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1 Executive Summary

The chemical industry (defined in this report to exclude pharmaceuticals) is one of Germany’s most successful industries, boasting €147 billion in sales, making it the fourth largest global producer. It also consistently runs trade surpluses, which reached more than €30 billion in 2013. But despite this strength, Germany’s current situation appears to be cause for worry. The chemical sector was severely affected by the 2008-09 global recession, and after a rapid cyclical turnaround, production has stagnated since early 2011. Over a longer time horizon, Germany’s share of global production and exports has fallen considerably, suggesting a decline in competitiveness.

Using constant-market share analysis of chemical exports at the aggregate and subsector level for Germany and several other large developed- and developing-country chemical producers, this report confirms that the majority of the decrease in export market share observed over the past 20 years is due to declining competitiveness as opposed to slow-growing destination markets. The late 1990s saw sharp competitiveness declines in the German chemical industry related to structural problems in the domestic economy that raised business costs, but this was followed by a period of relative stability in the 2000. Since the financial crisis, however, German sector competitiveness has resumed its erosion.

Competitiveness declines have also been seen in other developed nations at the expense of China, India and Saudi Arabia; the magnitude of the German decline is larger than that of the United States but less than Japan. The German decline has been driven primarily by polymers, specialties and petrochemicals. Despite the declines, German chemical production remains quite competitive in absolute terms, ranking number 4 of 13 countries (though this is a drop from number 2 in 1995).

There are many potential reasons for a nation’s decline of chemical sector competitiveness, including high energy prices, lagging innovation, currency appreciation, high labour costs, regulatory and tax burdens, and quality of transportation infrastructure, among others. This report uses an econometric model that links changes in chemical competitiveness to these potential drivers, and finds that sector R&D intensity, natural gas prices and the exchange rate all have strong quantitative links to competitiveness. Higher labour costs are also associated with declines in competitiveness, but the quantitative effect is not large.

The results provide rigorous evidence-based support to three hypotheses about chemical competitiveness:

- The US shale gas boom has improved the competitiveness of US producers (particularly in petrochemicals and polymers) relative to European countries and Japan.
- German energy policy has created a cost disadvantage for chemical producers in Germany in recent years.
- Product and process innovation are a critical factor in delivering more value to the customer to compensate for cost disadvantages in developed countries, especially for Germany.

We also believe that the regulatory burden and quality of infrastructure are important drivers of competitiveness, but a lack of chemical sector specific data prevented us from rigorously testing these hypotheses.

The econometric results allow scenario analysis, by which alternative assumptions about the future path of the drivers in Germany can show us the implied change in export competitiveness, and hence export market share. If nothing is done, German chemical competitiveness will continue to erode, resulting in a steadily decreasing share of world chemical exports. However, the analysis shows that policy actions to improve competitiveness could potentially arrest this decline.

In terms of magnitude, a sharp reduction in German energy prices would provide the most pronounced near-term boost, but this would fade later on as the initial increase in supply would eventually yield slowly rising prices. Encouraging more R&D investment is a longer-term strategy.
whose benefits would cumulate over time. Taken together, they hold the potential of halting the secular decline of chemical export market share seen since the global financial crisis. Policy makers should not rely on a weaker euro to bolster competitiveness, because our results show that any likely depreciation would be too small to have a substantial impact on chemical sector competitiveness.
2 Importance of German chemical competitiveness

The chemical industry is one of Germany’s most successful industries. Indeed, modern chemistry was in large part invented in Germany, with companies such as BASF and Bayer growing from humble beginnings to help build an entire industry embracing a wide field of processing and manufacturing activities. Output from the German chemical industry is essential to thousands of products ranging from basic polymers that are the building blocks of all things plastic, to fertilizers that help keep people fed, to soaps and detergents that keep us clean, to perfumes and cosmetics that help us become (or stay) beautiful.

The German chemical sector is the fourth-largest in the world, with sales of €147 billion in 2013. The largest subsectors are petrochemicals and polymers, which together account for about 55% of total German chemical sales. But German production is diversified, with the remaining share spread across basic inorganics, paints and coatings, consumer chemicals and other specialty chemicals.

The chemical sector is also the fifth-largest manufacturing sector in Germany, accounting for just over 7.2% of manufacturing output (behind automotive, engineering, fabricated metals and electrical equipment).

Despite its long history of strength in chemical manufacturing, Germany’s current situation appears to be cause for worry. The chemical sector was severely affected by the 2008-09 global recession (during which production fell by 30% peak to trough). After a rapid cyclical turnaround that brought production close to its pre-recession peak by early 2011, production has stagnated since then, in contrast to the 2% average annual growth seen in the decade preceding the crisis.

Many would argue that this is due primarily to the sluggish European economy, but we believe other factors relating to national sector competitiveness are at play. The first reason is that not all German industrial sectors are experiencing the stagnation of production seen in the chemical sector. Automotive production, for example, also recouped its recession losses rapidly, but has continued to grow at a 2% average annual rate since 2011, even in the context of European auto demand that was plumbing two-decade lows.

The second reason is that much anecdotal evidence suggests that the competitiveness of chemical production in Germany and Europe more broadly is being affected by the rapid expansion of shale gas production in the United States that has dramatically lowered energy and feedstock costs there.

While these pieces of evidence are suggestive, they do not constitute conclusive evidence of a competitiveness problem in Germany’s chemical sector, nor do they prove that energy costs (or any other factor such as R&D, regulation, etc.) are an important factor driving national chemical-sector competitiveness.

At the outset, it is important to clarify what is meant by competitiveness. For the purposes of this report, we view it as a national rather than firm-specific concept, i.e. the ability of one country’s chemical sector to sell goods and services in a given market relative to sectors in other countries. In practice, this means that products must be of good quality, meet a demand in the marketplace and be priced to what the market will bear while generating sufficient profits. This is distinct from firm-level competitiveness, and means that a loss of national competitiveness does not necessarily imply that all producers in that country are losing market share or becoming less profitable.

The purpose of this report is to bring evidence-based research to bear on the following questions, about which there are many opinions, but few facts:

- Has the German chemical sector gained or lost competitiveness over the last 20 years? Which subsectors are driving the changes?
- What is the quantitative relationship between sector competitiveness and its drivers, and which ones are the most important?
We attempt to provide answers to these questions in the remainder of this report. In the first part, we quantify and analyse competitiveness trends in Germany over the past 20 years and compare them to those seen in important chemical-producing countries in both the developed and developing world. We use the constant-market-share analysis of exports, a well-tested and rigorous methodology for isolating the extent to which patterns in export growth are due to shifts in competitiveness, providing an answer to the first question above.

We then analyse trends in the factors that could be potential drivers of national chemical competitiveness, including measures of energy and feedstock prices, labour costs, innovation, capital spending, regulation, and several other factors, again benchmarking the German situation relative to its own past as well as against that faced by other countries.

The final and most important part of the report is econometric analysis that models changes in the competitiveness index developed in the earlier part of the report as a function of factors that we believe could be important drivers of competitiveness. The results of this exercise will provide an answer the second question and, more importantly, allow us to do scenario analysis of how German chemical sector competitiveness might evolve in the future under alternative assumptions about the drivers.
3 Measuring competitiveness: the constant market share approach

3.1 Overview of methodology

The constant market share (CMS) approach to analyzing competitiveness, originally developed in the early 1970s for analysis of trade, decomposes a country’s export growth into that due to general global demand, changes in markets and sectors served, and changes in competitiveness. It is based on the principle that changes in the geographic structure and product structure of exports will affect a country’s export growth relative to that of the world, and hence its global export market share.1

Thus, even if a country maintains its export share in destination markets and sectors it serves, if those countries and sectors are growing more slowly than the average, its global export market share will decrease.

In theory, this should mean that if one corrects for the fact that a country’s export product mix and geographic distribution is different from the world average (termed the structural effect), its export growth should equal world export growth, thus maintaining a “constant market share” of world exports.

In practice, a country’s export growth often differs from the world average even after correcting for the structural effect. This residual difference is termed the competitiveness effect, and it measures change in market share in the destination markets and sectors that the country serves. If this is declining, it is assumed to indicate a reduction in competitiveness and vice versa.

3.2 Strengths and weaknesses

The great strength of the CMS approach is its ability to decompose a nation’s export growth into that driven by growth trends in destination markets (which are arguably beyond the direct control of individual countries) and that due to national competitiveness (which can be influenced by economic policies). It thus provides a useful, rigorous, and easy-to-understand way of gauging the extent to which trade performance is driven by external vs policy-related factors. Other measures of changes in competitiveness, such as movements in the trade balance or exchange rates, do not have this ability.

Another important strength is that the indicators are consistent across countries, thus facilitating international comparisons. Furthermore, export data quality is very good compared to other economic indicators because of the administrative information that needs to be collected when goods cross international borders.

