



# Uncertainty is slowing capital expenditure

January 25, 2017

## Authors

Eric Heymann  
(+49) 69 910-31730  
eric.heyman@db.com

Oliver Rakau  
+49 69 910-31875  
Oliver.Rakau@db.com

## Editor

Stefan Schneider

Deutsche Bank AG  
Deutsche Bank Research  
Frankfurt am Main  
Germany  
E-mail: marketing.dbr@db.com  
Fax: +49 69 910-31877

[www.dbresearch.com](http://www.dbresearch.com)

DB Research Management  
Stefan Schneider

Original in German: January 18, 2017

In view of the pronounced economic and (geo)political uncertainties and the weak starting level, (private-sector) equipment investment in Germany is likely to decrease in 2017 despite a respectable level of capacity utilisation.

The interplay of multiple factors is currently causing a high level of uncertainty: the potentially serious impact on Germany in the event of the uncertainties materialising, the continued high number of simultaneous uncertainties, the complexity of many capital expenditure decisions and the lack of confidence in politicians (and/or their ability to come up with solutions).

We will present several uncertainty indicators based on news, surveys and financial markets data that provide a way of quantifying the uncertainty. The news-based indicator provides clear warning signs, whereas the other indicators support a more positive outlook. However, a combined indicator points to sustained weakness of capital expenditure in the first half of 2017; in recent years, it has shown a high correlation with Germany's spending on capital equipment.

The Brexit decision in summer 2016 creates a whole host of uncertainties for the years ahead. It is unclear how quickly the United Kingdom will leave the EU and what the situation will be afterwards. As the UK is one of Germany's main export markets, the imminent entry into uncharted political territory will probably subdue capital expenditure in both the UK and Germany.

Donald Trump's election as the next US president has raised concerns about setbacks for international free trade. His spending and taxation plans along with the appreciating US dollar may partly offset the uncertainty; the effects are more likely to be felt in Germany in 2018, however.

The list of other international uncertainties is long. The main one to be mentioned for 2017 is the strengthening of extremist political parties in the elections that are due to be held in many major EU countries. The risk of a 'hard landing' in China is another regular subject of discussion in view of the growing level of debt. There are also political uncertainties in Russia and Turkey.

The severe shortage of skilled workers is increasing domestic uncertainty due to lengthy and/or expensive recruitment processes that can quickly detract from the value of the capital expenditure. Changes in the skills and qualifications that employees need to have (digitalisation) and in German politics ('early retirement at 63') are compounding the effect.

The shift in German energy policy is acting as a brake on capital expenditure, particularly for companies with very high energy consumption. Although there are many energy and climate policy targets, there is considerable uncertainty surrounding the political measures and instruments, the economic costs, the consequences for consumers and companies, and technical progress.



## Uncertainty is slowing capital expenditure

Uncertainty has been a common theme running through the global economy and financial markets in recent years. This year is unlikely to bring any relief in this regard. Uncertainty could in fact increase even more, particularly in view of the many elections due to be held in Europe this year in which there is a possibility that anti-EU/anti-euro forces will come to power. The negotiations on the United Kingdom's exit from the EU and US president Trump's (economic) policy agenda also contain many imponderables. These are just the first few items on a long list of uncertainties that affect the economic outlook for 2017.

### Uncertainties holding back capital expenditure

Ultimately, any economic subject's decisions are subject to uncertainty. This is true for consumers, companies and politicians alike. In contrast to risk, in which the likelihood of events materializing is presumed to be known, the probability of uncertain events occurring cannot be calculated. An uncertain event can have a positive or negative impact if it occurs. What is critical, however, is the lack of ability to plan.

By contrast, the probability of risks materialising and thus the expected consequences are known so, for example, it is possible to calculate expected values in consumer and capital spending decisions. In reality, of course, it is almost impossible to make such a clear distinction between the two terms. For our purposes, we will therefore widen the definition of risk to include circumstances in which plausible assumptions about the distribution of probability can be made.

The effect of uncertainty on companies' capital expenditure is likely to be particularly pronounced. Reliable forecasts are required, e.g. of future unit sales, due to the long period of time before there is a return on the investment and the high costs of cancelling a capital expenditure project. If the uncertainty is too great, companies may find it attractive to postpone projects, particularly large-scale ones, or to scale them back in order to limit the possible losses. If concerns grow that profit targets will not be met by some way, such projects may even be avoided altogether.

Despite slightly above-average capacity utilisation at the end of 2016, we therefore expect (private-sector) spending on machinery & equipment in Germany to decrease in 2017 – a much more cautious assessment than that of many other forecasters. In contrast, a large portion of consumer spending is accounted for by everyday necessities and can thus be postponed only to a limited extent and we expect limited impact of uncertainty.

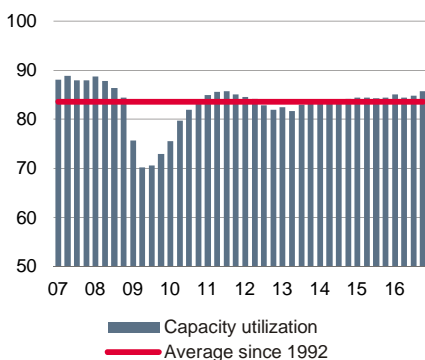
Given their current relevance, we will concentrate on [macroeconomic and political uncertainties](#) below. The uncertainties that have been frequently discussed in the last few years include a possible 'hard landing' in China and a collapse of the EU/single currency. Last year, these were joined by Brexit and the bleaker prospects for global free trade. The German economy's strong dependence on global trade, integration in global supply chains and the substantial level of German outward investment make such uncertainties particularly relevant to Germany and German companies.

These macroeconomic uncertainties need to be distinguished from [classic corporate investment risk](#). We define this as, for example, fluctuations in demand over the course of 'normal' economic cycles. Customer preferences may also evolve in an unexpected manner. Technological advances and the political and regulatory environment may influence the development of individual products and sectors. These risks have always existed, and companies are rewarded for taking such risks by the opportunity to generate profits.

Capacity utilisation slightly higher than the long-term average

1

Capacity utilisation in German manufacturing, %

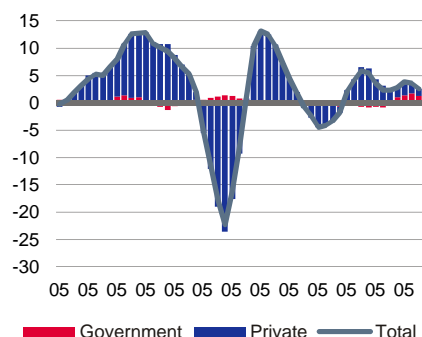


Source: ifo Institut

Government equipment investment more important lately

2

Contribution to investment in machinery & equipment, yoy, real, 4Q mov. avg., pp



Sources: Federal Statistical Office, Deutsche Bank Research

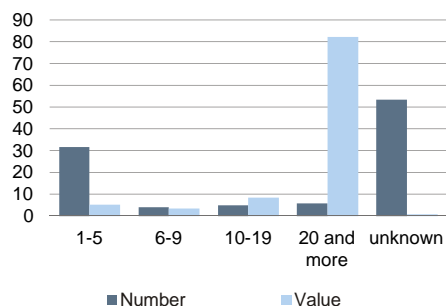


## Uncertainty is slowing capital expenditure

### Large exporters with many trading relationships

3

Share of exporting companies by number of export destinations, %



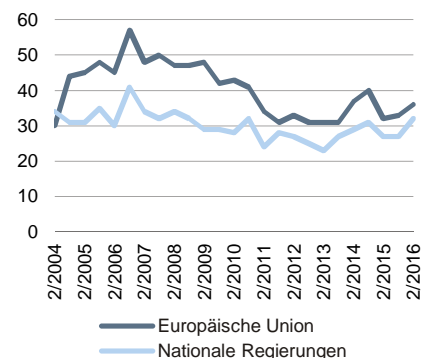
High proportion of "unknown" due to intra-EU trade, where minimum reporting threshold often not reached. Share in total value of exports very low, though.

