Globalization Report 2016

Who benefits most from globalization?

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Content

Executive Summary

The globalization report appears regularly and sets an authoritative standard for the comprehensive analysis of current globalization issues and global economic development. The 2016 globalization report comes in two parts. Building on the previous report, the first part focuses on the question of to what extent different countries have benefited from globalization in the past and to which degree this is possible in the future. The second part analyses the export performance and the development of the international competitiveness of 42 globally important economies.

The first part of the investigation creates a globalization index which takes into account the economic, political and social aspects of globalization. Subsequently, the index data are used, together with a regression analysis, to quantify and compare the impacts on growth caused by globalization in the various countries. Then the country is identified which has achieved the most growth as a result of globalization.

The most important results of the first part can be summarised thus:

- If we add together the absolute differences in per capita gross domestic product (GDP) between the scenario without advancing globalization and the historically observed development between 1990 and 2014, we find Japan, Switzerland, Finland and Denmark at the top of the tree. Germany is ranked below them alongside smaller European countries. Bringing up the rear in terms of absolute globalization gains per inhabitant are the large emerging countries.

- The emerging countries' low positions in terms of absolute globalization gains – especially China's – are inter alia due to their weak per capita economic output in the baseline year. Analysis of the relative globalization gains shows a different picture: the average income gain from globalization per inhabitant compared to per capita

GDP in 1990 is about 17 % for China as against 5 % for Germany and only 1.5 % for the USA.

The associated analysis of export performance and the development of the global market shares of the 42 economies in total included in this study primarily reveals the following aspects:

- Between 1995 and 2014, the group of emerging countries grew massively in importance relative to the group of developed countries. In this respect, it is clear that the emerging countries' growth is due to a large extent to China's huge growth. We must also acknowledge that some developed countries – in particular, Germany – held up well despite the new competition from the emerging economies.

- There are also obvious differences at the sector level: While in some sectors much more than half of globally traded goods now come from emerging countries (such as office equipment and computers or broadcasting and communication technology), in other sectors the established developed countries are still leading the way (e.g. in the pharmaceutical industry and in aerospace equipment construction).

- A constant market share analysis shows conclusively that the rise of the emerging countries is primarily due to their much improved competitiveness relative to the average competitiveness of all economies.

1 Introduction

The 2016 globalization report is divided into two parts. The growth effect of globalization on a total of 42 economies is analysed, based on the key question "Who benefits most from globalization?" The aim of the investigation is to establish for every highly developed economy and the most important emerging countries to what extent they were affected by increasing globalization between 1990 and 2014 and, where applicable, to what extent they benefited from it. This approach reveals the big and small winners of globalization and thus enables us to determine the "globalization champion."

Subsequently, we analyse the export performance of these countries and the development of their global market shares since 1995. In addition, a constant market share analysis gives us information on the extent to which the various economies' competitiveness has developed relative to the other countries examined. It reveals the factors on the basis of which each global market share has developed.

2 Who benefits most from globalization?

In order to quantify the growth effects of globalization, we have produced a globalization index and performed an econometric study of the causal relations between globalization and the economic development of the economies included in this study.[1] A synthesis of this knowledge enables us to give rankings to the country-specific changes in economic output due to globalization and thus to select the globalization champion.

2.1 Summary of methodology

The detailed investigation of the causal relations between globalization and economic development is the core of the study. Our knowledge of these causal relations is used to quantify the economic changes caused by globalization in the ex post time period of 1990–2014. The section below gives a brief overview of the approach. The appendix to this study contains a detailed description of the methodology.

In order to establish the globalization champion we used the following steps:

1. Production of the globalization index

2. Investigating the causal relations between globalization and economic development

3. Determining the globalization champion

In order to be able to quantify the economic influence of globalization, this multi-layered process must be made measurable. This is done in the first phase of the study on the basis of a comprehensive **globalization index**. The index is made up of sophisticated indicators illustrating the economic, social and political aspects of globalization.[2]

A second phase brings the analysis of the **causal relations between globalization and economic development** into the foreground. The growth effect of globalization is also quantified using regression analyses. This enables the effect of individual influences on economic development to be filtered out, while the effects of other drivers of economic development are statistically estimated.

In the regressions, economic development is interpreted as a variable in terms of the percentage growth of output per inhabitant. The globalization index acted as the main indicator. The regression results for this variable show how strongly economic development is driven by globalization.

This knowledge of the sensitivity of economic growth per inhabitant with regard to globalization is then used in the next phase of the work in order to quantify individual countries' globalization-induced growth increases and on this basis to determine the **globalization champion**.

Globalization-induced growth increases are quantified in two sub-phases. Initially, a calculation is made for each country of the growth rates which it would have had in the event of a period of stagnation of globalization. Next, the annual changes in the globalization index are multiplied by the estimated globalization effect and subtracted from the historical growth rate values.

Finally, based on the GDP at the start of the period in question and applying the recently calculated growth rates, a counterfactual growth trajectory is created for each country to illustrate its economic development in the event of a period of stagnation of globalization.

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1   The economies investigated are the 42 countries in Prognos' macroeconomic multi-country model, VIEW. This list of countries includes all the highly developed economies and large emerging countries which together make up over 90 % of global economic output.

2   The selection of the indicators is in line with the KOF globalization index (see Dreher 2006).

TABLE 1 **Globalization index for 2014**

Ranking	Country	Globalisation index	Ranking	Country	Globalisation index
1	Ireland	88.87	22	Bulgaria	64.35
2	Netherlands	84.73	23	Greece	62.95
3	Belgium	83.57	24	Slovenia	62.10
4	Switzerland	79.41	25	Italy	61.38
5	Austria	76.07	26	Poland	61.27
6	Denmark	75.83	27	USA	61.25
7	Hungary	75.56	28	Chile	58.94
8	Sweden	75.05	29	Latvia	58.14
9	United Kingdom	74.59	30	Romania	58.04
10	Finland	73.15	31	Lithuania	57.93
11	Portugal	70.29	32	Israel	56.20
12	Norway	70.10	33	Japan	55.24
13	France	70.07	34	South Africa	50.92
14	Estonia	69.48	35	Turkey	48.73
15	Canada	68.37	36	South Korea	45.89
16	Czech Republic	68.19	37	Russia	43.79
17	Slovakia	67.00	38	Mexico	42.46
18	Spain	66.89	39	China	41.06
19	New Zealand	66.30	40	Brazil	40.34
20	Germany	65.66	41	Argentina	33.52
21	Australia	64.38	42	India	31.08

Source: Prognos 2016   Bertelsmann**Stiftung**

By comparing historical values of GDP with the values that arise from the counterfactual growth trajectory, we can tabulate and compare the individual countries' globalization-induced increases and decreases in growth. The decisive factor in the final determination of the globalization champion is which country was able to achieve cumulatively over the whole period between 1990 and 2014 the largest gains in per capita GDP as a result of globalization.

2.2 Globalization index results

The globalization index shows that with Ireland, the Netherlands and Belgium at the top of the table, primarily it is highly developed, well connected and mostly smaller economies that display especially high levels of globalization (Table 1).

Larger highly developed economies such as France, Spain, Germany and Italy are in mid-table. Among this group, the United Kingdom has the highest ranking. Bringing up the rear in the globalization index are countries like China, Brazil, Argentina and India – the major emerging countries. These results are comparable to the results of other globalization indices.[3]

The overall index is made up of the three Economy, Social and Political sub-indices. A separate look at each sub-index provides information on how the ranking is to be assessed in the overall index (Table 2). By way of example, the top positions held by Ireland, the Netherlands and Belgium are due to their very high values in the Economy and Social sub-indices. In the Political sub-index those

3   In the previous study "Globalization report 2014 – Who benefits most from globalization?" there is a detailed comparison of the globalization index with the New Globalization Index, the Ernst & Young, the Economic Intelligence Unit (EIU) and the KOF globalization indices.

TABLE 2 **Sub-indices of the globalization index for 2014**

Ranking	Country	Economy	Ranking	Country	Social	Ranking	Country	Politics
1	Ireland	85.5	1	Austria	97.6	1	Italy	99.3
2	Netherlands	77.5	2	Switzerland	96.8	2	France	99.3
3	Belgium	74.6	3	Netherlands	96.5	3	Austria	98.4
4	Switzerland	68.6	4	Ireland	96.4	4	Belgium	98.1
5	Hungary	66.9	5	Belgium	95.9	5	Spain	97.7
6	Estonia	65.4	6	Canada	93.9	6	United Kingdom	97.4
7	Denmark	64.8	7	Denmark	92.1	7	Sweden	96.2
8	Sweden	63.4	8	France	91.7	8	Brazil	95.5
9	Finland	62.2	9	United Kingdom	91.0	9	Netherlands	94.6
10	United Kingdom	61.5	10	Portugal	89.7	10	Switzerland	94.5
11	Austria	61.4	11	Sweden	88.9	11	Portugal	94.5
12	New Zealand	58.1	12	Norway	88.9	12	Canada	94.5
13	Norway	56.2	13	Germany	88.5	13	Turkey	94.0
14	Czech Republic	56.0	14	Slovakia	87.2	14	Argentina	93.8
15	Portugal	55.8	15	Finland	87.0	15	USA	93.4
16	Latvia	54.5	16	Spain	86.9	16	Germany	93.1
17	Bulgaria	54.4	17	Australia	86.6	17	Norway	92.9
18	Slovakia	54.3	18	Czech Republic	86.3	18	Denmark	92.7
19	France	53.1	19	Hungary	84.8	19	India	92.6
20	Chile	51.3	20	Greece	83.9	20	Finland	92.2
21	Canada	51.2	21	Poland	81.7	21	Hungary	92.2
22	Slovenia	50.4	22	USA	81.7	22	Greece	92.1
23	Spain	50.0	23	Italy	81.5	23	Australia	91.8
24	Lithuania	49.4	24	Israel	79.3	24	Ireland	91.3
25	Germany	48.9	25	Estonia	77.4	25	South Korea	91.0
26	Australia	47.9	26	New Zealand	76.5	26	Japan	90.7
27	Israel	46.6	27	Slovenia	75.6	27	Romania	90.7
28	Greece	46.3	28	Latvia	74.1	28	Chile	90.0
29	Poland	45.0	29	Bulgaria	73.5	29	Poland	89.8
30	USA	43.7	30	Romania	70.0	30	South Africa	87.7
31	Romania	43.2	31	Lithuania	69.0	31	Czech Republic	86.6
32	Italy	42.0	32	Japan	68.3	32	China	85.2
33	South Africa	39.8	33	Turkey	66.7	33	Slovakia	85.0
34	Japan	39.1	34	Russia	66.2	34	Bulgaria	85.0
35	Mexico	30.6	35	China	51.9	35	Russia	84.7
36	South Korea	29.1	36	Argentina	51.2	36	Slovenia	83.7
37	Turkey	27.6	37	South Korea	51.1	37	New Zealand	80.7
38	China	22.8	38	Chile	50.9	38	Estonia	73.8
39	Russia	22.7	39	Mexico	50.6	39	Lithuania	72.5
40	Brazil	21.4	40	South Africa	47.5	40	Mexico	70.0
41	India	12.5	41	Brazil	42.0	41	Israel	62.0
42	Argentina	7.5	42	India	25.2	42	Latvia	53.1

Source: Prognos 2016 — Bertelsmann**Stiftung**

economies also have high values, although other countries are at the top of the ranking in this case.

At first sight, the low values in the globalization index for the major emerging countries are a surprise. Indeed, China is often described as a globalization pace-setter. The emerging countries are lower down the table primarily in the Economy and Social sub-indices. Among other things, this result can be traced to the standardisation of all transaction variables in the Economy sub-index against the size of each economy (Box 1).[4]

4 Results from the empirical investigation show that even methodical approaches which "handicap" large economies less give similar results (see e.g. Vujakovic 2010).

Highly developed economies which are positioned in mid-table in the overall index have the top rankings in the Political sub-index. This is especially the case for Italy and France. Spain and the United Kingdom are also near the top. In the overall index and the sub-indices, Germany is only in mid-table positions, even though the country has been the unofficial "world champion exporter" for years.

In interpreting these results, we should note that high or low values do not represent an assessment. They are merely a measurement of the extent to which a country is connected to the rest of the world (in each sub-area).

To classify the results of the globalization index or sub-index it is helpful to give examples of some country-specific differences for some of the indicators. This shows us that Germany's relatively low value in the globalization index is at least partly due to economies of scale: Domestic markets play a more important role for larger economies than for smaller ones. Thus the value creation chains of companies from smaller countries rely to a much greater extent on international suppliers. In Germany, the total value of exports and imports in 2014 was around 2.7 billion euros – nine times as high as in the Czech Republic. In terms of gross domestic product, the order is reversed: the Czech Republic exported and imported goods amounting to 137 % of its economic output. For Germany, this "openness" only amounts to 69 %. Economies of scale also have clear effects on other indicators.

Geographical features and the country-specific importance of the financial sector also have an appreciable influence on the rankings in the globalization index. In particular, the Netherlands and Belgium have a very high degree of openness due to the international importance of their ports, Rotterdam and Antwerp. The importance of Ireland's capital, Dublin, as a financial centre means that the country is in a top ranking position in terms of international capital flows. In this context, the United Kingdom's high value in the Economy sub-index is a reflection of London's strength as a financial centre.

In general, a glance at the development of the globalization index since 1990 indicates that the rankings have barely changed in the last 24 years (Figure 1). Every economy showed an upward movement in the 1990s. However, it was similar for every country. Thus the leaders for the entire period under observation have been Ireland, the Netherlands and Belgium.

BOX 1 **China's position in the globalization index**

In the overall index, China is in 39th place. This result is mainly due to China's low score in the Economy sub-index. This may be surprising, given China's importance to the global economy, but a glance at China's scores for the individual indicators gives an explanation. Firstly, we must be clear that the Economy sub-index includes not only transaction variables but also those indicators which measure the limitations on transactions. Because of its relatively restrictive trade policy for all four indicators, China occupies one of the lowest rankings in this sub-index. This applies most obviously to the capital controls indicator. With a score of 3.5 for this indicator, China is in fifth from last position of all countries in the index. For comparison's sake: the globalization index leaders such as Ireland and the Netherlands score between 8 and 9 for this indicator.

Secondly, China does not score very highly compared to other economies in the "transaction variable" indicators. This is the case for portfolio investments (9.1 % of GDP – 42nd place), foreign direct investments (18 % of GDP – 42nd place) and trade in services (5 % of GDP – 41st place). Even in commodity trading, China, with 38 % of GDP, is "only" in 35th place of all the countries in the index. One of the main reasons for this is that, for the globalization index, the absolute transaction variables of a country are adjusted to take into account its GDP. For example, in absolute terms, China accounts for over 3.9 billion euros of commodity trading – six times Belgium's trade volume; this puts it in second place after the United States.

In the main, therefore, smaller, highly developed countries are the most highly globalized countries in the world. Those countries owe their high ranking partly to the high scores their economic output gained for the economic indicators. In contrast, the large European countries – with the exception of the United Kingdom – occupy positions in mid-table, which is mainly due to the average scores of their economic indicators, enhanced by the high weighting of the sub-index. The major emerging countries bring up the rear in the globalization index but over time have shown an above-average ability to catch up with the others.

FIGURE 1 **Developments in the globalization index for selected countries for the period 1990–2014**
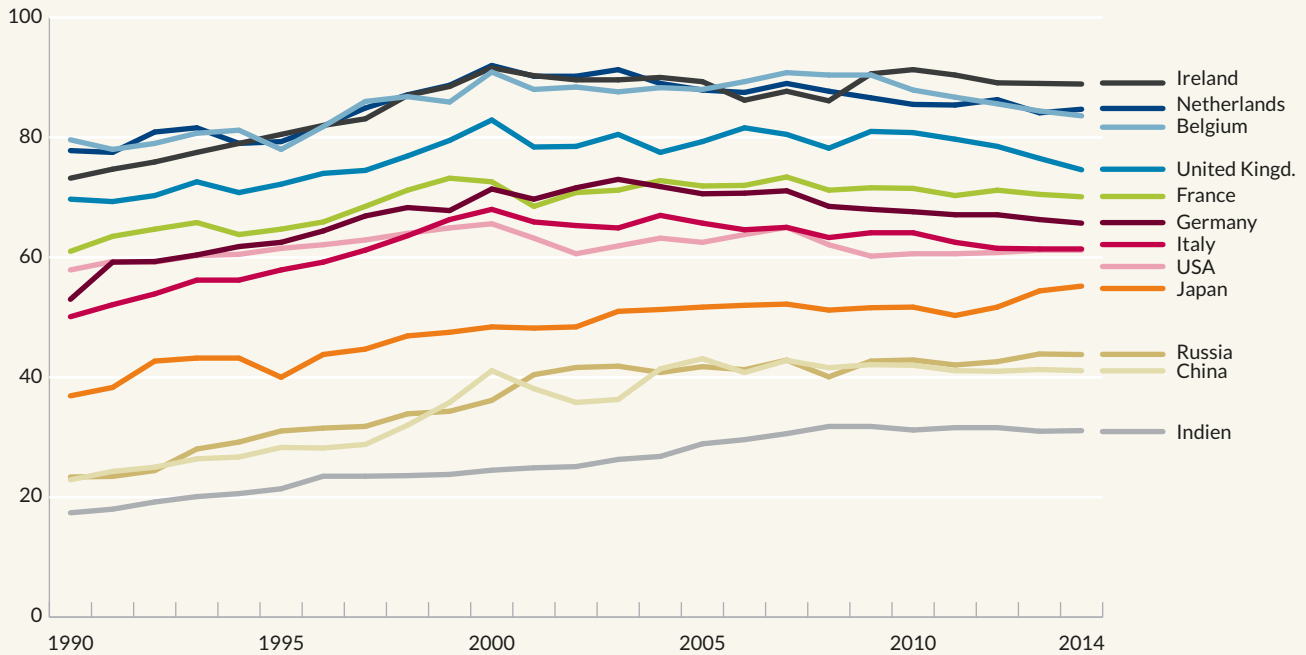
Source: Prognos 2016

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2.3 Results of regression analyses of the correlation between globalization and economic growth

The correlation between globalization and economic growth is quantified using regression analyses. This enables the effect of individual influences on economic development to be filtered out, while the effects of other drivers of economic development are statistically estimated.

The regression results of the baseline specification (Table 3) form the basis of the investigation. Alongside the globalization index – its main explanatory variable – the baseline includes per capita GDP, birth rate, investments and a crisis indicator for 2008 and 2009.[5]

The results demonstrate that globalization has a very positive influence on the growth of per capita GDP. The estimated coefficient of 0.31 means that an increase in the globalization index of one point on average leads to an increase in the growth of per capita GDP of 0.31 %. For Germany, for example, this means that, since the country

increased its globalization index by 0.53 per year between 1990 and 2014, 0.16 % was added to its annual per capita growth rate through its increasing connectedness with the rest of the world. As a whole, the average growth in per capita GDP over that period was 1.37 %. Thus globalization played an important role in this growth.