A final strength is the granularity of the sectoral information. We have conducted this analysis in six subsectors of chemicals for the 8 EU countries (including Germany), and six other developed and developing countries with significant chemical exports. Oxford Economics maintains a database of bilateral trade flows (history and forecasts) for more than 70 industrial sectors across 33 countries, and this is the information on which the analysis in this report is based. If we were to undertake analysis using other indicators of sector activity, such as production, such subsector disaggregation would not be possible for all of these countries on a consistent basis.

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1 For a more technical discussion of the CMS methodology on which this analysis is based, see European Central Bank, “Competitiveness and the export performance of the Euro area,” occasional paper no. 30, June 2005, section 2.
Box 3.1: Countries and sectors analysed

Countries/regions
- Developed countries: EU aggregate, Germany, France, UK, Italy, Spain, Netherlands, Belgium, Poland, US, Japan
- Developing countries: Brazil, China, India, Saudi Arabia

Sectors
- Chemicals
- Pharmaceuticals
- Non-primary plastics

Subsectors of chemicals
- Petrochemicals
- Polymers
- Basic inorganics (including fertiliser)
- Specialty chemicals (aggregate of paints and coatings and other specialty chemicals)
- Consumer chemicals (soaps, detergents, cosmetics and perfumes)

While we believe that CMS is the best analytic approach to evaluating and understanding competitiveness, it does have some weaknesses that must be acknowledged. The main one is that it measures the change in competitiveness rather than its absolute level. As a result, it cannot tell us whether China, for instance, is more competitive than Germany in an absolute sense. In the conclusion of the report we will bring in additional information to construct absolute competitiveness rankings, but it is important to stress that the analytic work in sections 4, 6 and 7 analyse changes in, rather than levels of, competitiveness.

Secondly, because it is a residual term, the competitiveness effect may capture some factors that are not directly related to competitiveness. For example, if a country’s chemical exports are very small (as was the case in Saudi Arabia prior to the global financial crisis), the opening of a single plant intended to serve export markets would yield large and potentially overstated increases in measured competitiveness. In addition, some of the observed increase in market share in developing countries may be due to patterns that one would expect as a country industrialises, much the same way that GDP per capita tends to grow more quickly than in the developed world due to “catch-up.”

By the same token, some of the structural effect may in fact reflect a competitive strength or weakness of a country. This is particularly the case for countries that are geographically proximate to fast-growing markets, such as Japan. This gives it a competitive edge relative to Germany with regard to transport costs and time to market. We would argue, however, that geography cannot be changed by government policies, and thus would not produce any changes in competitiveness. That being said, efforts to improve transport links and negotiate regional trade agreements could well make that unchanging geographic proximity more advantageous from a competitiveness perspective.

A second weakness is that, by focusing solely on exports for the important reasons of data quality and country coverage just mentioned, our analysis does not include the German home market, and thus make an implicit assumption that trends in export competitiveness accurately reflect trends in the home market. However, CMS does examine the home impact indirectly, in that the export competitiveness of other countries will manifest itself in changes in import penetration in Germany. Furthermore, VCI has carried out production-based CMS analysis of the German home market and trends are broadly similar to the results presented here.
3.3 Interpretation of results

To facilitate interpretation of the CMS results in the next section, the chart and table above show the evolution of Germany’s export market share (including both intra- and extra-EU trade). Looking first at the chart, the “Actual” line is the actual market share as measured by international trade data, and the horizontal line shows Germany’s share in 1995. The third line shows the “constant market share” adjusting for sectoral and geographic growth dynamics, and thus splits the actual decline in market share into the structural effect and competitiveness effect. We can immediately see that Germany’s global export market share dropped markedly in the late 1990s, and most of this was due to worsening competitiveness rather than slowly growing destination markets (Garman markets actually grew marginally faster). After a period of stability in the 2000s, the financial crisis again led to a decline in market share, although it is not immediately clear from the chart whether this is due to the structural or competitive effect (the reasons for these patterns will be described in the next section).

The table presents the CMS results in a slightly different way, showing the average annual growth rate of German and world chemical exports in the top section and then decomposing the gap into that due to growth dynamics (structure effect) and competitive effect. So, for instance, in the post-crisis period, average annual German chemical export growth was 3 percentage points less than world exports (4.3% vs. 7.3%) and we can see that this gap was roughly evenly split between the structure effect and competitive effect.

Source: Oxford Economics

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2 Because inclusion of the exporting country in the CMS analysis would bias the structure effect, “world” exports must exclude the country for which market share is being calculated in order to maintain consistency. As a result the export market shares reported in this and similar charts will be slightly higher than those in the charts on pages 4 and 7.
4 German chemical competitiveness in international perspective

Trade in chemicals is big business: total world exports increased nearly six-fold to €835 billion from 1995 to 2012. For comparison total global chemical production reached €3.2 trillion in 2012, implying that one-quarter of production is exported. In 1995, Germany was the second-largest chemical exporter, only slightly behind the US despite having an economy just one-fourth the size, and exporting 60% more in value terms than Japan. Nonetheless, a closer look at the charts below reveals some dramatic changes in these shares over the years. Germany’s share has declined to 13% (mirroring declines of varying sizes in the US and Japan) at the expense of increases in key developing countries. The goal of this section is to describe and understand these trends.

4.1 Overview of German trends since 1995

Referring back to the chart on the previous page, the 17 years from 1995 to 2012 can be usefully divided into 3 distinct periods. The first, in the late 1990s, was characterised by dramatic changes in the German economy subsequent to the collapse of the Soviet Union and reunification of Germany. In addition to the challenge and cost of reintegrating the East and West German economies, the changes strengthened linkages between eastern and western Europe more broadly.

The increasing regional trade liberalisation worked to the benefit of nations such as Poland and the Czech Republic, which had by the mid-1990s succeeded in building market-based economies with reasonably well-developed industrial sectors, but significantly lower wages and production costs. This put pressure on Germany, the UK and other large Western European exporters, both within Europe and in external markets.

In addition to these external pressures, Germany faced serious problems of unemployment (reaching almost 10% in 1997), labour market rigidity, and a mismatch between negotiated wages and underlying productivity. The resulting increase in social spending forced increases in taxes and charges that undermined business competitiveness, leading many observers to call Germany the “sick man” of Europe. As a result, Germany was not able to capitalise on the late-1990s pickup in the global economy, particularly in the US (industrial production grew 5.1% annually from 1995 to 2000).

By the late 1990s, exchange rate integration was well underway with the introduction of the euro as an accounting unit in early 1999 and as a currency in 2002. The euro weakened considerably in the two years after its launch and this likely helped

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stop Germany’s prior decline in chemical competitiveness.

Subsequent to that, however, competitive pressures started to mount with the accession of China to the World Trade Organisation in December 2001. As China gained expanded access to foreign markets and continued its rapid development of low-cost manufacturing, one might have predicted that Germany’s market share and competitiveness would diminish further.

Quite the contrary, Germany’s market share remained virtually stable until the 2008 global financial crisis (albeit at a much lower level than in the early 1990s). As mentioned earlier, the introduction of the euro decreased foreign-exchange transactions costs in intra-EU trade, and the rate at which the deutsche mark was fixed to the euro was relatively advantageous to Germany.

But just as importantly, the government of Gerhard Schröder successfully implemented several far-reaching economic reforms as part of the “Agenda 2010” program, including tax reductions, cuts and reforms in the social safety net, and increased investment in R&D and education. As a result, unemployment declined steadily, productivity improved, and Germany became a model to emulate.

Nonetheless, in the wake of the 2008-09 global financial crisis and recession, Germany’s export share slid further, partly due to a slow recovery in its key destination markets, but mainly due to a further deterioration of competitiveness. As discussed in detail in section 5, the divergence of energy costs in the US relative to other parts of the world may be an important factor.

4.2 Benchmarking Germany against other developed nations

The four charts to the right show the deviation of actual market share from its 1995 level for several developed countries. Germany’s performance contrasts with the EU as a whole, which actually managed to increase its extra-EU export market share through the early 2000s (driven largely by
Poland and Spain). Since then, however, market share has declined considerably, due both to slipping competitiveness and slower-growing destination markets.

Even the US, which is often held up as the global competitiveness leader, has seen a considerable decline in market share, and the large majority is due to declining competitiveness. However, the damage was done largely in the early 2000s, as US chemical manufacturers were buffeted by a strong dollar and increasing head-to-head export competition with China after its entry into the WTO. Since then, however, export competitiveness has stabilised. This confirms the fact that Germany is not alone among developed countries in facing competitive pressures in the chemical sector.

Japan shows a completely different pattern, which illustrates the advantage of being located near a high-growth region. Its actual global export market share has declined relatively little compared to Germany and the US. But the reason for this is not improved competitiveness; rather, it is the structural effect of growth dynamics. Japan has become an important exporter to fast-growing China, and accounting for this would actually have implied an increase in market share in the 2000s. In essence, proximity to rapidly growing markets is helping offset a very large and growing competitiveness gap in Japan.

