

# The Global Economic Impact of Novartis

Case Study





---

## IMPRINT

Basel, Berlin, Darmstadt, October 9<sup>th</sup>, 2018

### Authors

Richard Scholz  
Nora Albu  
Natalia Benke  
Dr. Marcus Cramer  
Dr. Dennis A. Ostwald

*WifOR*

Sonja Haut

*Novartis*

### Bibliographical Data

R. Scholz, N. Albu, N. Benke, M. Cramer, D.A. Ostwald, and S. Haut, *The Global Economic Impact of Novartis*, Basel/Berlin/Darmstadt, September 2018.

### Contact

Dr. Marcus Cramer  
+49 30 232 566 6 - 50  
[marcus.cramer@wifor.com](mailto:marcus.cramer@wifor.com)



WifOR Berlin  
Joseph-Haydn-Straße 1  
10557 Berlin  
[www.wifor.com](http://www.wifor.com)

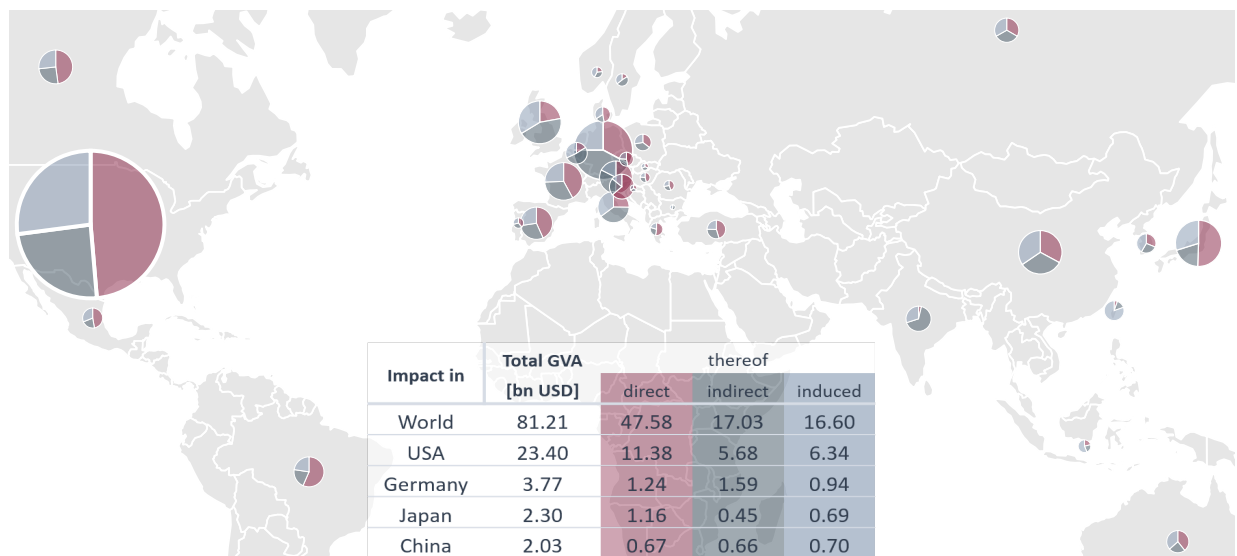
# 1 INTRODUCTION

Economic or financial impact is a key element of the Financial, Environmental and Social (FES) impact valuation, the Novartis version of the Triple Bottom Line approach. Separate case studies are available on elements of social and environmental impact.

Gross value added (GVA) quantifies the value of goods and services produced by a company, by an industry sector, within a certain region of an economy, or by an economy as a whole. The GVA of a company directly quantifies the contribution to the gross domestic product (GDP) of the country of operations. As such it is *the* measure of economic growth and quantifies a company's contribution to national economic wealth. Often, policy targets are formulated in terms of GDP, a prominent example being the Europe 2020 strategy target of increasing combined public and private investment in R&D to 3% of GDP. The GVA is thus key to being able to directly compare a company's performance to such strategy and policy targets.