The other estimated results of the baseline specification also show the expected signs. Per capita GDP, birth rate and the indicator for the most recent global economic crisis negatively influenced the estimate and all these results are statistically significant. The coefficient of −8.60 for the influence of economic output means that an increase in GDP per inhabitant of 1 % leads to a decrease in per capita growth of 0.086 % two years later. The same applies to fertility. For this variable, an increase of 1 % corresponds to a fall in per capita growth of 0.09 %. The estimated coefficient of −3.63 for the crisis years 2008 and 2009 means that per capita economic growth in this period was about 3.6 % lower than in the other period under observation. The estimated value of investments as a share of GDP (0.17) also falls into line with expectations.

The reliability of the estimates is tested using various alternative regression parameters. The first alternative is one where the growth effect of globalization is estimated separately for various groups of countries but in other

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5 The selection of the variables for the baseline specification is largely based on the significance of the growth effects of these determinants as demonstrated in the results. An endogenous variable – investments – is also included.

TABLE 3 **Regression results of the determinants of economic growth per inhabitant**

Dependent variable: Growth of per capita GDP in percent	IV method with FE	IV method with FE and country groups
Globalisation overall	0.31***	
	(0.08)	
Globalisation for		
· large economies with high per capita income		0.24***
		(0.03)
· small economies with high per capita income		0.19**
		(0.06)
· large economies with low per capita income		0.23
		(0.15)
· small economies with low per capita income		0.38***
		(0.10)
Per capita GDP of period before last (logarithmized)	–8.60***	–8.27***
	(1.34)	(1.41)
Birth rate (logarithmized)	–9.03***	–9.40***
	(1.86)	(2.56)
Investments (as % of GDP)	0.17*	0.15*
	(0.08)	(0.08)
Crisis indicator 2008–2009	–3.63***	–3.60***
	(0.40)	(0.39)
Number of observations	**966**	**966**
R² (centered)	**0.375**	**0.385**

N.B.: The symbols *, ** and *** show the significance of the estimates for the 10%, 5% and 1% levels. The figures in brackets are the standard errors by country clusters. All regressions contain a constant. FE = country-specific fixed effects

Source: Prognos 2016   Bertelsmann**Stiftung**

respects the same explanatory variables are used. To that end the economies included in this study are divided according to GDP per capita in 1990 and the size of the economy in 1990 (measured as GDP) into four large groups of countries as similar as possible in size (Table 21 in Appendix 5.2).[6]

The results show that all four country groups demonstrate the same per capita growth sensitivity to globalization (Table 3, column 3). Compared to the baseline, small economies with low per capita GDP (0.38) have a somewhat higher growth sensitivity to globalization while all the other groups of countries have a slightly lower sensitivity. The differences between the estimates are too small to allow for meaningful interpretations – the more so since only

one of the estimates significantly differs from 0.31.[7] Thus it is clear that the alternative parameter with estimates of the growth impact of globalization that are specific to the groups of countries does not produce significant additional results. Furthermore, the estimated coefficients of the other explanatory variables scarcely differ from those of the baseline.

Depending on the baseline and the parameter for the sensitivities specific to the groups of countries, additional regressions with various combinations of explanatory variables are tested as further alternatives. The results of these regressions solidify the finding that the estimated growth influences of globalization and those of the other explanatory variables can be regarded as robust and reliable (Table 17 and Table 18 in the Appendix).

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6   The division was carried out as follows: Firstly, all the countries in the study were divided in two by median GDP per capita in 1990. This was 10 050 euros. Next, the groups of countries thus created were each divided into two sub-groups by median GDP in 1990. This figure was 250 billion euros for the group of countries with a high GDP per capita and 95 billion euros for the group of countries with a small GDP per capita.

7   The smallest p-value for two-sample t-tests is 0.01 for the group of large economies with a high per capita GDP. The next smallest value is 0.05 for the group of small economies with a high GDP. Thus the null hypothesis that the estimated sensitivity of growth to globalization is a value of 0.31 can be rejected only for the group of large economies with a high per capita GDP with a significance level of under 5 %.

The overall result of the regression analysis demonstrates that globalization has a stable and very positive influence on the growth of per capita GDP. The robustness of the estimates, in particular, increases our faith in the regression results. The estimated sensitivity of per capita growth using the baseline of 0.31 % per point on the globalization index also acts as the main interim result of this section. Based on this sensitivity, the globalization champion is determined in the next section.

2.4   Effects of globalization on growth

Based on the above results, we examine to what extent the countries in question benefited from increasing globalization from 1990 to 2014. This analysis is based on a comparison of the historical development of GDP against a counterfactual scenario in which we assume that globalization remained stagnant at its 1990 level. In other words: we assume in the comparison scenario that the globalization index remained at its 1990 level for each country for all of the years from 1990 to 2014.[8] As metrics for the globalization effects, we use the cumulative differences in per capita GDP over the entire period in question. In interpreting the results, we must distinguish between economic growth and cumulative income gains (Box 2).

The globalization champion is the country the inhabitants of which have benefited the most from increasing globalization, taking into account the cumulative effects. In line with this focus on the individual's economic situation, we also use the absolute income gains and the absolute income gains weighted according to purchasing power as two alternative key indicators to determine the globalization champion.

In order to differentiate the results in relation to the various starting positions and the various sizes of the individual economies, the globalization-induced per capita income gains are shown in relation to the GDP in 1990, as well as the aggregated income gains of the entire economy.

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8   For the counterfactual scenario, the development of per capita GDP is calculated using the following formula:

$$\frac{BIP_t}{POP_t} = \frac{BIP_{1990}}{POP_{1990}} * \prod_{k=1991}^{t} \left(1 + \frac{g_k - 0{,}31 * (GI_k - GI_{k-1})}{100} \right)$$

Where g^t stands for the historical growth rate of GDP in %, POP_t for population in year t and GI_t for the globalization index value in year t. Next, the GDP itself is produced through the multiplication of per capita GDP with the historical population figures.

2.4.1   Globalization champion determined using per capita income gains

Looking at the absolute per capita income gains due to increasing globalization, we see that Japan is in first place (Table 4).[9] Therefore, from this perspective, Japan is the globalization champion, followed by Switzerland, Finland and Denmark. Ireland, Austria, Greece and Sweden are other small European countries occupying places in the top ten on the list. However, Germany – a large economy – has also shown large per capita income gains and can therefore count itself as one of the (bigger) winners of the globalization process.

Places 11 to 24 are occupied primarily by Central European countries or national economies with a gross domestic product per capita that is high in comparison with the rest of the world. Slovenia also provides a Central and Eastern European country among these countries. It is noteworthy that residents of large industrial nations have not benefited equally from increasing global interconnectedness. Globalization gains per capita in the United States are less than half as high as those for Germany. France, Canada and Spain have also benefited less from globalization.

The lower mid-range of globalization winners consists primarily of nations from Central and Eastern Europe. Bringing up the rear in terms of absolute globalization gains per inhabitant are the large emerging countries. Thus, in spite of the importance to them of large internal markets and strong economic output for global economic development, these countries do not number among the main beneficiaries of globalization in the sense of absolute per capita income gains.

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9   In classifying the results properly it is important to note that the above investigation allows for no analysis of income distribution within a country. The globalization-induced income gains demonstrated refer exclusively to the population as a whole.

BOX 2 **Interpretation of globalization-induced income gains as a key indicator in determining the globalization champion**

The stagnant globalization assumed for the counterfactual scenario implies lower economic growth and, therefore, a less favourable growth trajectory. The year-on-year difference between the per capita GDP under this alternative scenario and what actually happened is the absolute economic gain (Figure 2).

In order to measure the cumulative effects of globalization, these gains for each country are added together for the entire 1990–2014 period. In this study

the amount calculated in this way is also described as the "cumulative income gain due to increasing globalization." This amount should not be confused with the amounts used in the national accounts such as disposable income.

Furthermore, we must distinguish between income gains and changed growth rates. Thus a one-off increase in the GDP growth rate itself produces income gains which accumulate over the remaining period under investigation even when growth rates do not otherwise change over that period. In contrast, a one-off globalization-related income gain has no implications for the growth rate in the following years.

FIGURE 2 **Schematic representation of the change in gross domestic product and globalization-induced income gains**
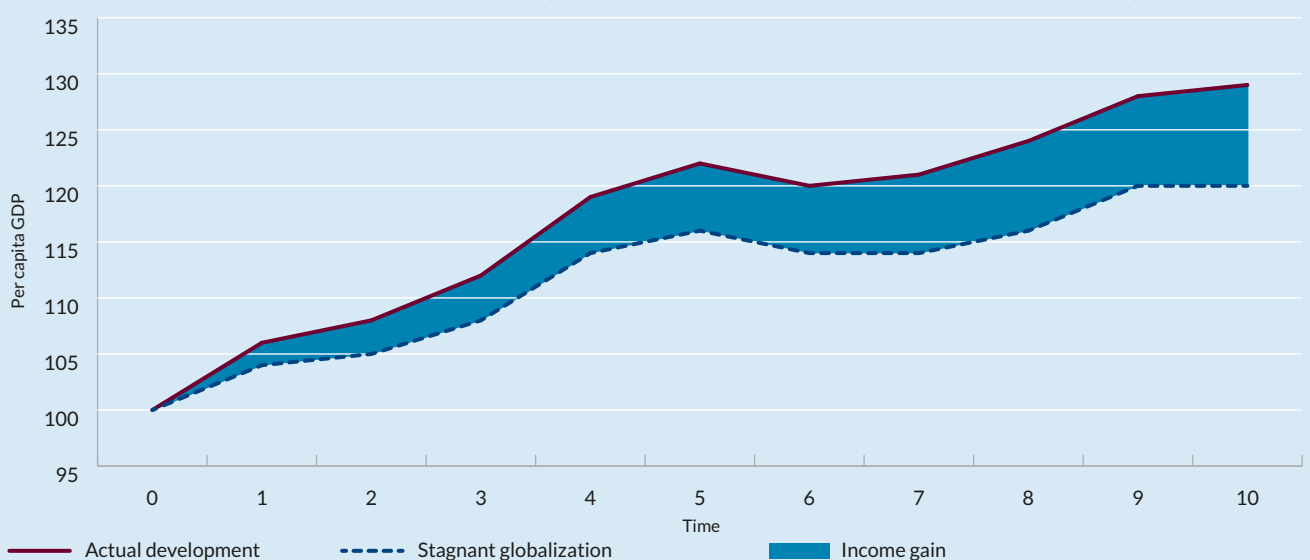

Source: Prognos 2016

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TABLE 4 **Absolute per capita income gains due to increasing globalization 1990–2014**

Ranking	Country	Average annual per capita income gain from 1990 in euros*	Cumulative per capita income gain from 1990 in euros*
1	Japan	1,470	35,300
2	Switzerland	1,360	32,700
3	Finland	1,340	32,100
4	Denmark	1,210	29,100
5	Ireland	1,130	27,100
6	Germany	1,130	27,000
7	Israel	1,040	24,900
8	Austria	880	21,100
9	Greece	880	21,100
10	Sweden	850	20,400
11	South Korea	830	19,800
12	Italy	780	18,800
13	Australia	770	18,400
14	Portugal	770	18,400
15	Slovenia	710	17,000
16	New Zealand	700	16,900
17	Netherlands	690	16,500
18	United Kingdom	680	16,200
19	France	650	15,600
20	Canada	650	15,500
21	Spain	530	12,700
22	Belgium	500	11,900
23	United States	490	11,700
24	Estonia	440	10,600
25	Hungary	400	9,600
26	Norway	340	8,100
27	Lithuania	310	7,500
28	Chile	310	7,400
29	Slovakia	300	7,300
30	Poland	270	6,400
31	Latvia	260	6,300
32	Czech Republic	260	6,300
33	Turkey	200	4,800
34	Romania	190	4,500
35	South Africa	180	4,200
36	Bulgaria	170	4,000
37	Argentina	130	3,100
38	Mexico	130	3,000
39	Brazil	120	2,900
40	Russia	120	2,800
41	China	70	1,700
42	India	20	400

* actual prices in 2000; rounded values

Source: Prognos 2016   Bertelsmann**Stiftung**

Another important issue arises for countries with the highest globalization index values: Belgium, the Netherlands and Ireland are not top of the table in terms of per capita globalization gains. The reason for this is that these economies have a high degree of connectedness with the rest of the world but were not very dynamic in the period under investigation. This result shows clearly the significance of constant efforts to open up an economy to the rest of the world – even, or especially, for highly globalized countries.

Looking at the change over time gives us additional information on how the globalization-related per capita income gains should be assessed (Figures 13 to 16 in the Appendix). This shows that the largest growth gains occurred in the period from the mid-1990s to the middle of the first decade of the 21st century. Globalization champion Japan and the other main globalization winners had already increased their per capita GDP at the beginning of the period under investigation as a result of globalization. Thus

BOX 3 **Comparison of current results with results in the 2014 globalization report**

The globalization index used here was initially created in 2014 and the globalization champion was determined on that basis. What changes can we see when comparing current results with the results from 2014?

In terms of absolute per capita income gains due to increasing globalization over the period in question (Table 4) the same countries as before are in the top positions. Ireland has joined Japan, Switzerland, Finland and Denmark in the top five, which has pushed Germany down to number 6. However, the order has changed. Japan is now at the top of the table (3rd place in the 2014 globalization report), followed by Switzerland (5th), Finland (1st), Denmark (2nd) and Ireland (9th). There are also differences in the absolute income gains: Compared to the previous survey, Japan and Switzerland have seen a large increase in cumulative growth, while Denmark and Austria have seen a reduction. What do these results mean?

Two variables vital for the calculation of the globalization gains have changed for all countries. Firstly, the estimated coefficient of the regression calculation is now 0.31. In the previous globalization report, this value was 0.35, based on the data then available. Both cases demonstrate

it is clear how important the changes in the early years of the period under observation are for the overall results of this investigation (Box 4).

Alongside the absolute income gains, the additional purchasing power that arises for each economy as a result is also important. For this reason, we analyzed income gains per capita that were weighted according to purchasing power as an alternative way to determine the globalization champion (Table 5). Under this approach, Finland is in top position. Also Greece is near the top, in second place (previously 9th). In contrast, from this perspective Japan slips down to 16th place.

that globalization has a very positive influence on the growth of per capita GDP, although in the current estimate the influence is slightly less. The extension of the period under observation by three years had the same effect on all countries.

In contrast, the changes in the globalization index turned out differently for various countries. For some countries such as the USA, the index values have not changed noticeably in the three years since the study of the 1990–2011 period; however, for other countries there have been noticeable changes. Thus Japan's index value has clearly increased in the last two years. In contrast, the globalization index for the United Kingdom has worsened noticeably since 2011. In some countries, the globalization index also changed noticeably in the preceding periods compared to the previous study: for China between 1990 and 2001 and for Austria from 2000 to 2011. Various factors are responsible for the changes in the index values. The fall in the United Kingdom's globalization index is mainly due to the slow development of foreign trade and tighter capital flow controls in the more recent past. Japan has significantly increased its foreign investments and its degree of openness. In addition, in the case of Japan, for example, exchange rate fluctuations also play an important role. The changes in the index value in periods further back in time are mainly due to revised data.

TABLE 5 **Per capita income gains due to increasing globalization 1990–2014, weighted for purchasing power**

Ranking	Country	Average annual per capita income gain in euros, adjusted*	Cumulative per capita income gain in euros, adjusted*
1	Finland	1.460	35.000
2	Greece	1.410	33.800
3	Ireland	1.280	30.600
4	Germany	1.270	30.400
5	South Korea	1.250	30.000
6	Switzerland	1.240	29.800
7	Slovenia	1.240	29.700
8	Israel	1.230	29.500
9	Portugal	1.190	28.500
10	Denmark	1.170	28.000
11	New Zealand	1.120	26.800
12	Austria	1.060	25.500
13	Estonia	1.060	25.400
14	Hungary	1.040	25.000
15	Italy	1.040	25.000
16	Japan	1.030	24.600
17	Australia	930	22.400
18	Sweden	850	20.500
19	Netherlands	840	20.100
20	Lithuania	830	19.800
21	Spain	780	18.700
22	Canada	780	18.700
23	France	750	18.100
24	Czech Republic	710	17.100
25	United Kingdom	700	16.900
26	Bulgaria	650	15.600
27	Romania	650	15.500
28	Latvia	640	15.400
29	Poland	630	15.100
30	Slovakia	630	15.000
31	Belgium	600	14.500
32	Chile	580	14.000
33	United States	490	11.700
34	Russia	450	10.800
35	South Africa	450	10.700
36	Turkey	440	10.600
37	Norway	330	7.800
38	Brazil	290	7.000
39	China	220	5.300
40	Mexico	190	4.600
41	Argentina	150	3.700
42	India	80	2.000

* adjusted for purchasing power in relation to the United States; actual prices in 2000; rounded values

Source: Prognos 2016　　　　　　　　　　| Bertelsmann**Stiftung**

BOX 4 **Choice of period under observation**

DThe period under observation (1990–2014) is limited firstly by the fall of the Iron Curtain and the associated breakdown of the planned economies in the former eastern bloc. In the 1990s, the integration of the former eastern bloc countries into the (free market-based) global economy began. China accelerated the opening of its markets to foreign trade as well. This led to a noticeable surge in internationalization. The end of the period under observation is dictated by the limits of the available data.

It should be noted that the choice of the period under analysis has noticeable effects on the globalization gains calculated: The earlier a country (e.g. Japan) has been able to benefit from globalization, the longer the period over which per capita income gains are able to be accumulated. In contrast, countries like Chile and Slovakia, which have only registered a clear increase in their globalization index during the latter period, are disadvantaged by the choice of period under investigation. On the other hand, a later start to the period under observation disadvantages those countries which opened their economies up relatively early and then remained constantly at a high level.

2.4.2 Globalization-induced per capita income gains compared to the starting point

Analysis of the per capita income gains compared to the starting point of per capita GDP produces a very different ranking of countries (Table 6). Economies which in 1990 had a low to medium ranking in terms of per capita GDP under this approach occupy the top positions – China in particular. The cumulative globalization-induced per capita income gains in China are four times as high as the country's per capita GDP in 1990.

Also at the top are South Korea and Central European countries – those which have resolutely globalized over the past decades and are experiencing a high growth rate. The majority of the smaller economies with a high per capita GDP occupy places in mid-table. In contrast, Sweden, Belgium and, in particular, Norway are down in the lower places.

Of the highly developed large industrialized countries, Germany occupies the highest ranking (21st place). Spain, Italy and France occupy positions in the lower mid-range. The results for the United Kingdom and the United States are especially noteworthy. Their rankings at the lower end of the table are the consequence of relatively low absolute income gains compared to a high starting point of per capita GDP.