### 4.3 Benchmarking Germany against key emerging markets

Chemical export market shares are on the increase across the developing world, but as in the developed world, there are marked contrasts in trends over time. The most meteoric increase is in China, where market share increased fourfold to rival that of Germany by 2012. This increase is evident across most subsectors, illustrating the development of a diversified chemical industry in China. Not surprisingly, most of the increase in market share occurred after China’s entry into the WTO in 2001.

Interestingly, the structural effect was flat to slightly negative in the 1990s and 2000s, reflecting the
fact that one of China’s largest destination markets during that time was Japan, which was dealing with two decades of deflation and meagre economic growth. Since the financial crisis, it has increasingly focused its attention on India and other fast-growing Asian markets, resulting in a positive structural effect. Broadly similar patterns are evident in India, though the scale is smaller.

Saudi Arabia’s export market share has increased as well, with nearly all of it occurring within the past seven years. The sharp spike in 2008 is undoubtedly due to the opening of a plant that serves export markets (and hence overplays the competitiveness effect), but the increase has continued rapidly in the post-crisis years. But unlike for China, the rise is concentrated in petrochemicals and polymers; other sectors have very low export market shares and have not seen any significant rises over the sample period. Furthermore, a larger proportion of the increase in market share is explained by high growth in destination markets, although the improvement in competitiveness is substantial as well.

Some of this increase seen in China, India and Saudi Arabia is likely due to the catching-up process, by which countries at low levels of development can adopt technologies and production techniques from developed nations while still benefiting from relatively low production costs. Interestingly, the increase in China’s chemical export market share has decelerated in the past couple of years, which could signal diminishing opportunities for competitiveness catch-up.

Brazil is a completely different story, where export market share (a very small 1% of world exports in 1995) has struggled to increase. There was a slight increase in the mid-2000s as the government of Lula da Silva successfully implemented structural reforms designed to improve the business environment. Since then, however, reform has stalled and the tangle of red tape, regulation, and taxes known locally as the “custo Brasil” has stymied further improvements in competitiveness.
4.4 Subsector trends and comparisons

As noted earlier, one of the key advantages of using export data to assess competitiveness is the ability to drill down to the subsector level. This allows us not only to understand which ones are driving the trends observed for aggregate chemicals, but also to draw contrasts between subsectors, the competitiveness of which are likely to evolve in different ways depending on their particular characteristics.

For Germany, the most striking observation is that the majority of the erosion of export competitiveness since the financial crisis is attributable to the petrochemicals and polymers subsectors. Taken together, they accounted for half of German chemical exports in 2012. The drop in petrochemicals’ and polymers’ global export share has been much more severe than the chemical sector as a whole: each of them fell by about 50%, much of which occurred in the 1990s.

But since the global financial crisis, the competitiveness of the polymers sector has suffered again – possibly driven by lower energy and feedstock prices in places like the US and Saudi Arabia. Somewhat surprisingly, the petrochemicals sector has fared a bit less badly.

The poor performance of the petrochemicals and polymers subsectors means that other chemical subsectors must be doing relatively better, and that is indeed the case. A notable example is soaps, cosmetics and perfumes, a relatively high-value subsector toward the consumer end of the supply chain. Its market share dropped by less than 3 percentage points in the late 1990s and clawed some of that back in the 2000s.

Basic inorganics has also fared well, seeing virtually no change in market share since 1995. There was a slight drop prior to the financial crisis, but a recovery of competitiveness since then.

Pharmaceutical manufacturing, while outside the chemical sector, is also a high-value knowledge-intensive sector in which Germany is a dominant player. The 2000s actually saw a strong increase in competitiveness amongst German pharmaceutical manufacturers that allowed export market share to increase back to mid-1990s levels.

Most other sectors, such as specialty chemicals, have broadly similar trends to the aggregate chemical sector. (Charts and tables for all sectors and countries can be found in the appendix.)
5 Drivers of chemical competitiveness

5.1 Identification of potential drivers

There is a long research literature on the factors that are potentially important to industrial competitiveness, and many of them are important not only for the chemical industry but for the whole spectrum of tradable goods. Because competitiveness is fundamentally about offering superior customer value at an attractive price, all drivers are in one way or another related to business costs or product quality.

On the cost side, in many industries labour is a large enough share of overall production costs that international differences in wages can have a large bearing on competitiveness, and indeed is one of the reasons that some industries, such as mass-market apparel, have largely migrated to the developing world over the past several decades. While the chemical industry is less labour intensive than manufacturing as a whole, there is reason to believe that labour costs could nonetheless matter.

Another cost that is particularly important in the chemicals industry is energy and raw materials costs. The chemical industry is the most energy-intensive of all manufacturing sectors: in the US, for example, it accounts for more than one-quarter of manufacturing energy consumption, well above its 10% share of manufacturing output. For certain subsectors like petrochemicals and basic inorganics, energy and feedstock costs are larger than payroll costs, so we would expect this to be especially important – indeed anecdotal evidence from the US shale gas boom is highly suggestive in this regard.

Exchange rates also affect the cost of goods purchased by foreign buyers, and macro-econometric research consistently demonstrates that a weaker currency tends to be followed (generally with a lag of 1 to 2 years) by an acceleration of export growth. We would expect the same to be true in the chemicals industry, though the impact of higher import prices could have an offsetting impact in subsectors that are significant importers of raw materials.

Costs are also affected by a variety of government policies. On the negative side, complex and burdensome tax systems reduce after-tax profits (and hence the resources to invest in activities that improve competitiveness) and also increase compliance costs. Similarly, regulations, if not well structured, needlessly increase the resources that companies must devote to compliance and, in some cases, have unintended consequences that actually stymie new product development and innovation.

On the positive side, governments have a large role to play in the development and quality of infrastructure such as transport networks, with ports and roads being the most important with respect to international trade. To the extent that it reduces transportation costs, complements private business investment and stimulates supply chain breadth, the quality of a country’s infrastructure could have a bearing on competitiveness.

With regard to product quality, the most important potential factor is innovation, which opens up new possibilities both in terms of new products and more efficient processes for producing existing products. The internet is the archetypal example, having spawned not only new products, but entirely new industries. But the chemical sector is also rife with examples of wider innovation impacts, such as lightweight materials for automotive and aerospace efficiency, development of cleaner-burning fuels, and many others. To the extent that investment in equipment allows such innovations to be developed and produced, it also will have an impact on competitiveness.

5.2 International comparison of trends

Comparing Germany to other countries yields important information on the extent to which the necessary conditions for strong competitiveness are in place. As noted earlier, the shale gas boom in the US has opened up a wide gap in natural gas costs relative elsewhere in the world, with US prices now just one-third of European levels – but
still well above the subsidised $0.75 per million BTU in Saudi Arabia. The same regional trends hold for feedstock prices such as naphtha and propylene. But Japan is arguably in a worse situation, because the reduction of nuclear energy capacity in the wake of the Fukushima disaster has dramatically increased demand – and prices – for fossil-fuel-based electricity generation.

Germany also suffers from electricity prices that are more than double those in the US. Although raw electricity prices for industrial users are generally lower than the EU average, they become significantly higher once all taxes and levies are included, especially with regard to France and the UK.

Chart 5.1

With regard to labour costs, there is very little chemical-specific data, and what data exist are confined to the developed world. Nonetheless, they reveal that German chemical-sector wages are the highest among its developed-world peers, although growth in Japan has narrowed the gap somewhat. The US and UK are in a significantly more advantageous position. This would be acceptable if labour productivity were rising to keep pace, but in fact German chemical sector productivity (including pharmaceuticals) has actually declined somewhat since 2008.

By looking at labour cost trends in manufacturing as a whole (rather than just the chemicals sector), we can get a more complete picture of relative positions, because (1) we have information on the growth rate of unit labour costs, which corrects for the fact that wage increases accompanied by equivalent increases in productivity do not signal deteriorating competitiveness and (2) information is available for many more countries. It shows that developing countries are seeing the most pronounced growth, particularly China. So while we know there is a wage gap with the developing countries, strong wage growth in excess of productivity is narrowing it rapidly. Germany and Japan stand out as countries that have been able to hold their unit labour costs constant over the past ten years, at least for manufacturing as a whole.

Chart 5.2

Chart 5.3

There has been a secular decline in chemical-sector R&D intensity over the past 20 years in the developed world, although patterns in individual countries vary. In Germany, the decline was fairly steady, from just under 4% of sector sales in 1995 to 2½% in the mid-2000s, but since then declines
have been less pronounced. In Japan, R&D intensity is significantly higher than elsewhere, and the mid-2000s drop was not large enough to narrow the gap with other countries.

But perhaps the most surprising trend is in China, where R&D intensity increased in the early 2000s after China entered the WTO, but has since drifted down to 0.75% of sector output and has been, like in the developed world, flat in recent years. But even with declining intensity, R&D spending in absolute terms is growing more rapidly than in developed countries. But it may also signal that China continues to rely on imported technology and imitation of existing production processes to drive sector competitiveness (which will eventually bump up against obstacles as China reaches the technological frontier) or that it is specialised in relatively low-value commoditised products (meaning that the future competitiveness impact on high-value German exporters could be muted).

