Swiss job market

Due to the positive employment trend in the pharmaceutical sector, its importance for the Swiss economy has increased over the past 25 years. The share of employment in the pharmaceutical industry in the total economy rose from 0.5 percent in 1996 to 0.9 in 2022. The share of the rest of Swiss manufacturing was 7.2 percent (1996: 2.9%). The pharmaceutical industry therefore provides one in fourteen jobs in the manufacturing sector.

Fig. 1-3 One in fourteen employees in the manufacturing sector works for a pharmaceutical company

Pharmaceutical industry share in total employment, 1980–2022



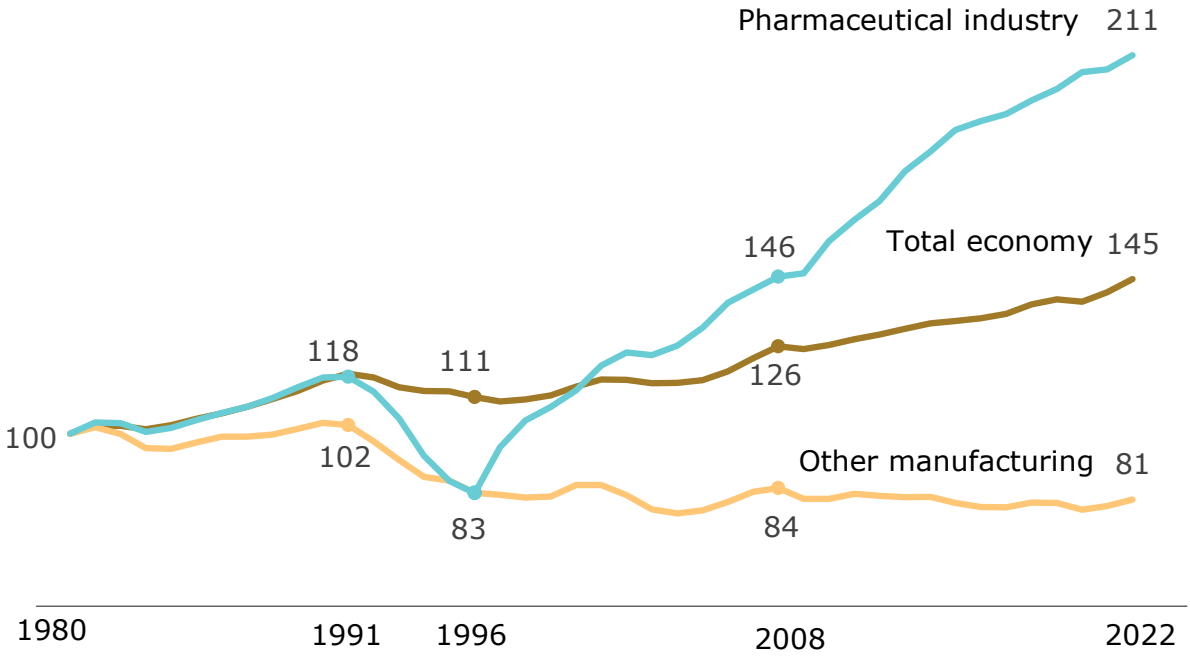
Sources: BAK Economics, FSO

Full-time equivalent employment

In 2022, there were over 47,800 full-time equivalent (FTE) jobs in the pharmaceutical industry. This represents 1.1 percent of all Swiss jobs, or 7.1 percent of all jobs in Swiss manufacturing. In the graphic below, the restructuring phase in the first half of the 90s can clearly be seen, as can the upward trend since 1996. In FTE, the number of jobs has more than doubled since 1980. While the number of jobs in FTE has also increased for the whole Swiss economy, this is not the case for other manufacturing. Overall, the development in the pharmaceutical sector has been much more evident than in other manufacturing sectors and the overall economy.

Fig. 1-4 The number of jobs has doubled since 1980

Number of jobs [FTE], 1980–2022, index 1980 = 100



Sources: BAK Economics, FSO

Definition of full-time equivalent employment (FTE)

Differences in part-time structures mean that employment figures for the different sectors are only comparable to a limited extent. For this reason, full-time equivalent (FTE) employment is used as a measure for such comparisons. FTE indicates the theoretical number of employees there would be if the total volume of work were performed exclusively by full-time employees.

Employment structure

Qualification structure

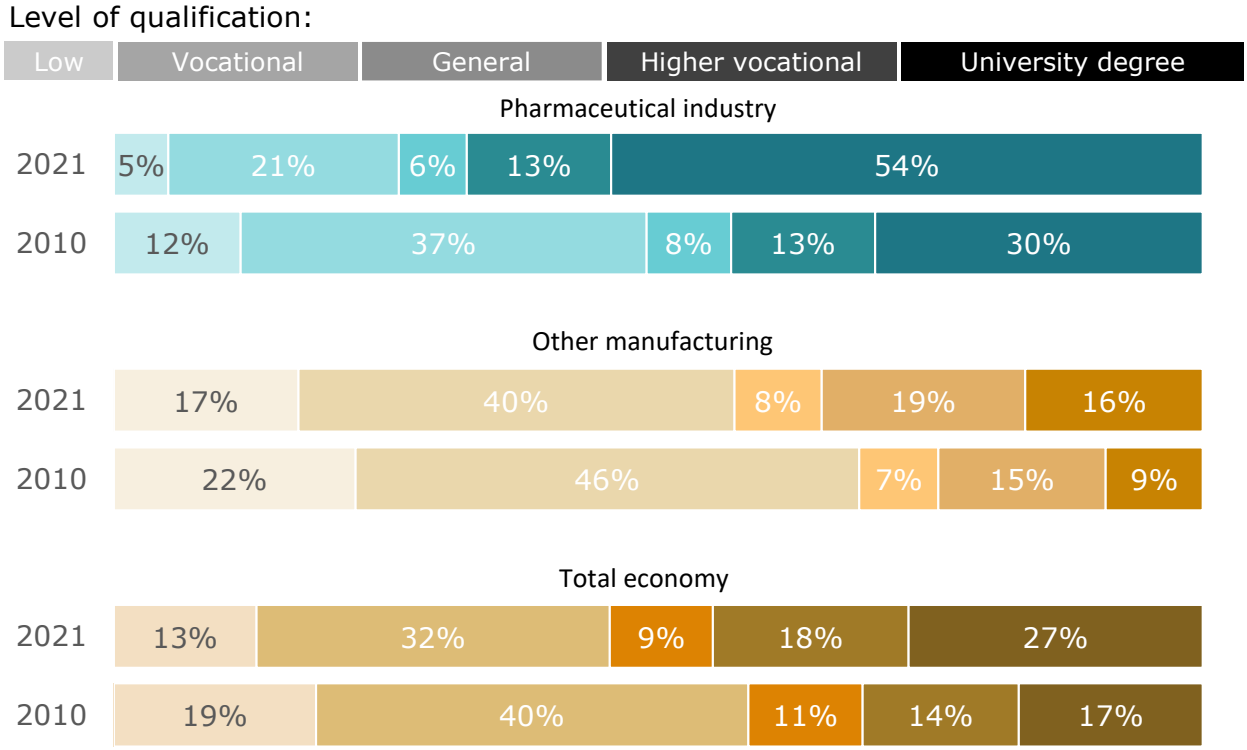
One of the characteristics of the Swiss pharmaceutical industry is its significant innovative strength. Swiss companies invested more than 9 billion Swiss francs in research and development (R&D) in 2022. The number of employees active in R&D increased from around 5,000 in 2000 to 10,900 in 2021 and corresponds to 20 percent of all R&D jobs in Switzerland. Notably more than half of R&D jobs in the pharmaceutical sector are held by foreigners or cross-border workers, which is the highest proportion of any sector of the economy.

R&D jobs are characterised by a high level of qualification. This means that the pharmaceutical industry must be able to attract personnel with tertiary education. In contrast, jobs for which automation of tasks is possible require fewer highly qualified people. In the pharmaceutical industry, the trend towards a qualification structure with increased prevalence of higher levels of training is particularly marked. Currently, 67 in 100 employees in the pharmaceutical industry have a tertiary qualification while the average across all sectors is just 45.

In other manufacturing sectors and the overall economy, vocational education and training remains the dominant qualification (40% or 32%), but its significance has lessened between 2010 and 2021. Although the demand for highly qualified employees has also increased in other Swiss sectors, the momentum lags far behind the pharmaceutical industry.

Fig. 1-5 54 percent of employees have a university degree

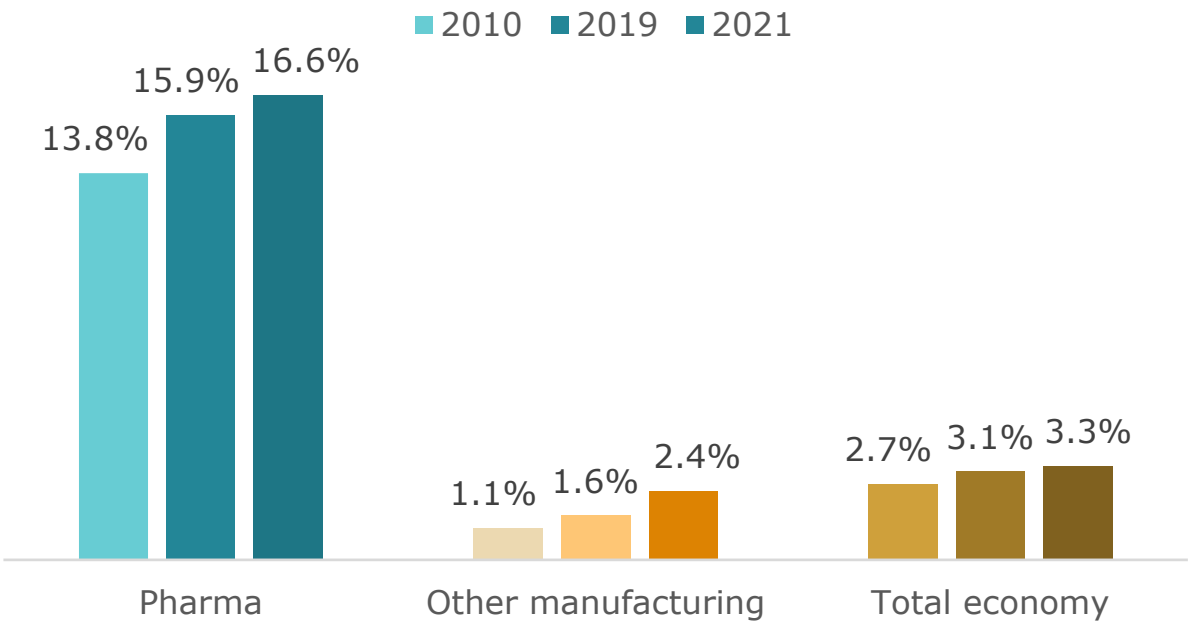
Qualification structure in 2010 and 2021



Note: Employees' level of educational achievement (low = lower secondary); possible rounding differences.
Sources: BAK Economics, FSO

Fig. 1-6 Over 16 percent of employees have completed a doctoral or postdoctoral degree

Percentage of workforce with a doctoral or postdoctoral degree in 2010, 2019 and 2021



Sources: BAK Economics, FSO

The proportion of employees with a doctoral degree has also increased in the pharmaceutical industry, from 13.8 percent in 2010 to 16.6 in 2021. Every sixth employee in the pharmaceutical industry has a doctoral degree. In comparison, overall in the Swiss economy, every thirtieth employee has a doctoral degree.

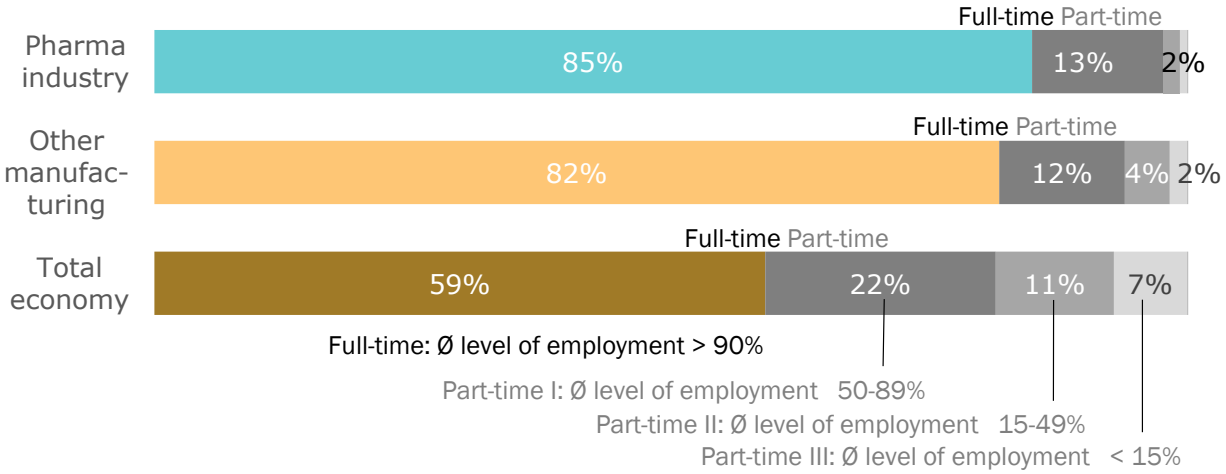
The analysis of the qualification structure shows the growing need for skilled, highly-skilled or highly-qualified workers. To be able to meet this need, the pharmaceutical industry offers an attractive working environment and above average salaries.

Part-time structure

The structure of part-time work is almost identical between the pharmaceutical industry and other manufacturing industries. Only 15 percent of employees have working hours of less than 90 percent. In the economy as a whole, part-time work is more common with over a third of employees working less than 90 percent. Some sectors such as retail and the hotel and catering sector have a significantly higher proportion of part-time employees than manufacturing sectors.

Fig. 1-7 Average level of employment is higher than in the manufacturing sector and much higher than in the overall economy

Percentage of employees by level of employment in 2022



Sources: BAK Economics, FSO

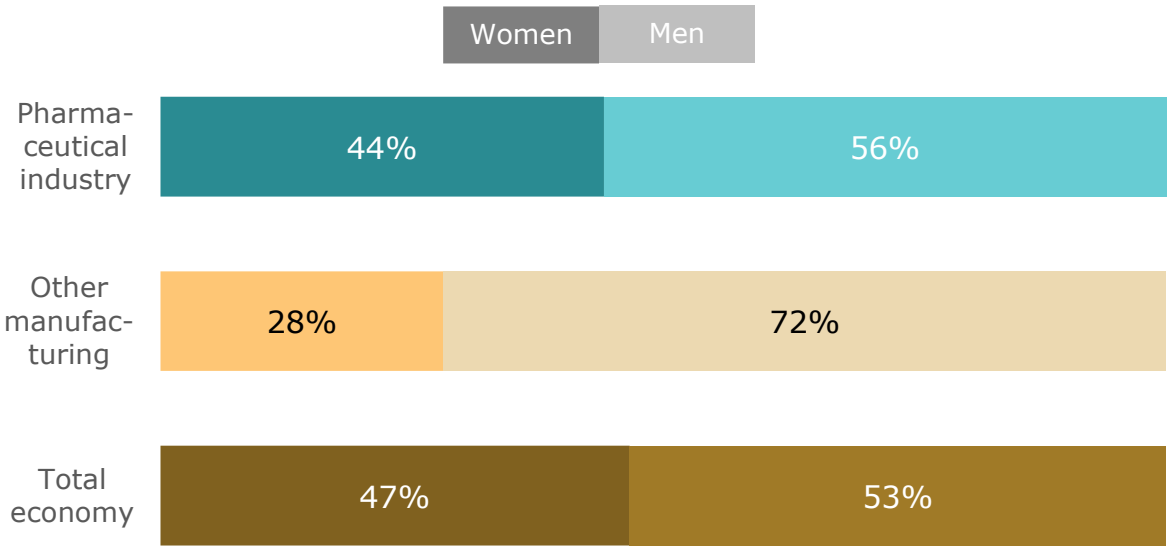
Proportion of women

In terms of the proportion of women, the pharmaceutical industry and the economy as a whole have a relatively similar profile (44%/47% women). By contrast, the rest of the manufacturing sector has an above-average proportion of men (72%).

Since 2016, the proportion of women in leadership roles in the pharmaceutical industry has increased significantly. In 2016, the proportion was only 21 percent, well below the national average. Now, 37 percent of leadership positions in the pharmaceutical industry are occupied by women, which corresponds to the Swiss average. Moreover, 30% of all women working in the pharmaceutical industry occupy a management position. This proportion is higher than in the rest of the economy (18%) and has also grown strongly since 2016.

Fig. 1-8 The proportion of women is clearly above the manufacturing sector average

Employees by gender as a percentage of total employment in 2022



Sources: BAK Economics, FSO

1.2 Importance for other sectors

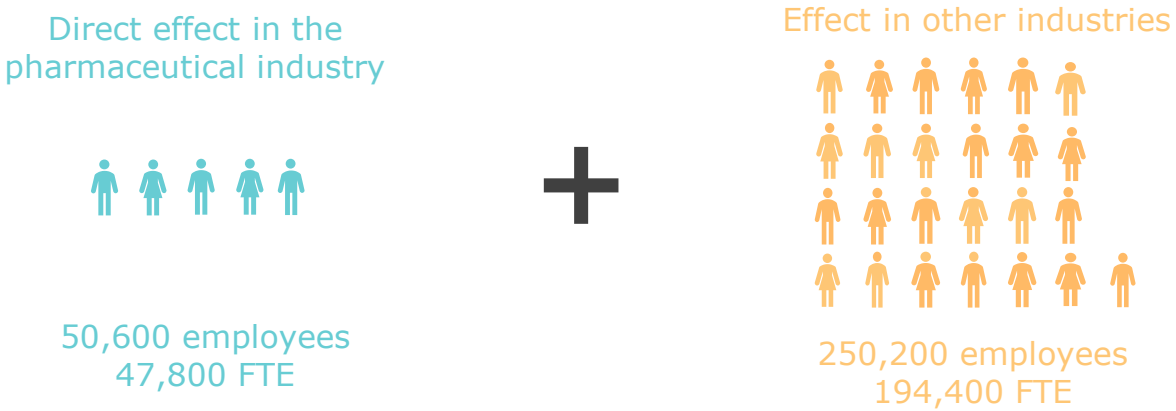
At first glance, the pharmaceutical sector accounts for a modest 1.1 percent of all employment (FTE) in the overall economy (FTE). The effective overall economic importance of the pharmaceutical industry is much greater, though, since pharmaceutical companies' activities create additional jobs in other sectors.

For pharmaceutical production, preliminary goods and services are sourced from companies in a variety of other industries, sectors and from abroad. Examples of preliminary goods and services are machinery, chemical substances, insurance services, building/plant maintenance, cleaning and security services, IT services as well as energy. Consumer spending by people employed in the pharmaceutical companies also generates sales in trade and commerce. The intertwined nature of these businesses is the reason why jobs in other sectors are connected with the production activities of pharmaceutical companies.

For this study, a macroeconomic impact model was used to calculate the extent to which the production, research and development activities of the pharmaceutical industry impacted employment in the overall economy in 2022. This model can be used to analyse and quantify all relevant payment flows in an integration across the entire value chain (cf. section 5.1).

This impact analysis shows that in 2022 some 250,200 people were employed in other Swiss sectors thanks to the activities of Swiss pharmaceutical companies. Total impact on employment is around 300,800 people. This corresponds to 5.4 percent of total employment in Switzerland.

Fig. 1-9 Total impact on employment is five times higher than in the pharmaceutical industry due to multiplier effects

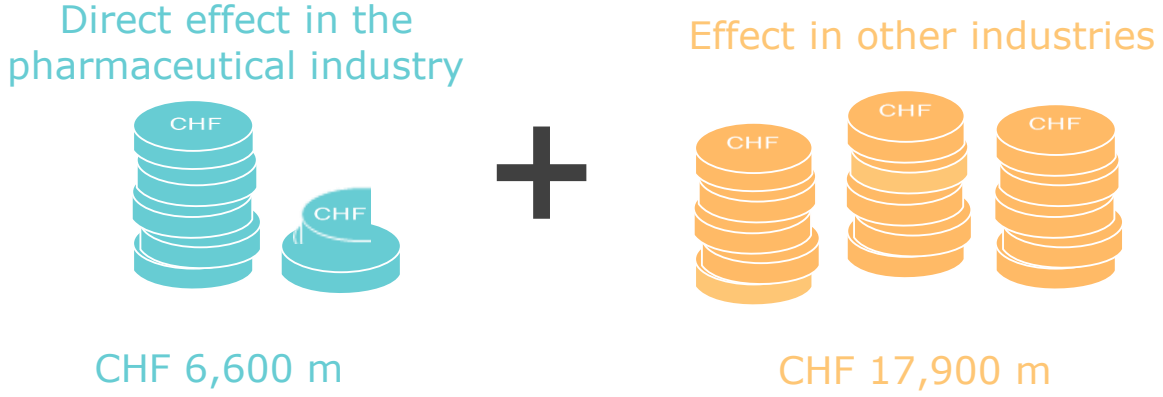


Note: figures are rounded
Source: BAK Economics

Income effects

Cumulative employee income of around 17.9 billion Swiss francs was generated through additional jobs in other sectors of the economy in 2022. Thus, for every 1,000 Swiss francs of salary paid to employees in the pharmaceutical industry, an additional 2,700 Swiss francs of pay was generated on average for employees from companies in other sectors. All in all, the pharmaceutical industry triggered around 24.5 billion Swiss francs in national employee income, which corresponds to around 5.9 percent of the overall economy.

Fig. 1-10 For every 1,000 Swiss francs of salary paid in the pharmaceutical industry, an additional 2,700 Swiss francs of employee income is generated in other sectors



Note: figures are rounded
Source: BAK Economics

The following table summarises the employment and income effects. The multiplier shows how much larger the total effect is compared to the direct effect. An employment multiplier of 5.9 means that the total effect is 5.9 times bigger than the direct effect in the pharmaceutical industry. This means that for every person employed in the pharmaceutical sector, an additional 4.9 people are employed on average in other sectors.

Tab. 1-1 Impact on the labour market, direct and in other sectors, 2022

Effect in …	the pharma industry	other industries	Total effect	Multi-plier
Employees	50 600	250 200	300 800	5.9
in % of total economy	0.9	4.5	5.4	
Employees [FTE]	47 800	194 400	242 200	5.1
in % of total economy	1.1	4.5	5.6	
Hours worked [m hrs]	86	360	446	5.2
in % of total economy	1.1	4.7	5.8	
Gross wages and salaries [CHF m]	6 600	17 900	24 500	3.7
in % of total economy	1.6	4.3	5.9	

Note: possible rounding differences
Source: BAK Economics

Excursus 1: The pharmaceutical industry as a job creator

The Swiss pharmaceutical industry has its origins in the 19th century chemical dye industry. Dye producers such as the Gesellschaft für Chemische Industrie (later Ciba), Geigy and Kern & Sandoz (later Sandoz) realised that their expertise was also useful for the production of medicines, and gradually entered the pharmaceutical business. Roche, founded in Basel in 1896, focused on pharmaceutical products from the beginning.

There were already over 22,000 people working in the Swiss pharmaceutical industry in 1933. At the time, that was one percent of total employment.

The following decades until the mid-1970s were a very successful period for the sector, with the Swiss companies establishing themselves as global players. The difficult global environment in the wake of the oil crises subsequently dampened growth. Furthermore, the market was saturated with pharmaceutical products and new growth drivers such as biotech research were still at the beginning of their development. Throughout the 80s, the sector gained new momentum and in 1990, almost 90,000 people worked in the chemical-pharmaceutical industry – a high that is still unsurpassed. The first employment data only for the pharmaceutical industry was available in 1980. From 26,000 people employed in 1980, employment in pharmaceuticals increased to 29,000 people in 1990.

In the 90s, the chemical/pharmaceutical sector went through a crisis. Restructuring, fusions and acquisitions led to relocation of production. This was compounded by weak overall economic growth. In this period, almost 30 percent of jobs in the chemical/pharmaceutical sector were lost.

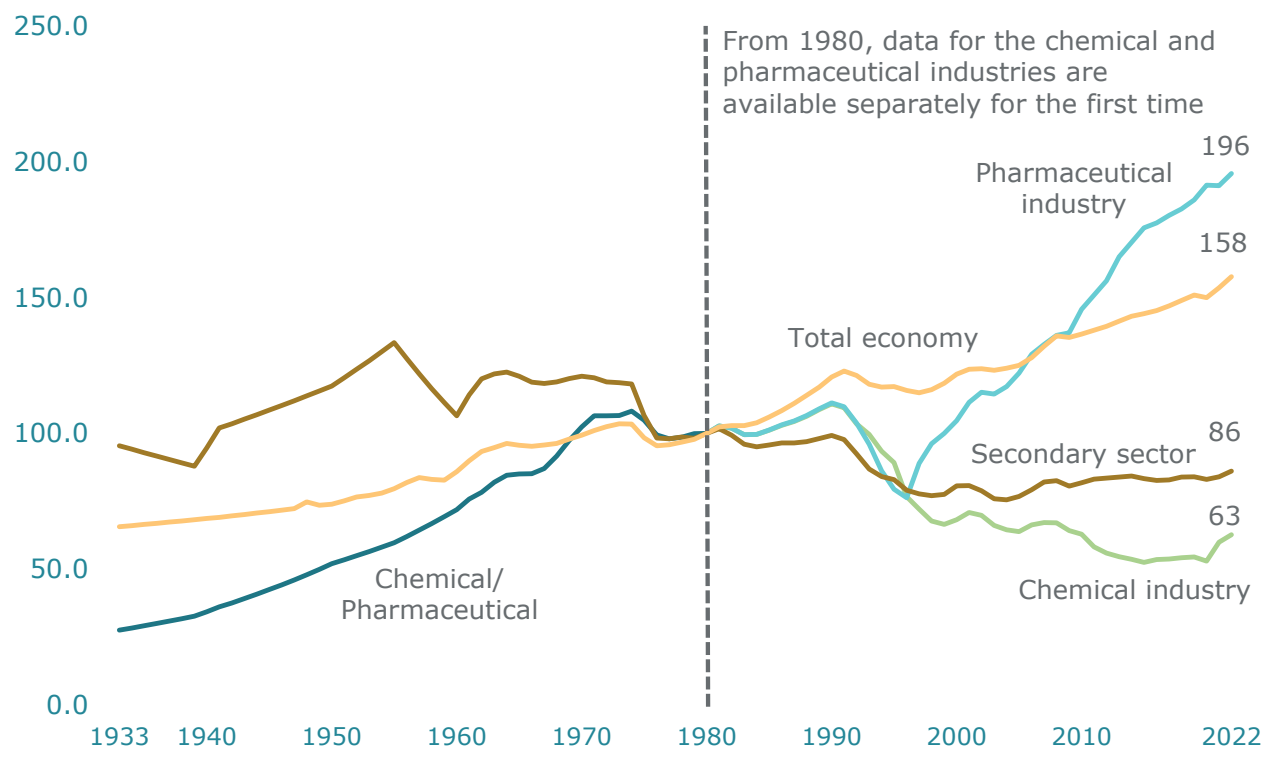
In 1996, Novartis was created from the merger of Ciba-Geigy and Sandoz, one of the biggest mergers in Swiss economic history. This was accompanied by a stronger focus on pharmaceutical products: Sandoz's chemicals business had already been split off in 1995 (Clariant). After the fusion creating Novartis, there was a spin-off of Ciba Specialty Chemicals in 1996 and the agrochemicals business (part of the later Syngenta) in 1999. The focus on pharmaceutical business paid off – there has been a continual upwards trend in the pharmaceutical industry from the second half of the 90s until now. This led to an increase in employment that was barely slowed down by the global financial crisis and the Corina pandemic. In 2022, over 50,000 people were employed in pharmaceuticals – 2.5 times

more than in 1996. The sector has thus clearly taken the lead within the chemical/pharmaceutical sector. In 2009, more people were employed in the pharmaceutical than the chemical sector for the first time.