Of the large emerging countries only China occupies a high ranking. However, the larger absolute per capita income gains compared to China of other emerging countries are overcompensated by higher starting points for per capita GDP. For that reason, Russia and Brazil are in the lower mid-range, while Argentina and Mexico occupy lower-range places in the rankings. India's position in mid-table is due to the lowest absolute per capita income gain of all the countries studied combined with the lowest level of per capita GDP in the start year.

TABLE 6 **Globalization-induced per capita income gains 1990–2014 compared to per capita GDP in 1990**

Ranking	Country	Cumulative per capita income gains compared to per capita GDP in 1990, in %
1	China	406 %
2	South Korea	262 %
3	Romania	229 %
4	Bulgaria	218 %
5	Estonia	210 %
6	Chile	210 %
7	Hungary	199 %
8	Greece	193 %
9	Poland	190 %
10	Portugal	190 %
11	Slovenia	183 %
12	Ireland	178 %
13	Israel	164 %
14	Lithuania	161 %
15	Finland	147 %
16	Latvia	143 %
17	New Zealand	133 %
18	Slovakia	132 %
19	India	128 %
20	Turkey	127 %
21	Germany	123 %
22	South Africa	119 %
23	Denmark	109 %
24	Czech Republic	103 %
25	Italy	101 %
26	Spain	100 %
27	Russia	99 %
28	Austria	98 %
29	Australia	96 %
30	Japan	95 %
31	Switzerland	84 %
32	Brazil	79 %
33	Sweden	76 %
34	Netherlands	76 %
35	France	76 %
36	United Kingdom	71 %
37	Canada	71 %
38	Belgium	57 %
39	Argentina	51 %
40	Mexico	49 %
41	United States	37 %
42	Norway	27 %

Source: Prognos 2016   Bertelsmann**Stiftung**

2.4.3 Globalization-induced income gains at the country level

When we look at globalization-induced income gains at the country level, it is scarcely surprising that only large economies are represented at the top of the table (Table 7). Japan is in first position with an average annual income gain of 187 billion euros as a result of increasing globalization. Japan's gains over the whole period under investigation amount to over 4 trillion euros. The globalization gains of the United States (141 billion euros p.a.), China (96 billion euros p.a.) and Germany (92 billion euros p.a.) are also significant.

The ranking of globalization gains at the country level largely corresponds to public perception, since at the aggregated level the large economies are the vital actors and beneficiaries of increasing global interconnectedness. The fact that, contrary to commonly-held assumptions, China and India are not in first and second places on the list of globalization winners produced here is also due to the observation period: firstly, the choice of observation period means for both countries that the calculations of the absolute income gains are based on the low GDP values in 1990. Secondly, both countries have only undergone a noticeable globalization surge since the mid-1990s. However, it is clear that progress made in the first years of observation has an especially strong effect on the aggregated globalization gains.

TABLE 7 **Average and cumulative globalization-induced income gains at the national level between 1990 and 2014**

Ranking	Country	Average annual income gain from 1990 in billions of euros*	Cumulative income gain from 1990 in billions of euros*
1	Japan	187.2	4,493
2	United States	141.1	3,386
3	China	95.6	2,295
4	Germany	92.2	2,214
5	Italy	45.4	1,090
6	United Kingdom	41.1	987
7	France	41.0	983
8	South Korea	40.0	959
9	Spain	22.8	548
10	Brazil	22.6	543
11	India	21.9	525
12	Canada	20.7	497
13	Russia	17.2	413
14	Australia	15.9	381
15	Mexico	13.6	327
16	Turkey	13.4	322
17	Netherlands	11.2	268
18	Poland	10.2	245
19	Switzerland	10.2	244
20	Greece	9.7	232
21	South Africa	8.6	205
22	Portugal	8.0	191
23	Sweden	7.8	186
24	Israel	7.4	177
25	Austria	7.2	173
26	Finland	7.0	169
27	Denmark	6.6	158
28	Belgium	5.2	126
29	Chile	5.0	121
30	Argentina	4.8	116
31	Ireland	4.7	114
32	Hungary	4.0	96
33	Romania	3.9	95
34	New Zealand	2.8	68
35	Czech Republic	2.7	65
36	Slovakia	1.6	39
37	Norway	1.6	38
38	Slovenia	1.4	34
39	Bulgaria	1.3	30
40	Lithuania	1.0	24
41	Estonia	0.6	14
42	Latvia	0.6	14

* actual prices in 2000; rounded values

Source: Prognos 2016　　　　　　　　　Bertelsmann**Stiftung**

2.4.4　Globalization gains correlated with GDP as a whole

The investigation shows that globalization is a primary driver of growth for many economies. In contrast, in some countries the growth contribution of globalization is of minor importance. This is illustrated by a comparison of globalization-induced income gains with the overall growth of GDP between 1990 and 2014 (Tables 19 and 20 in the Appendix).

While in some countries over a third or even a half of income gains since 1990 are associated with globalization, in other countries the proportion of globalization-related income gains as a percentage of the entire growth of economic output amounts to under 5 %. This difference can be explained by country-specific factors.

Thus for many European countries the creation of the European Single Market has been vitally important. In contrast, for the large emerging countries the dynamic of its own internal market or the spread of technology from the industrialized nations has played a more important role.

3 International competitiveness and export performance

As the above analyses show, economies can benefit enormously from globalization. International competitiveness is a key to success in the global marketplace. The next section firstly examines the developments in the export performance of 42 economies in total and sets out how global market shares have changed in the past 20 years. Then, using a constant market share analysis, we show the extent to which global market shares or losses are due to changes in an economy's relative competitiveness.

3.1 Export performance

The speed and intensity of globalization have enormously increased in the last two decades. The global volume of trade between 1995 and 2014 was much more dynamic than overall GDP. In particular, the sharp increase in the global economic importance of the emerging countries has changed the fabric of global economic relations permanently.[10]

Thus the proportion of total exports supplied by emerging countries rose between 1995 and 2014 from 12 % to 31 % (Figure 3). China was responsible for a large part of this increase: its proportion rose from 4 % to 17 % over the period under observation. The significant gain for the emerging countries came at the cost of the group of industrialized countries. Even Germany's export percentage went down. Nevertheless, the German export sector performed well on the global market compared to the other large industrial nations.

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10 The 42 countries in the VIEW model currently produce over 90 % of global GDP. In the section below, we take the aggregate of these 42 countries as an approximation of the global reference.

FIGURE 3 **Proportion of global exports supplied by country groups in %, 1995 to 2014**

Germany ▪ Industrialized countries (apart from Germany) ▪ Emerging countries
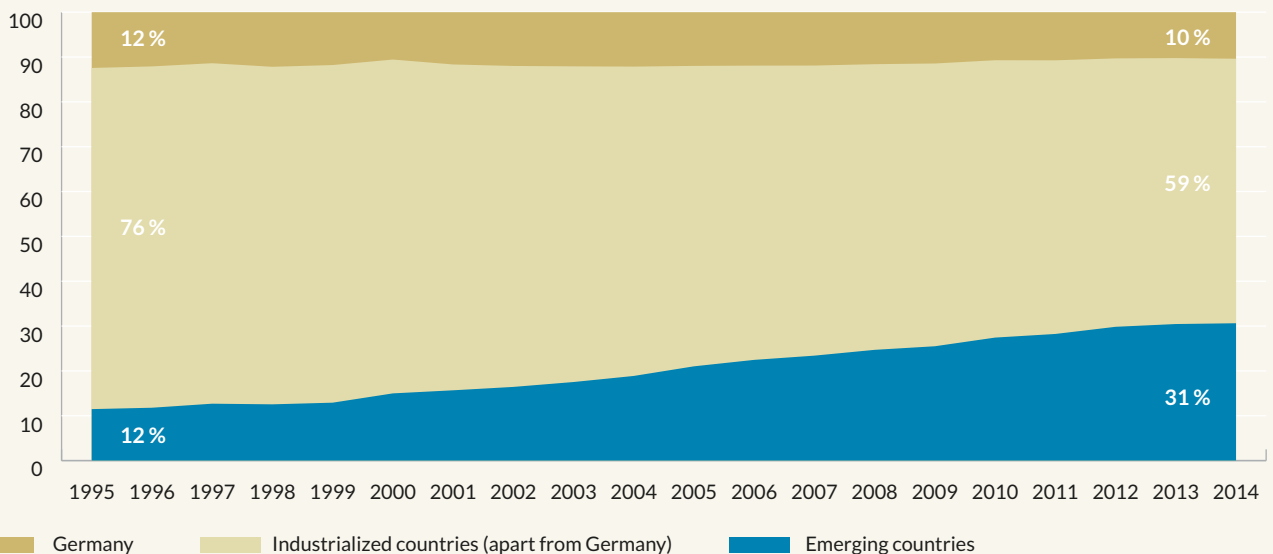
Source: Comtrade 2016, calculations by Prognos AG

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TABLE 8 **Change in exports and global export market shares in 42 economies, 1995–2014, in %**

Country	Exports in billions of USD		Growth in % p.a.		Proportion of global exports in %		Difference (%)	
	1995	2014			1995	2014		
China	148	2,340	15.6 %		3.8 %	17.1 %	13.3	
Lithuania	3	32	13.8 %		0.1 %	0.2 %	0.2	
Slovakia	8	86	13.0 %		0.2 %	0.6 %	0.4	
India	31	314	12.9 %		0.8 %	2.3 %	1.5	
Latvia	1	13	12.8 %		0.0 %	0.1 %	0.1	
Poland	23	214	12.5 %		0.6 %	1.6 %	1.0	
Estonia	2	17	12.3 %		0.0 %	0.1 %	0.1	
Hungary	12	110	12.1 %		0.3 %	0.8 %	0.5	
Romania	8	68	12.0 %		0.2 %	0.5 %	0.3	
Czech Republic	21	174	11.7 %		0.5 %	1.3 %	0.7	
Russia*	75	483	10.9 %		1.9 %	3.5 %	1.7	
Turkey	22	152	10.8 %		0.6 %	1.1 %	0.6	
Bulgaria*	5	28	10.4 %		0.1 %	0.2 %	0.1	
South Africa*	23	85	9.9 %		0.6 %	0.6 %	0.1	
Chile	15	76	8.8 %		0.4 %	0.6 %	0.2	
Mexico	79	388	8.7 %		2.0 %	2.8 %	0.8	
Brazil	46	218	8.6 %		1.2 %	1.6 %	0.4	
South Korea	123	572	8.4 %		3.2 %	4.2 %	1.0	
Australia	48	220	8.3 %		1.2 %	1.6 %	0.4	
Slovenia	8	30	7.1 %		0.2 %	0.2 %	0.0	
Israel	19	68	7.1 %		0.5 %	0.5 %	0.0	
Norway	39	139	7.0 %		1.0 %	1.0 %	0.0	
Spain	89	305	6.7 %		2.3 %	2.2 %	−0.1	
Netherlands	171	569	6.5 %		4.4 %	4.2 %	−0.2	
Greece	11	35	6.4 %		0.3 %	0.3 %	0.0	
Argentina	21	65	6.1 %		0.5 %	0.5 %	−0.1	
New Zealand	13	40	5.9 %		0.3 %	0.3 %	−0.1	
Belgium	158	458	5.7 %		4.1 %	3.3 %	−0.7	
Germany	494	1,420	5.7 %		12.7 %	10.4 %	−2.3	
Switzerland	81	233	5.7 %		2.1 %	1.7 %	−0.4	
Ireland	41	117	5.7 %		1.0 %	0.9 %	−0.2	
Austria	57	163	5.7 %		1.5 %	1.2 %	−0.3	
Portugal	23	64	5.4 %		0.6 %	0.5 %	−0.1	
United States	560	1,441	5.1 %		14.4 %	10.5 %	−3.9	
Canada	181	442	4.8 %		4.7 %	3.2 %	−1.4	
Denmark	44	101	4.4 %		1.1 %	0.7 %	−0.4	
Italy	228	514	4.4 %		5.9 %	3.8 %	−2.1	
Sweden	71	157	4.2 %		1.8 %	1.1 %	−0.7	
Great Britain	232	459	3.6 %		6.0 %	3.4 %	−2.6	
France	283	551	3.6 %		7.3 %	4.0 %	−3.3	
Finland	40	70	3.0 %		1.0 %	0.5 %	−0.5	
Japan	434	650	2.2 %		11.1 %	4.7 %	−6.4	
All 42 countries	**3,992**	**13,679**	**6.7 %**		**100.0 %**	**100.0 %**	**–**	

*Different baseline year: Russia and Bulgaria: 1996; South Africa: 2000

Source: Comtrade 2016, calculations by Prognos AG

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FIGURE 4 **Change in exports and global market share, emerging countries, 1995 to 2014**

Source: Comtrade 2016, calculations by Prognos AG

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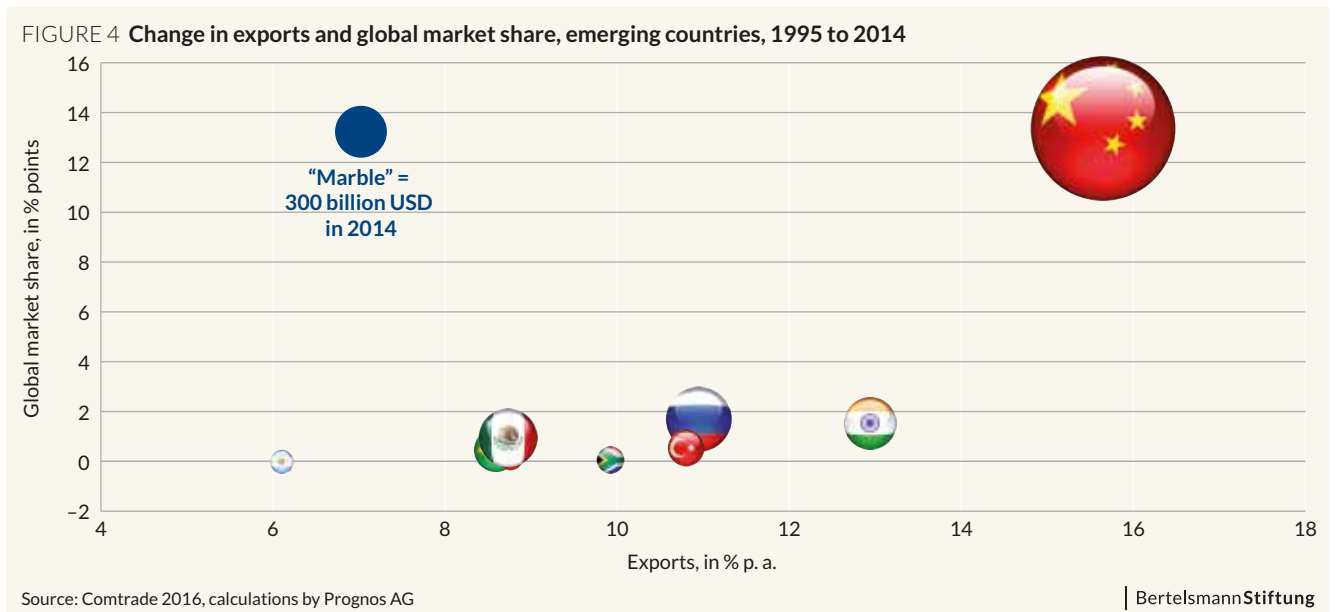
A summary table for all 42 economies shows that every country's exports rose appreciably. Primarily, many emerging countries and Central and Eastern European economies achieved very high growth rates. Many of them increased their average exports between 1995 and 2014 by over 10 % p.a. (Table 8, left-hand side, marked in blue). The larger, established economies showed the smallest growth rates. The larger emerging countries and South Korea showed the largest gains in their share of the global export market (Table 8, right-hand side, marked in blue).[11]

The People's Republic of China has a prominent position in the group of emerging countries. No other economy in this study showed such a high growth rate and such high absolute gains between 1995 and 2014 as China (Figure 4). The gradual opening of the country to the West since the end of the 1970s, which was accompanied by a heavy focus on foreign trade and foreign investments, together with an experimental and gradual policy of economic reform, unleashed the country's great growth potential: thus China's average annual growth rate from 1979 to 2010 was 10 %.

Many other emerging countries have displayed impressive growth in both of the last two decades but have clearly

lagged behind the People's Republic of China in terms both of dynamism and absolute growth.

Likewise, exports from the Central and Eastern European countries have grown especially quickly, primarily due to the integration of this region into the European Single Market. The nations in that region with the largest exports in 2014 were Poland (export volume 214 billion euros), the Czech Republic (174 billion euros) and Hungary (110 billion euros; Figure 5).

The rise of the emerging countries and the Central and Eastern European economies has been at the cost of the established western economies. The Group of Seven (G7) countries are seeing continued losses in their global export market shares. Japan, USA and France are seeing especially high losses – between 3 and 6 % (Figure 6).The other industrialized countries have also had to accept losses in their global market shares. In particular, the export sector of the Scandinavian countries – apart from Norway, which is strongly focused on the export of energy commodities – showed below-average performance between 1995 and 2014 (Figure 7). The Netherlands and Belgium play a special role in this group of countries. The overall European importance of the ports of Rotterdam and Antwerp distorts both countries' foreign trade data. Many European countries do a large amount of their trade outside Europe via these transshipment points. This inflates the trade balance of both economies.
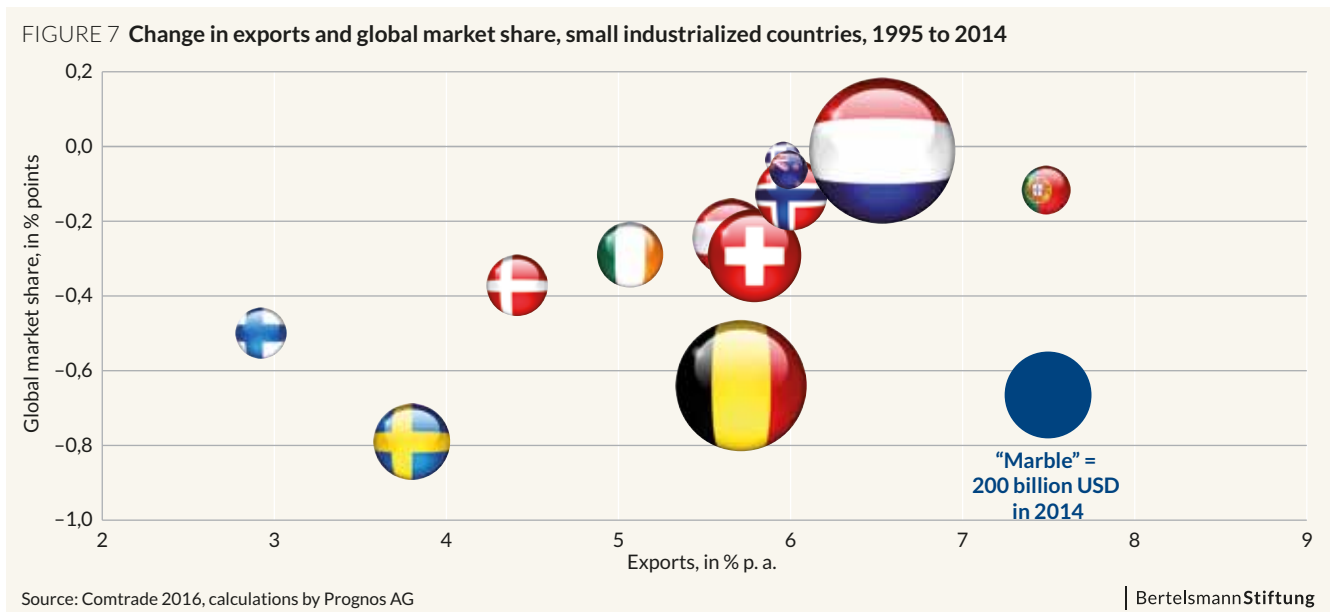
11   The analysis is based on current data from Comtrade. The data was drawn from the following SITC-AG1 sectors: 0 Food and live animals; 1 Beverages and tobacco; 2 Crude materials, inedible, except fuels; 3 Mineral fuels, lubricants and related materials; 4 Animal and vegetable oils, fats and waxes; 5 Chemicals and related products, n.e.s.; 6 Manufactured goods classified chiefly by material; 7 Machinery and transport equipment; 8 Miscellaneous manufactured articles.