**GROSS VALUE ADDED QUANTIFIES CONTRIBUTION TO GDP UND THUS TO ECONOMIC GROWTH AND NATIONAL WEALTH**

As such it is *the* measure of economic growth and quantifies a company's contribution to national economic wealth. Often, policy targets are formulated in terms of GDP, a prominent example being the Europe 2020 strategy target of increasing combined public and private investment in R&D to 3% of GDP. The GVA is thus key to being able to directly compare a company's performance to such strategy and policy targets.



**Figure 1. Novartis GDP contributions throughout the world.** Direct, indirect, and induced gross-value-added effects for selected impact countries 2017.

Novartis has translated its business figures into this macroeconomic rationale and has, besides its direct impact in its respective countries of operations studied its economic impact along global supply chains. There, GVA and employment effects occur as “ripple effects” (*indirect effects*, tier 1 to n) through the Novartis third-party spend (*intermediate consumption*). For example, intermediary inputs that are purchased in Switzerland may be partially produced in the US and thus the company's purchases in one country may trigger economic growth and employment in another country.

Going a substantial step further, the so-called *induced effects* were also considered. These arise through the spending of wages by Novartis staff and the spending of its suppliers' labor force that is related to the company's intermediate consumption, see Figure 2.

The impact analysis was performed for different geographical and operational regions, i.e. in regions where the contribution occurred and where it was triggered, respectively. By adhering to the concept of the *System of National Accounts*, the analysis provides a high level of significance and comparability with official macroeconomic indicators. It thus forms a sound basis for informing different stakeholders and improving decision-making by uncovering the economic relevance of Novartis business activities along its global upstream supply chain (tier 1 to n).

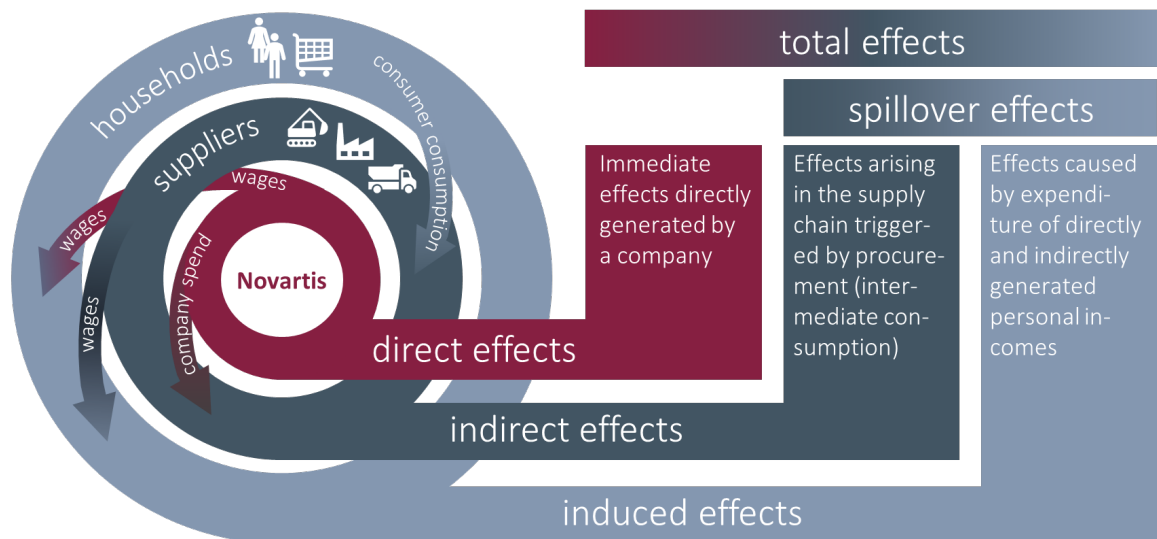


Figure 2. Model scope. Direct, indirect, and induced effects.

## 2 METHODS

The analysis required the collection of business data of all legal entities across the world for the time periods under consideration. This data was then translated into the rationale of the System of National

Accounts, resulting in the economic key figures of direct gross output, gross value added, and employment for each country of operation. A detailed breakdown of third-party procurement data by country and according to the International Standard Industrial Classification (ISIC Rev.4) was performed. This was the basis for quantifying the indirect and induced effects, which occur throughout the globalized economy and may be resolved on country level. WifOR obtained these spillover effects,

which show the company's impact along the global upstream supply chain (tier 1 to n), by applying the input-output model developed by Wassily Leontief and extending it twofold.