Source: Federal Statistical Office

### Drop in confidence

4

Share of respondents that trust..., % EU

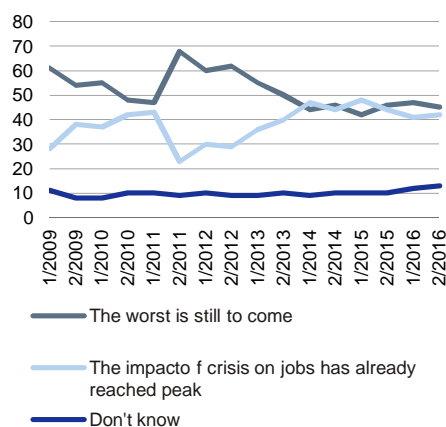


Source: EU Commission (Eurobarometer 86, 2016)

### Citizens believe labour market situation will deteriorate further

5

Share of respondents, % EU



Sources: EU Commission (Eurobarometer 86, 2016)

## High level of uncertainty driven by extent and complexity

We are currently seeing multiple factors whose interplay is causing a far higher level of uncertainty than was the case in the years between the fall of the Iron Curtain and the global economic and financial crisis, when the integration of emerging markets and developing countries into global trade created structural growth boost to the global economy.

- In our opinion, the biggest factor is the **extent** of the potential effects on Germany in the event that current uncertainties materialise. These mainly relate to Germany's most important trading partners and, in some cases, would entail significant structural breaks. The economic consequences of Trump's presidency in the United States, Germany's largest export market (ranked 1st, January to October 2016), are not yet clear, for example. However, Trump's pronouncements during the election campaign along with other factors are clouding the outlook for global free trade. Following the Brexit decision, there is no clarity at all about future trade relations and political cooperation between the EU and the UK (ranked 3rd). Europe's political calendar in 2017 is looking busy, with elections in the Netherlands (ranked 4th), France (ranked 2nd) and Germany. Fringe parties are likely to gain momentum and fears about European unity are growing, not least because voting results showed in 2016 that established forces lost out despite being ahead in the polls. Reliable surveys had previously classified such elections more as risks than uncertainties. Snap elections in the UK, Italy (ranked 6th) and even Spain (ranked 11th) cannot be ruled out. This would mean elections in the six largest economies of the EU. The possible bursting of the real-estate bubble in China (ranked 5th) would have global repercussions.
- Moreover, the **number** of uncertainties has risen significantly since the start of the financial and economic crisis in 2008. Although they frequently drop out of the spotlight after a phase of dominating the headlines (e.g. Greece, high sovereign debts in Europe, TARGET2 balances), this does not mean that they have actually disappeared.
- Another important factor is the **globalisation** that has occurred over the last few decades; it has significantly compounded the effects of uncertainty because national economic and political shocks and uncertainty ripple out to the rest of the world more quickly. Internationalised supply chains mean that negative effects are quickly felt in countries far away. In addition, companies that export goods are operating in more and more markets at once, which is increasing the **complexity** of their decisions. For example, 5% of German exporters export to between ten and 19 countries and a further 6% in fact export to more than 20 different countries. These 6% account for 82% of exports. The fast **pace** at which information is disseminated also makes decision-makers aware of uncertainties sooner.
- The **lack of confidence** in politicians (and their ability to come up with solutions) is probably also contributing to the reluctance to invest because it increases the negative effects that are expected if uncertainties materialise. According to the Eurobarometer survey conducted regularly by the European Commission, only 36% of EU citizens express confidence in the EU (2008: 50%). Confidence in national governments has also declined, although it was already low before the start of the crisis. Despite the gradual recovery of the European labour market, 45% of those surveyed in mid-2016 said that the worst was still to come for the labour market, with only 42% believing the opposite was more likely. Although these are surveys of all citizens and not specifically of corporate decision-makers, they do provide at least a hint of how great the uncertainty might still be despite the survey results' recent slight improvement.



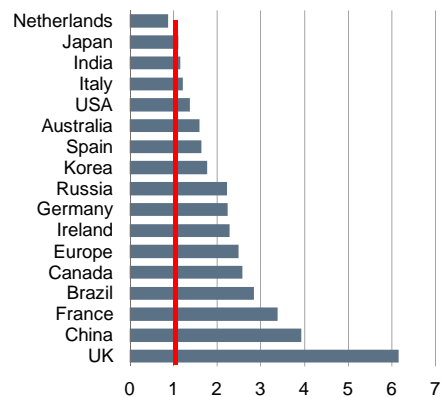
## Uncertainty is slowing capital expenditure

### Uncertainty: Four indicator types provide clues

#### Uncertainty above pre-crisis levels

6

Economic policy uncertainty; Average 2016 relative to 1997-2007 average



Sources: www.PolicyUncertainty.com, Deutsche Bank Research

One of the defining features of uncertainty is that it is not quantifiable, and nor are its potential effects. However, there are some indicators that, taken together, enable reliable conclusions to be drawn about the effects of the uncertainty on investing activities. We have divided these indicators into four main types on the basis of different data sources and different forms of uncertainty.<sup>1</sup>

#### News-based indicators

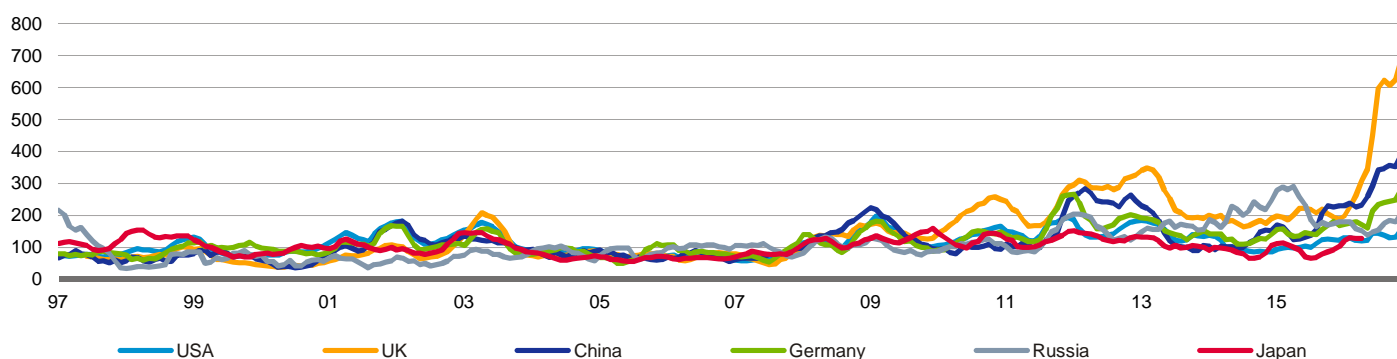
An index of economic policy uncertainty<sup>2</sup> based on an analysis of news articles has been attracting growing attention lately. This is due in no small part to the fact that the uncertainty measured by this index, particularly in Europe, has risen to unprecedented levels in recent months. The highest level was reached in the United Kingdom as a result of the uncertainty surrounding the result of the Brexit referendum and the subsequent outcome of the UK's negotiations with the EU. In June, the month of the referendum, uncertainty was ten times higher than before the crisis.