FIGURE 5 **Change in exports and global market share, Central and Eastern European countries, 1995 to 2014**

"Marble" =
100 billion USD
in 2014
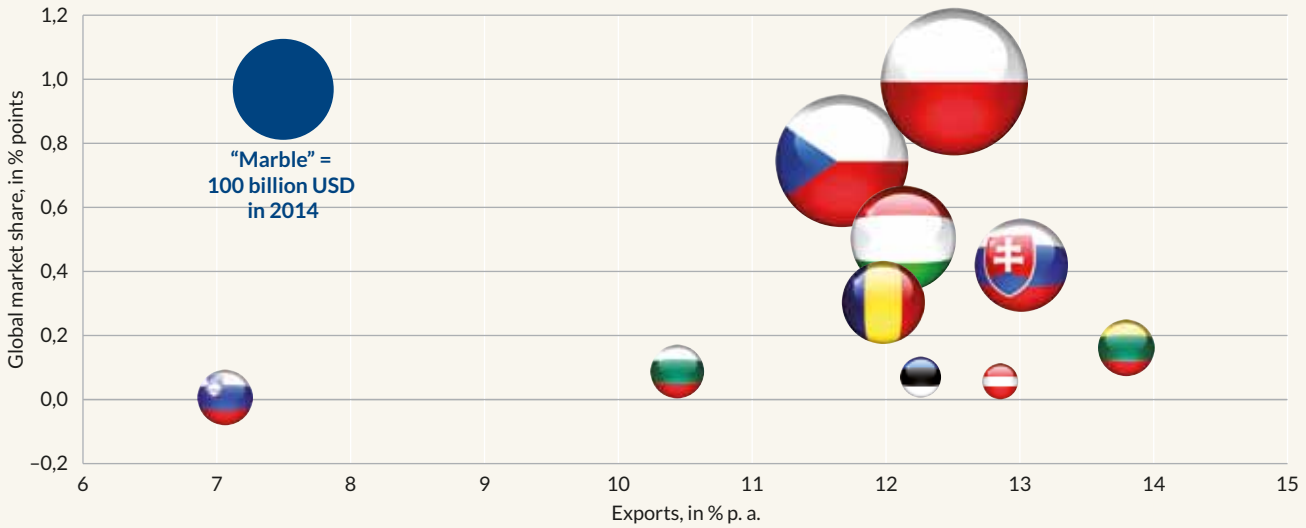
Source: Comtrade 2016, calculations by Prognos AG

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FIGURE 6 **Change in exports and global market share, large industrialized countries, 1995 to 2014**

"Marble" =
500 billion USD
in 2014
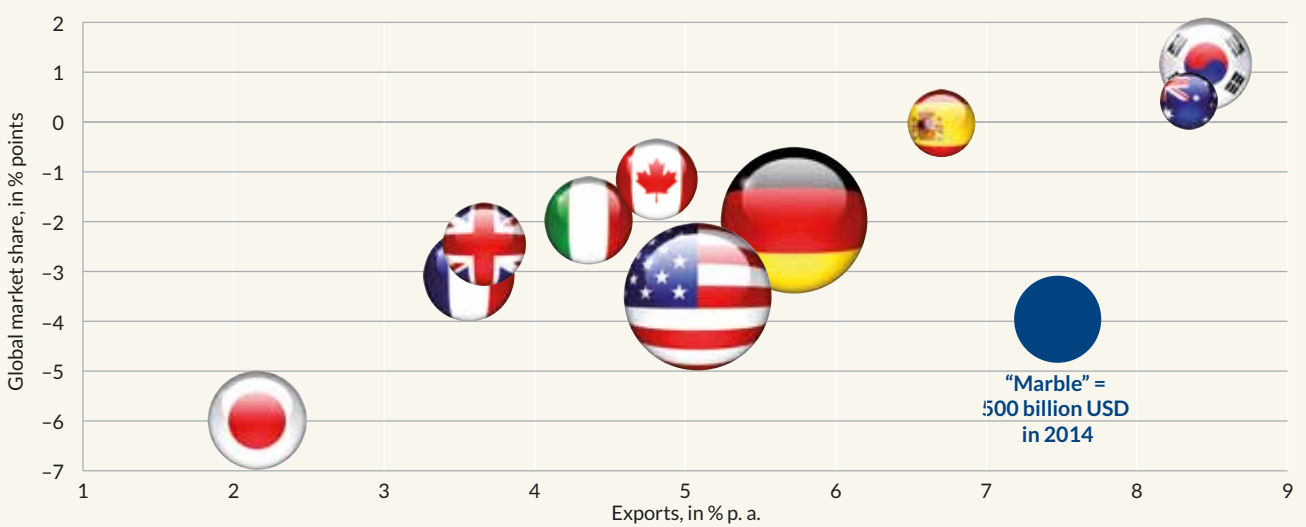
Source: Comtrade 2016, calculations by Prognos AG

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Overall, world trade from 1995 to 2014 has been very dynamic. Even in Japan, which achieved the lowest growth in exports of all the economies in this study, exports rose by 2.5 % p.a. on average. In first place in terms of growth rate and absolute growth stands the People's Republic of China. The other emerging countries and Central and Eastern European countries also displayed a high growth rate. Conversely, the G7 countries in particular showed a clear relative loss of importance.

FIGURE 7 **Change in exports and global market share, small industrialized countries, 1995 to 2014**

Source: Comtrade 2016, calculations by Prognos AG
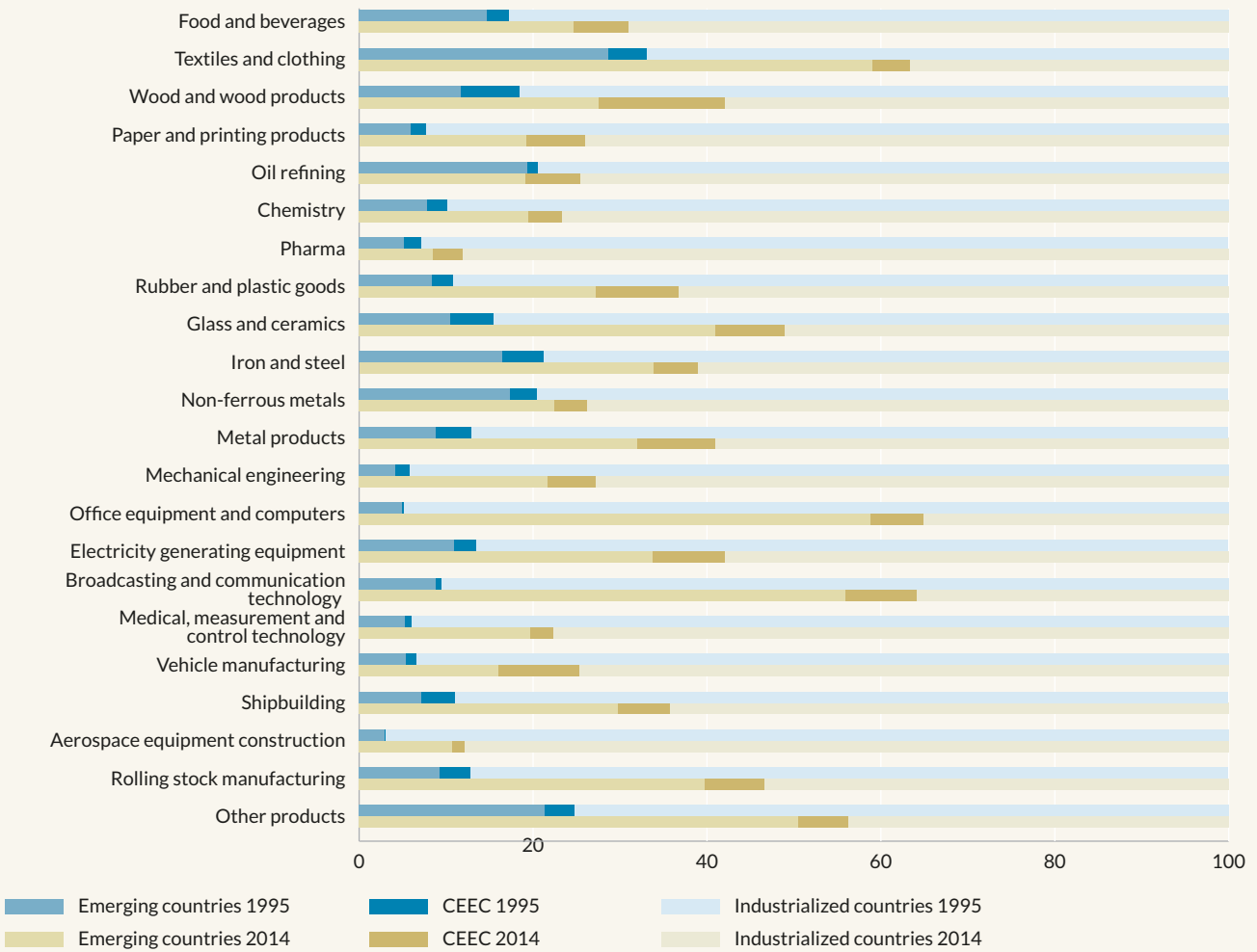
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3.2 Change in global market shares at sector level

The section above shows that the group of emerging countries has increased its share of global exports significantly over the past 20 years. This catching-up process can be seen in all sectors of manufacturing. However, there are clear differences between sectors. While in some sectors much more than half of globally traded goods now come from emerging countries, in other sectors the established developed countries are still leading the way (Figure 8).

In the textiles and clothing, office equipment and computers and broadcasting and communication technology sectors, the emerging countries have not only caught up with the established developed countries but have even overtaken them in terms of their share of global exports. Also in the glass and ceramics and railroad equipment sectors, the emerging countries' market shares are now very high.

In other areas, global import demand is still covered almost exclusively by the highly developed economies. In particular, the pharmaceutical industry and the aerospace equipment construction sector fall into that category. The industrialized countries are also still very dominant in paper and printing, oil refining, chemistry, non-ferrous metals, medical, measurement and control technology and automobile construction.

FIGURE 8 **Share of regions in global exports by sector, 1995 (upper bar) and 2014 (lower bar), in %**

Source: Prognos world trade model 2016

Legend:
- Emerging countries 1995
- CEEC 1995
- Industrialized countries 1995
- Emerging countries 2014
- CEEC 2014
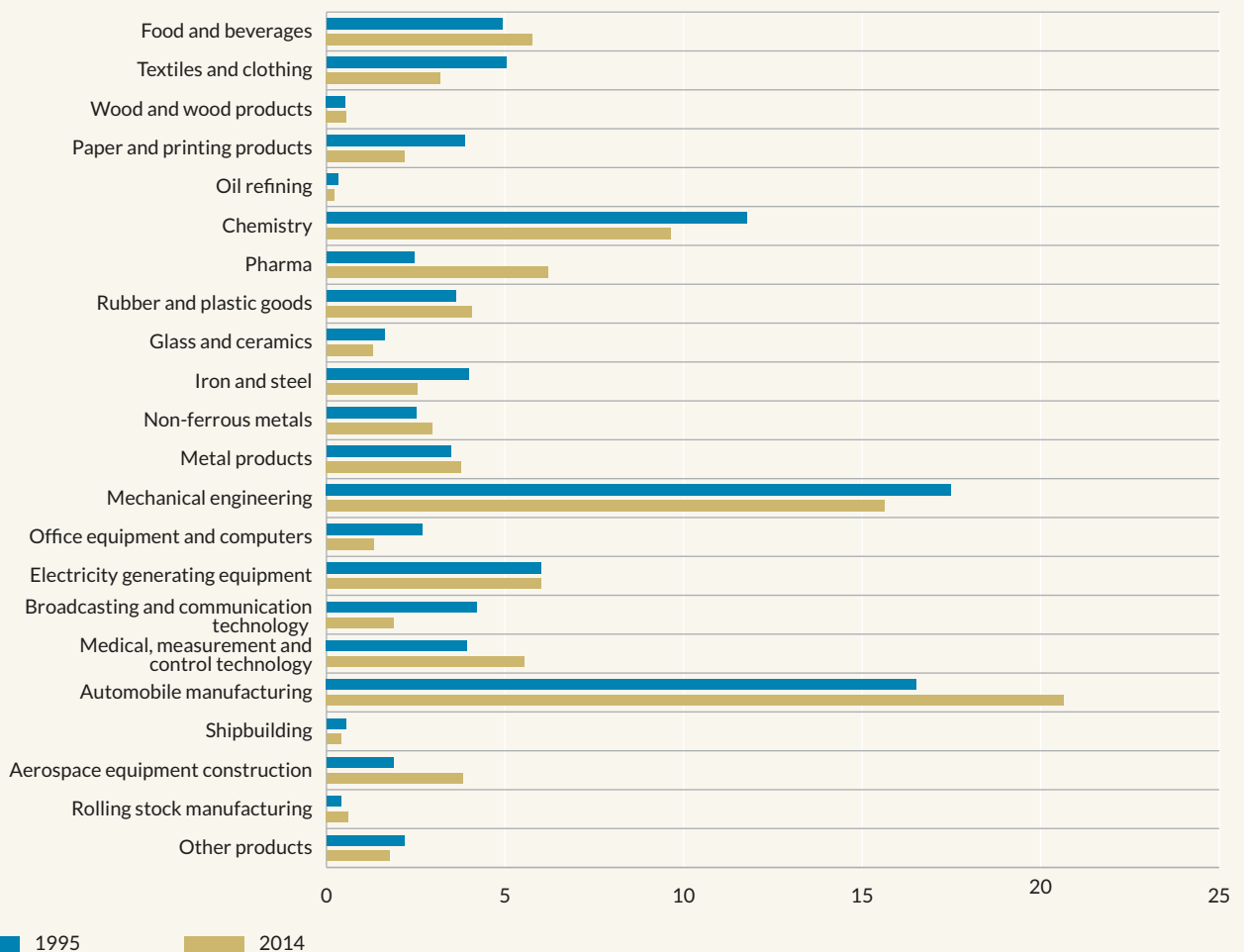- Industrialized countries 2014

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Germany has performed well on the global market over the last 20 years compared to the other industrialized countries. One possible reason for this can be seen by taking a closer look at the German export sector, which is very much focused on the sectors which (at least so far) have been affected less than average by the shifts in the global production structure. This applies to the three largest German export sectors measured by volume, automobile construction, mechanical engineering and the chemical industry, as well as for the sector that has in the most recent past shown the highest growth in Germany, the pharmaceutical industry (Figure 9). For industrialized countries such as Japan and the United States, in contrast, sectors like broadcasting and communication technology and office equipment and computers used to (also) play a prominent role – sectors which have shifted their production capacity very heavily to emerging or Central and Eastern European countries.

Automobile construction is now Germany's largest export sector. German companies slightly increased their share of the global export market between 1995 and 2014 from 18 % to 20 % (Figure 10). Mexico is the only emerging country to establish itself in the top five countries for automobile exports. Germany is also very well positioned in mechanical engineering, although the market share in this sector fell from 19 % to 16 %. In the chemical industry, Germany is in second place after the United States. In both the above-mentioned sectors, China is now playing an important, if not yet dominant, role.