To summarise, employment in pharmaceuticals has grown by 1.6 percent per year since 1980. Job growth was significantly higher than in the rest of the economy (+1.1% p.a.). However, in the whole chemical/pharmaceutical sector, employment is around 4,500 people lower than in 1990.

Fig. 1-11 Pharmaceutical industry becomes increasingly important as employer

Indexed employment trend (1980 = 100)



Sources: BAK Economics, FSO, Historical Statistics of Switzerland


98 % unserer Arbeit erblicken nie das Licht der Welt.
Die restlichen 2 % verändern sie für immer.
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2 Value-added contribution of the pharmaceutical industry

With nominal value added of 44.1 billion Swiss francs, the pharmaceutical industry is the biggest industrial sector in Switzerland. Its momentum means the sector is an important motor of the Swiss economy. Internationally, Switzerland is one of the leading locations for pharmaceuticals. The success of the pharmaceutical companies also has positive effects on other sectors. In 2022, the activities of the pharmaceutical industry enabled value added of 30.4 billion Swiss francs to be generated in other sectors. The total value-added effect was 74.5 billion Swiss francs, and almost one Swiss franc in ten was generated along the value chains of pharmaceutical companies' research, development and production activities.

2.1 Economic output (value added)

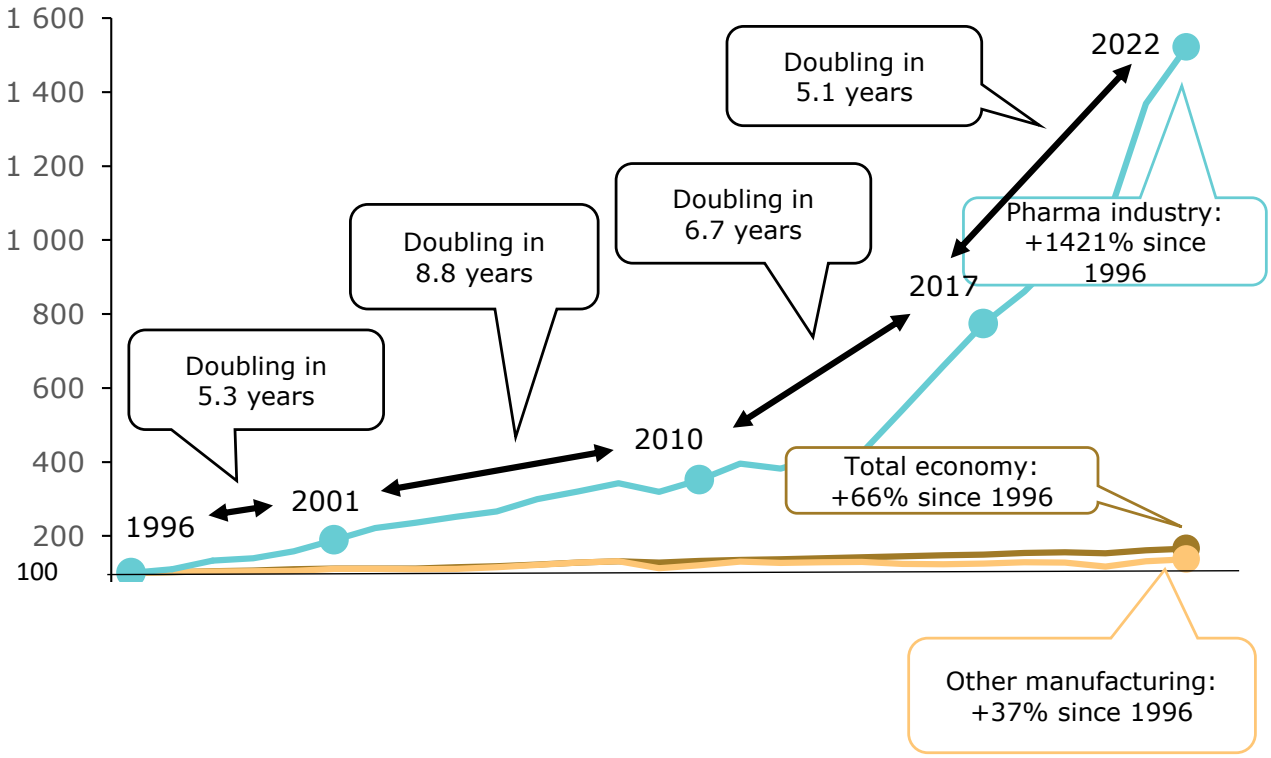
Real value added has increased more than ten-fold since 1996

The restructuring phase in the mid-1990s and the growth phase from 1996 onwards have made the Swiss pharmaceutical industry one of the most successful in the world. The real value added of the pharmaceutical industry doubled between 1996 and 2001. In less than two decades, between 2001 and 2017, this figure quadrupled again.

Overall, the real value added of the pharmaceutical industry grew by over 1,400 percent between 1996 and 2022. Growth in the same period in the Swiss economy as a whole was significantly lower. Since 1996, the real cumulative value added of the overall economy grew by 66 percent and by 37 percent in other manufacturing sectors. This means that the economy as a whole was 1.5 times bigger in 2022 than in 1996, while the value of the pharmaceutical industry is 15 times higher than in 1996.

Fig. 2-1 Real gross value added was more than fifteen times higher in 2022 than in 1996

Index of real gross value added, 1996 = 100



Reading aid: Real value added is depicted as an index (base year 1996). The index value for 1996 is therefore the same for all rows (= 100). The value of 166 in 2022 for the economy as a whole means that the real value added was 66 percent higher in 2022 than in 1996. Double this figure would equate to a value of 200.
Sources: BAK Economics, FSO

Definition of gross value added

Aside from employment, gross value added is the most important macro-economic measure regarding the importance of an industry. The value added is the barometer of economic output and represents the value added that an industry creates with the production of a product or the provision of a service. Mathematically, the gross value added is the difference between the overall production of an economic entity and the preliminary goods and services needed for the output of that sector. These preliminary goods and services include all external production factors that are sourced from third parties and feed into production as input factors (e.g. raw materials, energy, rents, ICT services). In terms of income, gross value added represents the amount disposable for the remuneration of the production factors labour and capital less amortisation (= net value added).

Nominal versus real gross value added

Economic accountants distinguish between real and nominal gross value added. While nominal value added represents the effective performance observed, real value added considers the impact of changing prices. This deflation happens on a gross production value level (by means of production prices) as well as on a preliminary goods and services level (by means of the production prices of the supplying sectors). Real value added shows the development of effective value added over time. It is unaffected by price trends and reflects the dynamic nature of production output in the sense of the quantity of products or services produced.

Value added deflator

A deflator is a statistical instrument used to describe price trends on the production side of the economy. Unlike the consumer price index, which measures inflation of individual goods from the consumer perspective, the deflator relates to only part of the product price. Price changes that are due to variations in external production costs, such as energy, chemical materials or the price of clinical studies, are considered in the deflator. The deflator is a price index for every component of product costs that the companies can influence themselves, for example through increases in productivity and efficiency.

The value added deflator is calculated indirectly. For price trends in production, prices can be monitored. They are collected from businesses by the Federal Statistical Office in the form of the producer price index. Knowing the volume structure of goods and services procured externally as well as their producer prices, it is possible to filter out the influence of external costs on the production price. What remains is the value added deflator.

The deflator shows the relationship between the nominal and the real gross value added. If the nominal value added increases at a faster rate than the real value added, this is reflected by an increasing deflator. Conversely, if the real value added develops more dynamically than the nominal value added in terms of value, this leads to a declining deflator.

Growth since the beginning of the Covid-19 pandemic

After the outbreak of the pandemic in February 2020, the Swiss economy suffered a slump, from which most sectors only fully recovered after two years. As one of very few exceptions, the pharmaceutical industry was able to continually increase real value added during the Covid-19 pandemic.

Demand for medicines in times of crisis is less responsive to the economy than the demand for the goods and services of other industries. The partial postponing of treatments and operations that led to a decrease or temporary delay in demand was more than compensated for by the participation of Swiss pharmaceutical companies in the fight against Covid-19. Roche, for example, rolled out a variety of rapid tests and antibody tests for Covid-19 in 2020. Another example is Janssen Vaccines in Bern-Bümpliz, which played a major role in the development of the Johnson & Johnson vaccine.

Without the strong growth of the pharmaceutical industry in 2020, the decline of real value added in Switzerland during the pandemic would have been noticeably stronger. This explains in part why the Swiss economy weathered the crisis better than its European neighbours.

Increasing pressure on prices is reflected in declining sector deflator

The value added of the pharmaceutical industry did not grow as strongly in nominal terms as in real terms. Nominal value added rose by 8.2 percent per annum between 2012 and 2022, while real growth amounted to 14.8 percent per annum. The main reason for this discrepancy is the pressure on prices in healthcare, international competition and the strong Swiss franc.

The deflator measures the price trend for the portion of the production value that is attributable to the pharmaceutical industry's activity. In comparison to the period 2002–2012, the deflator has sunk strongly from -2 percent to -6.6 percent. This means that over time, the pharmaceutical industry has had less return on the same output, or its output has become cheaper.

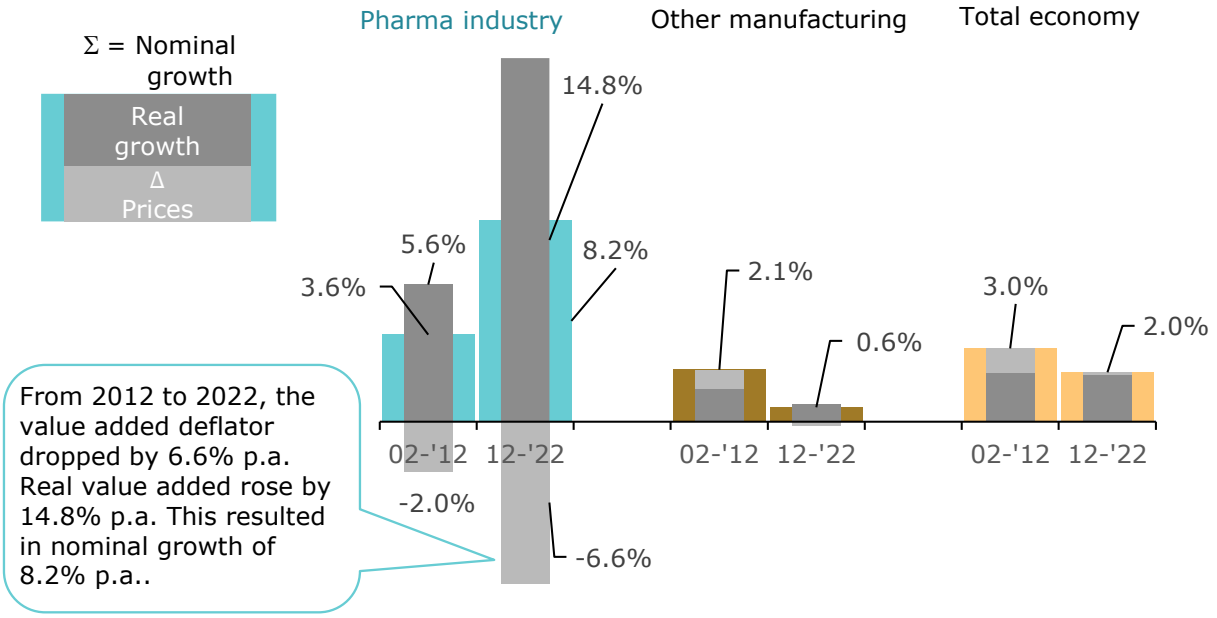
In Switzerland, both the FSO's consumer price index and producer price index give an idea of the scale of this decrease. Between 2004 and 2013, the producer price index sank by 14 percent. Between 2013 and 2022, it

sank by 24 percent. In the same period, the user price index for pharmaceuticals fell by 27 percent and 17 percent.

The importance of this development becomes clear when compared with other manufacturing and the overall economy. Although other industries reacted more strongly to the strong Swiss franc, the deflator only sank by -0.2 percent in the period 2012–2022. For the economy as a whole, the deflator averaged 0.1 percent per year in the same period.

Fig. 2-2 Over the past 20 years, the pharmaceutical industry has seen an above-average decline in prices

Breakdown of nominal value added growth, 2002–2012 and 2012–2022



Reading aid: The illustration shows how nominal value added growth (wide column) is achieved by combining (stacked columns) the change in real value added and prices (deflator). Real value added rose by 14.8 percent per annum between 2012 and 2022, while the deflator dropped by 6.6 percent per annum. This resulted in an average increase in nominal gross value added of 8.2 percent per annum (+14.8%+(-6.6%) = 8.2%).
Sources: BAK Economics, FSO

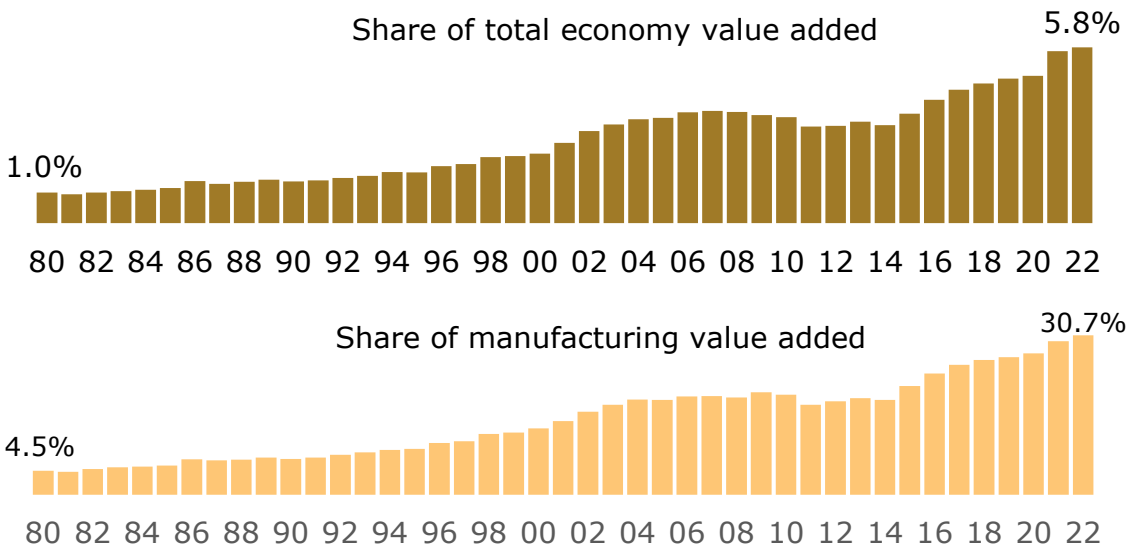
Share of the overall economy currently almost 6 percent

Even if nominal development in the pharmaceutical industry was not as high as in real figures because of pressure on prices of medicines, nominal growth was still stronger than in other manufacturing and the overall economy. The share of the pharmaceutical industry in manufacturing and the overall economy has grown strongly since 1996.