The combination of Brexit and the start of the election campaign has probably contributed to the sharp rise in uncertainty in Germany, too. In recent months, average uncertainty levels in Germany have been at the same high level last seen in 2012 at the height of the euro crisis and more than twice as high as before the crisis. Since the peak in June/July, global uncertainty has fallen again slightly, but remains far higher than the long-term average. However, the uncertainty measure for the United States has risen only a little in recent months, despite the US election campaign.

#### Economic policy uncertainty elevated especially in Europe

7

Standardised, 6 months average



Sources: "Measuring Economic Policy Uncertainty" by Scott R. Baker, Nicholas Bloom and Steven J. Davis at www.PolicyUncertainty.com, Deutsche Bank Research

News-based uncertainty indicators are compiled by searching through news articles for individual keywords or combinations thereof. Examples include the words uncertainty, economy, regulation, legislation and parliament. The index referred to above compares the number of articles identified in this way with the absolute number of articles published. Such indices can apparently ascertain episodes of increased uncertainty very well. For example, the larger peaks in

<sup>1</sup> Macroeconomic uncertainty: What is it, how can we measure it and why does it matter? (2013). Quarterly Bulletin 2013 Q2. Bank of England. <http://www.policyuncertainty.com/>

<sup>2</sup> Measuring Economic Policy Uncertainty (2016). Scott R Baker, Nicholas Bloom, Steven J. Davis. March 10, 2016.



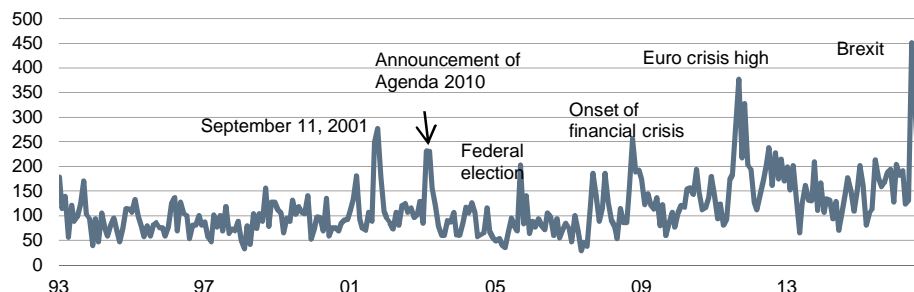


## Uncertainty is slowing capital expenditure

the index for Germany can be clearly assigned to individual political and economic events.

Newsbased uncertainty index for Germany

8



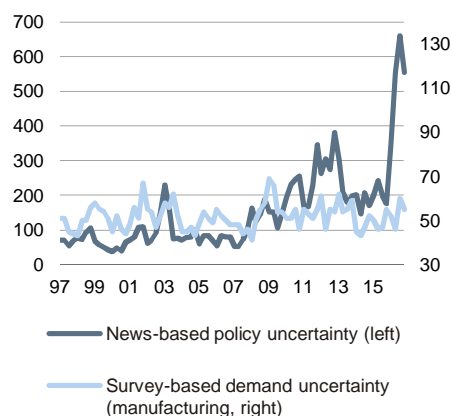
Source: "Measuring Economic Policy Uncertainty" by S. R. Baker, N. Bloom and S. J. Davis at [www.PolicyUncertainty.com](http://www.PolicyUncertainty.com)

These news-based indicators have some restrictions as far as their relevance to the (short-term) capital expenditure outlook is concerned. This includes the choice of words analysed. The keywords chosen for the indicator that we described, for example, focus on economic policy uncertainty. Global threats to growth – which are relevant to the German export industry – could therefore potentially be understated. It is also an indicator of the breadth of awareness and uncertainty. As an example, the plethora of articles about the risks of Brexit, which caused the uncertainty indicator to rise to a record high, could therefore overstate the short-term implications for capital expenditure because exiting the EU is designed to be a two-year process and the adverse impact, at least on replacement investment, should not be as strong.

Diverging uncertainty signals following the Brexit vote

9

United Kingdom



Sources: CBI, Deutsche Bank Research, [www.PolicyUncertainty.com](http://www.PolicyUncertainty.com)

### Survey-based indicators

An alternative to news-based indicators are those that draw on surveys. The monthly economic surveys conducted among companies and consumers in many countries are particularly relevant due to their regularity. Some include surveys that ask specifically about uncertainty. In the United Kingdom, for example, companies are regularly surveyed about factors that hold back their capital expenditure, and uncertainty is one of the possible answers. Even more widespread is survey data that can be defined as a measure of uncertainty, at least indirectly. The main examples in Germany are the ifo index and its expectations component.

In the United Kingdom, the degree of uncertainty revealed by the (direct) survey-based indicator differs significantly from the news-based economic policy uncertainty. The increase and the level of uncertainty are far higher (because of the plethora of news) than the assessment given by the surveyed companies regarding their investing activities. However, the changes of the two indicators show significant correlation since 2012, which, if nothing else, is a sign that political uncertainty has been playing a bigger role for companies since 2012, especially in Europe.

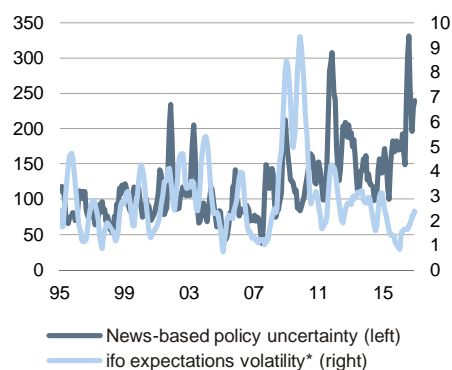
Indirect conclusions have to be drawn in the case of surveys that do not ask directly about the degree or effects of uncertainty. For example, a rising or falling ifo index is not, per se, associated with exceptional uncertainty beyond the level of normal economic fluctuation. However, there are several ways in which the data can be translated into measures of uncertainty:

- Increasing **volatility of ifo expectations** can, for example, indicate that expectations are having to be revised quickly because they prove to be



## Uncertainty is slowing capital expenditure

For higher correlation pre-crisis 10



\*last 12 months

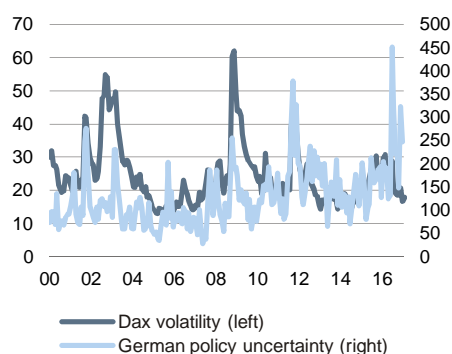
Sources: Deutsche Bank Research, ifo, Haver

wrong or exaggerated once more information becomes available. Surveys such as those conducted by ifo that ask specifically about expectations are a more suitable way of measuring uncertainty indirectly than, for example, the purchasing managers' indices (PMIs) that mainly look at changes in quantifiable indicators (e.g. actual production) in the month of the survey. The European Commission's monthly economic survey also contains a few questions about expectations, so the data can also be transformed as described here.