In other industrial sectors things look quite different: In the office equipment and computers, broadcasting and communication technology and rail transport sectors, production is now very highly concentrated in the emerging countries. A glance at the most important individual

FIGURE 9 **Share of German industrial goods exports by sector, 1995 and 2014, in %**

Sector	
Food and beverages	
Textiles and clothing	
Wood and wood products	
Paper and printing products	
Oil refining	
Chemistry	
Pharma	
Rubber and plastic goods	
Glass and ceramics	
Iron and steel	
Non-ferrous metals	
Metal products	
Mechanical engineering	
Office equipment and computers	
Electricity generating equipment	
Broadcasting and communication technology	
Medical, measurement and control technology	
Automobile manufacturing	
Shipbuilding	
Aerospace equipment construction	
Rolling stock manufacturing	
Other products	

■ 1995 ■ 2014

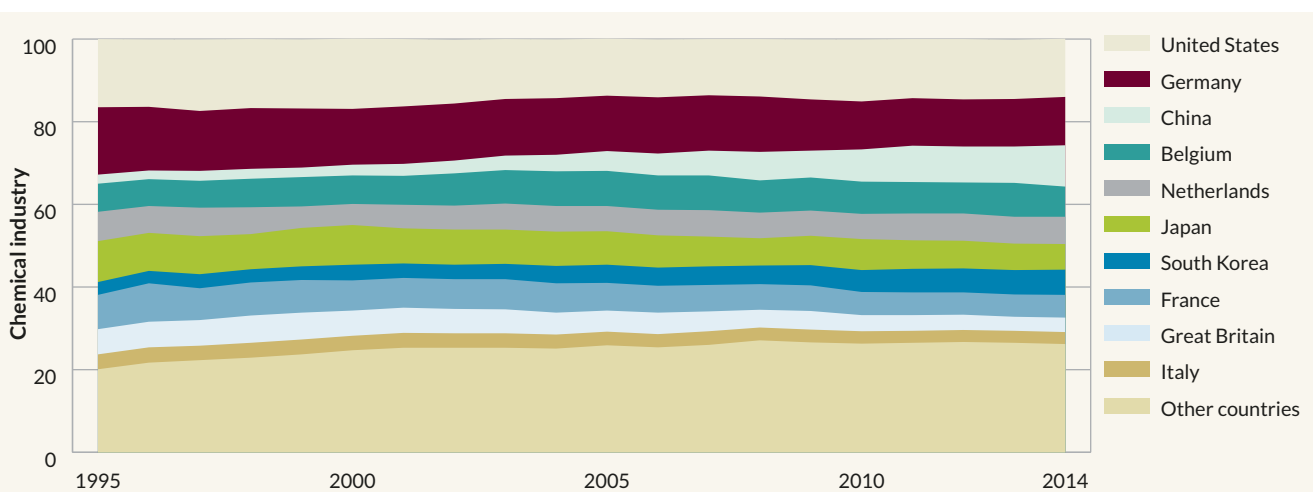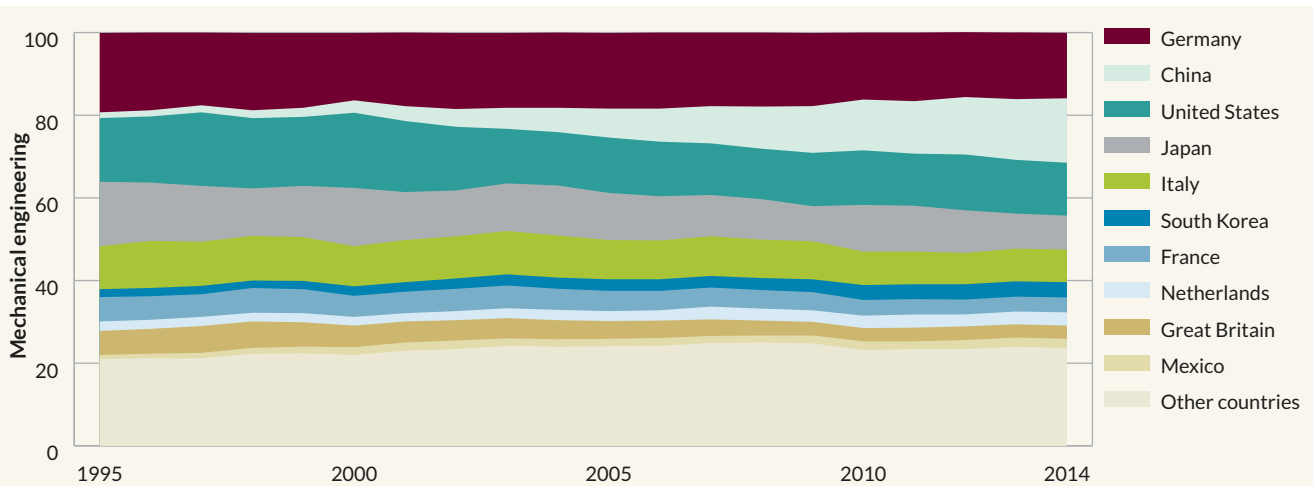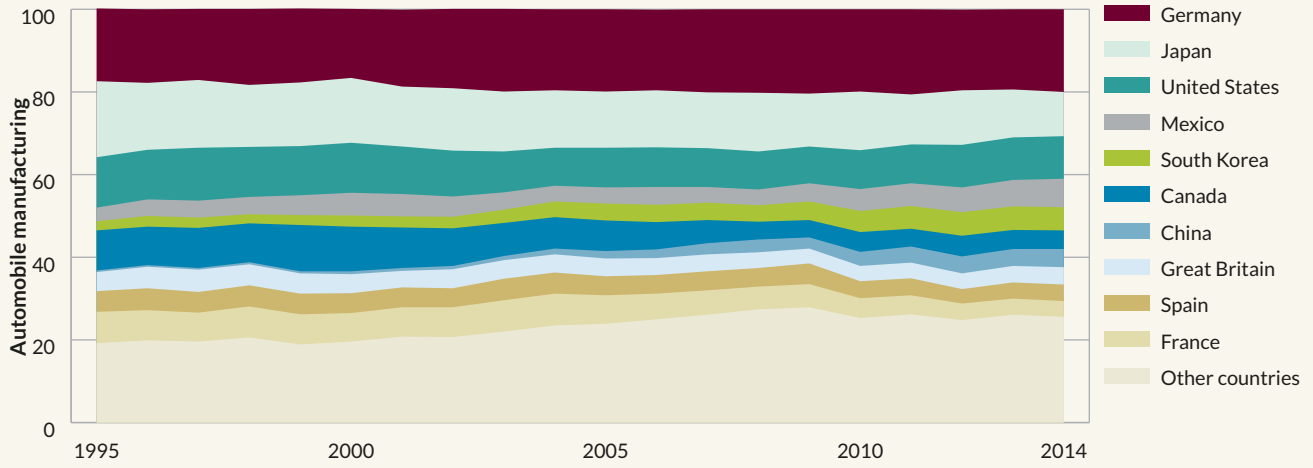Source: Prognos world trade model 2016

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countries shows that the increase in importance of the emerging countries group is often directly associated with the increase in China's importance. In both electronics sectors, the People's Republic has a market share of about 50 % (Figure 11). The bulk of the industrialized countries' market share losses are often borne by one or two economies: mainly Japan, but also the United States, have forfeited their previously dominant position in many of the sectors in question.

At the same time it is clear that Germany's consistently high global market share is not only due to the fact that its domestic export sector specializes in products which (as yet) play no great role in the emerging countries. Thus Germany has slightly increased its market share even in railroad equipment – even though this is primarily the sector in which the emerging and Central and Eastern European countries (especially China) have increased their market

shares the most. The United States has also managed to defend its position in that sector. Other previously large exporters of railroad equipment such as Japan and Italy have lost out badly. The result shows clearly that Germany has managed better than most other industrialized countries to maintain its international competitiveness or to focus on particular markets or export goods which have shown an above-average level of growth.

To test this hypothesis, a constant market share analysis was carried out to correlate export performance with the changes in the individual economies' global market shares. On this basis the reasons for the differing export performance from country to country could be systematically examined and presented.

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FIGURE 10 **Changes in global market shares of top ten exporters in automobile construction, mechanical engineering and the chemical industry, 1995–2014 in %**

Source: Prognos world trade model 2016

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FIGURE 11 **Changes in global market shares of top ten exporters in office equipment and computers, broadcasting and communication technology and rail transport construction sectors, 1995–2014 in %**
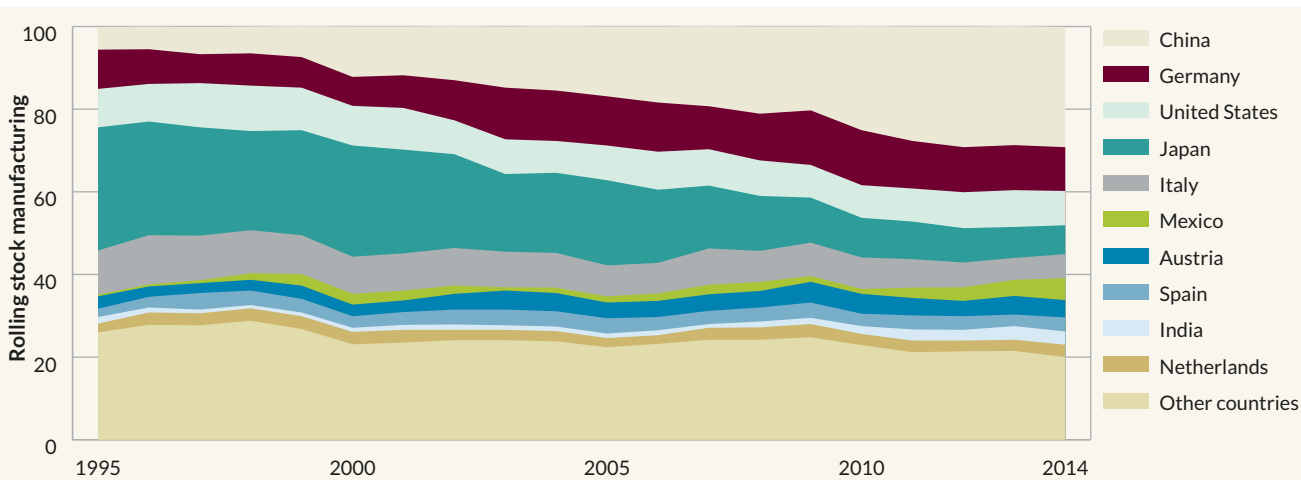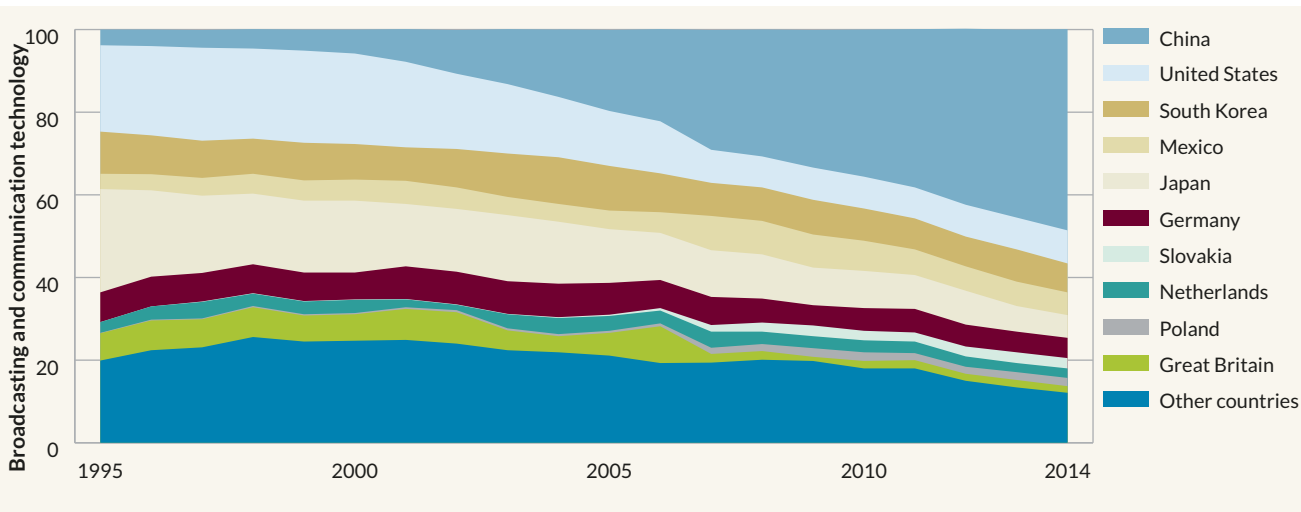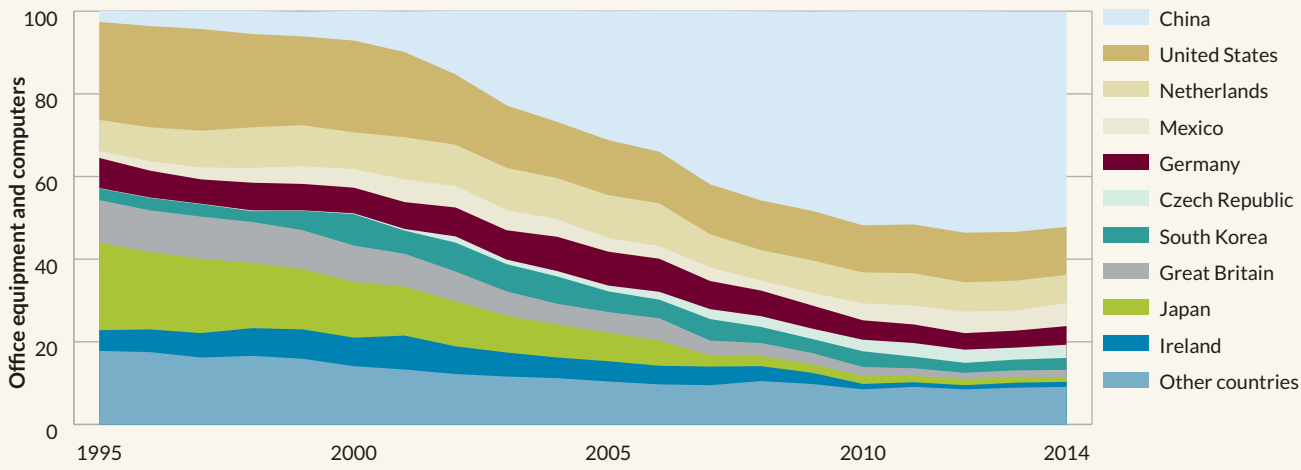
3.3   Constant Market Share Analysis

A constant market share analysis (CMS analysis) is one way of showing how the competitiveness of an economy has developed over a selected time period relative to other economies. The aim of the analysis is to explain which factors have caused a change in a country's global market share in the export of industrial goods:

- The **regional factor** describes whether a country's exports in growth markets are below or above average.[12]

- The **structural factor** illustrates whether a country exports a below-average or above-average amount of goods in the growth sectors.

- The **competitiveness factor** conclusively illustrates the extent to which a country's changed global market share is due to increased or decreased competitiveness (box 6).

Thus, under the approach used for the CMS analysis, the global market share of a country rises because the country is offering the "right" products, is supplying the "right" markets or because the country has become more competitive compared to the other countries (possibly through higher productivity, lower wage costs or a more favourable exchange rate).

The CMS analysis of the 42 countries in this study shows that the change in their relative competitiveness is the main reason for economies' market share gains or losses. China is the biggest winner over the last two decades by some margin. China increased its share of global exports of industrial goods by over 15 percentage points between 1995 and 2014. This increase is entirely due to the country's increased competitiveness (Figure 12).

The picture is different for South Korea: its market share increase of 1.1 percentage points is the fourth-highest of all countries. However, only half of this increase is due to increased competitiveness. The rest of the increase is due to the country's strong position in dynamic markets – the South Korean market share is high in China, in particular.

Japan has lost market shares more than any other country. The slump in competitiveness is even greater than the market share losses initially imply, since the strong

position of Japan's export industry on the growth markets of China and South Korea tempered the negative effect.

The entire period under observation, 1995–2014, can be roughly divided into three periods: The first phase ends with the bursting of the dotcom bubble and China's joining the World Trade Organization (WTO); the second period ends with the beginning of the global financial crisis.

China's economic rise was already apparent by the second half of the 1990s. Between 1995 and 2000, the country noticeably improved its competitiveness. The United

BOX 6 **Constant Market Share Analysis (CMS analysis)**

The constant market share analysis (CMS analysis) explains why and how – regional factor, structural factor, competitiveness factor – a country's global market share has changed. The aim of the analysis is to explain how an economy's international competitiveness on the global market (in export goods) has changed over a certain time period. The basis of the CMS analysis is the global market share of each of the 42 countries included in this study. However, it is not enough to simply look at each global market share. We must also examine the make-up of exports in terms of goods and countries.

The importance of the structural effect can be seen in an example: let us assume that Germany exports primarily cars, while the United States exports primarily chemical products. If the global demand for cars becomes greater than the demand for chemical products, the German export goods industry gains market shares on the global market compared to its US-American competitors. However, these gains in market share do not explain anything about global competitiveness: the US-American chemicals producers have not lost any competitiveness nor have German car manufacturers seen their competitiveness rise. The market share changes are only due to the differing growth rates of global import demand for goods.

Furthermore, the regional orientation of a country's export sector must be taken into consideration. This **regional effect** can be illustrated by an example: let us assume that Poland is a market of above-average importance for the German export industry, while France's export industry is not very important for it at all. If Polish import demand grows at an above-average rate, Germany gains global market share – all things

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12   Growth markets are classified as those economies with an import demand that has dramatically increased in the period in question. Likewise, by "growth sectors" we mean those sectors in which exports are greater than the average for all sectors.

States' competitiveness also increased in this period. Of the smaller economies, Hungary, Ireland and South Korea were among the biggest winners in this phase.

Most of the highly developed nations dropped back during this period. Japan, which had boomed in the 1980s, was in long-term economic decline. Also Germany, France, Italy, Switzerland and the United Kingdom were part of the group of countries which had to accept the largest losses in global market shares, due to falling competitiveness (Table 9).

In the period from the beginning of the millennium until the beginning of the global economic and financial crisis, **2001 to 2008**, China rapidly grew in importance after joining the WTO in 2001 and finally opening its economy to the global market. The country was still increasing enormously in competitiveness, while, in particular, the United States, Japan, the United Kingdom, France, Italy and Canada were losing global market shares due to falling competitiveness.

being equal – compared to France, without anything having changed in terms of relative competitiveness.

In order to determine the competitiveness of a country's export sector, we must isolate the structural effect and the regional effect. Then the change in global export share can be separated from both effects. The result is the competitiveness effect. The competitiveness effect includes the market share changes which are due neither to export structure nor regional structure but to the changes in a country's competitiveness.

CMS analysis

The CMS analysis process allows changes in the export share over a period to be broken down into regional, structural and residual factors. The residual factor is interpreted as the change in international competitiveness. The following equation underpins the CMS analysis:

$$w^1 - w^0 \equiv w^0 * \underbrace{\sum_j (\frac{A_j^1 - A_j^0}{A_j^0} * a_j^0)}_{Regionalfaktor} + w^0 * \underbrace{\sum_i (\frac{A_i^1 - A_i^0}{A_i^0} * a_i^0)}_{Strukturfaktor} + Restfaktor$$

Where:

    w = Market share of country concerned
    A = Share of global exports
    a = Share of country concerned's own exports
    j = Region j
    i = Good i
    0 = Baseline year
    1 = Year of report

The first term describes the regional effect. It shows how the global market share of the economy concerned would have developed if the regional export structure had remained constant. A positive value means that the country exports

more than the average amount to growth regions.