MULTI-CRITERIA ANALYSIS  
BASED ON SOCIO-ECONOMICALLY  
EXTENDED GLOBAL MULTI-REGIONAL  
INPUT-OUTPUT MODEL

- ▶ While in the traditional model private consumption of the labor force belongs to the final-demand sector (is *exogenous*), the labor force's activities were included in the model and thus treated as endogenous. As a result, not only the indirect effects – occurring through purchases in supplier industries and the resulting ripple effect on the supply chain – but also the induced effects – arising due to the spending of wages and their indirect effects – are accounted for.
- ▶ Rather than including only domestic transactions, the model is based on a global multi-regional input-output table and thus includes global trade linkages required to fully assess today's global value chains. The underlying database<sup>1</sup> traces supply chains across 56 sectors and 43 countries (All EU27 countries as well as Australia, Brazil, Canada, China, Croatia, India, Indonesia, Japan, Mexico, Norway, Russia, South Korea, Switzerland, Taiwan, Turkey, US, and a model for the rest of the world).

<sup>1</sup> Timmer, M. P., Dietzenbacher, E., Los, B., Stehrer, R. and de Vries, G. J. (2015), *An Illustrated User Guide to the World Input-Output Database: The Case of Global Automotive Production*, Rev. Int. Econ., 23: 575–605. Analysis is based on the WIOD 2016 release.

## 3 RESULTS

### 3.1 GDP contributions

Novartis quantified its economic impact for specific operational areas globally and broken down by country, both for where value was added as well as for the countries of Novartis business activities. In the year 2017, Novartis generated a direct GVA of USD 47.6 bn globally, see Figure 3. Through demand stimuli, Novartis business activities generated further USD 17.0 bn of GVA within upstream sectors (third-party spend, tier 1 to n). Direct and indirect labor compensation triggered additional consumption, resulting in an induced GVA effect of USD 16.6 bn. In total, Novartis thus generated a gross value added of USD 81.2 bn in 2017, which is larger than the nominal GDP of Kenya. Thus, for every US dollar of direct GVA generated by Novartis, an additional USD 0.71 of spillover GVA was generated in the world.

**NOVARTIS CONTRIBUTES MORE THAN USD 80 BN TO THE GLOBAL GDP**

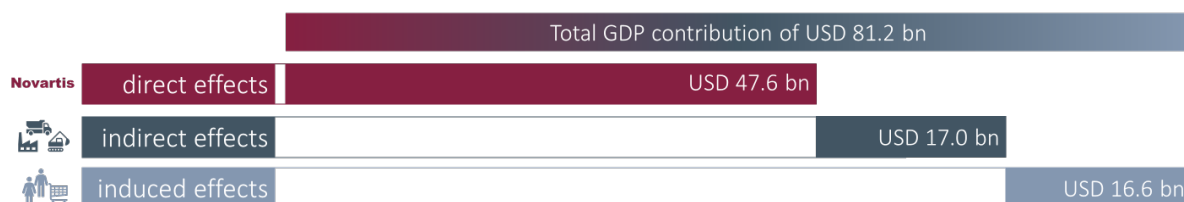


Figure 3. Novartis global GDP contribution. Direct, indirect, and induced effects.

The nature of the underlying global multi-regional model and the high detail of spend data allowed for a by-country analysis of economic effects. Figure 1 shows the Novartis GDP contribution to selected countries throughout the world. The largest total GVA effects are generated in the United States (USD 23.4 bn) due to the relatively large spillover effects (USD 5.7 bn indirect effects and USD 6.3 bn induced effects). Of those USD 12.0 bn spillover GVA effects in the US, 94% were generated by the activities of Novartis US (85%) and Novartis Switzerland (9%). Even in economies where the direct engagement of Novartis is relatively small, GVA effects that are triggered by demand stimuli along the global supply chain or via consumption spending of employees can be quite large: For example, Novartis contributed USD 0.7 bn to the GDP of China directly and USD 1.4 bn through spillover effects.