Chart 5.4

Also of note is the appreciation of the yuan over the past five years, which, combined with the rapid increase in unit labour costs noted earlier, may signal that the meteoric increases in export competitiveness in China are not sustainable.

Chart 5.5

Exchange rates worked significantly in Germany’s favour in the late 1990s, as the deutsche mark weakened more than 20% against the dollar prior to the introduction of the euro. This may have helped stop the slide in German competitiveness beginning in the 2000s. However, as the euro gained acceptance as a reserve currency, it strengthened up until the financial crisis, which made exports more expensive. The fact that German competitiveness remained stable over this period suggests that other factors driving competitiveness were offsetting some of the potential negative impacts of the currency.

Chart 5.6

With regard to the regulatory burden, there is no consistent international data on the burden of regulations specifically targeted at the chemical industry, but the World Economic Forum publishes an index of the overall business regulatory burden based on a survey of more than 13,000 business executives in 144 countries. This information is distilled into an index, with larger values indicating a lower burden. Chart 5.6 shows that China and Saudi Arabia have lighter burden than Germany, but improvements over the past seven years have put Germany in a better position than other developed countries.
6 An econometric model of chemical competitiveness

6.1 Overview of methodology

The foregoing analysis has laid the groundwork that allows us to investigate the quantitative links between a reliable measure of competitiveness for each of the chemical subsectors to a set of drivers that we believe to have an impact on it. While there have been many efforts to assert such relationships and use qualitative and anecdotal evidence to support those claims, we know of no previous work that examines these relationships in a rigorous quantitative manner using a consistent dataset spanning multiple countries and time periods.

We seek to explain the changes in the competitiveness index developed and described in sections 3 and 4 by modelling those changes as a function of changes in the hypothesised drivers and performing multiple regression analysis on data from 13 developed and developing countries. The results will tell us (1) whether the hypotheses about the links between competitiveness and energy prices, innovation, labour costs, exchange rates, and other potential drivers are in fact supported by the data; and (2) what the relative quantitative importance of each of the drivers is. Because we will do separate analyses of each subsector, we will be able to identify the key contrasts.

Our hypotheses about the relationship between the competitiveness index and the drivers can be summarised as follows:

- **Exchange rates**: negative (as a currency weakens competitiveness should increase, and vice versa).
- **Energy costs**: negative (if a country has relatively high and/or rising energy costs, competitiveness should decrease, and vice versa).
- **Labour costs**: negative (if a country has relatively high and/or rising labour costs, competitiveness should decrease, and vice versa).
- **R&D**: positive (as R&D increases, more innovation occurs and competitiveness should eventually increase, and vice versa).
- **Investment and infrastructure**: positive (as they increase, the associated new technologies and lower transport costs should improve competitiveness, and vice versa).
- **Government barriers**: negative (tax and regulatory compliance burdens can increase costs and discourage product development, which should reduce competitiveness, and vice versa).

6.2 Data description and sources

For each of the drivers, we assembled a number of potential indicators, which are summarised in box 6.1. Having multiple indicators compensates for the fact that any single one is likely to capture only a part of the driver we are seeking to quantify.

The data come from a variety of sources, but the main ones include Oxford Economics (capital expenditure, exchange rates, manufacturing unit labour costs, natural gas prices; all drawn from official government sources), VCI Chemdata (R&D intensity), World Economic Forum (scientific indicators, supply chain breadth, infrastructure, taxes and regulation). In addition, a number of sector-specific indicators, such as feedstock prices and labour costs, were obtained from IW Köln and the Bundesarbeitgeberverband Chemie.

Constructing the data set proved to be challenging, for several reasons. The most important was that, for many developing nations, data for some key drivers were limited or non-existent, meaning that they would be excluded from the sample unless we constructed proxy data. For instance, national natural gas prices were unavailable outside of Japan, the US and Europe. In order to include countries like China, Saudi Arabia and India in the econometric analysis, we made assumptions
about prices in emerging markets relative to the US and Europe based on information obtained from country and sector experts.

Box 6.1: Overview of drivers data

- **Exchange rates**: Local currency per US$
- **Energy costs**: Regional and national natural gas prices, national electricity prices, regional chemical feedstock prices (naphtha, ethylene, propylene, benzene)
- **Labour costs**: Unit labour costs (chemical-specific and manufacturing as a whole), hourly wages in chemical sector
- **Innovation**: R&D spending intensity, availability of scientists and engineers, quality of scientific institutions, supply chain breadth
- **Capital expenditure**: Subsector investment in equipment and structures
- **Infrastructure**: Quality of roads and ports
- **Taxes and regulation**: Corporate tax rate, executive opinion on regulatory burden, number of days to start a business, trade tariffs

The other challenge was that many of the drivers that had complete country coverage had very little historical data. This was the case for the World Economic Forum indicators, which only extend back to 2006. Because they are among the potentially important determinants of competitiveness, we could not leave them out of the analysis. As a result, the model and core results are based on historical relationships between competitiveness and its potential drivers over the past seven years, although we did examine statistical relationships from 1995 to 2012 for countries and drivers for which data were available in order to cross-check and validate the core model.

The final issue was that for some drivers we had difficulty finding information specific to the chemical sector. This was particularly the case for the regulatory sector. All of the available quantitative indicators aimed to measure the overall national regulatory environment. Clearly, there are specific regulations that could have a disproportionate impact on the chemical sector such as REACH and the Toxic Substances Control Act, but we know of no source that collects quantitative chemical-specific regulation indicators that are consistent across countries. Efforts to develop such indicators would be a worthwhile priority for future research.

### 6.3 Estimation approach

As noted earlier, we estimated separate models for each of the chemical subsectors as well as for the sector as an aggregate. Because of the short sample period, we have used a panel approach to set up the data and estimation. Such an approach identifies each observation uniquely based on the country and observation date. This involves stacking the data for all countries to create a joint econometric estimation. This approach enables us to detect patterns shared by all, or by groups of countries, and ensures the maximum use of information contained in the data.

We took a theory-based approach: the initial model specification included only the drivers that theory and prior belief strongly suggested should have a quantitative link, and then was “tested up” by including other drivers for which we believed the links were less certain.

The initial core specification for all subsectors was

\[
\%\Delta(C) = \beta_1 \%\Delta(E) + \beta_2 \%\Delta(L) + \beta_3 \%\Delta(RD) + \beta_4 \%\Delta(I) + \beta_5 \%\Delta(XR) + \epsilon
\]

where

- \(E\) = Energy prices
- \(L\) = Labour costs
- \(RD\) = R&D and innovation
- \(I\) = Sector investment
- \(XR\) = Exchange rate

Within this core framework, we examined intertemporal relationships (such as the fact that an increase in R&D or an exchange rate movement may only have an influence on...
competitiveness with a time delay), levels versus differences in the drivers (such as the fact that it may be the absolute level or change, rather than the percent change, in energy costs that has the bigger impact on the change in competitiveness), as well as the standard econometric diagnostics such as autocorrelation and heteroscedasticity. We also controlled for level of economic development to account for the fact that some of the increase in competitiveness observed in the developing countries is likely due to technological "catch-up" which could be considered a natural pattern independent of the core drivers.

Once a robust core model was identified for each subsector, we jointly and individually tested indicators for investment, taxation, regulation, supply chain breadth and infrastructure and, if statistically significant, included them in the final specification.

### 6.4 Results

The econometric results broadly supported our hypotheses. For the aggregate chemical sector as a whole, there were large and statistically significant relationships between the changes in the competitiveness index and energy prices, labour costs and R&D, and the direction of the effect was consistent with economic theory and our prior view. The table on this page shows summary results, with the direction of the relationship indicated by a plus or a minus sign and the relative strength of the relationship indicated by the number of pluses and minuses. An (i) indicates that the point estimate is nonzero, but statistically insignificant.

#### 6.4.1 Energy prices

Not surprisingly, energy prices – and specifically natural gas prices – had a strong negative impact on competitiveness in petrochemicals, which filters through to closely related downstream sectors such as polymers and paints and coatings. Energy consumption can account for as much as 85% of total operating costs in the petrochemicals sector, both as a feedstock and as a source of energy for crackers. Downstream sectors use less energy in the production process, but feel the impact of high energy prices in the petrochemicals they depend on as intermediate inputs for their production.

Consequently, we would expect that the competitiveness of sectors more downstream in chemical supply chains would be less affected by international differences in energy prices, and that is precisely what the results suggest. There is no statistical relationship evident for consumer chemicals and semi-finished plastics products, and the point coefficients are very close to zero.

#### 6.4.2 Labour costs

Labour costs relative to other countries had a relatively marginal impact on export competitiveness, with most sectors showing a small or non-existent relationship. This is not surprising, since labour intensity across chemical subsectors is generally lower than that for manufacturing as a whole. Thus, while lower labour costs are commonly thought to be a primary driver of national competitiveness, policy makers...
and businesses should be more focused on other costs – particularly energy costs – when thinking about strategies to bolster chemical competitiveness.