The second term reflects the structural effect. It shows how the total economic export share would have developed if the market shares for the individual export goods had remained constant. The structural effect is positive if those goods in which the country concerned had above-average market shares (in the baseline year) increased in importance globally.
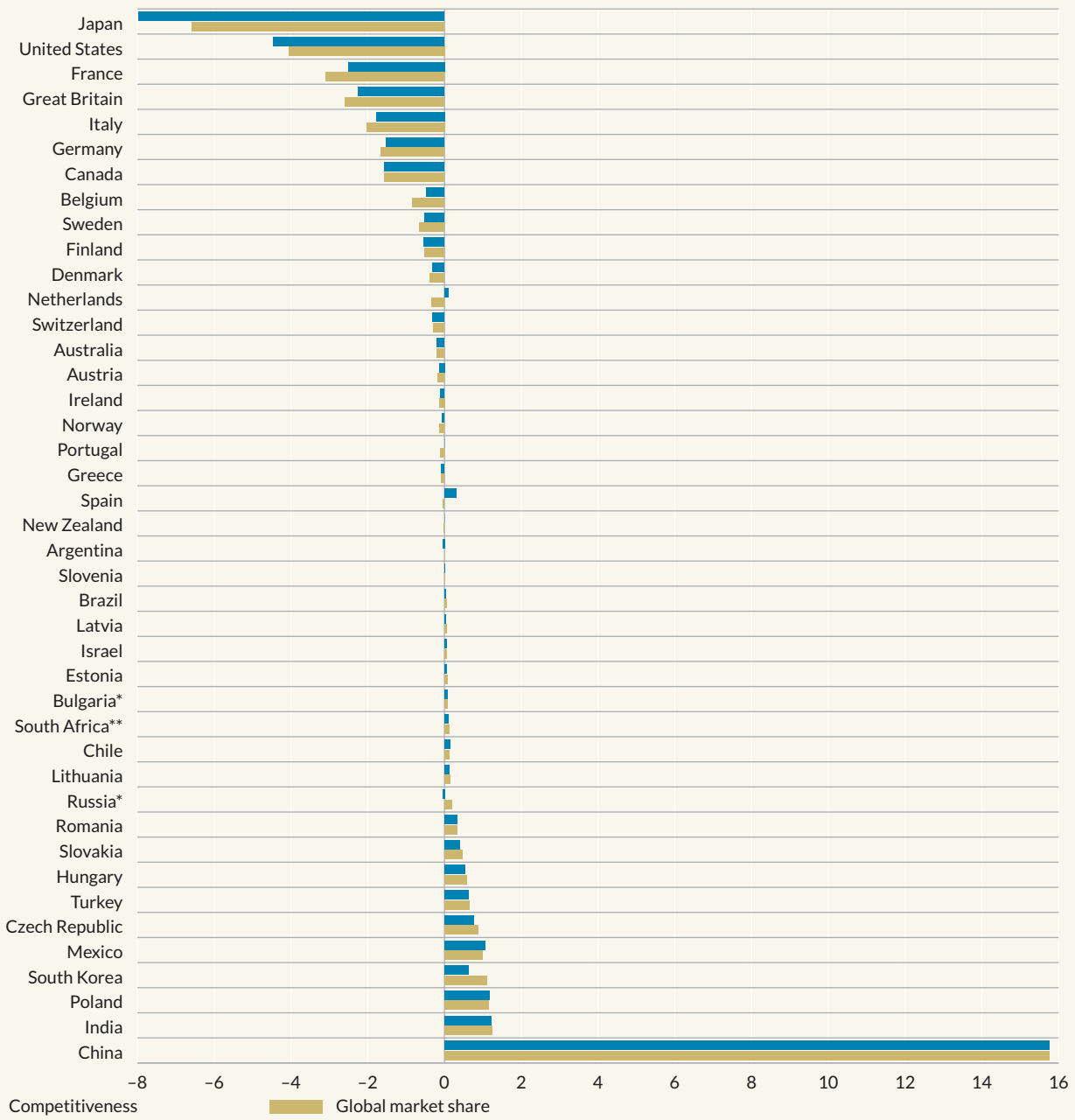
The third term, the residual factor, is the competitiveness effect. It corresponds to the total of the changes in weighted market share. The competitiveness effect includes the market share gain or loss of the export goods industry on the global market that is not due to export structure or regional structure.

Approach

First of all, in order to determine the structural effect, we must break down total exports into individual sectors. The exports of the 42 countries are assigned to 7 SITC-AG1 sectors (the two raw materials sectors are not included). On this basis we can now calculate how German exports would have developed if the structure of global import demand had not changed. With reference to the example above: what would have happened mathematically if global demand for cars had not risen disproportionately but merely in line with average import demand in other sectors?

To calculate the regional effect, we determine the shares of each of the 42 countries in this study in the import demand of their 41 partner countries, as well as the "rest of the world", between 1995 and 2014. This allows us to calculate how German exports would have developed if the individual countries' share of global import demand had remained constant.

FIGURE 12 **Change in global market share and contribution of competitiveness to this change, 1995 to 2013, in %**

Japan	
United States	
France	
Great Britain	
Italy	
Germany	
Canada	
Belgium	
Sweden	
Finland	
Denmark	
Netherlands	
Switzerland	
Australia	
Austria	
Ireland	
Norway	
Portugal	
Greece	
Spain	
New Zealand	
Argentina	
Slovenia	
Brazil	
Latvia	
Israel	
Estonia	
Bulgaria*	
South Africa**	
Chile	
Lithuania	
Russia*	
Romania	
Slovakia	
Hungary	
Turkey	
Czech Republic	
Mexico	
South Korea	
Poland	
India	
China	

‒8   ‒6   ‒4   ‒2   0   2   4   6   8   10   12   14   16

■ Competitiveness   ■ Global market share

* Baseline year 1996; ** Baseline year 2000
Source: Prognos 2016

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TABLE 9 **Portion of change in global market share due to increased/decreased competitiveness, in %**

Country	1995–2000		2001–2008		2009–2013	
China	1.7 %		8.0 %		4.0 %	
India	0.2 %		0.3 %		0.3 %	
Poland	0.2 %		0.7 %		0.2 %	
Mexico	0.9 %		–0.1 %		0.3 %	
Czech Republic	0.1 %		0.5 %		0.2 %	
Turkey	0.1 %		0.4 %		0.1 %	
South Korea	0.3 %		0.2 %		–0.1 %	
Hungary	0.3 %		0.2 %		0.0 %	
Slovakia	0.0 %		0.3 %		0.1 %	
Romania	0.0 %		0.2 %		0.1 %	
Spain	0.2 %		–0.1 %		0.0 %	
Chile	0.0 %		0.1 %		–0.1 %	
Lithuania	0.0 %		0.1 %		0.0 %	
South Africa**	–		0.1 %		0.0 %	
Netherlands	–0.2 %		0.2 %		0.2 %	
Bulgaria*	0.0 %		0.1 %		0.0 %	
Israel	0.1 %		0.0 %		0.0 %	
Estonia	0.0 %		0.0 %		0.0 %	
Latvia	0.0 %		0.0 %		0.0 %	
Brazil	0.0 %		0.2 %		–0.2 %	
Slovenia	0.0 %		0.0 %		0.0 %	
Portugal	0.0 %		0.0 %		0.0 %	
New Zealand	0.0 %		0.0 %		0.0 %	
Argentina	0.1 %		0.0 %		–0.1 %	
Russia*	0.0 %		0.1 %		0.1 %	
Norway	0.0 %		0.0 %		–0.1 %	
Greece	0.0 %		0.0 %		0.0 %	
Ireland	0.6 %		–0.6 %		–0.3 %	
Austria	–0.1 %		0.1 %		–0.1 %	
Australia	0.1 %		–0.2 %		–0.1 %	
Switzerland	–0.3 %		–0.1 %		0.0 %	
Denmark	–0.1 %		–0.1 %		–0.2 %	
Belgium	0.0 %		–0.2 %		–0.4 %	
Sweden	0.0 %		–0.1 %		–0.2 %	
Finland	0.0 %		–0.2 %		–0.2 %	
Germany	–1.9 %		–0.2 %		–0.3 %	
Canada	–0.2 %		–0.7 %		–0.4 %	
Italy	–0.6 %		–0.8 %		–0.3 %	
Great Britain	–0.3 %		–1.7 %		0.2 %	
France	–0.7 %		–1.2 %		–0.6 %	
United States	0.9 %		–3.7 %		–0.4 %	
Japan	–2.3 %		–2.0 %		–1.7 %	

* Baseline year 1996; ** Baseline year 2000

Source: Prognos 2016 Bertelsmann**Stiftung**

Even Ireland, whose competitiveness had significantly increased in the previous period, was now noticeably losing out. Germany's competitiveness also declined in this period. Among the biggest winners in this period alongside India and Turkey were Poland, the Czech Republic and Slovakia, the highest-exporting Central and Eastern European economies, which benefited from joining the internal European market.

In the third period, from **2009 to 2014**, China continued its rise, based on increasing competitiveness – again, primarily at the cost of the large, western economies of Japan, USA, Italy, Germany, France and Canada.

Some countries, such as Germany, are very competitive internationally. At the same time, according to inter alia the results of the CMS analysis, they are losing global market shares due to a relative decrease in competitiveness.

How can we reconcile this apparent contradiction? We should note that the CMS analysis omits an economy's relative competitiveness. The approach takes into account numerous factors which influence the competitiveness of an economy's companies (e.g. infrastructure, transport, communications; aspects such as product and service quality, research and development, public administration, education, taxation, density of regulation, etc.). This is why emerging countries such as China, starting from a very low level, have been able to improve massively in terms of the above factors. Thus they have been able to improve their competitiveness significantly relative to countries which already had a high level of development at the start of the period in question.

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5 Appendix

5.1 Methodology for determining the globalization champion

The detailed investigation of the causal relations between globalization and economic development is the core of the study. Our knowledge of the causal relations is used to quantify the economic changes caused by globalization in the ex post time period of 1990–2014 and to transfer them to a list of globalization winners.

In order to establish the globalization champion we used the following steps:

- Step 1: Designing the globalization index

- Step 2: Investigating the causal relations between globalization and economic development

- Step 3: Determining the globalization champion

5.1.1 Designing the globalization index

In order to be able to quantify the economic influence of globalization, this multi-layered process must be made measurable. This is done through a comprehensive index made up of sophisticated indicators illustrating the economic, social and political aspects of globalization (Table 10).

The selected economic indicators are divided into two categories.[13] The first category, "Transaction variables," includes indicators that refer to actual transactions of goods, services or financial assets. A larger transaction volume indicates that a country is more strongly interconnected with the rest of the world. The second

category, "Transaction restrictions," includes indicators for restrictions on the free transfer of goods and financial capital. Transaction restrictions are a sign of a less globalized country. Both the social and political aspects of globalization are represented in the individual sub-indices of the KOF Index of Globalization.[14]

The selected indicators illustrate the process of globalization overall very well both in terms of the depth and breadth of the particular aspects. In order to achieve a comprehensive picture of globalization, the indicators must be compiled into an index. To this end, the data is first adjusted for outliers and then normalized to a standardized measure between 0 and 100.[15] Higher values mean "more globalization" in each instance.[16] The removal of outliers is justified on both technical and content-related grounds: In terms of content, because every extreme result is not an expression of globalization,[17] and technically, because outliers distort the values once the indicators have been standardised.

In the next step, the economic indicators are initially collected into a sub-index. This is done separately for both subject areas "Transaction variables" and "Transaction restrictions." In that respect, the principal component analysis uses a statistical weighting process which examines the possible linear combinations of the

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13 Indicator selection is based on the KOF Index of Globalization (Dreher 2006).

14 A similar simplification is not possible for the economic components of globalization, since a higher level of detail is needed in the impact analysis of the future globalization scenarios.

15 To correct for outliers, the manifestations of an indicator that lie below the 5 percent quantile and above the 95 percent quantile for this indicator are revised to the upper or lower limits for this quantile.

16 The following formula was used to standardize indicators for which rising values meant "more globalization": $(X_{j,t} - Min(X)) / (Max(X) - Min(X)) \cdot 100$. $X_{j,t}$ is the value of the indicator for country j at time t. Max(X) and Min(X) are the maximum and minimum of this indicator for all countries at all times. The following formula was used to standardize indicators for which rising values meant "less globalization": $(Max(X) - X_{j,t}) / (Max(X) - Min(X)) \cdot 100$.

17 By way of example, goods handling at the port of Antwerp overestimates Belgium's actual exports and imports.

TABLE 10 Globalization indicators used

Indicators	Description	Source
Economic indicators		
_Transaction variables		
Trade in goods (as % of GDP)	Total exports and imports of goods as a percentage of GDP.	World Bank, World Development Indicators, 2015
Trade in services (as % of GDP)	Total exports and imports of services as a percentage of GDP.	World Bank, World Development Indicators, 2015
Foreign direct investments (as % of GDP)	Total foreign direct investments received and paid (cash balance) as a percentage of GDP.	United Nations Conference on Trade and Development, 2015
Portfolio investments (as % of GDP)	Cash balances of portfolio investments: Total assets and liabilities as a percentage of GDP.	International Monetary Fund, Coordinated Portfolio Investment Survey, 2015
Foreign payments (as % of GDP)	Total wages paid to foreign employees and capital yields as a percentage of GDP. Income from intangible assets is not included.	World Bank, World Development Indicators, 2015
_Transaction restrictions		
Import barriers	This indicator is based on the question in the Global Competitiveness Report: "In your country, to what extent do non-tariff barriers limit the ability of imported goods to compete in the domestic market?" The wording of this question has changed slightly over the years. Higher values mean lower import barriers.	Fraser Institute, 2015
Import duties	Indicator between 0 and 10. Higher values mean lower import duties. A value of 0 corresponds to an average import duty of 50%.	Fraser Institute, 2015
Taxes on international trade (as % of tax receipts)	Taxes on international trade include import and export duties, profits from monopolies, currency gains and taxes on currency gains.	World Bank, World Development Indicators, 2015
Capital controls	Index consisting of two components of equal weight. (1) Indicator based on the question in the Global Competitiveness Report: "In your country, how prevalent is foreign ownership of companies?" (2) IMF indicator integrating 13 types of capital controls.	Fraser Institute, 2015
Social indicators		
"Social globalization" sub-index in the KOF globalization index	This sub-index includes indicators on personal contacts, information flows and cultural proximity.	ETH Zürich, KOF Index of Globalization, 2015
Political indicators		
"Political globalization" sub-index in the KOF Index of Globalization	This sub-index includes indicators such as the amount of foreign representation and the number of international treaties, membership of international organisations and participation in UN Security Missions.	ETH Zürich, KOF Index of Globalization, 2015

Source: Prognos 2016   Bertelsmann**Stiftung**

individual indicators and selects the weightings such that the variation in the weighted amounts is a large as possible. Thus the principal component analysis maximises the statistical power of the resulting index. The sub-indices produced in this way for the individual subject areas are each given 50 % weighting in the Economy sub-index.[18]

Next the three sub-indices are aggregated into a globalization index. The economic components are given a weighting of 60 % and the social components and political components each given a weighting of 20 %. This deliberate move accords with the idea that the most major importance should be given to the economic indicators of globalization when assessing the economic developments of a country. The disproportionate weighting of the economic components correlates with the aims of this study and is

not a general value judgment on the significance of the individual components for globalization.

Some of the time series used have gaps. Missing data points are added as follows: gaps within the time series are interpolated in a linear fashion. Missing values at the beginning or end of a time series are replaced by the last available data points. Where an indicator for a country is not available over the entire period, the entire time series is calculated using regression. In addition, the indicator in an auxiliary regression is explained by all the other indicators. Our knowledge of the explanatory power and expressions of the indicators present enables us to approximate the missing indicator.

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18   The choice of weighting of the subject areas is taken from the KOF Index of Globalization.

5.1.2 Investigating the causal relations

The aim of this step is to quantify the growth effect of globalization using regression analyses. This enables the effect of individual influences on economic development to be filtered out, while the effects of other drivers of economic development are statistically estimated.

In the regressions, economic development is interpreted as a variable in terms of the percentage growth of output per inhabitant. The globalization index acted as the main indicator. The regression results for this variable show how strongly economic development is driven by globalization. Given the importance of globalization for the economic output of an economy we expect this variable to have a significant positive influence.

To ensure that the influence of globalization is neither overestimated nor underestimated, further determinants of economic development must be taken into account (Table 11). The anticipated growth effects of these variables are based both on theoretical considerations and empirical findings:

- The level of per capita GDP is considered in the light of the theory of economic convergence.[19] This theory states that domestic economies with a low per capita GDP tend to display a higher rate of economic growth, which points to this determinant's negative effect.

- A higher birth rate has the short-term effect of distributing a given economic growth across a larger population base. Accordingly, we anticipate that higher birth rates will correspond to a smaller growth in economic output per capita.[20]

- In contrast, a positive influence on economic growth per capita can be assumed with regard to investment activities (private and public) because, as a determinant of capital stock, investments contribute substantially to the potential of national economies.

- The inflation rate acts as an indicator of macroeconomic stability. A low inflation rate is believed to stimulate economic activity, while a high inflation rate can counter-heated economic growth. Based on these

considerations, we expect inflation to have a negative impact on economic growth.[21]

- Government spending as well as the debt ratio are considered key indicators of fiscal policy. While in terms of neo-classical theory and empirical findings we can assume that a high debt ratio is related to a reduction in economic growth, the influence of government spending is a priori ambiguous.[22] On the one hand, high government spending can crowd out private investment activity. On the other hand, public consumption expenditure can generate additional demand, promoting private investment.

- Additionally, we control for the quality of the legal system with the Rule of Law Index. A highly developed legal system is considered an important prerequisite for strong economic growth.

- Secondary education as a proxy for human capital should have a positive impact on economic growth.

- In addition, we control for the global economic crisis of 2008 and 2009 using an indicator variable.

The regression analyses are based on data on all 42 countries included in the Prognos World Report for the period between 1992 and 2014.[23] In this respect, 23 data points are available for each country and each variable. This data structure is taken into account by means of specific panel regression models.[24] In the specification of the regression model, two potential problem sources need to be taken into account: unobserved heterogeneity and possible endogeneity of different explanatory variables.

Unobserved heterogeneity occurs where even a careful selection of determinants cannot ensure that all differences between the countries under consideration are adequately accounted for. If these unobserved characteristics correlate with neither the dependent variable nor the determinants under consideration, no complication arises. If this does not apply, unobserved heterogeneity becomes a problem because the explanatory power of

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19 Per capita GDP is used in the regressions with its value delayed by two years in order to avoid the possibility that per capita growth will partly explain itself as a dependent variable.

20 Over the long term, a high birth rate can have positive effects on economic growth. However, such effects are not the subject of this study.

21 Theoretically, there is no absolute connection. Negative inflation rates (deflation) can be expected to exert negative effects on growth. However, in this analysis, with the exception of Japan, deflation phases are of minor importance. Argentina and Switzerland had negative inflation rates in three consecutive periods.

22 See Reinhard and Rogoff 2010.

23 Since the gross domestic product per capita is used in the regressions with its value delayed by two years, the data used for the regressions refers to the period of time between 1990 and 2014.

24 All analyses were performed with the Stata 12 statistics program.

TABLE 11 **Potential influences on economic growth as control variables for the regression analyses**

Factors influencing economic growth	Control variables	Source
Per capita GDP	Per capita GDP of period before last (logarithmized)	World Bank, World Development Indicators, 2015
Birth rate	Birth rate per woman (logarithmized)	World Bank, World Development Indicators, 2015
Investments	Gross investments as a percentage of GDP	World Bank, World Development Indicators, 2015
Inflation	Increase in consumer prices (%)	World Bank, World Development Indicators, 2015
Government consumption	Government consumption expenditure as a percentage of GDP	World Bank, World Development Indicators, 2015
Public debt	Public debt as a percentage of GDP	IMF, 2015
Quality of institutions	Rule of law index (scale from 0 to 10)	Fraser Institute, 2015
Secondary school education	Number of students attending secondary school divided by the number of students entitled to attend secondary school (%)	World Bank, World Development Indicators, 2015
Crisis indicator 2008–2009	Indicator variable with a value of 1 for the 2008–2009 period and 0 for all other years.	
Source: Prognos 2016		Bertelsmann**Stiftung**

unobserved characteristics may falsely be assigned to other determinants. Thus, unobserved heterogeneity can result in distorted estimates for all determinants. For this reason, fixed effects models were used in the analysis. These control for differences between the countries that can assumed to be approximately constant over the observed period of time.[25]

For example, endogeneity problems may occur if interdependencies exist between the dependent variable and one or more determinants. This type of connection, among others, may be presumed for investment activities and economic growth: strong investment activities encourage economic growth (and constitutes part of it) while, at the same time, positive economic development leads to a positive investment climate. In such cases, the difficulty arises in that we cannot differentiate which changes in the determinant influence the dependent variable and which changes result from reverse causality. Endogeneity problems also lead to distorted results.