— Another measure of uncertainty could be [the correlation between seasonally adjusted and non-seasonally adjusted ifo expectations](#), e.g. over the past 24 months. The more changes in expectations deviate from the usual seasonal and trend profile, the less correlation there is between the two indices. This is therefore a measure of the irregular component as the ifo institute calls it. Seasonal adjustment breaks down index movements into seasonal, trend and irregular movements. Larger fluctuations in the irregular component interrupt the correlation and may be a sign of (new) uncertainties. In September 2016, for example, the non-seasonally adjusted ifo expectations rose by a substantial 2.5 index points, which we interpreted as a backlash against the sharp drop in the previous month, which was probably caused by the Brexit vote. Over the long-term average, however, there is typically a decrease of roughly one index point in September. This contributed to the significant increase in the published expectations as the gap was attributed to the irregular component.

— The final measure of uncertainty based on ifo data that we will describe here is the [discrepancy between the ifo expectations and the prevailing business situation a few months later](#). In the case of normal economic fluctuation, companies have sufficient experience to be able to judge how their business situation will change. However, when uncertainty is at a high level, they are able to do so to a much lesser extent. In the last 24 months, for example, there was in fact a negative correlation between low expectations about the future business situation and the situation that actually materialised five months later – the time-lag at which the two series show the highest correlation historically. During the 1990s, the correlation was mostly above 80%.<sup>3</sup> Unfortunately, this is a lagging indicator because the current situation is being compared with expectations from a few months ago, so information about the current extent of uncertainty is not provided.

Dax volatility and policy uncertainty closely aligned during Euro crisis 11



Sources: Deutsche Bank Research, Bloomberg Finance LP, Haver

### Indicators based on financial markets

Movements in financial markets can also provide invaluable clues about prevailing uncertainty levels. In principle, it can be assumed that prices in financial markets, e.g. share prices, reflect traders' current knowledge and (average) expectations. If financial markets fluctuate substantially, or the fluctuation increases, it may be a sign that expectations are having to be revised very frequently and/or significantly, which in turn indicates a high level of uncertainty. The volatility of equity markets and currency markets are usually used to measure uncertainty. In Germany, the level of implied DAX volatility is relatively closely correlated with news-based uncertainty especially since the beginning of the crisis.

<sup>3</sup> It is becoming clear over the long term that the assessment of the business situation described by the ifo business expectations has a time lag of five months.



## Uncertainty is slowing capital expenditure

### Forecast-based indicators

The final uncertainty indicator that we are illustrating here is based on the analysis of forecasts. Forecasters try to evaluate all of the relevant available information and to incorporate it into their forecasts. The more uncertain the situation, the greater differences there are likely to be between the evaluations of the forecasters. The distribution of forecasts – the discrepancy between different forecasts of, for example, GDP growth – is therefore a measure of uncertainty.

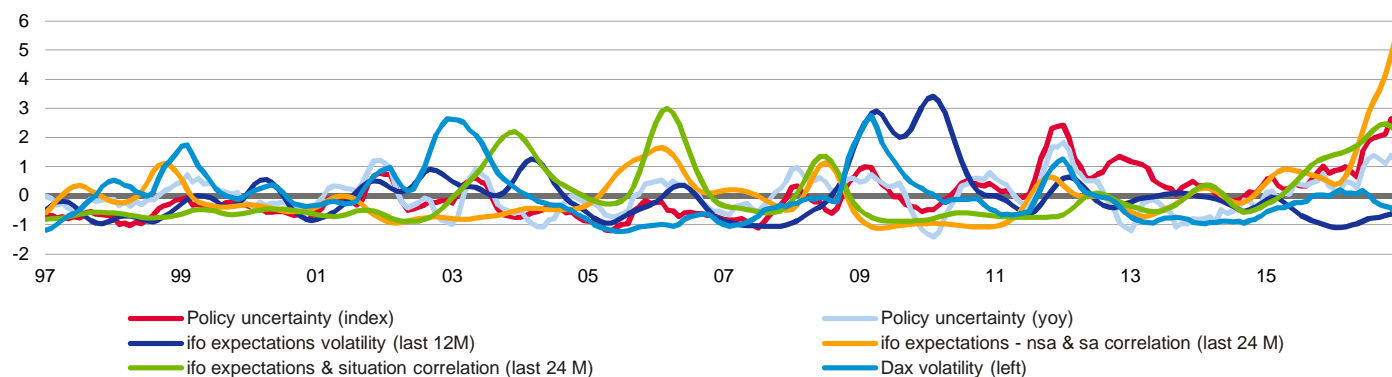
In the current environment, however, a problem with an indicator such as this is that the extreme degree of uncertainty might lead forecasters to not deviate (too far) from the average forecasts and/or to not adjust their forecasts. The Bank of England study referred to above also shows that this measure has a low correlation with the other measures. Moreover, macroeconomic forecasts are not adjusted very frequently, and the measure cannot be easily replicated by all observers. For this reason, we will not examine this measure any further.

Ultimately, there can be no single correct indicator for uncertainty because the influencing factors are too diverse and the differences between the data on which each indicator is based are too big. The fact that the uncertainty indicators presented here show a high correlation – measured by the difference between the indicators – does at least support the opinion that they contain information on the same factor, namely uncertainty.

### Most uncertainty indicators at extreme levels lately

12

Normalised data, 6-months mov. avg.



\*last 24 months; \*\*last 12 months

Sources: Deutsche Bank Research, ifo, Bloomberg Finance LP, Haver

### Elevated (political) uncertainty should subdue capital expenditure

To analyse the implications for capital expenditure of the different measures of uncertainty, we will calculate the coefficient of determination. This is the percentage of fluctuations in capital expenditure that can be explained solely by the different measures of uncertainty.<sup>4</sup> In doing so, we will restrict ourselves to analysing the correlation with German investment in machinery & equipment. This is influenced the most by decisions made by companies, particularly those in export-dependent industries. It is also the most volatile component of GDP. By contrast, construction spending is more influenced by consumers and the

<sup>4</sup> In view of the measures' volatility, we calculate it as an average for the quarter and as an average for the past four quarters. Overall, the smoothed time series provides much greater explanatory power.



## Uncertainty is slowing capital expenditure

government. Moreover, building projects usually take longer to plan and execute, and cancelling them is often extremely expensive. Uncertainty is therefore likely to be less critical in the short term.

It can be seen overall that some of the uncertainty measures that we have presented here have very high explanatory power for the growth in capital expenditure. What can also be seen is that the correlation for most of them has been much stronger since the start of the crisis than in the years before. The indicators mostly have a lead time of a few (one to four) quarters. The volatility of the ifo expectations and the level of DAX volatility show a very stable correlation with capital expenditure. Below, we will concentrate on the change in news-based uncertainty, the volatility of the ifo expectations<sup>5</sup> and the change in DAX volatility given their high correlation in recent years.