In addition to identifying how much GVA was generated in different countries thanks to Novartis activities, the analysis determined which Novartis countries were responsible for the worldwide GVA effects. A breakdown of spillover effects by Novartis countries revealed how they individually contributed to the generation of indirect and induced GVA in their countries of domicile as well as in the rest of the world. As an example, Table 1 shows that Novartis activities in Austria generated USD 0.2 bn of GVA in Germany, USD 0.1 bn of GVA in China, and USD 0.1 bn of GVA in France. In total, Novartis Austria generated USD 1.2 bn of spillover GVA, thereof 33% in Austria.

Novartis Austria		
Impact on region	Spillover GVA [bn USD]	Share of total spillover GVA
World	1.22	100%
AT	0.41	33.3%
DE	0.22	18.3%
CN	0.07	5.5%
FR	0.06	5.3%
US	0.06	5.1%
IT	0.03	2.8%

Table 1. GDP contributions of Novartis Austria. Spillover GVA effects by impact country.

The analysis of Novartis US showed a different picture, see Table 2. Almost 85% (USD 10.2 bn) of the total spillover GVA effects resulting from the activities of Novartis in the United States were generated locally in the US while the contributions of Novartis US to spillover GVA effects in other countries were relatively small. For instance, the second highest spillover GVA effects resulting from the activities of Novartis US, which were generated in Canada, accounted for only 1.9% of all the spillover GVA effects triggered by the activities of Novartis US, see Table 2.

Novartis US		
Impact on region	Spillover GVA [bn USD]	Share of total spillover GVA
World	12.02	100%
US	10.21	84.9%
CA	0.23	1.9%
CN	0.20	1.7%
GB	0.13	1.0%
DE	0.12	1.0%
MX	0.08	0.7%

**Table 2. GDP contributions of Novartis USA. Spillover GVA effects by country.**

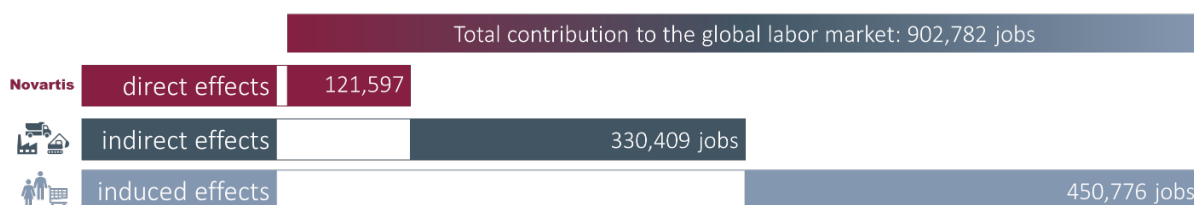
### 3.2 Employment

Novartis' contribution to the global labor market was analyzed at the same level of detail as its global GDP contributions. As before, direct effects, ripple effects along the value chain, as well as induced effects were investigated. The underlying model further allowed for a detailed analysis of where the employment impacts occurred and by which Novartis country and which business activity (operations, research, development) they were triggered.

In total, close to one million jobs worldwide were related to the business activities of Novartis in 2017, see Figure 4. Table 3 shows Novartis employment contributions throughout the world for selected countries and Figure 5 depicts how spillover contributions are distributed among triggering Novartis countries and business activities.

**NOVARTIS SUPPORTS CLOSE TO ONE MILLION JOBS GLOBALLY**

throughout the world for selected countries and Figure 5 depicts how spillover contributions are distributed among triggering Novartis countries and business activities.



**Figure 4. Novartis contributions to the global labor market. Direct, indirect, and induced effects in 2017.**

In 2017, Novartis employed 121,597 persons directly, thereof 22,867 employees in the United States and 14,269 employees in Switzerland. Of the total number of jobs supported worldwide (direct plus spillover), approximately 155,000 jobs were supported in India, approximately 132,000 in the United States, approximately 112,000 in China, and about 35,000 in Germany.

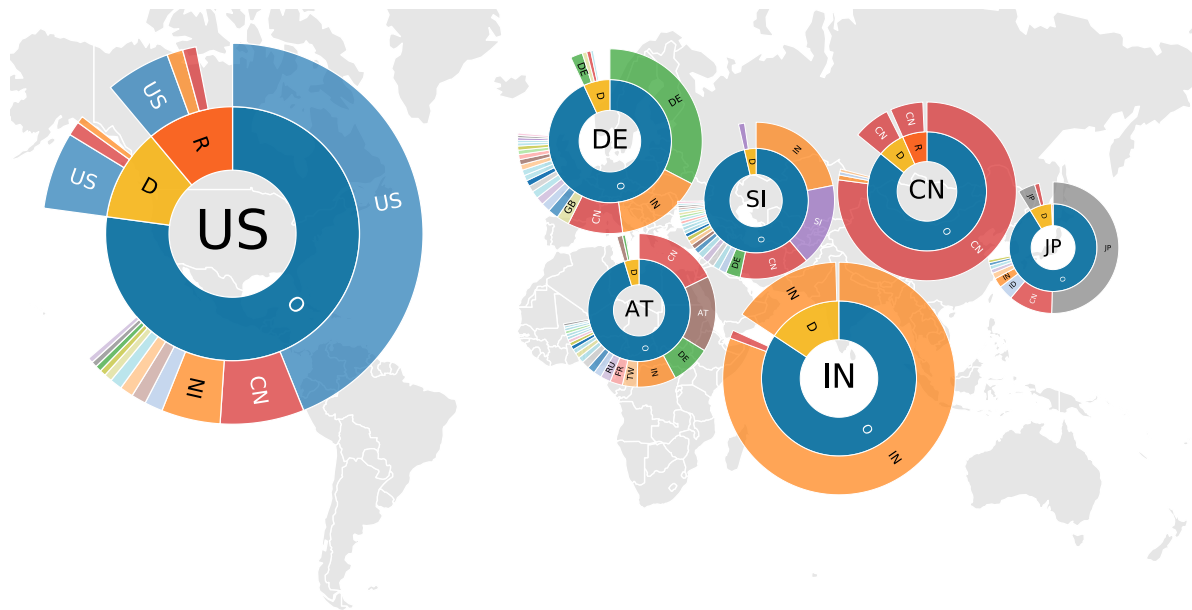
Impact country	Total employment	thereof		
		direct effects	indirect effects	induced effects
IN	154,980	7,859	71,237	75,885
US	131,882	22,867	50,922	58,093
CN	111,605	8,145	40,981	62,479
DE	35,374	8,146	15,957	11,271

**Table 3. Novartis' labor market contributions. Direct, indirect, and induced employment effects for selected impact countries.**

By evaluating how the individual Novartis countries contributed to supporting indirect and induced jobs in 2017, it was determined that Novartis US supported the most jobs in terms of spillover effects: In addition to directly providing 22,867 jobs at its US sites, Novartis US supported 167,895 jobs. Novartis India supported 64,529 spillover jobs and around 37,900 spillover jobs were supported by both China

and Germany. These contributions to the global labor market were further broken out by activity (operations, research, development) and by the country in which the contribution occurred (country of impact), see Figure 5.

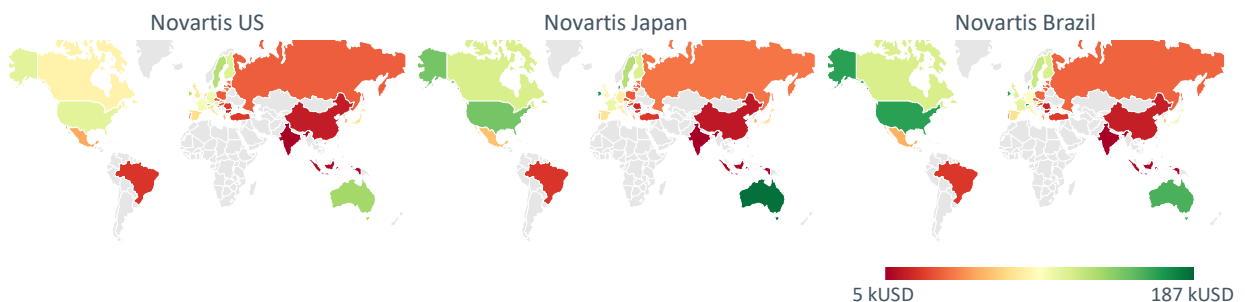
This analysis by activity and country of impact allowed for a deeper understanding of Novartis economic effects in the global economy and the inter-connectivity of countries in which Novartis is active and countries of impact. To give an example: Novartis activities in the US, India, Japan, and China mainly supported jobs locally while activities in Germany, Austria, and Slovenia contribute mainly to the labor market in the rest of the world.



**Figure 5. Indirect and induced contribution to the global labor market.** Spillover effects of Novartis US, Germany, Austria, Slovenia, India, China, and Japan by activity (operations (O), research (R), development (D)) and by country of impact.

### 3.3 Labor Productivity

By analyzing GVA and employment effects throughout the global supply chain, Novartis was also able to address questions of productivity. Labor productivity measures the value of goods and services that a worker produces in a given amount of time (here, one year). It is a key economic figure as it is directly linked to standards of living. Increasing labor productivity is usually attributed to increasing physical capital, new technologies, or human capital.



**Figure 6. Labor productivity along global supply chains.** Indirect labor productivity<sup>2</sup> for three Novartis countries by selected countries of impact.

<sup>2</sup> Ratio of indirect GVA effect and indirect employment effect for a given impact country and triggering Novartis country.

---

Analyzing labor productivity not only within Novartis but also along the supply chains provides insights from two different perspectives:

- ▶ Supply chains with low labor productivity hold opportunities: Productivity and therefore living standards may be increased by, e.g., acquiring business operations (vertical integration) and/or by fostering knowledge and technology transfer.
- ▶ Supply chains with low labor productivity pose risks: Low productivity may indicate the risk of increasing costs when suppliers are faced with pressure for higher wages but the chances of productivity gains are low.

The analysis of labor productivity along Novartis global supply chains allowed to identify low productivity hot spots (see Figure 6 for country examples). As outlined above, the identified hot spots provide economic opportunities but also potentially pose financial risks.

## 4 DISCUSSION AND OUTLOOK

Quantifying its economic footprint provided Novartis with intelligible insights. The company obtained a complete picture of its GDP and labor market contributions along its global supply chains. The level of detail provided by the analysis allowed Novartis to gather precise information and to use it in the dialogue with specific stakeholders.

The analysis gave valuable answers to questions such as:

- ▶ Which (operational) areas and which Novartis countries have the largest impact?
- ▶ Which impacts occur along the supply chain, and at which stages?
- ▶ Which impacts occur in which countries?
- ▶ What are the hot spots of opportunity and risk within the global supply chain concerning labor productivity?

Equipped with the GVA of each Novartis country and country of impact, the analysis forms the basis for sensible and comparable key indicators concerning, e.g., international R&D and sustainability targets.<sup>3</sup> In addition, two areas were identified for future work:

- ▶ Further detail the analysis by breaking down the impact by:
  - Industry sectors, enabling the analysis to uncover in which sectors (of which countries) value is added and jobs are supported
  - Procurement commodity class and/or supplier; this would deliver actionable insights concerning labor productivity and help enter into a dialogue with suppliers to address potential risks and opportunities more effectively
- ▶ Broaden the scope to address SDGs and to include social indicators
  - Indirect and induced average compensation of employees along supply chains
  - Quality of work: Differentiate between low, medium, and high skilled labor
  - In addition to labor productivity, account for capital and total productivity

---

<sup>3</sup> Compare, e.g., N. Benke, R. Scholz, N. Albu, M. Cramer, D.A. Ostwald, S. Haut, D. Kessler, *The Environmental Impact of Novartis Along Global Supply Chains*, Basel/Berlin/Darmstadt, July 2018.