To account for potential endogeneity problems, instrumental variable procedures (short: IV methods) are used. In this two-step process (also called a two-stage least squares estimation), each variable for which an endogeneity problem is suspected is divided into two parts: one part that is exogenous with respect to the dependent variable and one endogenous part. In the second step of the process – the actual regression – only the exogenous part of the original regressor is taken into account.

This ensures that no endogeneity problems exist in the final regression. In order to apply this method, at least one instrumental variable is needed for each potential endogenous determinant. It must be highly correlated with the endogenous explanatory variable while simultaneously holding explanatory power for the dependent variable, but must not be affected by the same endogeneity problem. In this study the time series of the potentially endogenous control variables are lagged by one year and then used as instrumental variables.[26]

Assuming that the dependent variables can be affected by current and past growth rates of the gross domestic product, but not by future realizations, these time series meet all requirements for suitable instrumental variables. Based on this approach, the assumption of exogeneity was discarded for the investment activity and birth rate variables.

The regression results with respect to the effects of globalization can be interpreted as follows: If the globalization index rises by one point, the growth of the per capita GDP increases by β percentage points, where β is the level of the estimated growth effect of globalization. To illustrate this: the economic growth per capita is 2.5 percent; the estimated effect of globalization is β = 0.2. In this case, a rise in the globalization index of one point leads to an increase in economic growth from 2.5 to 2.7 percent. This relationship is constant for all observed countries and for the entire study period.

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25 We are testing the fixed effects model in a comparison with a simple OLS model (least squares estimation). The unrestricted fixed effects model contains one constant and 41 country-specific indicator variables. The restricted OLS contains only the constant. The LR test between the two models examines whether the implicit restriction of the country-specific indicator variables to the value 0 is justified. However, the test results refute this hypothesis. In this context, the fixed effects model seems to be the more convincing alternative.

26 The option "endog" of the Stata command "xtivreg2" was used to test for joint exogeneity for different variable combinations. The endogeneity of birth rate corresponds with empirical findings which established a correlation between economic development and fertility. See Barro and Lee (1994).

This knowledge of the sensitivity of economic growth per inhabitant with regard to globalization is then used in the next phase of the work in order to quantify individual countries' globalization-induced growth increases.

5.1.3   Determining the globalization champion

Globalization-induced increases in growth are quantified in two sub-phases:

- Initially, a calculation is made for each country of the growth rates which it would have had in the event of a period of stagnation of globalization. Next, the annual changes in the globalization index are multiplied by the estimated globalization effect and subtracted from the historical growth rate values.

- Based on the GDP at the start of the period in question and applying the recently calculated growth rates, a counterfactual growth trajectory is created for each country to illustrate its economic development in the event of a period of stagnation of globalization.

By comparing historical values of GDP with the values that arise from the counterfactual growth trajectory, we can tabulate and compare the individual countries' globalization-induced increases and decreases in growth. The decisive factor in the final determination of the globalization champion is which country was able to achieve over the whole period between 1990 and 2014 the largest gains in per capita GDP as a result of globalization.

5.2 Additional tables

TABLE 12 **Globalization index over time, Argentina to Germany**

	ARG	AUS	BEL	BRA	BUL	CHL	CHN	DNK	GER
1990	32,5	53,4	79,6	28,7	28,6	39,7	22,9	63,6	53,0
1991	33,2	54,1	78,0	30,1	26,7	42,0	24,3	66,0	59,2
1992	33,8	56,2	79,0	32,0	33,5	42,5	25,0	68,8	59,3
1993	36,5	57,7	80,7	32,5	32,1	43,6	26,4	72,1	60,4
1994	38,7	59,8	81,2	32,7	32,0	45,1	26,7	67,3	61,8
1995	41,4	60,5	78,0	35,3	36,0	46,0	28,3	68,2	62,5
1996	41,3	60,4	81,8	36,0	41,9	47,1	28,2	69,2	64,4
1997	41,3	60,9	86,0	35,9	42,6	49,3	28,8	72,1	66,9
1998	41,7	62,3	86,8	35,0	43,8	50,9	32,0	73,4	68,3
1999	41,7	63,6	85,9	35,7	49,6	53,6	35,8	75,3	67,8
2000	41,7	65,1	90,9	35,1	55,6	55,7	41,1	82,7	71,4
2001	38,4	65,1	88,0	38,9	47,6	56,9	38,1	78,5	69,7
2002	40,7	64,0	88,4	39,3	45,3	56,8	35,8	78,9	71,6
2003	38,5	65,0	87,6	37,8	48,3	59,8	36,3	80,1	73,0
2004	39,9	65,1	88,3	39,8	54,1	61,9	41,4	79,6	71,8
2005	37,8	64,7	88,0	41,2	52,3	62,3	43,1	78,9	70,6
2006	36,1	67,0	89,3	40,8	58,0	64,3	40,8	79,3	70,7
2007	35,9	68,7	90,8	41,0	66,0	66,9	42,8	81,2	71,1
2008	36,0	65,3	90,4	38,8	63,2	65,8	41,6	78,4	68,5
2009	34,5	67,3	90,4	38,9	60,7	63,9	42,1	77,0	68,0
2010	34,4	67,9	87,9	39,7	60,2	63,1	42,0	77,8	67,6
2011	33,4	67,5	86,7	39,1	59,3	60,2	41,1	76,8	67,1
2012	33,7	65,3	85,6	39,8	62,9	58,7	41,0	76,3	67,1
2013	33,0	64,0	84,4	39,9	64,3	58,1	41,3	76,1	66,3
2014	33,5	64,4	83,6	40,3	64,3	58,9	41,1	75,8	65,7

Source: Prognos 2016   Bertelsmann**Stiftung**

TABLE 13 **Globalization index over time, Estonia to Japan**

	EST	FIN	FRA	GRC	IND	IRL	ISR	ITA	JPN
1990	39.1	55.7	61.0	39.1	17.4	73.2	40.1	50.1	36.9
1991	39.1	59.2	63.5	48.2	18.0	74.7	39.7	52.1	38.3
1992	40.2	61.4	64.7	48.9	19.2	75.9	40.1	53.9	42.7
1993	43.2	64.4	65.8	51.4	20.1	77.5	43.0	56.2	43.2
1994	47.8	64.9	63.8	52.0	20.6	79.0	43.5	56.2	43.2
1995	59.0	65.2	64.7	52.0	21.4	80.5	43.0	57.9	40.0
1996	61.1	69.2	65.9	53.9	23.5	82.0	45.5	59.2	43.8
1997	64.5	70.8	68.5	55.9	23.5	83.1	48.1	61.2	44.7
1998	64.8	72.1	71.2	58.9	23.6	87.0	51.0	63.6	46.9
1999	65.5	72.8	73.2	62.3	23.8	88.5	54.5	66.3	47.5
2000	67.9	76.5	72.6	65.6	24.5	91.6	57.9	68.0	48.4
2001	68.8	74.8	68.5	64.6	24.9	90.3	59.4	65.9	48.2
2002	68.6	74.7	70.8	64.6	25.1	89.6	60.5	65.3	48.4
2003	70.5	76.4	71.2	67.1	26.3	89.6	61.3	64.9	51.0
2004	73.6	76.8	72.8	67.8	26.8	90.0	59.4	67.0	51.3
2005	71.4	74.0	71.9	65.3	28.9	89.3	62.2	65.7	51.7
2006	71.9	73.7	72.0	65.0	29.6	86.2	61.0	64.6	52.0
2007	73.7	75.5	73.4	66.5	30.6	87.7	61.8	65.0	52.2
2008	72.7	72.9	71.2	65.9	31.8	86.1	63.4	63.3	51.2
2009	71.1	72.6	71.6	64.7	31.8	90.6	63.8	64.1	51.6
2010	72.6	74.1	71.5	63.6	31.2	91.3	63.4	64.1	51.7
2011	71.8	74.3	70.3	62.6	31.6	90.4	56.9	62.5	50.3
2012	71.6	75.6	71.2	61.8	31.6	89.1	56.9	61.5	51.7
2013	70.6	73.9	70.5	62.6	31.0	89.0	56.7	61.4	54.4
2014	69.5	73.1	70.1	62.9	31.1	88.9	56.2	61.4	55.2

Source: Prognos 2016   Bertelsmann**Stiftung**

TABLE 14 **Globalization index over time,
Canada to Austria**

	CAN	LIT	LTV	MEX	NZL	NETH	NOR	AUT
1990	60.7	33.4	31.7	34.5	50.0	77.8	66.3	64.9
1991	61.7	33.3	31.6	34.8	53.0	77.5	68.1	68.3
1992	62.2	33.1	32.4	38.6	55.4	80.9	67.4	68.2
1993	63.6	35.2	33.2	38.3	57.1	81.6	68.1	69.3
1994	64.4	39.7	38.7	39.0	59.5	79.0	68.8	70.0
1995	65.7	42.6	42.7	42.6	61.2	79.3	68.4	69.7
1996	67.2	47.1	48.0	40.1	62.1	81.9	69.5	71.5
1997	69.3	47.9	50.6	41.1	63.4	84.9	70.4	73.4
1998	71.5	49.2	51.4	42.4	64.8	87.1	71.0	74.8
1999	73.5	49.3	51.9	43.4	67.6	88.7	71.3	76.8
2000	74.9	49.6	52.7	45.3	70.2	92.0	72.0	79.1
2001	72.3	49.0	53.9	34.7	68.0	90.2	70.1	77.1
2002	70.5	49.5	54.9	35.3	67.4	90.2	68.4	76.7
2003	71.3	50.1	55.8	35.2	66.0	91.3	71.0	78.7
2004	71.5	55.2	58.0	35.9	67.0	89.0	68.6	78.8
2005	69.3	56.2	57.7	41.1	66.4	87.9	63.8	78.5
2006	68.7	57.1	57.5	38.0	68.4	87.5	66.9	79.0
2007	69.8	59.1	58.9	39.4	68.2	89.0	69.7	81.4
2008	68.5	58.1	58.3	38.7	68.8	87.7	67.1	78.1
2009	69.6	55.4	54.5	40.6	68.5	86.6	70.1	78.0
2010	69.6	57.0	56.9	42.1	67.8	85.5	68.7	76.9
2011	67.9	57.6	58.7	42.4	67.6	85.4	67.0	76.6
2012	67.7	59.0	58.4	42.9	66.1	86.3	69.7	77.0
2013	68.0	58.7	58.2	43.0	65.7	84.1	70.0	76.5
2014	68.4	58.1	57.9	42.5	66.3	84.7	70.1	76.1

Source: Prognos 2016   Bertelsmann**Stiftung**

TABLE 15 **Globalization index over time,
Poland to Slovenia**

	POL	PRT	ROM	RUS	SWE	CH	SVK	SLO
1990	38.9	46.7	21.4	23.4	68.1	68.8	46.3	35.8
1991	40.0	51.4	25.7	23.5	69.7	71.1	45.2	35.8
1992	42.9	56.0	25.8	24.4	69.5	71.1	44.5	37.6
1993	44.0	59.6	27.7	28.0	71.4	72.6	43.9	39.3
1994	43.8	60.4	30.3	29.2	72.0	72.8	44.4	42.6
1995	45.3	61.2	34.3	31.0	72.2	72.3	47.4	44.8
1996	45.5	62.6	35.9	31.5	72.5	73.9	49.4	47.6
1997	48.2	64.1	38.9	31.8	74.4	77.5	51.8	53.6
1998	51.1	65.5	40.3	33.9	75.7	80.4	53.9	55.2
1999	53.1	66.2	43.5	34.3	76.7	83.1	54.7	55.1
2000	55.7	69.3	47.6	36.1	79.4	87.4	58.6	57.1
2001	49.5	69.9	41.8	40.4	77.4	84.3	58.0	52.0
2002	51.0	67.6	43.1	41.6	78.1	83.1	53.6	52.3
2003	54.4	69.9	43.6	41.9	79.1	83.1	53.9	57.5
2004	62.2	73.0	45.8	40.8	79.4	79.9	69.6	63.1
2005	59.3	70.4	51.3	41.8	79.0	84.5	69.0	62.8
2006	59.9	73.1	46.4	41.3	79.8	82.2	69.0	62.4
2007	62.1	75.0	60.0	42.9	81.3	83.0	70.4	64.3
2008	61.0	73.7	59.8	40.1	78.9	82.2	69.7	65.2
2009	61.5	74.5	59.0	42.7	80.9	82.5	68.5	61.7
2010	60.8	74.6	57.3	42.9	80.7	80.4	68.3	61.8
2011	59.5	72.5	55.7	42.0	76.5	76.9	66.9	61.3
2012	60.1	71.8	56.4	42.6	76.1	79.0	66.4	61.5
2013	62.1	70.8	58.2	43.9	75.5	79.0	67.1	61.3
2014	61.3	70.3	58.0	43.8	75.0	79.4	67.0	62.1

Source: Prognos 2016   Bertelsmann**Stiftung**

TABLE 16 **Globalization index over time, Spain to the United Kingdom**

	ESP	RSA	KOR	CZE	TUR	HUN	USA	GBR
1990	55.8	26.0	24.4	53.5	34.9	44.2	57.9	69.7
1991	57.4	23.8	26.0	56.5	36.5	44.8	59.3	69.3
1992	58.9	22.6	28.4	54.9	38.0	47.5	59.2	70.3
1993	60.4	21.8	34.5	53.5	40.5	48.8	60.3	72.6
1994	61.8	23.1	35.0	54.5	45.6	50.5	60.5	70.8
1995	62.3	27.8	35.7	55.8	47.7	53.8	61.5	72.2
1996	63.2	29.6	37.9	57.6	48.0	57.8	62.1	74.0
1997	64.9	32.9	40.2	60.3	50.1	63.0	62.9	74.5
1998	66.8	36.3	44.4	62.0	49.2	65.7	64.0	76.9
1999	68.3	44.5	44.5	64.5	49.5	67.4	64.9	79.5
2000	70.6	47.2	46.7	67.0	50.9	70.0	65.6	82.9
2001	69.0	46.3	45.6	64.2	47.9	69.2	63.2	78.4
2002	69.0	46.7	44.3	65.6	46.0	66.2	60.6	78.5
2003	71.3	46.9	43.7	64.5	49.0	65.9	61.9	80.5
2004	70.4	45.5	45.9	70.3	50.3	75.4	63.2	77.5
2005	68.4	46.6	45.0	68.9	53.8	72.3	62.5	79.3
2006	68.5	47.9	45.8	68.7	49.2	75.8	63.8	81.6
2007	69.8	49.5	47.7	71.6	49.3	77.1	65.0	80.5
2008	68.3	48.7	47.2	69.8	49.5	76.6	62.1	78.2
2009	68.7	49.1	46.8	69.5	50.8	79.3	60.2	81.0
2010	68.7	49.4	46.9	69.5	49.5	78.5	60.6	80.8
2011	68.2	48.7	47.3	67.7	48.1	75.8	60.6	79.7
2012	67.7	49.6	46.9	69.8	48.9	77.0	60.8	78.5
2013	67.2	50.5	46.3	68.0	48.2	76.6	61.2	76.5
2014	66.9	50.9	45.9	68.2	48.7	75.6	61.2	74.6

Source: Prognos 2016   Bertelsmann**Stiftung**

TABLE 17 **Regression results of the determinants of economic growth per inhabitant – reliability test**

Dependent variable: Growth of per capita GDP in percent	IV method with FE	IV method with FE	IV method with FE	IV method with FE	IV method with FE	IV method with FE
Globalisation overall	0.31***	0.30***	0.25***	0.25***	0.26***	0.26***
	(0.08)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Per capita GDP of period before last (logarithmized)	−8.60***	−8.47***	−7.82***	−7.59***	−7.49***	−7.64***
	(1.34)	(1.33)	(1.42)	(1.50)	(1.51)	(1.55)
Birth rate (logarithmized)	−9.03***	−8.56***	−7.70***	−8.07***	−7.95***	−7.73***
	(1.86)	(1.80)	(1.98)	(1.89)	(1.91)	(1.94)
Investments (as % of GDP)	0.17*	0.17*	0.12	0.05	0.05	0.05
	(0.08)	(0.08)	(0.07)	(0.11)	(0.11)	(0.11)
Crisis indicator 2008–2009	−3.63***	−3.65***	−3.22***	−3.26***	−3.25***	−3.23***
	(0.40)	(0.40)	(0.31)	(0.32)	(0.32)	(0.32)
Inflation (in %)		−0.00	−0.00	−0.00	−0.00	−0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Government consumption expenditure as a percentage of GDP			−0.60***	−0.57***	−0.55***	−0.55***
			(0.12)	(0.14)	(0.14)	(0.14)
Public debt as a percentage of GDP				−0.02	−0.02	−0.02
				(0.02)	(0.02)	(0.02)
Rule of law index					0.31	0.30
					(0.38)	(0.37)
Secondary school education					0	0.01
					0	(0.02)
Number of observations	**966**	**966**	**966**	**966**	**966**	**966**
R² (centered)	**0.375**	**0.383**	**0.424**	**0.413**	**0.415**	**0.415**

N.B.: The symbols *, ** and *** show the significance of the estimates for the 10%, 5% and 1% levels. The figures in brackets are the standard errors by country clusters. All regressions contain a constant. FE = country-specific fixed effects

Source: Prognos 2016

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TABLE 18 **Regression results of the determinants of economic growth per inhabitant with country-specific estimates of the influence of globalization on growth – reliability test**