In 2022, nominal value added of the Swiss pharmaceutical industry was 44.1 billion Swiss francs, which corresponds to 5.8 percent of Switzerland's total economic output and 30.7 percent of manufacturing value added. The pharmaceutical industry's share of manufacturing and the overall economy has grown strongly again since 2015.

Fig. 2-3 The share of manufacturing value added amounts to 30.7 percent

Share of the total gross value added, 1980–2022



Sources: BAK Economics, FSO

2.2 Contribution of the pharmaceutical industry to growth

The pharmaceutical industry has been the most important growth engine of the Swiss economy in the last decade. On average, the pharmaceutical sector was responsible for 0.8 percentage points (pp) of Swiss economic growth per year from 2012 to 2022 (1.9% per annum), meaning that around 40 percent of the country's economic growth was attributable to the pharmaceutical industry.

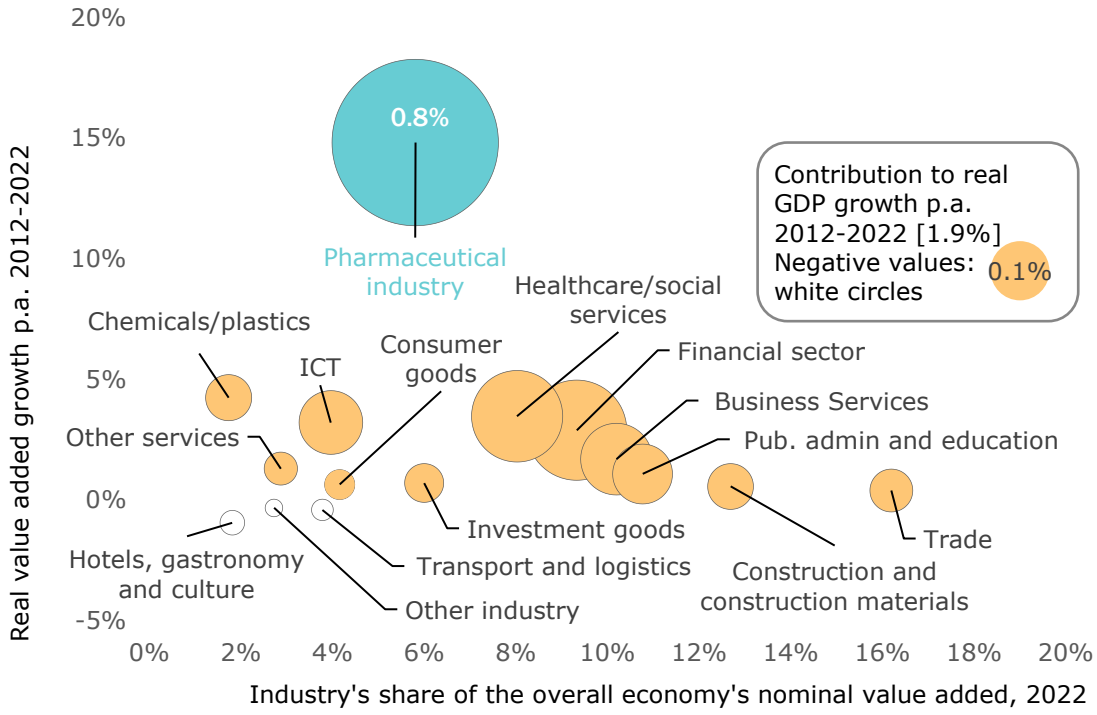
That also makes the pharmaceutical industry the industrial sector that made the biggest contribution by far to the growth of the Swiss economy. Other manufacturing industries had significant problems over the last decade (in part due to the strong Swiss franc) and could barely contribute to overall economic growth (+0.1 pp).

Behind the pharmaceutical industry, the financial sector made the second-largest contribution to GDP growth with 0.29 pp. In third place was healthcare and social services (+0.24 pp), followed by business services (these are various business-related services) with a contribution of 0.15 pp, and ICT services (+0.12 pp).

These four sectors (finance, healthcare and social services, business services, ICT services) together account for 42 percent of the overall economy, making them more than seven times as large as the pharmaceutical industry. Yet despite this, their joint contribution to GDP growth was just as high as that of the pharmaceutical industry with 0.89 pp. That shows just how extraordinary the pharmaceutical industry's performance was and how important it is as an engine for Swiss economic growth.

Fig. 2-4 More than 40 percent of Swiss GDP growth over the past ten years is attributable to the pharmaceutical industry

Industry contribution to real GDP growth, 2012–2022



Reading aid: The size of the bubbles shows how much individual sectors have contributed to the overall growth of the Swiss economy. The growth contribution is derived from combining the size of a sector (proportion of the overall economy) at the outset with its growth. For the current classification, the representation on the horizontal axis shows the current value added share of the economy (and not the percentage at the starting point on which the calculation of the growth contribution is based).
Sources: BAK Economics, FSO

2.3 International comparison

Significance for the national economy

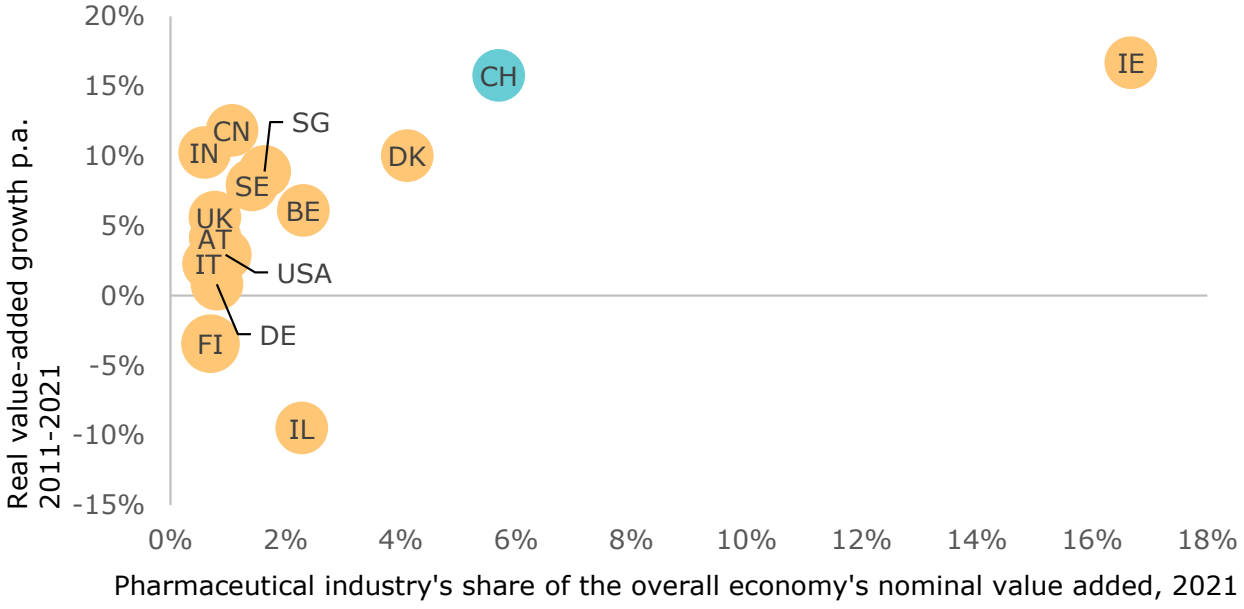
In 2021, the pharmaceutical industry's share of total national value added was 5.7 percent.[1] Only Ireland, where a tax reform made the establishment of numerous multinationals cheaper from 2015, did significantly better with 16.7 percent. In Denmark, the share of the pharmaceutical industry has increased sharply over the years and is now only just below the Swiss share. In many European countries such as Germany, France, the United Kingdom, Italy and Austria, the share of the pharmaceutical industry in the total economy is not more than 1 percent.

Growth

Switzerland is also one of the most dynamic countries in terms of value-added growth in the pharmaceutical sector. Between 2016 and 2021, only Ireland (16.7%) had a higher annual increase than Switzerland (15.8%). China, India and Denmark also achieved economic growth of over 10 percent. The USA and most European countries were significantly less dynamic than Switzerland in the same period.

Fig. 2-5 The pharmaceutical sector in Switzerland is very important and growing at a high rate

Importance for the national economy and growth of the pharmaceutical industry compared to other countries, 2021



Source: BAK Economics

[1] For the international comparison, data for 2021 has been used, as no more current data was available for all countries at the time of writing.

2.4 Importance for other sectors

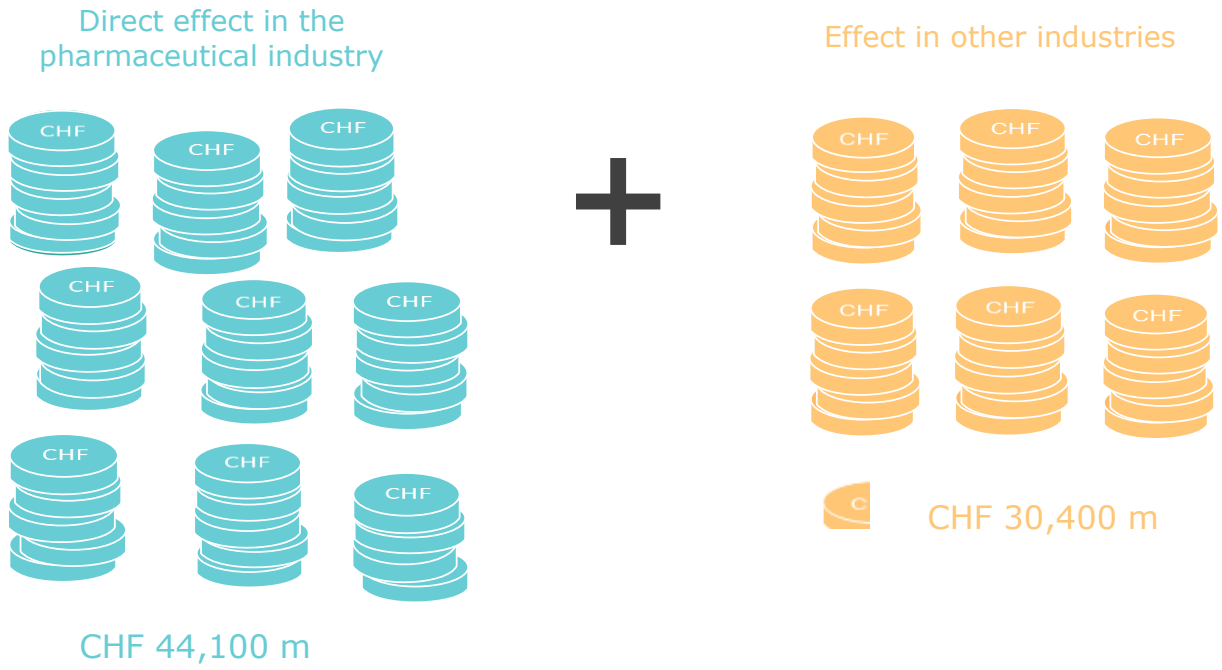
The principle of impact analysis and the calculation of multipliers can also be applied by analogy for analysing job market effects on value added. With the aid of the impact model, all effects along the entire value added chain can be considered. It can be used to calculate the value added generated by other sectors through the research, development and production activities of pharmaceutical companies.

Non-sector value added activities initiated by pharmaceutical production affect companies from a wide range of industries, such as the chemical industry, the consumer and investment goods industry, the energy and water supply, construction, transport, the financial sector, the ICT sector and the consulting industry as well as numerous other business services such as facility management, cleaning and security services.

Calculations with the BAK impact model show that thanks to the research, development and production activities of the pharmaceutical industry in 2022, a value added of around 30.4 billion Swiss francs was generated in other sectors. If direct and indirect effects resulting from the pharmaceutical industry's production and research activities are added together, the result is total value added of around 74.5 billion Swiss francs in 2022. This corresponds to 9.8 percent of Switzerland's total economic output and means that almost one Swiss franc in ten was generated directly or indirectly through pharmaceutical companies' research, development and production activities.

Fig. 2-6 Activities in the pharmaceutical sector generate a total of 74.5 billion Swiss francs in Switzerland

Value added effects, direct and in other sectors, 2022



Source: BAK Economics

The value added multiplier for 2022, calculated based on the BAK Economics model (cf. annex), stood at around 1.7. For every Swiss franc of value added in the pharmaceutical industry, approximately 70 centimes of additional value added is generated in other Swiss sectors.

Tab. 2-1 Value added effects, direct and in other sectors, 2022

Effect in …	the pharma industry	other industries	Total effect	Multiplier
Gross value added [CHF m]	44 100	30 400	74 500	1.7
in % of total economy	5.8	4.0	9.8	

Source: BAK Economics

Historical review

Excursus 2: The pharmaceutical industry as a driver of growth

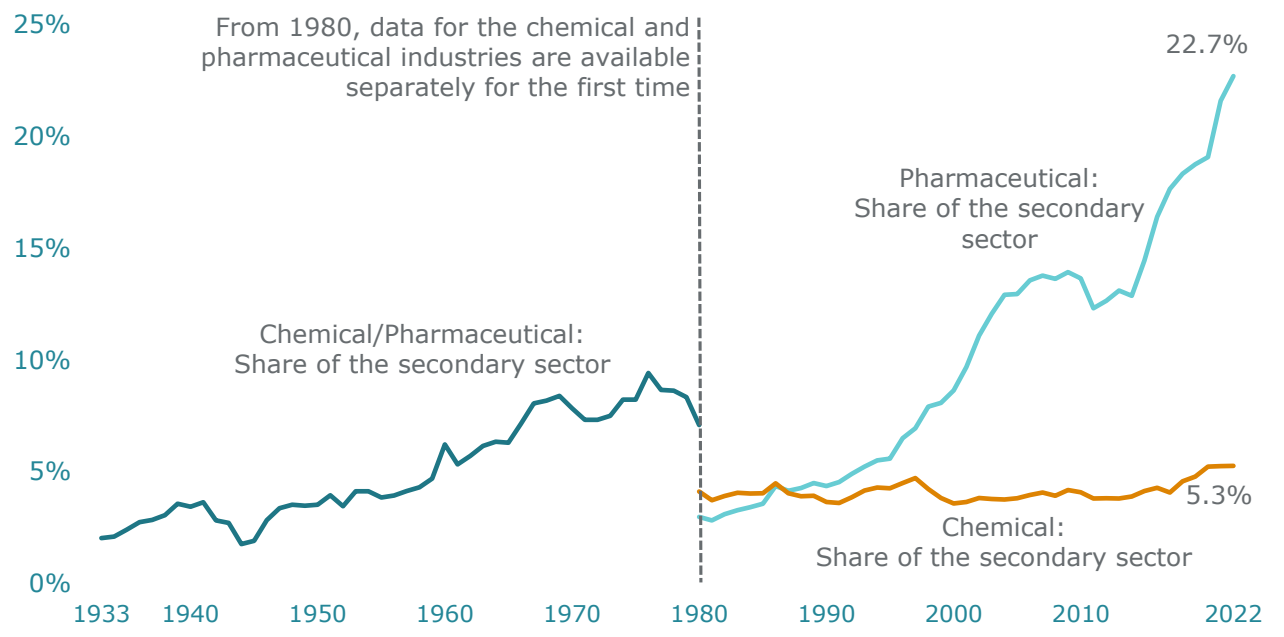
The value added development of the Swiss chemical/pharmaceutical industry has been very dynamic over the past 90 years. While the nominal value added of the chemical/pharmaceutical industry in 1933 was just 66 million Swiss francs, this value had multiplied to almost 55 billion Swiss francs in 2022. Excluding price effects, real value added growth for the period from 1933 until 2022 was 6.6 percent per year – substantially higher than in the secondary sector as a whole or the economy as a whole (+2.4% p.a./2.3% p.a.). As a result, the significance of the chemical/pharmaceutical industry increased significantly for the Swiss economy. The share of the total economy rose from 0.7 percent in 1933 to 7.1 in 2022. Even in times of upheaval such as the 1990s, when jobs were cut sharply, real growth rates in the chemical/pharmaceutical sector remained above average.

The pharmaceutical industry in particular is characterised by a low degree of economic dependence, as demand for pharmaceuticals remains stable even in times of crisis. If we look at development in the pharmaceutical industry in isolation, we can see even stronger performance. In 1980, nominal value added in the pharmaceutical industry was still significantly lower than in the chemical industry. In the 1990s, however, structural change accelerated away from the production of traditional chemical products to a world-leading location for pharmaceuticals, which also occupies a leading position in increasingly important biotech research. This trend continued unabated in the new millennium and now value added is more than three times higher in the pharmaceutical sector than the chemical sector. As a result of this development, the pharmaceutical industry has become the most important manufacturing sector in Switzerland. Its share of the total economy has increased five-fold over the last 42 years – from 1.0 percent in 1980 to 5.8 percent in 2022.

Decisive factors for the continued high growth of the pharmaceutical industry were the steady increase in productivity, the focus on particularly high-growth segments and the consistent development of international markets. As a result, the major Swiss pharmaceutical companies have become global market leaders in important areas such as cancer research.

Fig. 2.7 The pharmaceutical sector is the most important industrial sector today

Development of value added share 1933–2022



Sources: BAK Economics, FSO, Historical Statistics of Switzerland


Vor 25 Jahren brauchten HIV-Betroffene 30 Tabletten am Tag.
Heute nur noch eine.
Wir forschen weiter.
interpharma:ph
Die forschenden pharmazeutischen Unternehmen der Schweiz.
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3 Labour productivity of the pharmaceutical industry

The pharmaceutical industry is Switzerland's most productive sector by far. It generates five times as much value added per job as the industry average. This high level of productivity is one key success factor behind the sector's high growth in value added. The notable increase in productivity in the Swiss pharmaceutical industry over the last few years is the result of high capital investments, increasing focus on research and innovation, and continuing improvement in employees' qualifications. Even in an international comparison, the Swiss pharmaceutical industry outstrips other countries in terms of productivity.

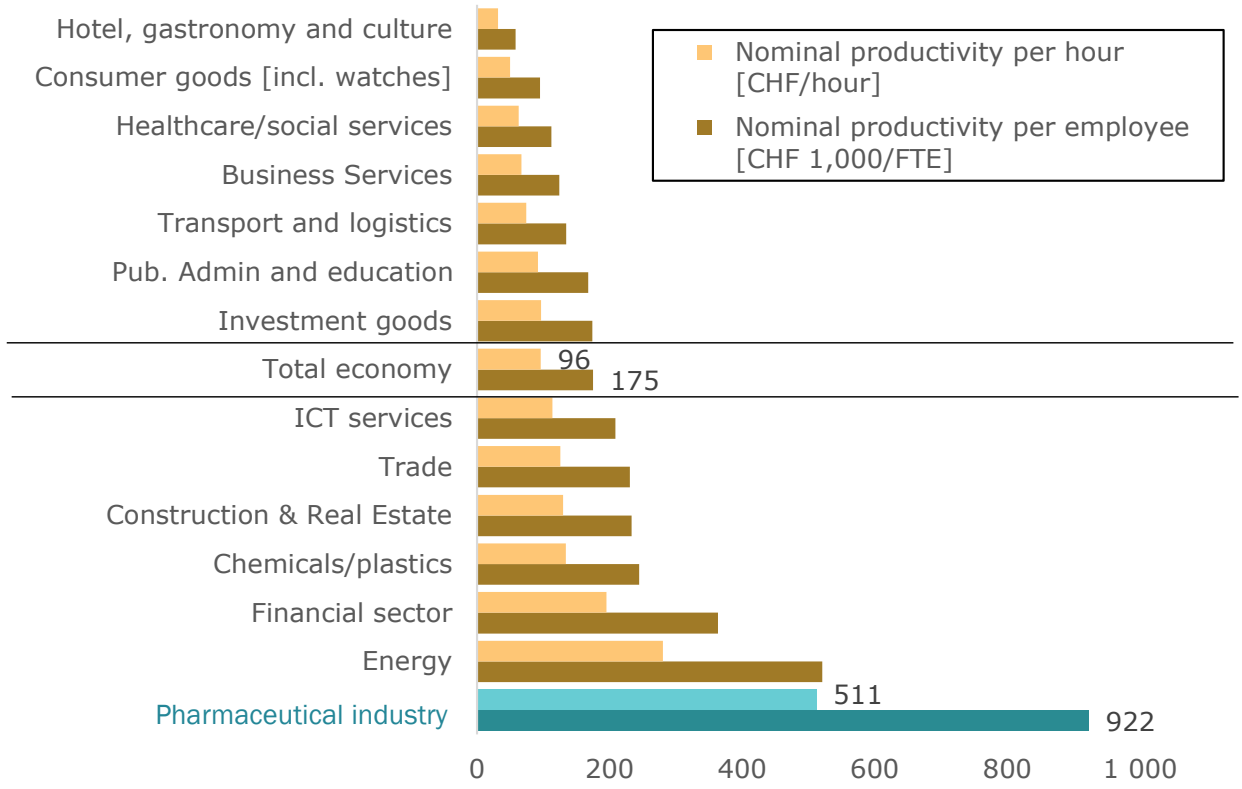
3.1 Level of labour productivity

When assessing a sector's performance capabilities and competitiveness, labour productivity is an important indicator. It reflects the relationship between value added and work effort. Labour productivity depends on several different factors such as capital intensity (workplace equipment (systems, software, etc.)), organisational efficiency, intensity of innovation and employee performance (qualifications, adaptability, etc.).

Thanks to its innovative strength, modern research and production infrastructure and highly qualified employees, the productivity of the Swiss pharmaceutical industry is far higher than that of other Swiss industries. In 2022, value added per job was 922,500 Swiss francs per full-time equivalent (FTE) job and 511 Swiss francs per hour worked. In comparison to the overall economy, every job in the pharmaceutical industry contributes around five times more to value added.

Fig. 3-1 The pharmaceutical industry generates five times as much value added per job as the national average

Labour and hourly productivity, 2022



Source: BAK Economics

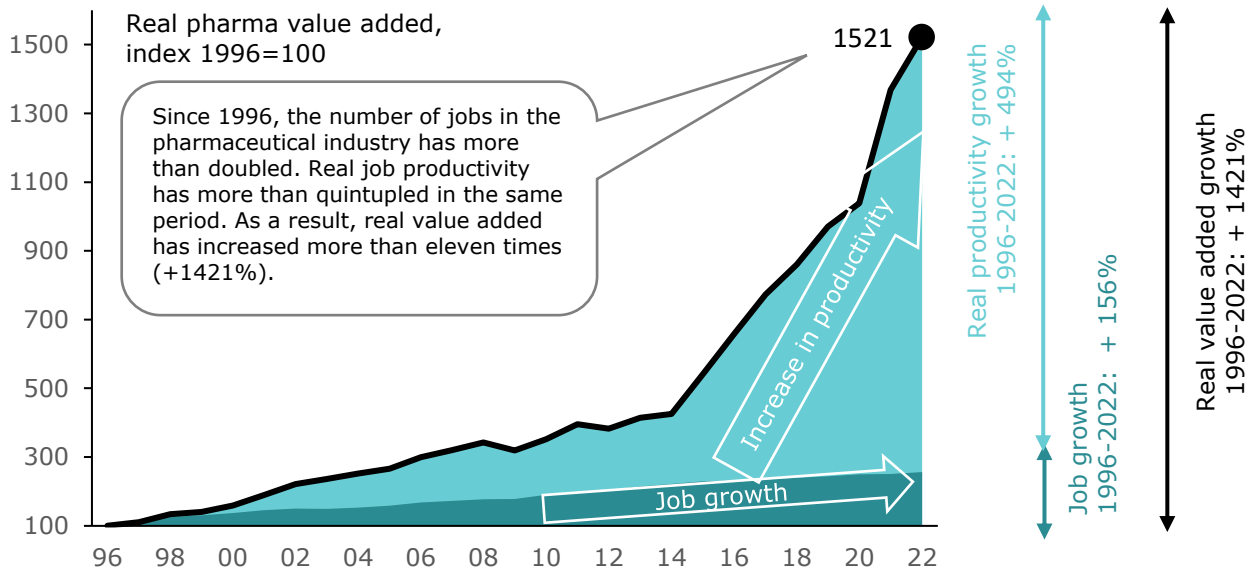
3.2 Growth of labour productivity

The Swiss pharmaceutical industry is able to defend its international competitiveness because of continuous increases in productivity. Productivity decreases costs and improves the profitability of activities. Reserves can be created for real investments, financing of rising research and development costs, dividend growth and increasing wages. The success of innovation activities is also reflected in productivity, as successful research makes it possible to patent products. Patents give companies legal certainty and predictability for making long-term investments in research and development. Both strengthen value added per job and thereby productivity.

Thanks to the abovementioned factors, labour productivity in the Swiss pharmaceutical industry has grown significantly since 1996. This increased productivity is the main reason for the strong increase in value added. In 2022, real labour productivity was 494 percent higher than in 1996, while employment growth for the same period was 156 percent. This combination has increased real value added compared to 1996 more than 15-fold.

Fig. 3-2 Increasing productivity played a key role in pharmaceutical industry growth between 1996 and 2022

Real labour productivity, jobs and real value added, 1996–2022, index 1996 = 100



Source: BAK Economics

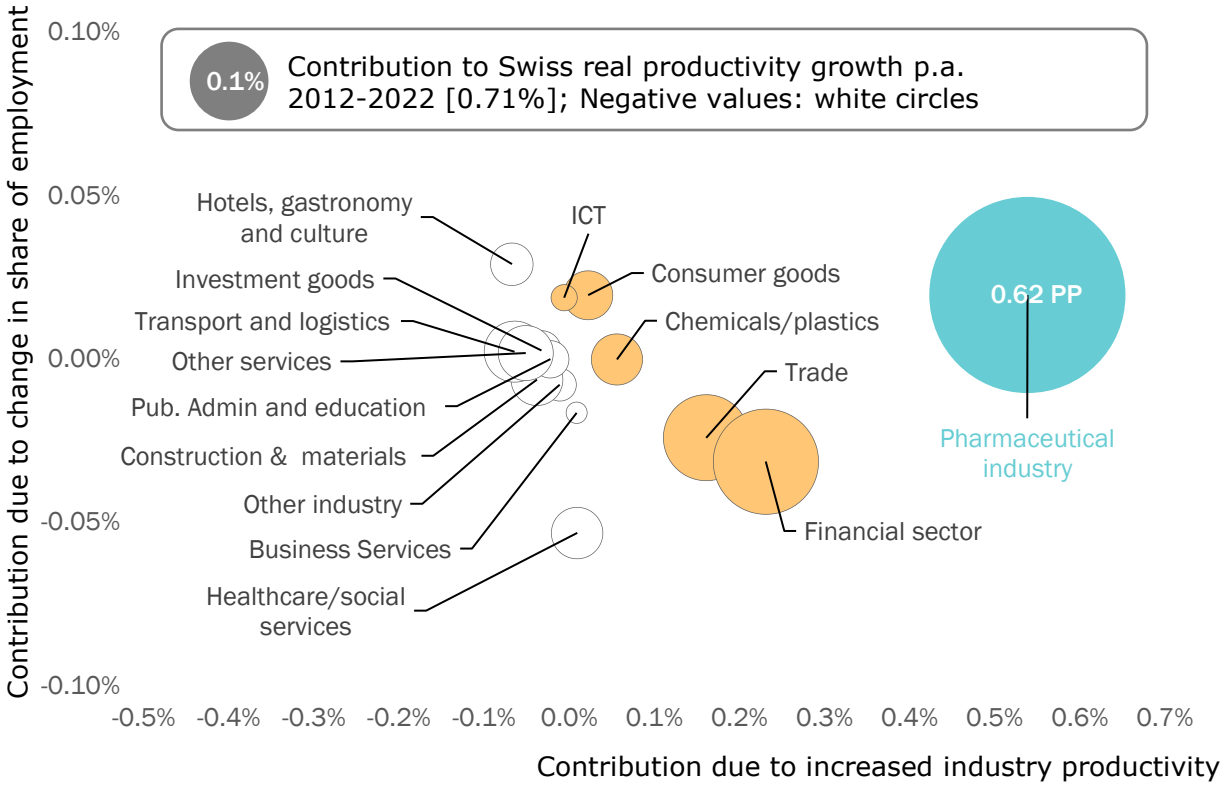
3.3 Contribution to overall economic growth

The pharmaceutical industry's high productivity growth in the past ten years has made it the most important driver of the economic productivity. Between 2012 and 2022, 0.62 percentage points of the average annual productivity growth of 0.72 percent in the overall economy was attributable to the pharmaceutical industry. Without the pharmaceutical industry's contribution to growth, the value added per job in Switzerland would barely have increased over the last decade.

The chart below uses circles of different sizes to indicate the size of the contributions made by each individual sector.

Fig. 3-3 The majority of overall productivity growth is attributable to the pharmaceutical industry

Industry contributions to growth in Swiss productivity, 2012–2022



Reading aid: The size of the bubbles shows the contribution made by each individual sector to the overall growth of labour productivity. This contribution is derived from a combination of three effects: (1) the productivity growth of the respective sector weighted by the share of employment at the outset, (2) the change in the share of employment of the sector in combination with the level of productivity at the outset relative to the average for the overall economy and (3) an interaction effect resulting from the combination of changes in the share of employment and productivity growth in the manufacturing sector.
Sources: BAK Economics, FSO

Besides the pharmaceutical industry, the financial sector (+0.18 pp) and trade (+0.12 pp) made notable positive contributions. Other (smaller) positive contributions came from the chemical industry, the consumer goods industry, and ICT services. The remaining sectors, on the other hand, made negative contributions to overall productivity growth.

The sectors' contribution to growth can be explained by three effects: a straightforward growth in productivity (impact of an increase in industry productivity on overall productivity), structural change (impact of a change in the share of employment on overall productivity) and (minor) interaction resulting from a combined change in equity and productivity. The first two effects (productivity growth and structural change) are shown in figure 3-3. One notable aspect is that productivity and structural change have a substantial and positive effect in the pharmaceutical industry. That not only means the pharmaceutical industry has become more productive, but that employment has also expanded at a rate that is well above average, which is reflected in the growing number of employees in this sector as a percent of total employment. By contrast, the productivity effect dominates alone in trade and the financial sector, for example.

3.4 International comparison

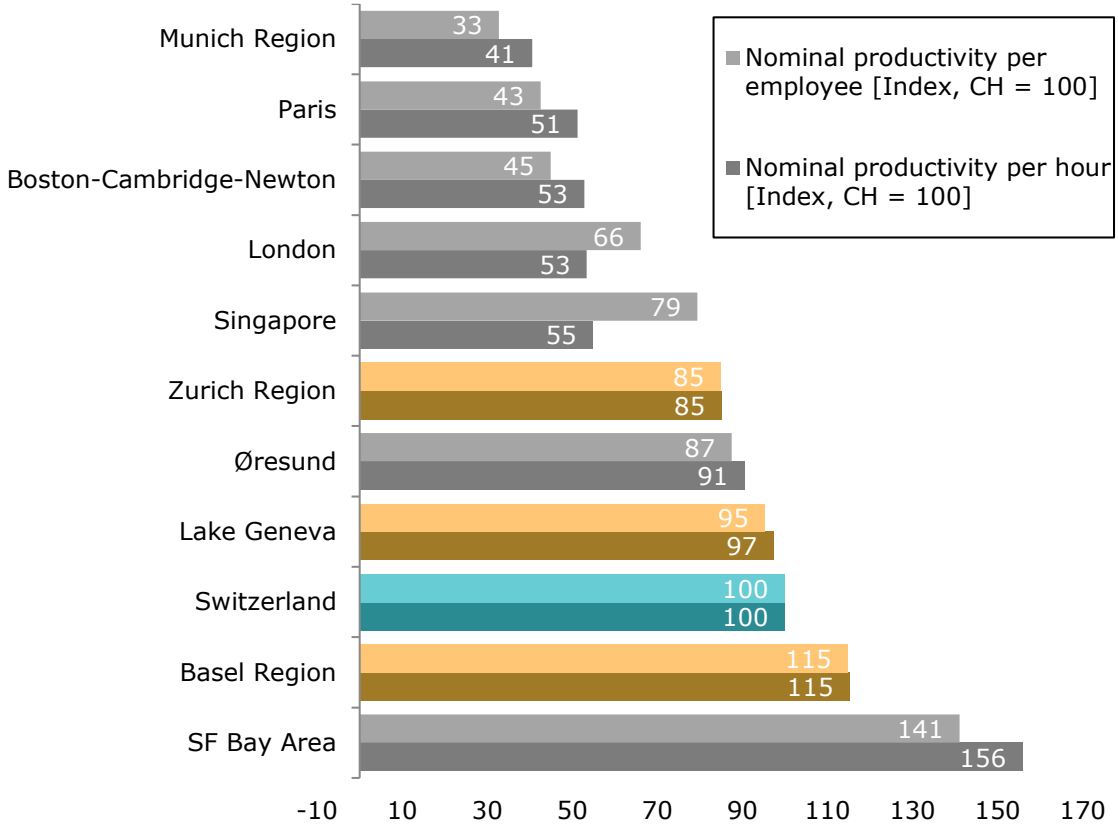
The analysis of a sector on the national level is not sufficient to measure international competitiveness. Sectors are often geographically concentrated in so-called clusters. These clusters are localised at the regional level and make it possible to identify differences within a country. The following graphic compares the level of labour productivity for selected pharmaceutical clusters. This comparison is presented as an index in relation to the average Swiss value (index CH = 100) for both hourly productivity (dark coloured) and labour productivity (light coloured).

With hourly productivity of 156, the San Francisco Bay Area is clearly at the top, followed by the Basel region with 115. This means that every hour worked in the pharmaceutical sector in the Basel region generates 15 percent higher value added than Switzerland.

All other regions in the comparison are lower than the Swiss average. Nevertheless, the Lake Geneva (3rd place) and Zurich (5th place) regions are in the first half of the ranking. This clearly highlights the extremely high level of productivity in Switzerland's pharmaceutical industry.

Fig. 3-4 By international standards, the productivity of the Basel region exceeds that of other regions; the Lake Geneva region occupies the upper middle rankings

Nominal labour productivity compared to other countries, 2022
Adjusted for purchasing power, indexed: CH = 100



Source: BAK Economics

The San Francisco Bay Area (141 index points) is also ahead of the Basel region (115) for value added per employee (labour productivity). These are the only regions that perform better than the Swiss average. The Lake Geneva region is close to the Swiss average and above most other regions in the comparison. In Singapore, there is a substantial gap between the index values for labour productivity and hourly productivity. This is due to the high number of regular working hours in Singapore. Because of this, much higher value added can be generated per employee there.

Historical review

Excursus 3: Competitiveness through growth in productivity

Thanks to its high level of innovation, the chemical/pharmaceutical sector has been able to boost productivity and thus its competitiveness over the past 90 years.

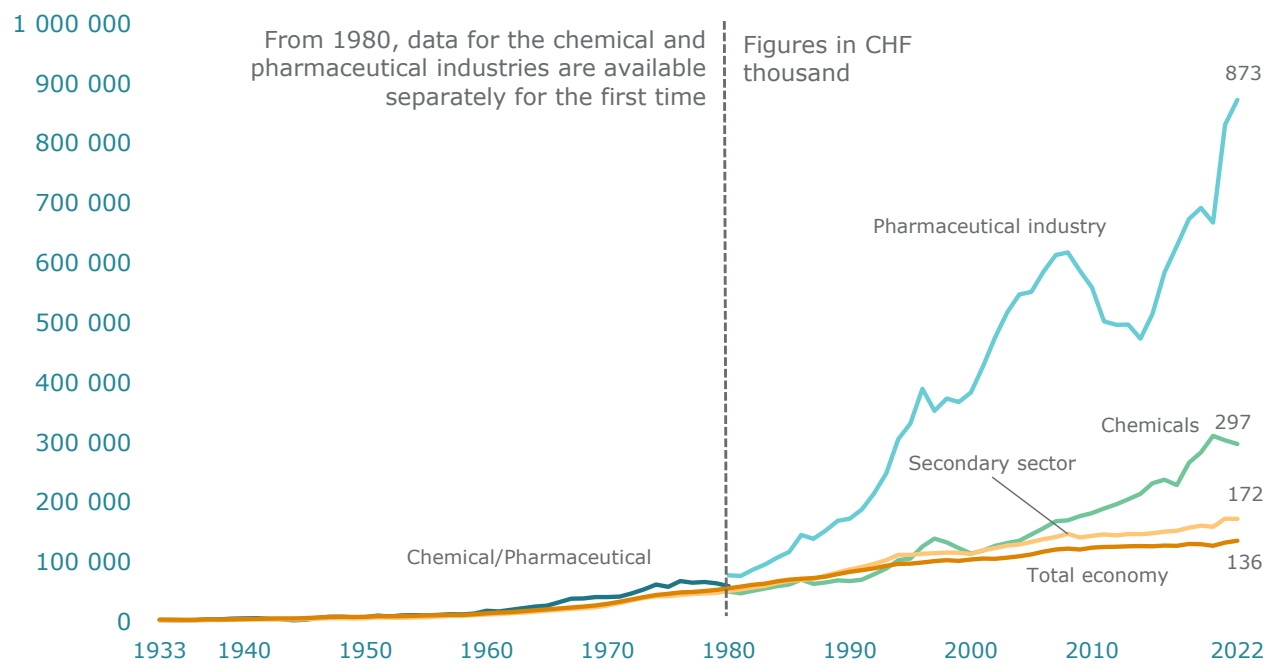
Early on, the focus of the Swiss chemical industry was on the production of innovative niche products, where transport and raw material costs were secondary. Nevertheless, in 1933, labour productivity was still below the Swiss average. In 1933, an employee in the chemical/pharmaceutical sector generated 3,000 Swiss francs per year – significantly less than the Swiss average of around 4,000 Swiss francs. In the post-war period, productivity accelerated significantly thanks to increased investment in research and an increasing supply of skilled workers. Some chemical and pharmaceutical companies applied new management methods from the USA to increase productivity. As early as the 1950s, labor productivity in the chemical/pharmaceutical sector regularly exceeded the level of the economy as a whole. The industry developed on this progress in productivity over the next decades.

This applies in particular for the pharmaceutical sector. However, concrete productivity figures are only available from the 1980s. In the pharmaceutical sector, labour productivity in the 1980s was already around 78,000 Swiss francs – around 40 percent higher than the Swiss average. Between 1980 and 2022, labour productivity multiplied to 873,000 Swiss francs. Today, an employee in the pharmaceutical sector generates over six times as much value added as the Swiss industry average. The pharmaceutical industry is thereby Switzerland’s most productive sector by far.

The rapid increase in productivity in the pharmaceutical sector since 1980 is due to several factors. Increasing capital investment and research intensity, continually higher qualifcation of employees, and the Covid-19 pandemic have all made a contribution. The high intensity of research in the sector is also shown in the strong growth of research and development (R&D) personnel. Between 2000 and 2021, the number of R&D personnel has more than doubled – from around 5,000 to 10,900 people.

Fig. 3-5 Productivity is 5 times higher than in the overall economy

Development of nominal labour productivity 1933–2022



Sources: BAK Economics, FSO, Historical Statistics of Switzerland

4 The pharmaceutical industry as an export sector

The pharmaceutical industry is Switzerland's biggest export sector. In 2022, the value of Swiss pharmaceutical exports was 109 billion Swiss francs. Europe is the most important market with over 47 percent. While the proportion of exports to Europe has decreased since the beginning of the 2000s, exports to the USA have more than doubled, reaching 27 percent in 2022. Several structural factors favour the growth in exports of Swiss pharmaceuticals, for example the aging population in industrial nations and the rising standard of living in developing countries. These factors ensure that pharmaceutical exports withstand cyclical fluctuations. This was also confirmed during the Covid-19 pandemic, when pharmaceutical exports were a significant support for the Swiss export industry.

4.1 Percentage of total goods exports in Switzerland

Despite the Covid-19 pandemic, pharmaceutical exports in 2022 reached a new record of 109 billion Swiss francs. Compared to the period before the pandemic, the significance of the pharmaceutical sector increased for the Swiss export economy.

Faster growth in pharmaceutical exports compared to other goods was reflected in the structure of Swiss exports. In 2000, the pharmaceutical industry's share of exports was 17.8 percent. Since the beginning of the 2000s, pharmaceutical exports have grown by 7.6 percent per year (despite a decrease in prices), while growth of other exported goods was 2.2 percent per year in the same period. This difference in growth meant pharmaceutical exports in 2022 reached 39.9 percent.

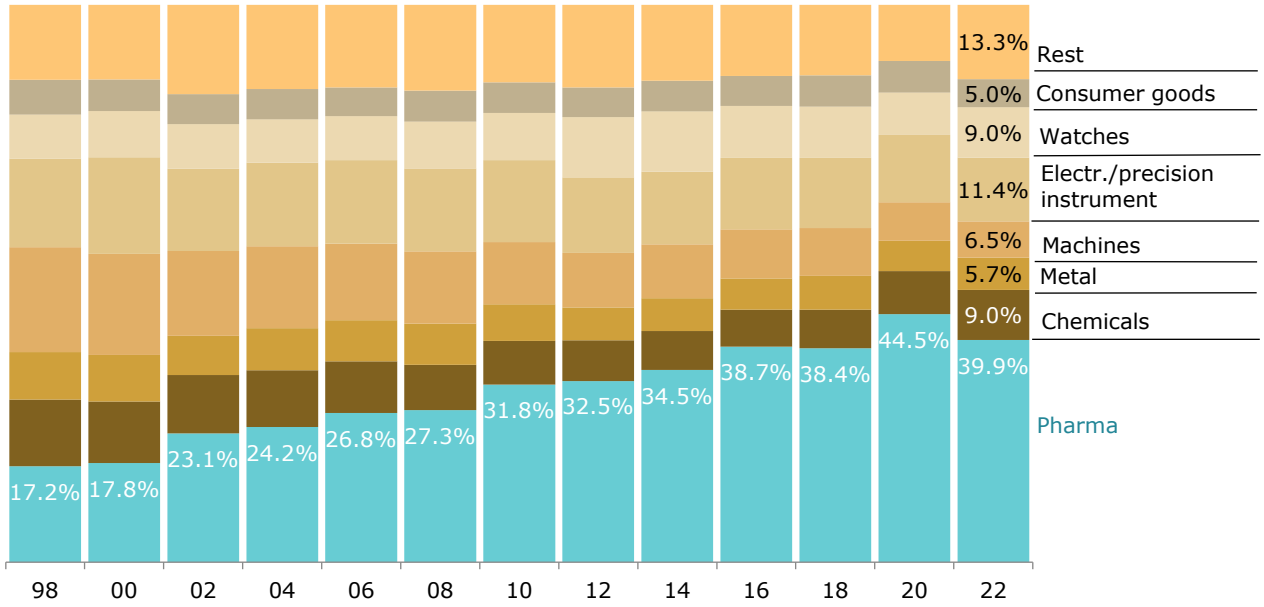
The pharmaceutical industry weathered the pandemic better than other export industries. In 2020, Swiss exports decreased by 7 percent, while pharmaceutical exports increased by 1.6 percent. This led to a temporary record percentage of 44.5 percent.

Because of the structural effects affecting long-term demand for pharmaceutical products, pharmaceutical exports are less cyclical than those of other sectors. Demand for medicines remains stable despite cyclical slumps. This relative resilience can be seen in the following graphic. The pharmaceutical industry's percentage does not only grow continuously – the increase is biggest in times of crisis, for example in 2001–02 during

the dotcom bubble, 2009–10 during the financial crisis, 2015–16 during the abolition of the minimum exchange rate, and most recently during the Covid-19 pandemic.

Fig. 4-1 Pharmaceutical exports as a percentage of total goods exports rose from 17.8 percent to 39.9 percent

Percentage of exports, 2000–2022

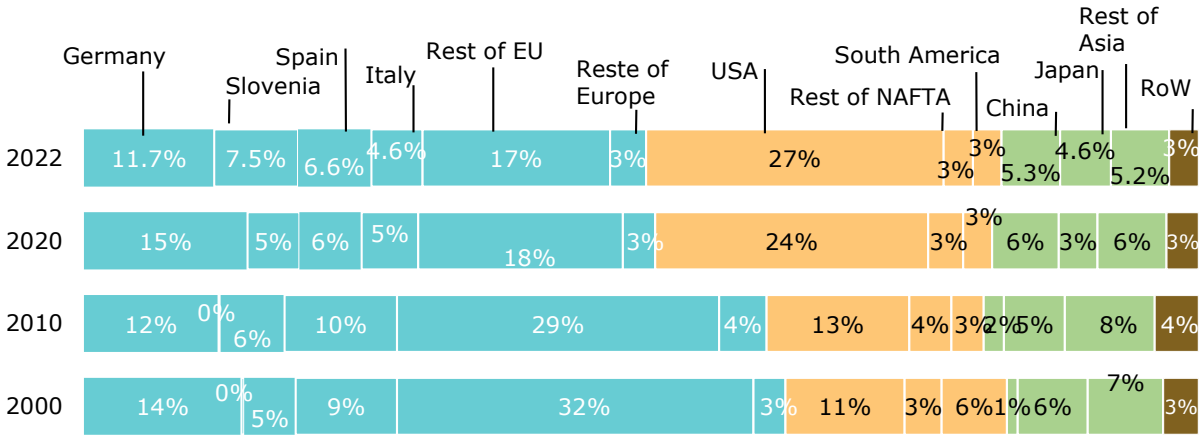


Percentage of nominal exports of an industry in total exports
Sources: BAK Economics, FOCBS

4.2 Exports by destination

In 2022, the EU remained the main recipient of pharmaceutical products from Switzerland with over 47 percent. Looking at individual countries rather than economic zones, the USA is the most important export market, followed by Germany (11.7%), Slovenia (7.5%), Spain (6.6%), China (5.3%), Japan and Italy (both 4.6%). Although the relative importance of the EU as an export market has decreased, exports to EU countries have nevertheless grown by 3.4 percent per year since 2010.

Fig. 4-2 Growth of pharmaceutical exports by destination, 2000–2022



Note: possible rounding differences.
Sources: BAK Economics, FOCBS

Other markets such as China and the BRIC countries have grown strongly in the last ten years. Between 2010 and 2022, exports to China increased from 1.1 billion Swiss francs to 5.8 billion Swiss francs and the share of exports to BRIC countries increased from 6 percent in 2010 to 9 percent in 2022. Compared to the EU and the USA, which together make up three quarters of exports, the significance of this market is (still) comparatively low. With improving standards of living in developing countries, their share is expected to continue growing.

In 2022, the USA was the country that imported the most Swiss pharmaceuticals. One key reason is that demand for drugs and therapies has grown more strongly in the USA than in Europe in the past, in part due to more dynamic population growth in the USA. Price pressure for drugs and therapies is also lower in the USA than in Europe since prices for drugs and therapies can be negotiated relatively freely.

Excursus 4: The pharmaceutical industry as the most important export sector

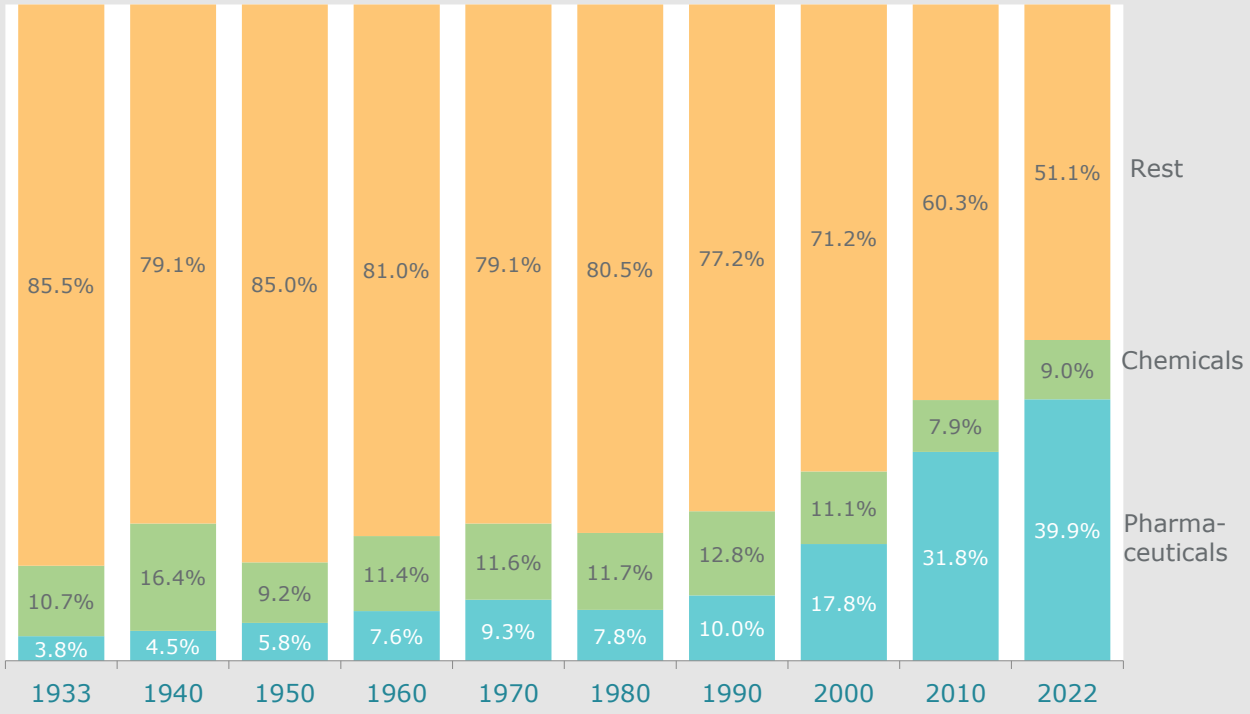
The success story of the pharmaceutical industry can best be seen in the development of exports. The export volume of pharmaceuticals has multiplied from 30 million Swiss francs in 1933 to around 110 billion Swiss francs in 2022. This corresponds to a 3,500-fold increase over the last 90 years. In comparison, other Swiss goods exports "only" increased 150-fold. It is noteworthy that pharmaceutical exports have grown faster than other exports in almost every decade. The only exception is the 70s. This constant outperformance demonstrates one of the greatest strengths of the pharmaceutical industry – the minimal dependence on cyclical fluctuations.

Over the last 90 years, there have been big changes within the chemical/pharmaceutical sector. In the 1930s and 1940s, paints and dyes were the most important export goods. However, by the 50s, pharmaceuticals, plastics, agrochemicals and vitamins played an increasingly important role. From the 1960s to the 1980s, chemical and pharmaceutical exports grew in almost equal measure. Due to the successful global marketing of specialised products, foreign trade gained an increasingly important role for chemical and pharmaceutical companies during this period. This changed in 1993 when the volume of exports of pharmaceuticals exceeded the volume of exports of chemicals for the first time (11.3 billion Swiss francs compared to 11.1 billion Swiss francs).

Over the last 30 years, the pharmaceutical industry has continued to develop this lead. Structural growth drivers such as the ageing population in industrial nations and the rising standard of living in emerging markets led to strong international growth in demand for pharmaceuticals. This is why pharmaceutical exports have grown significantly more strongly than other Swiss exports over the last 30 years. The pharmaceutical companies have been generating almost all of their revenue abroad for some time, as the Swiss domestic market for pharmaceuticals is small.

In summary, the significance of the pharmaceutical industry for Swiss foreign trade has massively increased over the last 90 years. The share of the total goods exports rose from 4 percent in 1933 to 40 percent in 2022. In concrete terms, this means that Swiss pharmaceutical exports reached a record value of 109 billion Swiss francs in 2022. As a result, the pharmaceutical industry has become by far the most important export industry. If chemical exports are added, the whole Swiss chemical/pharmaceutical sector accounts for over half of goods exports.

Fig. 4-3 Proportion of pharma in total Swiss goods exports as %



Sources: BAK Economics, FSO, Historical Statistics of Switzerland

Outlook

Excursus 5: The Swiss pharmaceutical industry, 2030 and 2050.

In the last 90 years, the Swiss pharmaceutical industry has become Switzerland's most important industrial and export sector. The future of the pharmaceutical industry therefore plays a significant role for growth prospects of the economy as a whole.

Overall, the chances for a continuation of the success story are good. The structural growth drivers of the recent past – the ageing population in industrial nations and the rising standard of living in emerging markets – should also continue to provide momentum. Rising costs in the healthcare sector, which come with high pressure on the prices of medicines, have a restraining effect. Overall, however, the global pharmaceutical market is expected to continue to exhibit robust growth in the coming decades, which will continue to outpace overall economic growth. The dynamic is not expected to be quite as extreme as over the last 30 years.

Thanks to dynamic pharmaceutical and biotech research internationally, numerous new treatment possibilities will emerge in the coming years and decades. If the hoped for further breakthroughs in cell therapy, immunotherapy, gene therapy and personalised medicine happen, new methods of treatment will be possible for illnesses from cancer to diabetes or Alzheimer's disease. There is high future growth potential for pharmaceutical companies that can prevail in the global innovation competition.

Switzerland's pharmaceutical companies are in a good starting position. The framework conditions of the location are mostly very good, as evidenced by the country's regular top rankings in location comparisons. Swiss pharmaceutical companies perform excellently in particular regarding innovation, e.g. spending on research and development or patent applications.

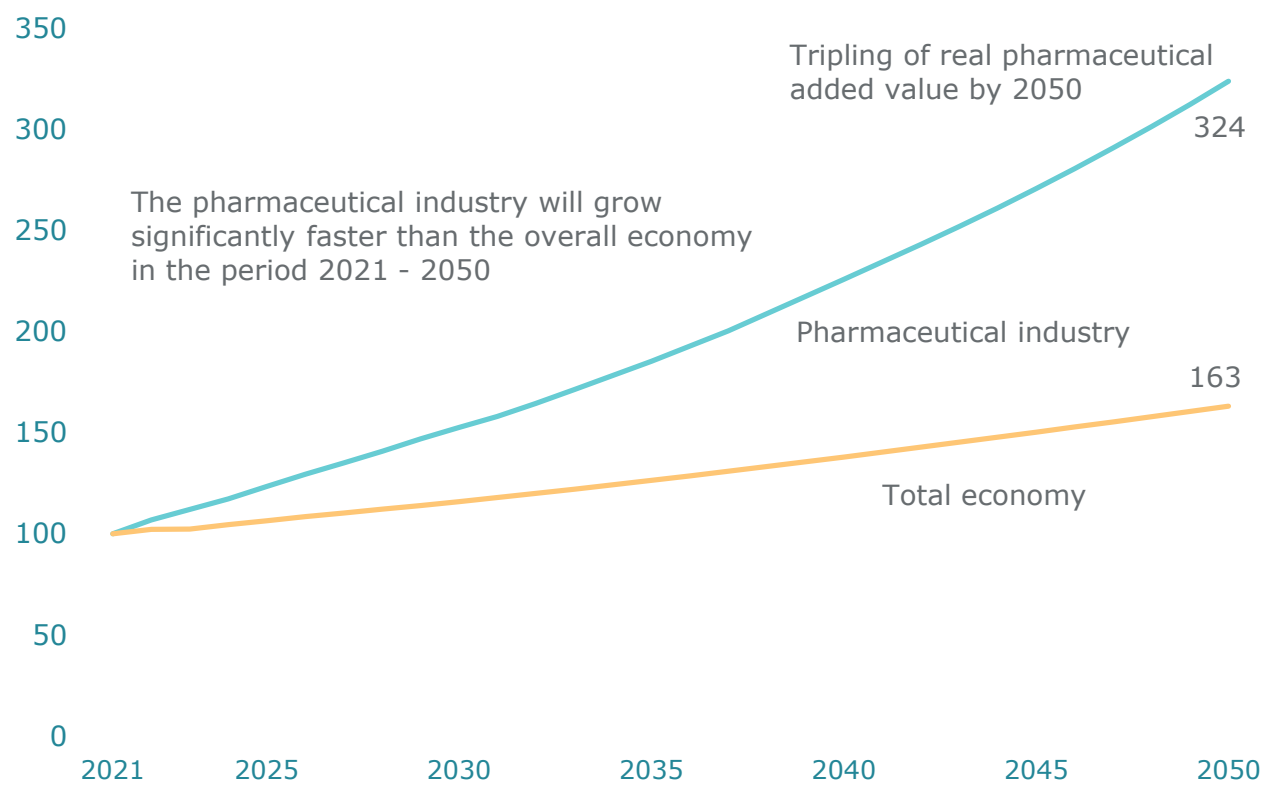
However, given the high pressure of competition, the framework conditions need to be continuously analysed and further optimised. It will be important, for example, to maintain or develop strong intellectual property protection in line with international standards as a guarantor of research and development. Swiss companies and universities will continue to need easy access to the important EU market and EU research programmes in the future. One area in which there is also a clear need for improvement is digitalisation, which is also becoming increasingly important in the

pharmaceutical industry. Switzerland lags behind top locations in the USA and Asia both in the digital penetration of research patents (e.g. the use of AI methods in drug discovery) and in the use of health data for research purposes.

Working on the premise that Switzerland remains a very competitive economic centre, BAK Economics forecasts growth of real gross value added of 4.6 percent per year for the pharmaceutical industry until 2030. The pharmaceutical industry will not grow as dynamically as in recent decades but the pace of growth will nevertheless remain twice as high as in the economy as a whole (+1.8% p.a.). The forecasts for the pharmaceutical industry for the period 2030–2050 also show real growth clearly above average at 3.8 percent (economy as a whole: +1.7% p.a.). This increases their share of the Swiss economy to 5.5 percent by 2050.

Fig. 4-4 Pharma success story continues

Indexed development of real added value, 2021 = 100



Source: BAK Economics

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Die forschenden pharmazeutischen Unternehmen der Schweiz.

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5 Annex

5.1 Concept of impact analysis

The basic idea

The basic idea behind the impact analysis is to show all payment streams triggered in the context of the pharmaceutical industry's business activities and to quantify the associated impact on value added, employment and income. This gives a vertical integration of the impact along the entire value chain, from procurement through production to the sale of goods.

Impact levels

In principle, a distinction can be drawn between three impact levels. The first impact level includes the direct effects of the pharmaceutical industry, which concern the immediate economic output of the industry (gross value added) and the associated impact on employment and income. On the second impact level, various secondary effects arise that have to be specified; they include the orders placed with other companies in relation to production (preliminary goods and services) and also the consumer demand of the employees. The third impact level involves the overall economic effects that arise because of the various secondary effects.

The impact analysis is about quantifying the economic effects in the business cycle that occur as a result of the various secondary effects. Here, an impact model is used to consider the numerous multiplier effects that arise because of the various business relations between companies. For example, the production of pharmaceuticals requires machinery, semi-finished goods and electricity that are sourced from other companies. For their part, the suppliers of goods and services also generate value added and create jobs.

Aside from these effects, the impact analysis considers the fact that the producers of semi-finished goods and other suppliers also obtain services from other companies, which in turn are also obtained from other providers, which likewise generate value added. The value-added effects become smaller in each additional "round". The impact model enables the thought experiment to be solved mathematically and calculate all knock-on effects that arise from the secondary effects.

Impact model

The central analytical tool of impact analysis is the input-output model. This is a static-equilibrium model whose equation system is derived from the structural information about the composition of supply and demand for goods and services in an industry.

The basis of the input-output model is a schematic assessment of the economy that illustrates how industries are intertwined and consumer demand, domestic production and goods imports are interrelated (cf. the following figure).

Fig. 5-1 Schematic diagram of an input-output table

	A0103	A0509	A1012	...	...	...	A9798	C01	..	C12	I	G	E	Total
A0103														
A0509														
A1012		Input-output matrix Demand for preliminary goods and services						Final demand						Total demand
...														
...														
...														
A9798														
Labour		Gross value added												
Capital														
Imports														
Total	Total supply													

A_j Typical good of industry j
C_i Private household consumer expenditures, product group i
I Investment
G Government spending
E Exports

Source: BAK Economics

The use of services and goods manufactured in the given industries is plotted on the horizontal axis. These either flow into other industries as preliminary goods and services or are directly used for consumer demand, invested or exported. The sum obtained from preliminary goods and services and consumer demand gives the aggregate demand. The sum of preliminary and final demand gives total demand.

The vertical axis shows the composition of total supply, which must correspond to total demand in a state of equilibrium. The overall supply is made up of domestic production ("gross production value") and imports. Deducting the preliminary goods and services of an industry that are needed for production from the gross production value gives the gross value added of the industry concerned. The gross value added serves to remunerate the production factors labour and capital.[2]

There are various forms of input-output (IO) models. The classic IO model (type I) considers only the immediate effects with the suppliers involved at the different stages of the value chain ("indirect effects"). The use of income arising at these stages is not considered or specified model exogenously.

In the extended IO model (type II), the (partial) endogenisation of private households takes into account the fact that a part of income is fed back into the economic cycle in the form of consumer spending. In a further extension step, company profits and the investments financed with these profits are also taken into account in the same way. In the economic cycle, the spending considered here (consumer spending or investments) also generates value added and employment ("induced effects").

To a certain extent, use of the extended type II model is viewed critically because the causal link of the induced income effect with the primary impulse is much looser than that of the indirect effect (relationships concerning preliminary goods and services). For example, consumer spending at the individual level is financed not only by employee income but also by other kinds of income (income from assets or state transfers).

The correlation between primary impulse and the induced consumer spending of the employees involved is much less stable than that with the production effects of the suppliers involved along the value chain. If additional production units are created by the suppliers involved using existing capacity, no additional jobs are generated, but very likely additional value

[2] In the interest of simplification, taxes and subsidies on products are excluded from the schematic diagram (but not from the model).

added is generated. The more links there are between primary impulse and the corresponding effect in the value chain, the more uncertain the correlation becomes between primary impulse and the corresponding effects on jobs.

Based on further-reaching assumptions, it has to be assumed that the effects in the fully extended model, taking into account the income-induced effects at each impact stage, overestimate the actual interdependence between the economic activity of a sector or a company and the resulting overall macroeconomic effect. On the other hand, an analysis that uses the simple standard model in individual cases may fall short of its objective.

A middle way is to limit the induced effect to the impact exerted by the income of directly involved employees in the industry that is the focus of the analysis. This kind of semi-extended IO model is implemented in the BAK impact model. Correspondingly, the consumer expenditure of employees in the pharmaceutical industry and the capital expenditure of the pharmaceutical industry are taken into account. Such effects are not taken into account along the upstream value chains. It is different for preliminary goods and services – preliminary goods and services required for production are taken into account for every individual impact level along the whole value chain.

5.2 Pharma multipliers compared with other countries

The influence of the pharmaceutical industry on the economy as a whole is also analysed in other countries. This section provides a brief overview of the results obtained in these studies.

The multipliers calculated for Switzerland's pharmaceutical industry can be ranked as somewhat below average overall in terms of value added (type I). On the one hand, this expresses the high profitability of the Swiss pharmaceutical industry, which results in a particularly high value-added contribution in the manufacturing industry (direct effect) and has a dampening effect on the multiplier. On the other hand, the Swiss pharmaceutical industry traditionally has a high degree of international integration along the upstream value chain. Imports might account for a higher share of total preliminary goods and services than in other countries.

For methodological reasons, the multiplier calculated for Switzerland is significantly lower than the type II multipliers from the studies for other countries, as BAK Economics differentiates more conservatively the consumption effects triggered by wage income. The analysis considers only the endogenous consumer spending of people directly employed in the pharmaceutical industry that is related to the level of pharmaceutical employee income. Also taken into account is the fact that the salaries of cross-border commuters from abroad are largely spent in their country of residence.

With regards to employment, however, the multipliers calculated for Switzerland are much higher than the comparative type I multipliers for other countries. This can be explained by the fact that the productivity differential between the pharmaceutical industry and the remaining industries involved in the whole value-added process is particularly high in Switzerland. Therefore, far more indirect jobs are dependent on a pharmaceutical job in Switzerland than abroad.

Tab. 5-1 International impact analyses of the pharmaceutical industry

Country/authors	Variable	Year	Type I	Type II
USA				
Battelle Technology Partnership Practice (2013)	Value added	2011	1.6	2.4
	Employment		2.3	4.1
TEConomy (2016)	Value added	2014	1.7	2.4
	Employment		3.0	5.2
Europe				
WifOR (2016)	Value added	2014	1.8	2.3
	Employment		3.6	5.7
pwc (2019)	Value added	2016	1.5	2.1
	Employment		2.2	3.9
Germany				
Pavel et al. (2015)	Value added	2012	-	3.1
	Employment		-	4.8
Nora et al. (2016)	Value added	2014	1.8	2.3
	Employment		3.6	5.7
Baden-Württemberg				
WifOR (2015)	Value added	2014	1.6	2.0
	Employment		1.7	2.3
UK				
pwc (2017)	Value added	2015	1.5	2.1
	Employment		2.4	3.4
Portugal				
Apifarma (2018)	Value added	2016	1.6	2.2
	Employment		-	-
Scotland				
University of Strathclyde (2018)	Value added	2015	-	1.8
	Employment		-	3.4
Australia				
Medicines Australia (2018)	Value added	2016	3.3	3.9
	Employment		1.9	-
Global				
WifOR (2020)	Value added	2017	2.5	3.5
	Employment		9.2	13.5

Type I: Consideration of immediate effects on the upstream and downstream stages of value added (direct and indirect effects); type II: additional consideration of income effects (induced effects) on all upstream stages of the value chain.
Source: BAK Economics

Literature

Apifarma, Holistic perspective on the value of medicines in Portugal, 2018.
Battelle Technology Partnership Practice, The Economic Impact of the U.S. Biopharmaceutical Industry. Pharmaceutical Research and Manufacturers of America (PhRMA), 2013.
Federal Statistical Office (FSO), Work volume statistics, 2023.
Federal Statistical Office (FSO), Job statistics, 2023.
Federal Statistical Office (FSO), Economic structure and analysis, 2023.
Federal Statistical Office (FSO), Swiss Earnings Structure Survey, 2023.
Federal Statistical Office (FSO), Structure Survey, 2023.
Federal Statistical Office (FSO), National Accounts, 2023.
Federal Statistical Office (FSO), Swiss Labour Force Survey (SLFS), 2023.
Federal Office for Customs and Border Security (FOCBS), Swiss-Impex, 2023.
Medicines Australia, The economic contribution of the innovative pharmaceutical industry to Australia, 2018.
Nora A. [et al.], The Economic Footprint of Selected Pharmaceutical Companies in Europe, 2016.
Pavel F. [et al.], Ökonomischer Fussabdruck von Novartis Deutschland: Die Bedeutung von Novartis für den Wirtschafts- und Wissenschaftsstandort Deutschland. Deutsches Institut für Wirtschaftsforschung (DIW), 2015.
pwc, The economic contribution of the UK Life Sciences industry. Im Auftrag von EFPIA, BIA, BIVDA und abhi, 2017.
pwc, Economic and societal footprint of the pharmaceutical industry in Europe. Commissioned by EFPIA, 2019.
TEConomy, The Economic Impact of the U.S. Biopharmaceutical Industry: 2020 National and State Estimates. Ohio: TEConomy Partners LLC, 2023.
University of Strathclyde, The Economic Contribution of the Pharmaceuticals Sector in Scotland, 2023.
WifOR, The economic footprint of the healthcare industry in Baden-Württemberg, 2015.
WifOR, The Economic Footprint of Selected Pharmaceutical Companies in Europe. Commissioned by EFPIA, 2016.
WifOR, The Global Economic Impact of the Pharmaceutical Industry, 2020.

Figures

Tables

List of abbreviations

AI	artificial intelligence
bn	billion
cf.	compare
CH	Switzerland
CHF	Swiss francs
e.g.	for example
esp.	especially
et al.	et alia
etc.	etcetera
EU	European Union
fig.	figure
FOCBS	Federal Office for Customs and Border Security
FSO	Federal Statistical Office
FTE	full-time equivalent
GDP	Gross domestic product
hrs	hour(s)
ICT	information and communications technology
i.e.	that is
IO	model input-output model
m	million
NOGA	General Classification of Economic Activities
p.a.	per annum
pp	percentage points
rem.	remaining
RoW	rest of the world
R&D	research and development
SLFS	Swiss Labour Force Survey
SF Bay Area	San Francisco Bay Area
spec.	specifically
tab.	table
t	thousand
UK	United Kingdom
USA	United States of America

About Interpharma

Interpharma was founded in 1933 and is the association of research-based pharmaceutical companies in Switzerland. The 22 member companies account for more than 90 percent of the market share for patented medicines in Switzerland and invest more than 9.5 billion Swiss francs per year in research and development in Switzerland. Interpharma is a driving force for efficient and high-quality healthcare that offers patients quick and easy access to innovative therapies and the best possible treatment. Our mission both at home and abroad is to ensure that patients receive first-class treatment, that innovations are rewarded and that our industry is able to contribute significantly to the welfare, growth and competitiveness of Switzerland.

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