### 6.4.3 R&D, innovation and investment

The dynamics of R&D’s relationship to competitiveness were complex. As noted earlier, our hypothesis was that R&D intensity should be positively related to competitiveness, but with a time lag, since the path from discovery to production can take years. For many subsectors, the data revealed both a near-term (2-3 years) and long-term (7-10 years) relationship, with the latter generally being stronger. This is consistent with the notion that downstream product development and process improvement can have positive effects within a relatively short time, whereas breakthrough basic discoveries can be game changers in terms of competitiveness, but take a long time to manifest themselves.

Unlike for energy prices, the influence of innovation is more broadly spread across the subsectors, with soaps, cosmetics and perfumes the only one for which the data show no relationship.

Investment growth has a similarly broad-based positive effect on competitiveness, although the effects are (not surprisingly) more immediate than for R&D, since there is an immediate impact on production. However, the quantitative importance is notably smaller than for R&D. This is because the main effect of investment is to expand production capacity (some of which will not be destined for export), with an ancillary benefit of improving overall competitiveness by embodying better technologies.

### 6.4.4 Exchange rates

Exchange rate movements also had the expected negative relationship to competitiveness – as a country’s currency weakens, prices in the currency of foreign buyers decrease (although this can be partly offset by the associated increase in the cost of imported raw materials). In addition, the effect acted with a one to two year lag, consistent with economic theory and macro-econometric studies.

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<tr>
<th>Sector</th>
<th>Energy prices Statistical relationship</th>
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<td>Petrochemicals</td>
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<tr>
<td>Polymers</td>
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<tr>
<td>Basic inorganics</td>
<td>Nil</td>
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<tr>
<td>Paints and coatings</td>
<td>- - - -</td>
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<tr>
<td>Other specialty chemicals</td>
<td>Nil</td>
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<tr>
<td>Consumer chemicals</td>
<td>Nil</td>
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<tr>
<td>Plastics products</td>
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</table>

Source: Oxford Economics

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<thead>
<tr>
<th>Sector</th>
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<td>Petrochemicals</td>
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<td>Polymers</td>
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<td>Consumer chemicals</td>
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<td>Plastics products</td>
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Source: Oxford Economics

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<thead>
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<th>Sector</th>
<th>R&amp;D/Innovation Statistical relationship</th>
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<td>Long-term</td>
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<tr>
<td>Basic inorganics</td>
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<td>Other specialty chemicals</td>
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<td>Consumer chemicals</td>
<td>+ +</td>
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<tr>
<td>Plastics products</td>
<td>+ + +</td>
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Source: Oxford Economics
The effects are typically stronger than most of the other core drivers, with every 10% change in the exchange rate associated with a 4% change in competitiveness and illustrates how efforts to increase competitiveness by policy means (such as encouraging R&D or attempting to reduce energy costs) may be partly offset by a significant strengthening of the currency.

6.4.5 Other drivers

As was the case for total chemicals, the indicators measuring the quality of infrastructure, supply chain interventions, and potential government-imposed obstacles to competitiveness such as high tax rates and heavy regulatory compliance burdens were not generally important drivers in the econometric model. There were, however, some notable exceptions that validate anecdotal evidence. For instance, the index of value chain breadth was positively related to competitiveness in the petrochemicals and polymers subsectors. This suggests that agglomeration and clustering effects are at play: geographic proximity of different links in the petrochemical value chain contributes not only to reduced transport costs, but exchange of information and technology that foster innovation and competitiveness. This is illustrated by the erosion of the chemical production footprint in Billingham in the UK. Once a vibrant cluster anchored by ICI, the largest firm in the British Empire in its heyday, it is now a shadow of its former self, with just a handful of much smaller companies operating there. Our results suggest it is in Germany’s interest to maintain the diversity of its chemical manufacturing clusters in order to sustain sector competitiveness.

The measures of the regulatory, tax and infrastructure burdens showed little statistical relationship to changes in the competitiveness index at the subsector level. However, that does not rule out the possibility that these factors are important. Rather, it may be due to the fact that none of the available indicators was specifically focused on the different chemical subsectors. While the analysis here is inconclusive, we believe further research on developing appropriate measures of chemical-specific measures of the regulatory burden and quality of infrastructure in particular would be worthwhile.
7 Scenario analysis

The foregoing econometric analysis provides a powerful tool to examine the potential future of “Platform Germany” as a strong and vibrant producer of chemicals, because it provides evidence-based quantitative links between export competitiveness and R&D activity, exchange rates, energy costs, and other drivers. By making alternative assumptions about the future path of these indicators in Europe, we can derive the implied change in export competitiveness, and hence export market share.

7.1 Descriptions of scenarios

Because R&D spending, energy costs and exchange rates are both the most important quantitative drivers of competitiveness and the ones that arguably are most able to be influenced by policy decisions, we have developed scenarios for each of them.

With regard to chemical sector R&D intensity, recent years have seen a flat profile at about 2% of sector sales, and our baseline assumes that that percentage will continue. We examine two alternative upside scenarios:

- R&D intensity returns to 2000 levels (about 3½% of sector sales) by 2018.
- R&D intensity doubles to over 4% of sector sales by 2018. This is a less likely scenario, because it would mean R&D intensity would return to levels last seen in the early 1990s.

With regard to energy costs, our baseline assumes that US gas prices will begin to rise in the next several years as demand begins to outstrip growth in supply as the shale gas boom moderates. In the EU, there may be scope for developing shale gas – the UK and Poland in particular have considerable proved reserves, but environmental worries have impeded their development relative to the US. We examine two alternative paths for energy prices:

- Moderate EU shale gas development: Natural gas prices gradually fall to US levels by 2020. Note that US prices are forecast to rise a fair amount by that time as the effects of the one-time supply effects of the US shale gas boom are counteracted by increasing demand, so the actual decline in natural gas prices is relatively small.

- Regulations and emission reduction charges: EU regulations set to come into force next year could raise chemical-sector energy costs by as much as 50% by 2018, so we have modelled this as a downside scenario.

Finally, for exchange rates, many economic observers (including Oxford Economics) have been surprised at the strength of the euro. While our baseline forecast calls for a 5% depreciation against the dollar over the next five years, we examine a scenario in which reductions of US monetary stimulus as well as further actions by the ECB in the opposite direction move the euro/dollar exchange rate down.

7.2 Competitiveness forecasts under alternative assumptions

The results of the scenario analysis indicate that the recent declines in German competitiveness are to some extent reversible. Looking first at increasing R&D and innovation, a doubling of R&D intensity by 2018 would put an end to the secular decline in export market share expected in the baseline. Even the more modest assumption of returning to early 2000s levels of R&D intensity has marked positive effects on export market share.

However, these benefits take time to appear, because the pipeline from new discovery to an actual product or process improvement can take years. But by the same token, the benefits are cumulative, meaning that Germany could expect the stabilisation of market share to persist beyond the forecast horizon.
A fall in natural gas prices would also have a positive impact on Germany’s chemical competitiveness, but the forecast profile is quite different to that of R&D. The “moderate” scenario in which the gap between US and European natural gas prices closed by 2020 would be enough to cause a marked deceleration of the decline in export market share for the next decade, after which a gradual increase in gas prices would cause the secular decline to resume.

To the extent that German petrochemical producers would need to shift from oil-based naphtha to natural gas-based ethylene and propylene for cracking, the benefits may be overstated, because making this transition would increase costs in the near term. Nonetheless, we believe the extensive non-feedstock uses of energy would mean that such costs would have a relatively small impact.

In sharp contrast, the impending EU energy regulations will only reinforce the negative competitiveness trends seen in the recent past by further worsening Germany’s energy cost disadvantage. As a result, we estimate that the global export market share will sink half a percentage point below baseline relatively quickly, which will mean that Germany would account for under 9% of global chemical exports by 2030.

As noted in section 6, the exchange rate is an important driver of sector competitiveness, but the prospects for a weakening of the euro are not large enough to have a significant quantitative impact. Even if the euro were to fall to 1.20 – its level at the depths of the Eurozone sovereign debt crisis in 2012 – German chemical market share would increase by less than ½ percentage point, since this would only be a 10% currency depreciation relative to now.

### 7.3 Potential policy implications

The foregoing has clearly demonstrated that future German trade competitiveness can be influenced by policy actions, and a concerted push to lower energy prices and increase R&D and innovation would have substantial positive effects, which would benefit German chemical manufacturers in both home and export markets. In terms of magnitude, a sharp reduction in energy prices would provide the most pronounced near-term boost, but this would fade later on. Encouraging more R&D investment is a longer-term strategy whose benefits would cumulate over time. Taken together, they hold the potential of significantly improving German chemical competitiveness over the next decade, allowing the export market share to be only slightly lower than the level of today by 2030.
On the other hand, chemical manufacturers should not depend on a weaker currency to boost sector competitiveness. Despite concerns from the ECB about the strength of the euro and signals that may be taken that would weaken it somewhat, it is likely to be too small to have any significant impact. The euro has fluctuated between US$1.20 and US$1.50 since 2004, and there is no economic reason to believe that it will move out of this range in the foreseeable future.
8 Conclusion

The inescapable conclusion from the analysis in this report is that the competitiveness of Germany as a platform for chemical exports has diminished in the past 20 years – initially in the late 1990s due to structural changes in the German and broader European economy following reunification and the opening up of Eastern Europe, and more recently in the wake of the global financial crisis as China, Saudi Arabia and other large developing countries have gained considerable market share. But Germany is not alone: all developed countries have had to cope with the arrival of lower-cost developing countries on world markets, and the table below shows that the German decline is not as bad as it looks when considered in a broader context.

The table below shows the competitiveness ranking of key chemical exporting countries in absolute levels and how that it has evolved over time.

Because the CMS methodology does not allow us to calculate absolute levels of competitiveness (only its evolution over time), we have used the ratio of the chemical sector trade surplus (or deficit) to total sector exports in 1995 as a proxy. We have then used the changes in competitiveness calculated from the CMS analysis to derive the level of competitiveness in 2012.

It is important to caution that the trade balance is an imperfect measure of competitiveness (particularly at an economy-wide level), because it is as much a function of the difference between aggregate domestic production and aggregate spending as it is of business cost competitiveness. However, at a sector level, we believe the trade balance provides a fairly reliable indicator of absolute levels of competitiveness.

Despite this decline, Germany still ranks above all major developed countries except the US in terms of absolute levels of competitiveness.

While some of this decline is due to economic factors that have affected other industries outside of chemicals, several sector-specific factors have played a role in the decline in chemical competitiveness in recent years, notably relatively high energy and feedstock prices (particularly for petrochemicals and polymers) and declines in chemical-sector R&D intensity.

Recent trends in energy prices are a key reason why the US has not slipped as much as Germany. The shale gas boom has been an important part of this. But looking ahead, the massive increase in chemical sector investment (on the order of $100 billion over the next five years according to the American Chemistry Council) means that US chemical competitiveness is likely to continue to improve even as energy prices there begin to rise. So Germany will face challenges not only from

<table>
<thead>
<tr>
<th>Countries</th>
<th>Competitive rank in 1995*</th>
<th>Change in competitiveness (CAGR)</th>
<th>Competitiveness rank in 2012</th>
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<td>Saudi Arabia</td>
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<td>UAE</td>
<td>13</td>
<td>8.7</td>
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*Based on sector trade balance as share of sector exports

Source: Oxford Economics
China and Saudi Arabia, but from the US as well.

But Germany’s slip in the rankings is may be able to be stopped in the future. Our econometric modelling suggests that policy actions to lower energy and feedstock prices and increase R&D and innovation could potentially improve German chemical sector competitiveness fairly dramatically over the next decade, improving export market share in the near term (with corresponding benefits in the home market) such that by 2030 Germany would have roughly the same export market share that it has today.

We also believe that the regulatory burden and quality of infrastructure are important drivers of competitiveness, but a lack of chemical sector specific data prevented us from quantifying their impact. Collection of consistent data and information on these factors would be a worthwhile investment to help businesses and governments understand how these factors affect costs and, ultimately the competitive posture of German chemical producers.
9 Oxford staff

Jeremy Leonard, Director of Industry Services

Jeremy Leonard joined Oxford Economics in July 2012, where he oversees and coordinates the work of the industry team, including maintenance and development of Oxford’s 69-country, 100-sector Global Industry Model, quarterly forecast updates and associated reports, conference presentations and client meetings, and bespoke consultancy projects.

Jeremy’s knowledge and experience span a broad range, including competitiveness and offshoring/reshoring, commodity price modelling, and applied economic research on sectors ranging from biotech to heavy manufacturing to telecoms. His current consulting work focuses on the global chemical sector and the impact of shale gas development on energy costs and relative levels of national competitiveness.

Prior to joining Oxford, Jeremy ran his own consulting firm based in Montreal for 15 years, providing a variety of economic analysis and forecasting services related to commodity prices, competitiveness, and the Canadian and US economies for the Washington, DC-based Manufacturers Alliance for Productivity and Innovation. He also served as economic research director for the Montreal-based Institute for Research on Public Policy.

Born and raised in Washington, DC, Jeremy was educated at the University of Pennsylvania and McGill University, where he received his MA in Economics summa cum laude.

Amit Sharda, Economist

Amit Sharda is an economist for Oxford Economics’ International Industry Service, where he is responsible for the chemical sector forecasts. He has been with the firm since 2010, and over that time has developed an increasingly thorough understanding of the key economic drivers of sectoral economic activity across all sub-segments. In addition, he has been the lead analyst on a number of chemical-related consultancy projects relating to competitiveness, most recently for the UK Chemical Industries Association, as well as doing extensive forecasting work analysing the global chemical industry prospects for BASF.

Amit was educated at the University of the West of England, where he received a first-class BA degree in Economics of Money, Banking and Finance.
9 Appendix charts and tables

9.1 Total chemicals

### EU: Chemicals

**Export market share, %**

- **Opening up of Eastern Europe**
- **Euro; China becomes big player**
- **Global financial crisis**

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<td>Constant export share</td>
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<td>Structural effect of growth dynamics</td>
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Source: Oxford Economics/Haver Analytics

### Germany: Chemicals

**Export market share, %**

- **Opening up of Eastern Europe**
- **Euro; China becomes big player**
- **Global financial crisis**

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Source: Oxford Economics/Haver Analytics

### US: Chemicals

**Export market share, %**

- **Opening up of Eastern Europe**
- **Euro; China becomes big player**
- **Global financial crisis**

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<td>Actual</td>
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Source: Oxford Economics/Haver Analytics

### EU: CMS analysis results

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<td>27.8</td>
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<td>Growth of EU ex-pharmaceutical exports</td>
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<td>Growth of World ex-pharmaceutical exports</td>
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<td>Difference between World and EU export growth</td>
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### Germany: Total chemicals

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<td>Growth of German ex-pharmaceutical exports</td>
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<td>-4.3</td>
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<td>-3.0</td>
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<td>-1.4</td>
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### US: CMS analysis results

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<td>-1.6</td>
<td>-0.3</td>
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</table>
Competitiveness of the EU chemical industry

**Japan: Chemicals**

- Actual
- Constant export share
- Structural effect of growth dynamics

Source: Oxford Economics/Haver Analytics

**China: Chemicals**

- Actual
- Constant market share
- Structural effect of growth dynamics

Source: Oxford Economics/Haver Analytics

**India: Chemicals**

- Actual
- Constant export share
- Structural effect of growth dynamics

Source: Oxford Economics/Haver Analytics

### Japan: CMS analysis results

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<tr>
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Due to Competitive effect

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<td>2008-2012</td>
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### China: CMS analysis results

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<th>Difference between World and Chinese export</th>
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Due to Structure effect

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Due to Competitive effect

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<td>2000-2007</td>
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<td>2008-2012</td>
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### India: CMS analysis results

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Due to Structure effect

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<td>2008-2012</td>
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Due to Competitive effect

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<tr>
<td>2008-2012</td>
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Competitiveness of the EU chemical industry

### Saudi Arabia: Chemicals

- **Actual**
- **Constant export share**
- **Structural effect of growth dynamics**

<table>
<thead>
<tr>
<th>Source: Oxford Economics/Haver Analytics</th>
<th>Opening up of Eastern Europe</th>
<th>Euro; China becomes big player</th>
<th>Global financial crisis</th>
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<tr>
<td>2008 - 2012</td>
<td>3.0</td>
<td>0.6</td>
<td>0.0</td>
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</table>

### Brazil: Chemicals

- **Actual**
- **Constant export share**
- **Structural effect of growth dynamics**

<table>
<thead>
<tr>
<th>Source: Oxford Economics/Haver Analytics</th>
<th>Opening up of Eastern Europe</th>
<th>Euro; China becomes big player</th>
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<tr>
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<td>0.6</td>
<td>0.0</td>
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</table>

### UK: Chemicals

- **Actual**
- **Constant export share**
- **Structural effect of growth dynamics**

<table>
<thead>
<tr>
<th>Source: Oxford Economics/Haver Analytics</th>
<th>Opening up of Eastern Europe</th>
<th>Euro; China becomes big player</th>
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<td>2008 - 2012</td>
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<td>0.0</td>
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</table>
Competitiveness of the EU chemical industry

France: Chemicals

Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

France: CMS analysis results

<table>
<thead>
<tr>
<th>Period</th>
<th>Export market share</th>
<th>Growth of French non-pharmaceutical exports</th>
<th>Growth of World non-pharmaceutical exports</th>
<th>Difference between World and French export growth</th>
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<th>Due to competitive effect</th>
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</table>

Italy: Chemicals

Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Italy: CMS analysis results

<table>
<thead>
<tr>
<th>Period</th>
<th>Export market share</th>
<th>Growth of Italian non-pharmaceutical exports</th>
<th>Growth of World non-pharmaceutical exports</th>
<th>Difference between World and Italian export growth</th>
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<td>2008 - 2012</td>
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Spain: Chemicals

Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Spain: CMS analysis results

<table>
<thead>
<tr>
<th>Period</th>
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<tr>
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<td>2000 - 2007</td>
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Competitiveness of the EU chemical industry

### Netherlands: Chemicals

- **Actual**
- **Constant export share**
- **Structural effect of growth dynamics**

<table>
<thead>
<tr>
<th>Year</th>
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<tr>
<td>1995</td>
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<tr>
<td>2011</td>
<td>7.7</td>
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</table>

Source: Oxford Economics/Haver Analytics

### Belgium: Chemicals

- **Actual**
- **Constant export share**
- **Structural effect of growth dynamics**

<table>
<thead>
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<th>Year</th>
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<td>2011</td>
<td>7.3</td>
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Source: Oxford Economics/Haver Analytics

Note: Belgian data unavailable prior to 1999

### CMS Analysis Results

#### Netherlands

- Export market share
- Growth of Netherlands ex-pharmaceutical exports
- Growth of World ex-pharmaceutical exports
- Difference between World and Dutch export growth
- Due to structure effect
- Due to competitive effect

<table>
<thead>
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#### Belgium

- Export market share
- Growth of Belgium ex-pharmaceutical exports
- Growth of World ex-pharmaceutical exports
- Difference between World and Belgian export growth
- Structure effect
- Competitive effect

<table>
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</table>
9.2 Petrochemicals

Competitiveness of the EU chemical industry

EU: Petrochemicals

Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Source: Oxford Economics/Haver Analytics

Germany: Petrochemicals

Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Source: Oxford Economics/Haver Analytics

US: Petrochemicals

Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Source: Oxford Economics/Haver Analytics

Japan: Petrochemicals

Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Source: Oxford Economics/Haver Analytics

China: Petrochemicals

Export market share, %

- Actual
- Constant market share
- Structural effect of growth dynamics

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Source: Oxford Economics/Haver Analytics

India: Petrochemicals

Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

Saudi Arabia: Petrochemicals

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

Brazil: Petrochemicals

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

UK: Petrochemicals

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

France: Petrochemicals

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

Italy: Petrochemicals

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

Spain: Petrochemicals

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

**Netherlands: Petrochemicals**
Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

- Opening up of Eastern Europe
- Euro; China becomes big player
- Global financial crisis

Source: Oxford Economics/Haver Analytics

**Belgium: Petrochemicals**
Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

- Opening up of Eastern Europe
- Euro; China becomes big player
- Global financial crisis

Source: Oxford Economics/Haver Analytics
9.3 Basic inorganics

EU: Basic inorganics

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

US: Basic inorganics

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

Japan: Basic inorganics

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

China: Basic inorganics

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

India: Basic inorganics

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

Saudi Arabia: Basic inorganics
Export market share, %

Brazil: Basic inorganics
Export market share, %

UK: Basic inorganics
Export market share, %

France: Basic inorganics
Export market share, %

Italy: Basic inorganics
Export market share, %

Spain: Basic inorganics
Export market share, %
Competitiveness of the EU chemical industry

**Netherlands: Basic inorganics**

- **Export market share, %**

<table>
<thead>
<tr>
<th>Year</th>
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<th>Constant export share</th>
<th>Structural effect of growth dynamics</th>
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<td>2011</td>
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**Belgium: Basic inorganics**

- **Export market share, %**

<table>
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<tr>
<th>Year</th>
<th>Actual</th>
<th>Constant export share</th>
<th>Structural effect of growth dynamics</th>
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<tbody>
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<tr>
<td>2011</td>
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</table>

Source: Oxford Economics/Haver Analytics

- Opening up of Eastern Europe
- Euro; China becomes big player
- Global financial crisis
- Opening up of Eastern Europe
9.4 Paints and coatings

Competitiveness of the EU chemical industry

EU: Paints and coatings

Germany: Paints and coatings

US: Paints and coatings

Japan: Paints and coatings

China: Paints and coatings

India: Paints and coatings

Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

Saudi Arabia: Paints and coatings

Export market share, %

Brazil: Paints and coatings

Export market share, %

UK: Paints and coatings

Export market share, %

France: Paints and coatings

Export market share, %

Italy: Paints and coatings

Export market share, %

Spain: Paints and coatings

Export market share, %

Source: Oxford Economics/Haver Analytics

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

Netherlands: Paints and coatings

Export market share, %


Source: Oxford Economics/Haver Analytics

Belgium: Paints and coatings

Export market share, %


Source: Oxford Economics/Haver Analytics

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Actual
Constant market share
Structural effect of growth dynamics
9.5 Pharmaceuticals

EU: Pharmaceuticals

![Graph showing export market share of EU pharmaceuticals from 1995 to 2011 with key events labeled: Opening up of Eastern Europe, Euro; China becomes big player, Global financial crisis.]

Source: Oxford Economics/Haver Analytics

Germany: Pharmaceuticals

![Graph showing export market share of Germany pharmaceuticals from 1995 to 2011 with key events labeled: Opening up of Eastern Europe, Euro; China becomes big player, Global financial crisis.]

Source: Oxford Economics/Haver Analytics

US: Pharmaceuticals

![Graph showing export market share of US pharmaceuticals from 1995 to 2011 with key events labeled: Opening up of Eastern Europe, Euro; China becomes big player, Global financial crisis.]

Source: Oxford Economics/Haver Analytics

Japan: Pharmaceuticals

![Graph showing export market share of Japan pharmaceuticals from 1995 to 2011 with key events labeled: Opening up of Eastern Europe, Euro; China becomes big player, Global financial crisis.]

Source: Oxford Economics/Haver Analytics

China: Pharmaceuticals

![Graph showing export market share of China pharmaceuticals from 1995 to 2011 with key events labeled: Opening up of Eastern Europe, Euro; China becomes big player, Global financial crisis.]

Source: Oxford Economics/Haver Analytics

India: Pharmaceuticals

![Graph showing export market share of India pharmaceuticals from 1995 to 2011 with key events labeled: Opening up of Eastern Europe, Euro; China becomes big player, Global financial crisis.]

Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

Saudi Arabia: Pharmaceuticals

- Actual
- Constant export share
- Structural effect of growth dynamics

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

Brazil: Pharmaceuticals

- Actual
- Constant export share
- Structural effect of growth dynamics

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

UK: Pharmaceuticals

- Actual
- Constant export share
- Structural effect of growth dynamics

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

France: Pharmaceuticals

- Actual
- Constant export share
- Structural effect of growth dynamics

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

Italy: Pharmaceuticals

- Actual
- Constant market share
- Structural effect of growth dynamics

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

Spain: Pharmaceuticals

- Actual
- Constant market share
- Structural effect of growth dynamics

Export market share, %

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

**Netherlands: Pharmaceuticals**

Export market share, %

- Actual
- Constant market share
- Structural effect of growth dynamics

<table>
<thead>
<tr>
<th>Year</th>
<th>Opening up of Eastern Europe</th>
<th>Euro; China becomes big player</th>
<th>Global financial crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
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</table>

Source: Oxford Economics/Haver Analytics

**Belgium: Pharmaceuticals**

Export market share, %

- Actual
- Constant market share
- Structural effect of growth dynamics

<table>
<thead>
<tr>
<th>Year</th>
<th>Opening up of Eastern Europe</th>
<th>Euro; China becomes big player</th>
<th>Global financial crisis</th>
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<tbody>
<tr>
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<td>2011</td>
<td>5.0</td>
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Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

9.6 Soaps, cosmetics and perfumes

**EU: Soaps, cosmetics and perfumes**

Export market share, %

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
<th>Constant export share</th>
<th>Structural effect of growth dynamics</th>
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<td>2011</td>
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</tbody>
</table>

Source: Oxford Economics/Haver Analytics

**Germany: Soaps, cosmetics and perfumes**

Export market share, %

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
<th>Constant export share</th>
<th>Structural effect of growth dynamics</th>
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<td>2011</td>
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</tbody>
</table>

Source: Oxford Economics/Haver Analytics

**US: Soaps, cosmetics and perfumes**

Export market share, %

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
<th>Constant export share</th>
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<td>2011</td>
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</tbody>
</table>

Source: Oxford Economics/Haver Analytics

**Japan: Soaps, cosmetics and perfumes**

Export market share, %

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
<th>Constant export share</th>
<th>Structural effect of growth dynamics</th>
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<tbody>
<tr>
<td>1995</td>
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<td>2011</td>
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</tbody>
</table>

Source: Oxford Economics/Haver Analytics

**China: Soaps, cosmetics and perfumes**

Export market share, %

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
<th>Constant export share</th>
<th>Structural effect of growth dynamics</th>
</tr>
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<td>1995</td>
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<td>2011</td>
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</tbody>
</table>

Source: Oxford Economics/Haver Analytics

**India: Soaps, cosmetics and perfumes**

Export market share, %

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
<th>Constant export share</th>
<th>Structural effect of growth dynamics</th>
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<tbody>
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<td>1995</td>
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</table>

Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

Saudi Arabia: Soaps, cosmetics and perfumes
Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe
Euro: China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

Brazil: Soaps, cosmetics and perfumes
Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe
Euro: China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

UK: Soaps, cosmetics and perfumes
Export market share, %

- Actual
- Constant market share
- Structural effect of growth dynamics

Opening up of Eastern Europe
Euro: China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

France: Soaps, cosmetics and perfumes
Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe
Euro: China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

Italy: Soaps, cosmetics and perfumes
Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe
Euro: China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics

Spain: Soaps, cosmetics and perfumes
Export market share, %

- Actual
- Constant export share
- Structural effect of growth dynamics

Opening up of Eastern Europe
Euro: China becomes big player
Global financial crisis

Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

Netherlands: Soaps, cosmetics and perfumes
- Actual
- Constant export share
- Structural effect of growth dynamics

Belgium: Soaps, cosmetics and perfumes
- Actual
- Constant export share
- Structural effect of growth dynamics

Source: Oxford Economics/Haver Analytics

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis
Competitiveness of the EU chemical industry

9.7 Polymers

**EU: Polymers**

- Actual
- Constant market share
- Structural effect of growth dynamics

**Germany: Polymers**

- Actual
- Constant market share
- Structural effect of growth dynamics

**US: Polymers**

- Actual
- Constant export share
- Structural effect of growth dynamics

**Japan: Polymers**

- Actual
- Constant export share
- Structural effect of growth dynamics

**China: Polymers**

- Actual
- Constant market share
- Structural effect of growth dynamics

**India: Polymers**

- Actual
- Constant export share
- Structural effect of growth dynamics

Sources: Oxford Economics/Haver Analytics

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis

Opening up of Eastern Europe
Euro; China becomes big player
Global financial crisis
Competitiveness of the EU chemical industry

Saudi Arabia: Polymers
Export market share, %

Brazil: Polymers
Export market share, %

UK: Polymers
Export market share, %

France: Polymers
Export market share, %

Italy: Polymers
Export market share, %

Spain: Polymers
Export market share, %

Source: Oxford Economics/Haver Analytics
Figure showing the competitiveness of the EU chemical industry for polymers in the Netherlands and Belgium.

- **Netherlands: Polymers**
  - Export market share, %
  - Actual
  - Constant market share
  - Structural effect of growth dynamics
  - **1995-2011**
    - Opening up of Eastern Europe
    - Euro; China becomes big player
    - Global financial crisis

- **Belgium: Polymers**
  - Export market share, %
  - Actual
  - Constant market share
  - Structural effect of growth dynamics
  - **1999-2011**
    - Opening up of Eastern Europe
    - Euro; China becomes big player
    - Global financial crisis

Source: Oxford Economics/Haver Analytics
9.8 Plastics products

**EU: Plastics products**

- **Export market share, %**
  - Opening up of Eastern Europe
  - Euro; China becomes big player
  - Global financial crisis

**Germany: Plastics products**

- **Export market share, %**
  - Opening up of Eastern Europe
  - Euro; China becomes big player
  - Global financial crisis

**US: Plastics products**

- **Export market share, %**
  - Opening up of Eastern Europe
  - Euro; China becomes big player
  - Global financial crisis

**Japan: Plastics products**

- **Export market share, %**
  - Opening up of Eastern Europe
  - Euro; China becomes big player
  - Global financial crisis

**China: Plastics products**

- **Export market share, %**
  - Opening up of Eastern Europe
  - Euro; China becomes big player
  - Global financial crisis

**India: Plastics products**

- **Export market share, %**
  - Opening up of Eastern Europe
  - Euro; China becomes big player
  - Global financial crisis
Competitiveness of the EU chemical industry

Saudi Arabia: Plastics products

Export market share, %

Source: Oxford Economics/Haver Analytics

Brazil: Plastics products

Export market share, %

Source: Oxford Economics/Haver Analytics

UK: Plastics products

Export market share, %

Source: Oxford Economics/Haver Analytics

France: Plastics products

Export market share, %

Source: Oxford Economics/Haver Analytics

Italy: Plastics products

Export market share, %

Source: Oxford Economics/Haver Analytics

Spain: Plastics products

Export market share, %

Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

**Netherlands: Plastics products**

<table>
<thead>
<tr>
<th>Year</th>
<th>Export market share, %</th>
<th>Actual</th>
<th>Constant export share</th>
<th>Structural effect of growth dynamics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
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<td>2011</td>
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</tbody>
</table>

Source: Oxford Economics/Haver Analytics

**Belgium: Plastics products**

<table>
<thead>
<tr>
<th>Year</th>
<th>Export market share, %</th>
<th>Actual</th>
<th>Constant export share</th>
<th>Structural effect of growth dynamics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
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<tr>
<td>2011</td>
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</tbody>
</table>

Source: Oxford Economics/Haver Analytics
9.9 Other chemicals

**EU: Other chemicals**

Export market share, %

- **Actual**
- **Constant market share**
- **Structural effect of growth dynamics**

- **Opening up of Eastern Europe**
- **Euro; China becomes big player**
- **Global financial crisis**

Source: Oxford Economics/Haver Analytics

**Germany: Other chemicals: Scenarios**

Export market share, %

- **Actual**
- **Constant market share**
- **Structural effect of growth dynamics**

- **Opening up of Eastern Europe**
- **Euro; China becomes big player**
- **Global financial crisis**

Source: Oxford Economics/Haver Analytics

**US: Other chemicals**

Export market share, %

- **Actual**
- **Constant export share**
- **Structural effect of growth dynamics**

- **Opening up of Eastern Europe**
- **Euro; China becomes big player**
- **Global financial crisis**

Source: Oxford Economics/Haver Analytics

**Japan: Other chemicals**

Export market share, %

- **Actual**
- **Constant export share**
- **Structural effect of growth dynamics**

- **Opening up of Eastern Europe**
- **Euro; China becomes big player**
- **Global financial crisis**

Source: Oxford Economics/Haver Analytics

**China: Other chemicals**

Export market share, %

- **Actual**
- **Constant market share**
- **Structural effect of growth dynamics**

- **Opening up of Eastern Europe**
- **Euro; China becomes big player**
- **Global financial crisis**

Source: Oxford Economics/Haver Analytics

**India: Other chemicals**

Export market share, %

- **Actual**
- **Constant export share**
- **Structural effect of growth dynamics**

- **Opening up of Eastern Europe**
- **Euro; China becomes big player**
- **Global financial crisis**

Source: Oxford Economics/Haver Analytics
Competitiveness of the EU chemical industry

Netherlands: Other chemicals

Export market share, %


Source: Oxford Economics/Haver Analytics

Belgium: Other chemicals

Export market share, %


Source: Oxford Economics/Haver Analytics

Opening up of Eastern Europe

Euro; China becomes big player

Global financial crisis

Euro; China becomes big player

Opening up of Eastern Europe

Global financial crisis

Source: Oxford Economics/Haver Analytics
### Competitiveness of the EU chemical industry

#### 9.10 Specialty chemicals

**EU: Specialty chemicals**
- Export market share, %
- Actual: Red line
- Constant market share: Navy line
- Structural effect of growth dynamics: Pink line

**Germany: Specialty chemicals**
- Export market share, %
- Actual: Red line
- Constant market share: Navy line
- Structural effect of growth dynamics: Pink line

**US: Specialty chemicals**
- Export market share, %
- Actual: Red line
- Constant export share: Navy line
- Structural effect of growth dynamics: Pink line

**Japan: Specialty chemicals**
- Export market share, %
- Actual: Red line
- Constant export share: Navy line
- Structural effect of growth dynamics: Pink line

**China: Specialty chemicals**
- Export market share, %
- Actual: Red line
- Constant market share: Navy line
- Structural effect of growth dynamics: Pink line

**India: Specialty chemicals**
- Export market share, %
- Actual: Red line
- Constant export share: Navy line
- Structural effect of growth dynamics: Pink line

*Source: Oxford Economics/Haver Analytics*
Competitiveness of the EU chemical industry

**Netherlands: Specialty Chemicals**
- Export market share, %
- 1995-2011
- Actual: Red line
- Constant market share: Blue line
- Structural effect of growth dynamics: Purple line
- Key events:
  - Opening up of Eastern Europe
  - Euro; China becomes big player
  - Global financial crisis

**Belgium: Specialty Chemicals**
- Export market share, %
- 1995-2011
- Actual: Red line
- Constant market share: Blue line
- Structural effect of growth dynamics: Purple line
- Key events:
  - Opening up of Eastern Europe
  - Euro; China becomes big player
  - Global financial crisis

Source: Oxford Economics/Haver Analytics
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