Dependent variable: Growth of per capita GDP in percent	IV method with FE and country groups	IV method with FE and country groups	IV method with FE and country groups	IV method with FE and country groups	IV method with FE and country groups	IV method with FE and country groups
Globalisation for						
· large economies with high per capita income	0.24***	0.23***	0.22***	0.25***	0.25***	0.26***
	(0.03)	(0.03)	(0.05)	(0.07)	(0.06)	(0.06)
· small economies with high per capita income	0.19**	0.18**	0.15	0.13	0.13	0.13
	(0.06)	(0.06)	(0.09)	(0.10)	(0.10)	(0.10)
· large economies with low per capita income	0.23	0.20	0.20	0.19	0.17	0.17
	(0.15)	(0.13)	(0.12)	(0.11)	(0.10)	(0.10)
· small economies with low per capita income	0.38***	0.37***	0.30***	0.31***	0.32***	0.32***
	(0.10)	(0.10)	(0.08)	(0.09)	(0.09)	(0.09)
· Per capita GDP of period before last (logarithmized)	−8.27***	−8.11***	−7.64***	−7.29***	−7.05***	−7.17***
	(1.41)	(1.36)	(1.43)	(1.48)	(1.50)	(1.53)
Birth rate (logarithmized)	−9.40***	−9.08***	−7.91**	−8.47***	−8.55***	−8.39***
	(2.56)	(2.50)	(2.68)	(2.45)	(2.44)	(2.50)
Investments (as % of GDP)	0.15*	0.15*	0.11	0.02	0.03	0.02
	(0.08)	(0.07)	(0.07)	(0.12)	(0.11)	(0.11)
Crisis indicator 2008–2009	−3.60***	−3.62***	−3.23***	−3.27***	−3.26***	−3.24***
	(0.39)	(0.40)	(0.32)	(0.33)	(0.34)	(0.33)
Inflation (in %)		−0.00	−0.00	−0.00	−0.00	−0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Government consumption expenditure as a percentage of GDP			−0.57***	−0.53***	−0.49***	−0.50***
			(0.11)	(0.12)	(0.12)	(0.12)
Public debt as a percentage of GDP				−0.03	−0.02	−0.02
				(0.02)	(0.02)	(0.02)
Rule of law index					0.48	0.47
					(0.34)	(0.34)
Secondary school education						0.01
						(0.02)
Number of observations	**966**	**966**	**966**	**966**	**966**	**966**
R² (centered)	**0.385**	**0.392**	**0.428**	**0.415**	**0.419**	**0.419**

N.B.: The symbols *, ** and *** show the significance of the estimates for the 10%, 5% and 1% levels. The figures in brackets are the standard errors by country clusters. All regressions contain a constant. FE = country-specific fixed effects

Source: Prognos 2016

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TABLE 19 **Absolute increase in globalization-induced per capita GDP 1990–2014 compared to the overall increase in per capita GDP**

Ranking	Country	Absolute increase in per capita GDP due to increasing globalization, in euros*	Total absolute increase in per capita GDP, in euros*	Proportion of increase in per capita GDP due to increasing globalization, in %
1	Japan	2,490	7,660	32.4
2	Ireland	1,600	19,430	8.2
3	Finland	1,550	7,590	20.5
4	Switzerland	1,520	7,250	20.9
5	Israel	1,350	12,400	10.9
6	Denmark	1,270	7,620	16.7
7	South Korea	1,320	13,480	9.8
8	Germany	1,160	8,460	13.7
9	Slovenia	1,050	4,630	22.7
10	Austria	1,020	8,830	11.5
11	Australia	960	9,790	9.9
12	Portugal	870	2,820	31.0
13	Greece	880	1,670	52.7
14	Sweden	810	11,350	7.2
15	Czech Republic	400	2,750	14.6
16	France	720	5,470	13.2
17	Canada	700	8,130	8.6
18	Netherlands	630	8,970	7.0
19	Estonia	690	2,640	26.0
20	Italy	680	1,390	49.3
21	Hungary	620	1,910	32.7
22	Slovakia	610	4,700	12.9
23	New Zealand	590	4,950	12.0
24	Lithuania	580	3,040	19.2
25	Spain	550	4,040	13.7
26	United Kingdom	510	10,620	4.8
27	Poland	520	4,620	11.3
28	Latvia	510	2,900	17.4
29	Norway	540	14,630	3.7
30	Chile	470	4,860	9.7
31	United States	430	12,970	3.3
32	Romania	360	1,400	26.0
33	Bulgaria	340	1,380	24.3
34	Belgium	330	7,120	4.7
35	South Africa	320	710	44.6
36	Turkey	280	2,890	9.7
37	Russia	220	580	37.8
38	Mexico	200	1,820	11.1
39	Brazil	190	1,730	11.2
40	China	180	3,130	5.8
41	India	40	710	5.9
42	Argentina	50	5,780	0.9

* actual prices in 2000; rounded values

Source: Prognos 2016

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TABLE 20 **Relative increase in globalization-induced per capita GDP 1990–2014 compared to the overall increase in per capita GDP**

Ranking	Country	Increase in per capita GDP due to increasing globalization compared to starting level, in %	Total increase in per capita GDP due to increasing globalization compared to starting level, in %	Proportion of increase in per capita GDP due to increasing globalization compared to starting level, in %
1	China	42,6	731,0	5,8
2	Bulgaria	18,5	76,2	24,3
3	Romania	18,4	70,8	26,0
4	South Korea	17,5	178,2	9,8
5	Poland	15,4	136,5	11,3
6	Estonia	13,6	52,3	26,0
7	Chile	13,4	137,8	9,7
8	Hungary	13,0	39,7	32,7
9	Lithuania	12,6	65,3	19,2
10	India	12,2	206,7	5,9
11	Latvia	11,4	65,7	17,4
12	Slovenia	11,3	49,8	22,7
13	Slovakia	11,0	85,4	12,9
14	Ireland	10,5	127,5	8,2
15	Portugal	9,0	29,1	31,0
16	South Africa	9,0	20,1	44,6
17	Israel	8,9	81,8	10,9
18	Greece	8,0	15,2	52,7
19	Russia	7,7	20,4	37,8
20	Turkey	7,4	76,8	9,7
21	Finland	7,1	34,7	20,5
22	Japan	6,7	20,6	32,4
23	Czech Republic	6,5	44,7	14,6
24	Germany	5,3	38,6	13,7
25	Brazil	5,2	47,0	11,2
26	Australia	5,1	51,3	9,9
27	Denmark	4,8	28,6	16,7
28	Austria	4,7	41,1	11,5
29	New Zealand	4,7	38,9	12,0
30	Spain	4,4	31,9	13,7
31	Switzerland	3,9	18,6	20,9
32	Italy	3,7	7,5	49,3
33	France	3,5	26,5	13,2
34	Mexico	3,3	29,9	11,1
35	Canada	3,2	37,3	8,6
36	Sweden	3,0	42,5	7,2
37	Netherlands	2,9	41,4	7,0
38	United Kingdom	2,2	46,8	4,8
39	Norway	1,8	47,8	3,7
40	Belgium	1,6	34,2	4,7
41	United States	1,3	40,6	3,3
42	Argentina	0,8	95,6	0,9

Source: Prognos 2016

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TABLE 21 **Classification of economies investigated using per capita GDP and size of economy**			
Large economies with high per capita income	**Small economies with high per capita income**	**Large economies with low per capita income**	**Small economies with low per capita income**
Australia	Belgium	Argentina	Bulgaria
Germany	Denmark	Brazil	Chile
France	Finland	China	Estonia
Italy	Greece	India	Latvia
Japan	Ireland	Mexico	Lithuania
Canada	Israel	Poland	Romania
Netherlands	New Zealand	Portugal	Slovakia
Switzerland	Norway	Russia	Slovenia
Spain	Austria	South Africa	Czech Republic
United States	Sweden	South Korea	Hungary
United Kingdom		Turkey	
Source: Prognos 2016			Bertelsmann**Stiftung**

5.3   Additional Figures

FIGURE 13 **Per capita GDP with and without globalization from 1990 to 2014, Argentina to France, in euros (baseline year 2000)**

— per capita GDP   - - - per capita GDP without globalization

Source: Prognos 2016

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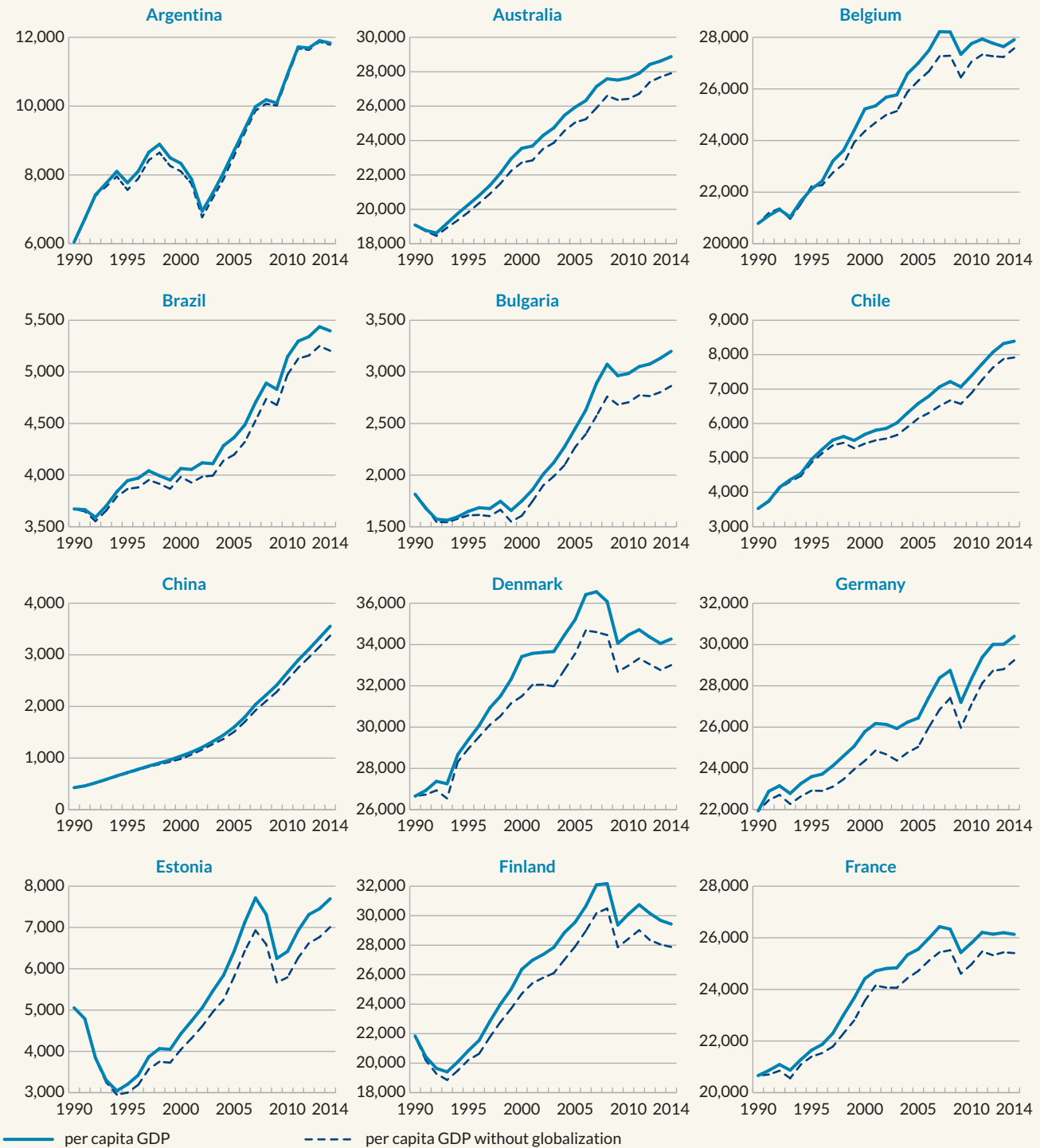
FIGURE 14 **Per capita GDP with and without globalization from 1990 to 2014, Greece to the Netherlands, in euros (baseline year 2000)**

per capita GDP   per capita GDP without globalization
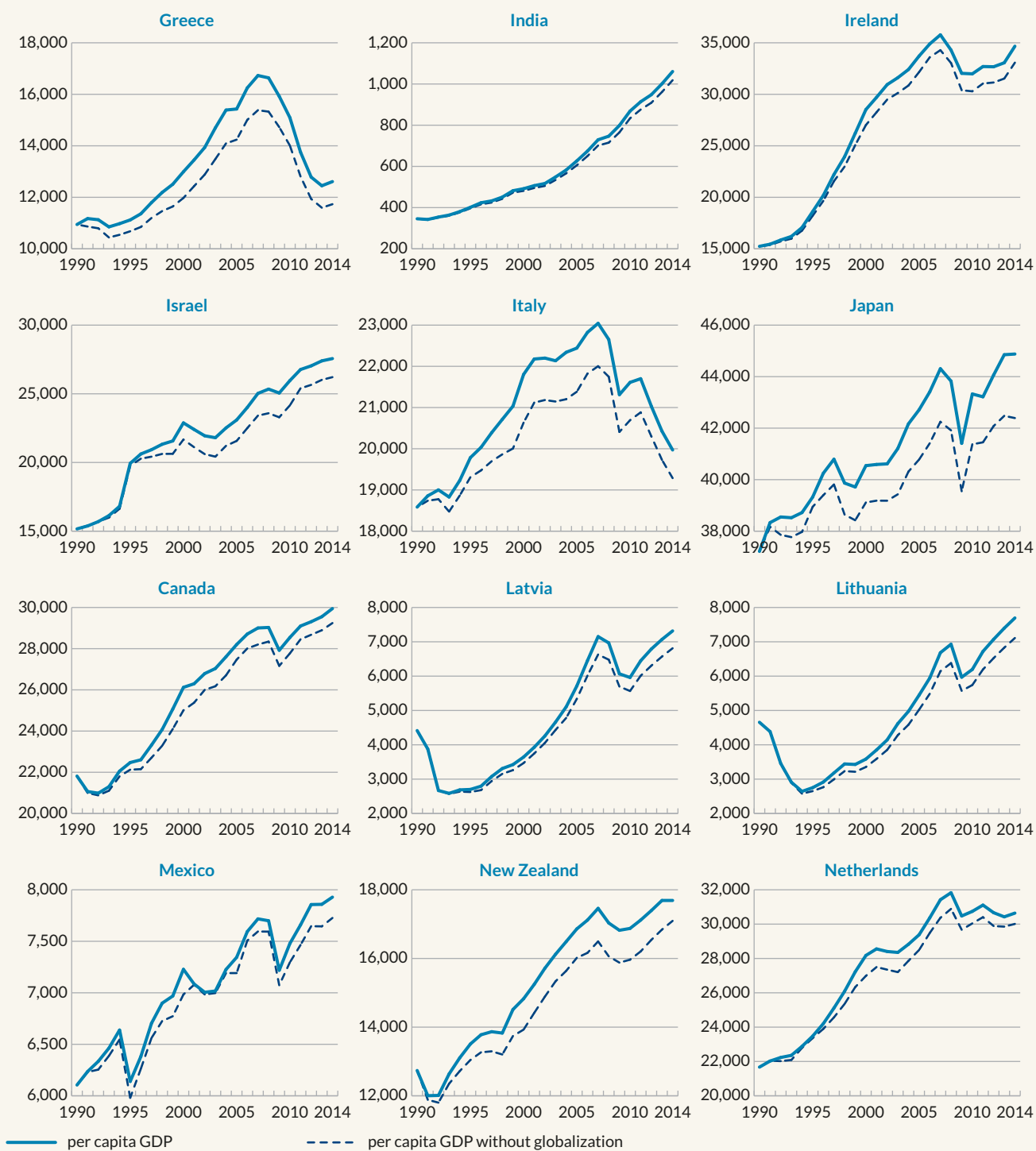
Source: Prognos 2016

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FIGURE 15 **Per capita GDP with and without globalization from 1990 to 2014, Norway to South Africa, in euros (baseline year 2000)**

—— per capita GDP   – – – per capita GDP without globalization
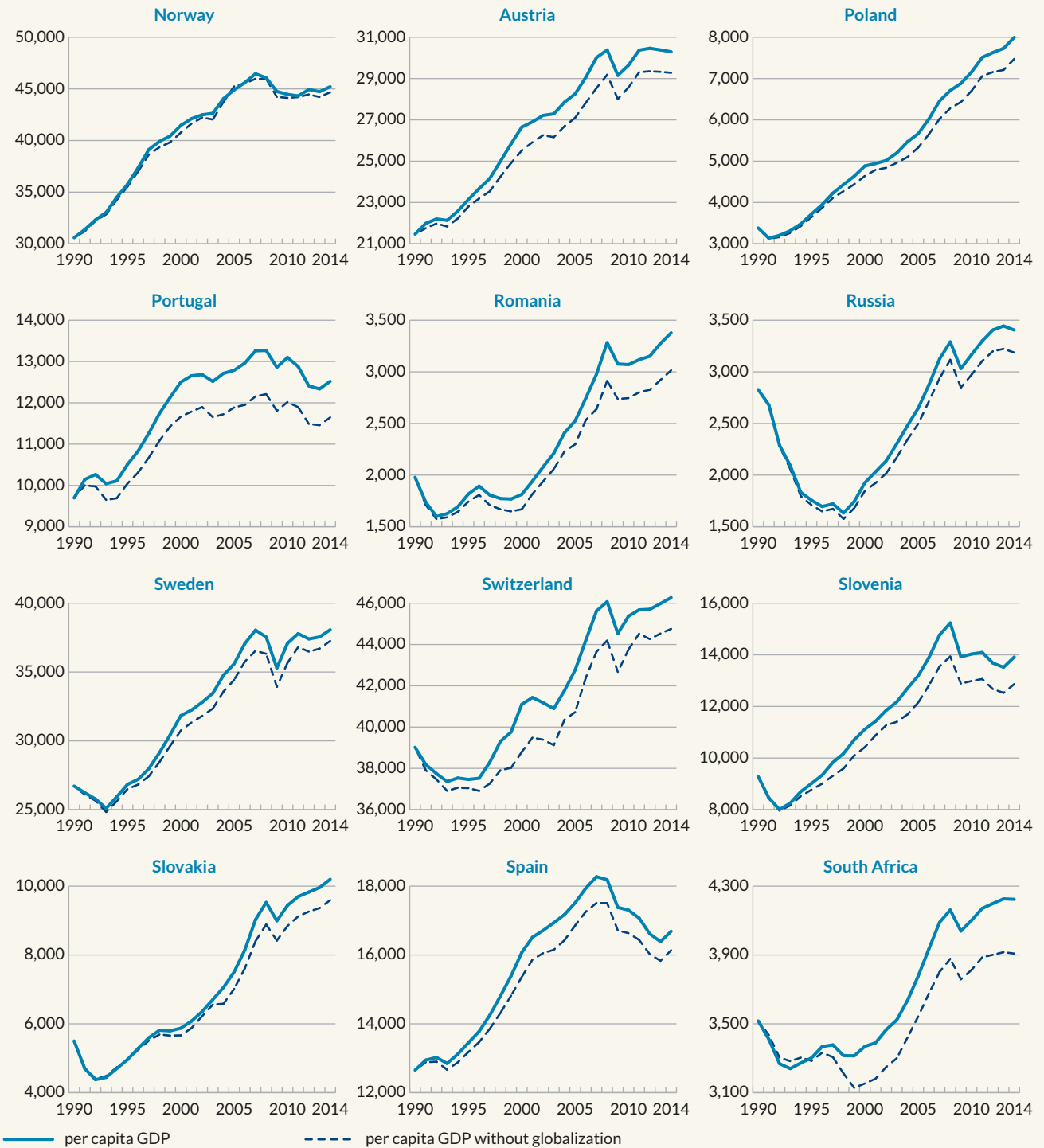
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FIGURE 16 **Per capita GDP with and without globalization from 1990 to 2014, South Korea to the United Kingdom, in euros (baseline year 2000)**

| ── per capita GDP | ---- per capita GDP without globalization |

Source: Prognos 2016

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