### Uncertainty and investment in machinery & equipment

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Germany, quarterly averages of uncertainty measures & growth rate of investment in machinery and equipment (yoy)

	Actual data					
	1997-2016		1997-2007		2008-2016	
	R <sup>2</sup>	Lead (-) / lag (+) <sup>***</sup>	R <sup>2</sup>	Lead (-) / lag (+) <sup>***</sup>	R <sup>2</sup>	Lead (-) / lag (+) <sup>***</sup>
Policy uncertainty level	0.15	-3	0.23	-2	0.05	-3
Policy uncertainty change (yoy)	0.11	-4	0.04	-2	0.18	-4
ifo expectations volatility**	0.45	1	0.33	1	0.46	1
ifo expectations - nsa & sa correlation****	0.13	-1	0.30	-2	0.26	-5
ifo expectations & situation correlation****	0.03	-1	0.05	-4	0.43	-5
Dax volatility level	0.21	-1	0.28	2	0.38	-1
Dax volatility change	0.13	-3	0.03	1	0.34	-3
Composite* (lagged)	0.47	0	0.25	2	0.63	0
Composite* (same quarter)	0.25	-1	0.13	0	0.31	-1

	4 quarter moving average					
	1997-2016		1997-2007		2008-2016	
	R <sup>2</sup>	Lead (-) / lag (+) <sup>***</sup>	R <sup>2</sup>	Lead (-) / lag (+) <sup>***</sup>	R <sup>2</sup>	Lead (-) / lag (+) <sup>***</sup>
Policy uncertainty level	0.24	-3	0.51	-3	0.08	-3
Policy uncertainty change (yoy)	0.24	-4	0.05	-3	0.43	-4
ifo expectations volatility**	0.57	1	0.47	0	0.59	1
ifo expectations - nsa & sa correlation****	0.25	0	0.45	-2	0.29	-5
ifo expectations & situation correlation****	0.03	-1	0.07	-4	0.42	-4
Dax volatility level	0.28	-1	0.34	1	0.58	-2
Dax volatility change	0.18	-3	0.05	0	0.63	-3
Composite* (lagged)	0.52	0	0.23	1	0.76	0
Composite* (same quarter)	0.39	-1	0.24	-1	0.49	-2

\* unweighted average of normalized values of policy uncertainty change, ifo expectations volatility and Dax volatility change; \*\* over last 12 months; \*\*\* in quarters, \*\*\*\* over the last 24 months

Sources: Deutsche Bank Research, Haver, ifo, Bloomberg, Federal Statistical Office

As current political risks are dominant, the news-based indicator is probably the most relevant at present. Its extremely high level and the sharp rise in recent quarters are important warning signs and, taken by themselves, would be consistent with a decrease in capital expenditure of 10% or more. Whereas,

<sup>5</sup> In our examination of the survey-based data, we will not look any further at the two measures that are based on the correlation between the adjusted and non-adjusted ifo expectations and the correlation between the expectations and the business situation that later materialises according to the ifo data because the correlation with growth in capital expenditure does not hold steady over time.





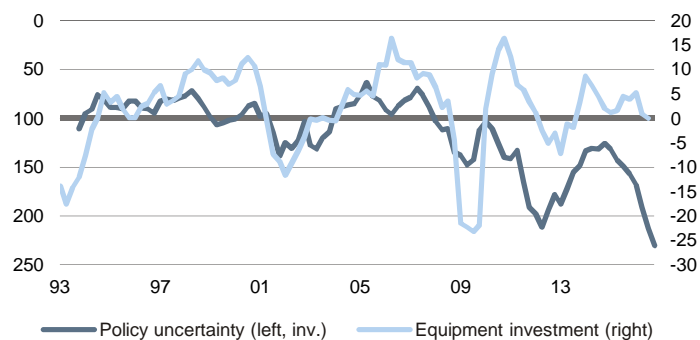
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before the crisis, the level of economic policy uncertainty was closely correlated with capital expenditure, since 2008 the change in uncertainty levels has explained the surprisingly higher degree of fluctuation in capital expenditure with a lead of four quarters. The unstable relationship might reduce the reliability of this indicator, though.

### High level of policy uncertainty weighs on investment ...

14

Index, 4Q avg. (left); % yoy, real (right)

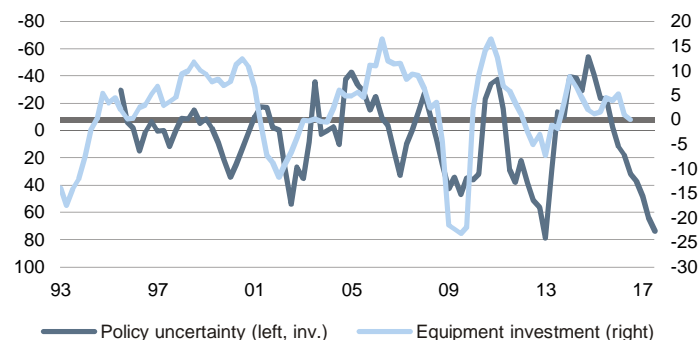


Sources: Federal Statistical Office, "Measuring Economic Policy Uncertainty" by S. Baker, N. Bloom & S. Davis

### ... and Brexit-related increase points to growth risks

15

Change yoy, index points, 4Q avg., 3Q lead (left); % yoy, real (right)



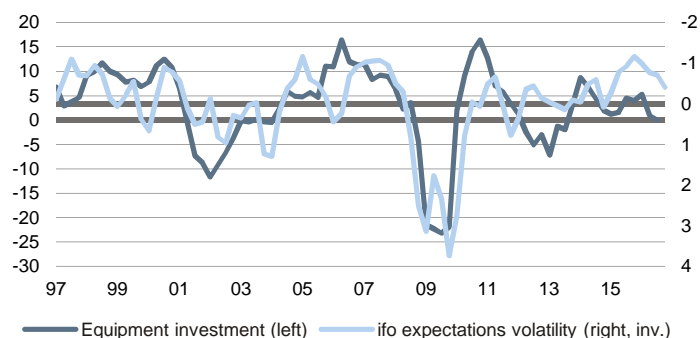
Sources: Federal Statistical Office, "Measuring Economic Policy Uncertainty" by S. Baker, N. Bloom & S. Davis

By contrast, neither the ifo expectations nor the DAX are experiencing unusually high volatility at present, and the decline in the DAX's volatility in fact points to a rapid acceleration of capital expenditure. Whereas the economic policy uncertainty might overstate the short-term implications for capital expenditure due to the strong media interest in Brexit and the US election, the two other indicators are currently likely to understate the uncertainty.

### Less volatile ifo expectations give the all-clear in the short term

16

% yoy, real (left); std. deviation, last 12 months (right)

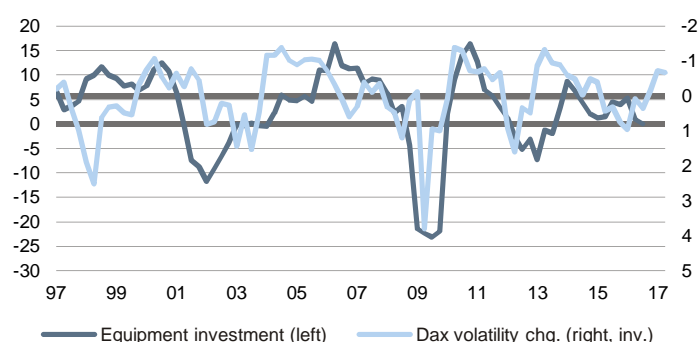


Sources: Deutsche Bank Research, Federal Statistical Office, ifo

### Falling Dax-Volatility = accelerating investment?

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% yoy, real (links); % yoy, implied volatility, option based (VDax, right)



Sources: Deutsche Bank Research, Federal Statistical Office, Bloomberg Finance LP

The volatility of the ifo expectations has recently increased significantly from an exceptionally low level, not least due to the effect of Brexit. The low level might be due in part to current political risks (e.g. Brexit) probably having a more medium- to long-term impact, whereas the ifo survey only asks about expectations for the next six months. That might be why corporates' demand expectations are currently not being adjusted significantly; however, companies may nonetheless adapt their capital expenditure plans in view of pronounced medium-term uncertainty. With regard to stock market volatility, our equity strategists have pointed out that, although the absolute level of volatility is low, there are frequent peaks. The policy pursued by major global central banks, whose actions have injected a lot of liquidity into the financial markets, has probably also played a substantial role.

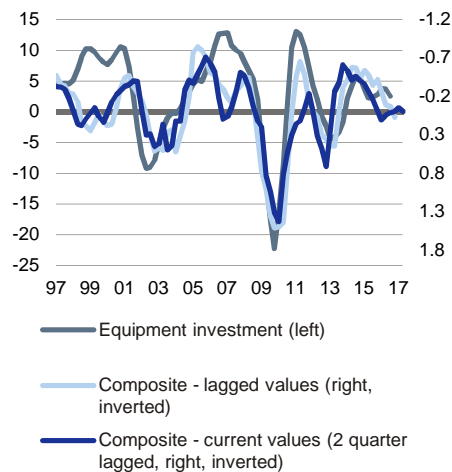


## Uncertainty is slowing capital expenditure

### Muted outlook for investment

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% yoy, real (left); stand. average (right); both 4Q average



Composite: Simple average of standardized news-based, survey-based (ifo expectations)

Sources: Deutsche Bank Research, Federal Statistical

None of the uncertainty indicators is without its problems. Their methodologies mean that they are referring to different types uncertainty and therefore may not always provide an adequate picture of the macroeconomic effects. That is why we use the three aforementioned measures to derive two combined indicators. Firstly, we calculate the unweighted average of the normalised values from the current quarter; secondly, we calculate an index, taking into account the time-lag characteristics of the individual indicators with regards to investment spending. In the time since the crisis, the former has shown a similarly high correlation with capital expenditure as the individual indicators, with a lead time of two quarters. The latter does not have a lead time because of the delayed values used in the measures of uncertainty, but does explain more than 70% of the changes in capital expenditure. The two combined indicators point to a slowdown, caused by strong political uncertainty, in what is already a weak pace of growth in spending on capital equipment.

## Major international uncertainties

### Globalisation: Levelling out or on a cliff edge?

Since 2012, global trade has expanded at only about the same pace as global GDP. In the decades before, the average growth of global trade was always much stronger than that of the world's economy. This was one of the reasons for Germany's export strength, which also stimulated domestic capital expenditure. In our view, the relatively weak level of trade is mainly due to structural changes and is likely to be only partly resolved by a sustained recovery of the global economy.<sup>6</sup> If, as we expect, this structural weakness continues in the coming years, many exporters will probably have to adjust their long-term sales expectations. This is not an uncertainty but a well-founded expectation.

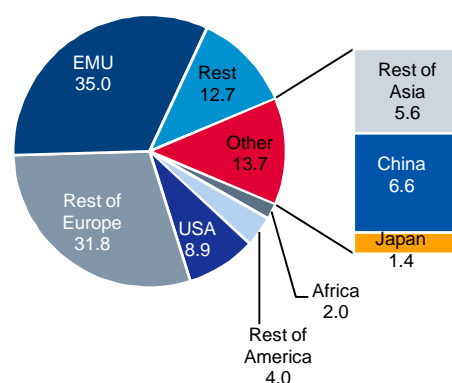
The subject is becoming an area of uncertainty due to increasing political and social criticism of global free trade and the free movement of goods, people and capital in Europe. In fact, the number of trade restrictions in the G20 countries has almost quadrupled since the start of the global financial and economic crisis in 2008, and the prospects for future progress have recently become much bleaker. Donald Trump, the new US president, has withdrawn from the negotiations on the Trans-Pacific Partnership (TPP); speculation is growing about a 'trade war' with China. Although the likelihood of such an escalation is low, Donald Trump would have many options as US president to undermine free trade agreements unilaterally. Moreover, public statements on both sides of the Atlantic indicate that the Transatlantic Trade and Investment Partnership (TTIP) will not materialise in the foreseeable future. Another key reason for the outcome of the Brexit vote is thought to have been scepticism about the free movement of people within the Schengen Area.

Overall, this means that uncertainties about the future pace – and possibly even the direction – of globalisation have risen significantly. Until more is known, particularly about the agenda of the new US administration, German exporters are likely to exercise caution when it comes to capital expenditure and will probably prefer making greater use of existing capacity for now.

### German exports: Asia more significant than US

19

Share in total goods exports, 2015, %



Sources: Deutsche Bank Research, Deutsche Bundesbank

<sup>6</sup> Peters, Heiko (2016). Focus Germany: How to pay for retirement? Deutsche Bank Research. Frankfurt am Main. And Heymann, Eric and Heiko Peters (2016). Logistics: Weak environment – no trend reversal in sight. Deutsche Bank Research. Germany Monitor. Frankfurt am Main.

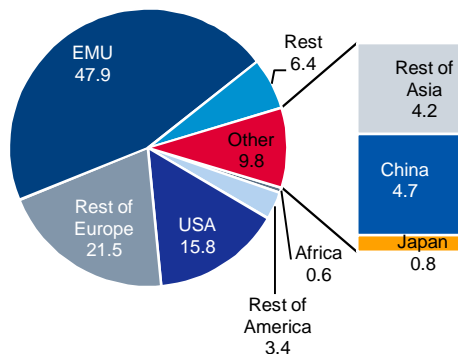


## Uncertainty is slowing capital expenditure

USA accounts for significant portion of German foreign direct investment

20

Share in total FDI stock, 2015, %

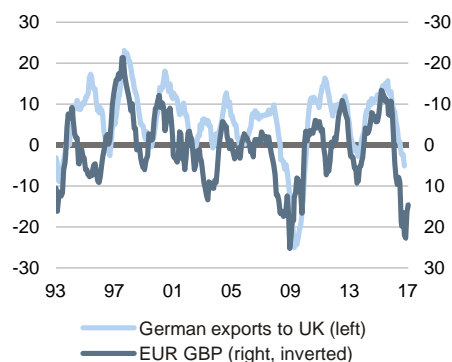


Sources: Deutsche Bank Research, Deutsche Bundesbank

German exports have become expensive for UK consumers

21

% yoy, 6M mov. avg. (left); % yoy (right)

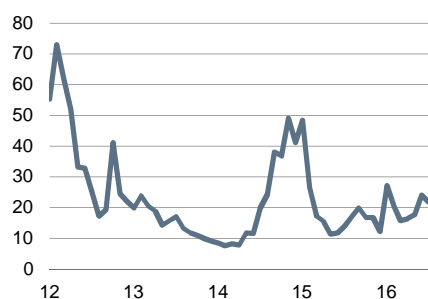


Sources: Deutsche Bank Research, Bloomberg Finance LP, Deutsche Bundesbank

Breakup of the eurozone: now seen as more likely again

22

Sentix Euro-area Break-up index



Source: Bloomberg Finance LP

### Trumponomics: Boost for demand vs. isolation

Our US economists expect that Donald Trump will quickly deliver on his major election promises (tax cuts, deregulation) and thus provide a boost for capital-expenditure-driven growth, which is why they have raised their GDP growth forecasts. However, the new president's unorthodox political style is still likely to be good for a few surprises. In addition, implementation of the trade-policy and protectionist measures – and even a border adjustment tax – announced during the election campaign might cause considerable turmoil, with knock-on effects for the profits of affected companies. Initially, this may also lead to a reluctance to invest among those German companies that might be affected as exporters or through their direct investments in the United States.

### Brexit: Hard or soft (or not at all)?

There are also substantial uncertainties surrounding Brexit. Although the legal framework for economic relations with the United Kingdom will not change in the short term, Brexit is unlikely to leave the UK economy unscathed, even if initial concerns by some observers about a sudden recession have failed to materialise. However, the referendum will probably affect German exporters in the short term, not least because of the sharp depreciation of the pound. Exports to the UK have been falling in the past few months. Around 7.5% of the German goods exported were destined for the United Kingdom in 2016, and the years 2010 to 2015 saw sometimes significant growth in the nominal volume of German goods exported across the English Channel. The United Kingdom even accounted for more than 9% of Germany's direct outward investment in 2014.

Political uncertainty, however, is likely to be a bigger factor in the medium term. The start date of negotiations (probably in the first half of 2017) and their duration (two years or longer) are unclear. It is likely that, at the end of this period, the future legal framework for trade between the EU and United Kingdom will still not be in place; the negotiations about the subsequent arrangements could also go on for years. Another complete unknown is what restrictions there will be on free trade between the economic areas in future – how hard or soft Brexit will be. It now looks like 'financial passporting' will cease to exist, which will impact on financial institutions' capital expenditure relatively quickly. In an environment such as this, capital spending plans of German (and other) companies with a longer return on investment period will probably be scrutinised and, in many cases, postponed or cancelled.

### And what about Frexit, Nexit and Italexit?

The past few years have put many certainties to the test. Both Brexit and Donald Trump's election as the next US president were predicted by only a few observers despite a tight race in the polls. Even if only subconsciously, company decision-makers may potentially regard the probability of other risks and uncertainties materialising as being higher – along the lines of 'nothing is impossible'. The (temporary) increase in the number of Google searches for the terms Frexit, Nexit and Italexit also indicates a rise in concerns about developments that are seen as completely unlikely, namely the exit of France, the Netherlands or Italy from the EU or eurozone.

As unlikely as these may be, the radical political and economic consequences for the whole of Europe are probably fuelling uncertainty when it comes to companies making decisions on capital expenditure. More than a third of German goods exports are destined for other eurozone countries, which also account for almost 50% of Germany's direct outward investment.



## Uncertainty is slowing capital expenditure

### China: A hard landing coming up?

A hard landing for the Chinese economy – i.e. the sharp contraction of growth rates to (well) below 5% per year – after decades of rapid growth has been a regularly discussed global economic uncertainty for years.

It is currently returning to the spotlight because the government and central bank have taken extensive measures to support the economy. However, these have probably contributed to the formation of a real-estate bubble. The lending volume recently rose by more than 20% year on year. Over 70% of this lending volume was attributable to mortgages in the period July to August 2016, compared with only 20% or so in the years 2009 to 2015. At the same time, property prices have continued to rocket. Overall, the debt levels of many companies and public authorities have risen both continuously and substantially in the last few years. Questions are increasingly being asked about whether this strategy is sustainable.

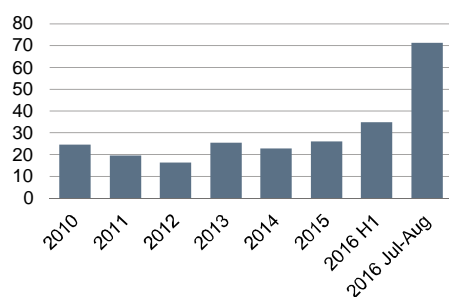
Monetary and fiscal policies are likely to have a positive economic impact in the short term, but our China economist predicts that the government and central bank will take steps to slow down the real-estate market in late 2016. He anticipates that they will succeed without harming the economy too much and that growth will slow down at a moderate pace (2016: 6.7%; 2017: 6.5%). Admittedly, achieving this growth is no easy task.

At more than 6% in 2016 (2000: 1.5%), the proportion of German exports to China is – despite high growth rates in recent years – lower than that of exports to the United States. Moreover, direct investment has also increased rapidly and now accounts for almost 5% (USA: 16%). However, an economic slowdown in China would have a significant impact on the rest of Asia at the very least, which would also put indirect pressure on German exporters.

Real estate fuelling Chinese lending boom

23

Share of mortgages credit in total volume; %



Sources: Deutsche Bank Research, WIND

### Russia and Turkey also facing political uncertainties

A few years ago, Russia was seen by many German companies as a new ray of hope for export business. But this hope has faded in the last few years. In 2012, Russia accounted for 3.5% of all German goods exports. This figure is likely to have fallen to just 1.8% in 2016. Russia's importance in individual sectors was and is much bigger. For example, the German engineering industry exported 5.1% of its products to Russia, although this fell to 2.8% in 2016. The Russian economy was affected by the collapse of crude oil and other commodity prices. Another factor is the sanctions imposed by the EU in the wake of the Ukraine crisis. Furthermore, Germany's exports to Russia have been hampered by the depreciation of the rouble against the euro. Although the nominal volume of goods exported from Germany to Russia bottomed out (at a low level) in 2016, the potential for a recovery in the short term is limited – or at least uncertain.

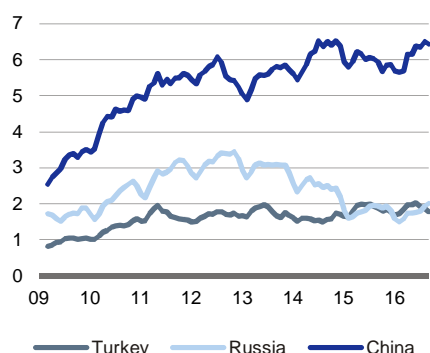
Political uncertainty in Russia evidently remains strong for German companies that continue to focus on the country as a sales market or investment location. This uncertainty encompasses both economic aspects (e.g. future of EU sanctions, trade restrictions imposed by Russia, exchange rate) and possible military events, such as a flaring up of the Ukraine crisis. It sounds like a paradox, but the fact that Russia is Germany's biggest supplier of energy (oil and gas) has actually provided an element of stability in the past because, so far, Russian energy supplies to Germany have not been disrupted by political crises.

The situation in Turkey is also dominated by uncertainty. Recent (political) events in the country (military coup and government backlash, attempted constitutional reforms, terrorist attacks) and resentment towards the EU are creating uncertainty and holding back both bilateral trade activities and capital

Exports to Russia way down on their record levels

24

nominal German goods exports, bn EUR, 3MMA



Sources: Deutsche Bank Research, Federal Statistical Office

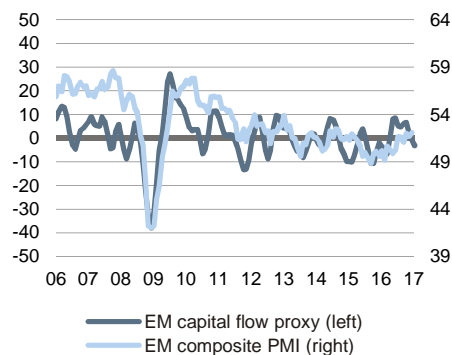


## Uncertainty is slowing capital expenditure

### EM capital inflows push growth

25

% change, 3M/3M (left); Index (right)

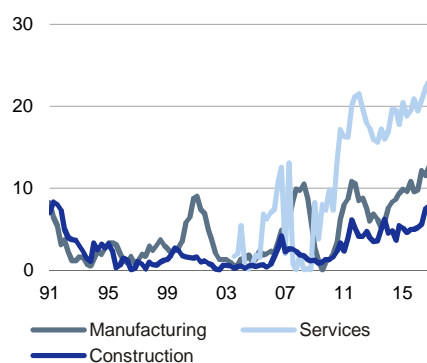


Sources: Deutsche Bank Research, Bloomberg Finance LP, Markit

### Labour shortage at historic high

26

Germany, shortage of labour force as limiting factor for business activity, % of companies



Source: EU Commission

### Many vacancies

27

number of vacancies, all sectors, sa., million



Source: Eurostat

expenditure. As Turkey only accounts for just under 1.9% (2016) of the German goods that are exported, the macroeconomic effect on investing activity in Germany is small, especially as we do not anticipate a recession in Turkey. Ultimately, the situation in Turkey is another stone in the mosaic of current uncertainty.

### Monetary policy: A more aggressive Fed

Since Donald Trump's victory in the US presidential election, the financial markets have increasingly priced in the expectation that the new administration's fiscal policy measures will (at first) push up growth and inflation in the United States. Consequently, the US central bank may also raise interest rates more quickly than had been anticipated. Against this backdrop, there may be significant outflows of capital from the emerging markets – reminiscent of the 'taper tantrum' in 2013 – and this would adversely affect these countries' growth. Moreover, expectations have increased that the ECB will scale back its bond buying programme (QE) even further at the end of 2017. Although our regional economists assume that the Emerging Markets are generally in better structural health than they were in 2013, the combination of capital outflows and new trade restrictions could mean severe consequences for the affected countries.

### Domestic brakes on capital expenditure

So far, we have predominantly concerned ourselves with international economic policy and geopolitical factors. However, developments in Germany are also creating uncertainty for investing activity. At present, these do not include the Bundestag election, because an outcome that would lead to a radical political shift currently seems rather unlikely – in spite of the vote for Brexit and Trump's victory.

### Shortage of skilled workers: Extremely low level makes recruitment uncertain

Complaints about the shortage of skilled workers have been high on the agenda in Germany for years. Nevertheless, we are including it in the list of uncertainties because, according to surveys, it has recently reached a level that has made it uncertain for companies whether they can fill their vacancies in the foreseeable future and at a reasonable cost. This particularly applies to start-ups and expansion investment requiring a large increase in the workforce in one go, and where failure would destroy the value of the capital expended.

The Association of German Chambers of Industry and Commerce (DIHK) conducts an economic survey in which it regularly asks its member companies what risks they see for the growth of their business in the next twelve months. In the autumn 2016 survey, the possible answer 'shortage of skilled workers' comfortably took first place. Of all the companies, 48% saw this as a limiting factor. In the European Commission's regular economic survey, the proportion of companies that cited the supply of workers as a challenge for their business rose to all-time highs at the end of 2016. There are also roughly one million vacancies in Germany.

As the nature of work in many sectors is changing significantly at the moment (e.g. digitalisation), it is also not certain whether workers' current skills and qualifications match what companies will need in the future.





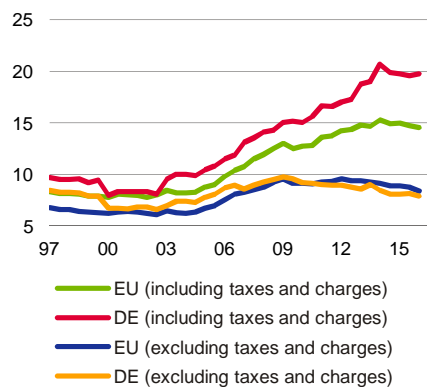
## Uncertainty is slowing capital expenditure

### Shift in German energy policy creates all kinds of uncertainties

Taxes and charges are the main drivers of electricity prices in Germany

28

Electricity prices for industrial clients\*, Cent per kilowatt hour



\* annual consumption between 500-2000 MWh

Source: Eurostat

The German 'Energiewende' is a once-in-a-lifetime project. We have described the negative consequences for capital expenditure, particularly by companies with very high energy consumption, on a number of occasions.<sup>7</sup> Although there are many specific energy and climate policy targets, there is considerable uncertainty surrounding the political measures and instruments, the economic costs, the consequences for consumers and companies, and technical progress.

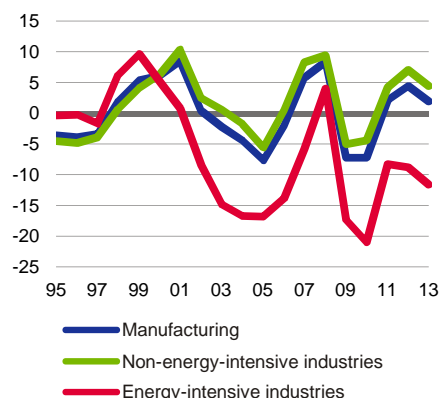
One of the sources of uncertainty for industrial companies is the cost of electricity going forward. Electricity prices in Germany are currently far higher than the EU average, not least because of the high proportion of taxes and charges. A notable example is the EEG surcharge, which is being levied to fund the expansion of renewable energy in the electricity sector. Uncertainty about the share of taxes and levies in German electricity prices will remain at a high level for the time being in view of repeated adjustments by the government, the uncertain funding requirements for renewable energies and the type of funding.

Industrial companies with particularly high energy consumption (e.g. those in the chemicals or metal production industries) currently benefit significantly from exemptions in the context of the 'Energiewende', such as a lower EEG surcharge. Supporters of the 'Energiewende' therefore correctly argue that the absolute level of electricity prices does not represent a disadvantage in international competition for the companies receiving this benefit. Nevertheless, there are holes in this argument because it is not certain how long the exemptions will continue to apply. The concessions are criticised by the EU, certain politicians and some scientists at irregular intervals or constantly. The lifetime of plant and equipment may span several decades, especially in energy-intensive sectors. The outlined uncertainties that can be seen in the political discussion surrounding the exemptions are therefore toxic to decisions on capital expenditure. It is a fact that new capital expenditure in energy-intensive sectors of industry has mainly been lower than the amount of depreciation in recent years (negative net investment). Moreover, real net fixed assets – effectively the result of earlier investing activities – have been declining in all energy-intensive sectors of industry for years.

Energy-intensive industries invest less

29

Nom. net capital expenditure as % of nominal gross capital expenditure in Germany



Source: Federal Statistical Office

In the cited report on the German 'Energiewende', we also described how most environmental targets of the 'Energiewende' are unlikely to be achieved where there is no system of generous subsidies. If targets are expected to be missed, this creates uncertainty about how politicians will react, e.g. by taking even more drastic measures or by adapting the targets. