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Fracking – you snooze, you lose?

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In recent years, a new method of extracting hitherto inaccessible natural gas and oil deposits has gained importance. *Hydraulic fracturing* or, in short, *fracking* is being pursued in the hope of making the USA virtually independent from oil and natural gas imports by 2035. In addition to environmental concerns associated with this extraction method, the question is to what extent the regional energy price differences generated by fracking affect the international competitiveness of the US economy, e.g. in comparison with Germany. In spite of differentials in national energy prices that cannot be neglected (especially in the business sector), much seems to indicate that there should be no long-term competitive advantages or disadvantages for the economy as a whole.

Recently the debate over fracking as a resource extraction technology has intensified. This technology enables the development of so-called unconventional deposits that were previously inaccessible with conventional extraction methods. Fracking is mainly used in natural gas extraction but increasingly for oil production as well.

Currently, fracking is being used mainly in the USA – for natural gas as well as for oil. This extraction method can now be applied there efficiently, and it is also helping to achieve the goal of energy self-sufficiency. The International Energy Agency (IEA) estimates that in 2035 the USA will be able to meet almost 100 % of domestic energy demand with local energy production.

The use of fracking impacts on prices. This applies mainly to the price of natural gas. This price is not determined in a universal global market but regional markets because the technical (and sometimes administrative) conditions for global natural gas trading are not yet sufficiently met. This is why there are no globally valid reference prices for natural gas either, as in the case of oil. Because fracking has brought to the US market a growing supply of natural gas, the gas price there has fallen by almost 45 % on the spot market since January 2010, with the most pronounced drop of almost two thirds recorded in April 2012. In Germany, on the other hand, the price of imported natural gas increased nearly 60 % over the same period. The trend was similar on the European natural gas spot markets. At the same time, the share of natural gas in the primary energy mix of the USA and Germany is similar at 25 % and 20 %, respectively.

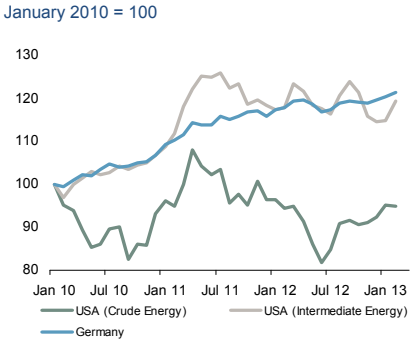
At first glance, these trends suggest an enormous competitive advantage for the US economy. It is assumed that lower primary energy prices mean lower energy costs for businesses and private households. Businesses have lower production costs than their foreign competitors. Increasing disposable incomes of private households leave more scope for consumption demand.

Different energy costs, especially for businesses

A comparison of end customer energy prices between the USA and Germany indeed shows significant differences. For businesses in the USA, the cost of industrial gas has fallen by around 30 % and electricity costs by around 1 % since 2010. In contrast, German businesses have had to deal with price increases of around 15 % for gas and 10 % for electricity. The difference for private households between Germany and the USA is not as huge. But here as well, the electricity price for private consumers in Germany has risen more strongly than in the USA since 2010, and gas prices have increased at a similar rate for both consumer groups.

The average energy cost reduction for US enterprises is also illustrated by the energy price components of the producer price index (Chart 1). The energy price sub-index in the producer prices in the USA at the stage of unprocessed products has dropped slightly since early 2010. Energy prices for producers at the next processing stage (intermediate stage) have increased since 2010 but moved sideways since early 2011. By contrast, in Germany the energy price component has been continuously increasing.

Chart 1: Producer price indexes, energy price components



Source: Bloomberg, Destatis, own calculations

However, the decisive question with regard to competitiveness is whether the presented trends in energy costs also mean that US companies produce their goods at a lower cost than German ones. On average this is not the case. The overall producer price indexes have shown a similar trend since 2010 both in the USA and in Germany (each around +10 %) despite the cost advantages US enterprises have in the use of energy. This is due to the relatively low share of energy costs in the total costs of

the enterprises. In Germany and in the USA this share is on the same level at a good 2 % on average (manufacturing, see Table 1). As a result, energy price changes have only a very minor impact on producer prices and, thus, ultimately on consumer prices as well.

Table 1: Cost structure of manufacturing enterprises

Share in overall costs in 2010 (in per cent)

	Germany	USA
Wages and salaries (incl. soc. sec.contrib.)	18.5	17.3
Material costs (without energy)	58.5	65.2
Energy	2.3	2.2
Capital costs	0.9	3.1
Depreciations	2.8	2.8
Rents and leases	1.4	0.7
Other	15.6	8.6

Source: Destatis, U.S. Department of Commerce, own calculations

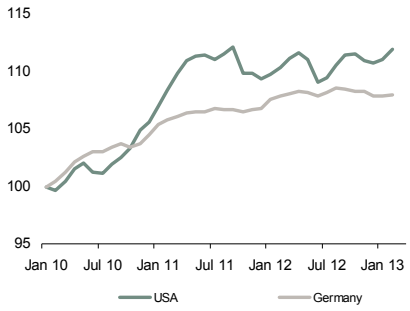
Very energy-intensive industries benefit more but have less weight

Energy-intensive industries are exceptions. These include primarily the non-metal industry (production of glass and ceramics, processing of nonmetallic minerals), paper production, the metal-making industry and, to a lesser extent, the chemical industry. Here the share of energy costs in total costs, however, is also only between 4 % and 10 % (depending on the industry and economy). Only selected specialised industries have energy cost shares of 15 % to 30 %. Examples include lime production or flat glass production. Individual energy-intensive specialised industries and their cost advantages or disadvantages, however, hardly have sufficient economic weight to influence the price competitiveness of an entire economy on their own (see Table 2). Accordingly, the export price trend does not show any significant divergences (Chart 2). Export prices have risen by 8 % in Germany and by 12 % in the USA since 2010.

In summary, the divergence of primary energy prices in the USA and Germany, particularly for natural gas, hardly have an impact on international price competitiveness. Obviously, in some cases it can still be beneficial for enterprises in energy-intensive industries to move their production to the USA, for example, to take advantage of the lower natural gas purchase price. Corresponding anecdotal evidence also exists for German companies. Nevertheless, this does not alter the overall assessment in any way.

Chart 2: Export price indexes

January 2010 = 100



Source: Feri, own calculations

High energy efficiency can offset energy cost disadvantages

Another reason that the issue of fracking has met with interest is that it creates the notion that it provides affordable local energy. However, in addition to the primary energy cost level, the question of how efficiently energy is being managed plays a role that cannot be ignored. The more efficiently energy is used, the easier it is to offset any cost disadvantages from energy purchases. This is another approach by which the effect of higher energy costs on competitiveness can be limited.

The German economy is more energy efficient than the US economy. In Germany GDP has increased by around 50 % since 1990 while primary energy usage dropped by some 10 %. In the USA, however, primary energy consumption increased by 15 % over the same period (while GDP grew by around 65 %). Although energy intensity, the quotient between primary energy consumption and GDP, has dropped in both economies during the period under review, Germany's energy intensity is significantly below OECD average while that of the US is higher (Chart 3). This applies even if we only examine the energy intensities in these two countries' industrial sector.

The reason for higher energy efficiency in Germany could be that Germany is poor in fossil fuels and must import them. In the USA the idea of energy efficiency is less prominent, as illustrated by energy intensities. Fracking and the associated availability of affordable resources may reduce efforts to achieve energy efficiency and to conserve natural resources. In the long term, this may create an economy that is not competitive under efficiency aspects. When the fracking technology ceases to be viable, for example when deposits become depleted or commodity prices no longer cover the cost-intensive fracking technology, all the more significant investment costs may be required to offset efficiencies again. In addition, it has to be considered that the ecological consequences of fracking are not completely understood and may cause high costs in the future as well.

Table 2: Structure of the manufacturing sector

Share of gross production value of the manufacturing sector in 2010 (in per cent)

	Germany	USA
Foods and animal feed (incl. beverages and tobacco)	10.3	15.8
Textiles and clothing (incl. shoes and leather goods)	1.3	1.5
Wood processing (incl. furniture)	2.0	2.7
Paper production	2.3	3.6
Printed materials	1.0	2.3
Mineral oil processing	7.3	4.4
Chemical and pharmaceutial products	11.3	16.1
Production of nonmetals	6.3	6.4
of which: flat glass production	*0.1*	*0.1*
lime production	*0.1*	*0.1*
Metal making and processing (incl. prod. of metal goods)	11.3	11.0
Computer products and electrical equipment	10.1	12.0
Enineering	12.1	7.1
Motor vehicle and parts production	21.5	12.6
Other	3.1	4.5

Source: Destatis, U.S. Department of Commerce, own calculations

Price differences converge

Even if fracking puts the US economy at a competitive advantage, particularly in specific industries, the question is whether these advantages can be sustainable. Several factors argue against this:

- As more domestic resources are extracted using fracking, US demand on global markets will diminish and may dry up completely when the country achieves energy self-sufficiency. This

would create an oversupply for traditional suppliers and, thus, pressure on prices.

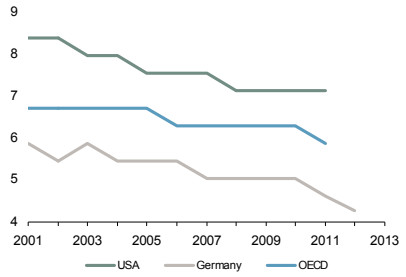
- The current price differences for gas result from regionally separated gas markets. However, these boundaries will be partly overcome in future when the US has created the technical and administrative conditions for the exportation of natural gas in liquefied form (LNG). When these surplus gas quantities in the US spill onto the world market, this will also impact on prices.

- In principle, other regions such as China may also turn to fracking in the future. This would also lead to an alignment of prices.

- Shale gas and oil prices cannot fall indefinitely because the cost of using expensive fracking technology sets a lower limit for commodity prices.

Chart 3: Energy intensities

PJ per USD billion GDP



Source: OECD, Feri, AG Energiebilanzen, own calculations

Conclusion

In designing their energy supply, Germany and the USA have embarked on different paths. As Germany focuses its energy transition on the shift to renewable energies, the USA pursues fracking to become independent from fossil fuel imports. In this sense, fracking is an interesting technology for exploiting domestic shale gas and oil deposits that used to be inaccessible. In our view, the hope or concern that this divergence could result in significant and, in particular, long-term competitive advantages or disadvantages for the affected economies is unjustified (especially in the case of Germany). Moreover, we are sceptical whether fracking constitutes a worthwhile alternative from the aspect of energy efficiency and best environmental practices. ■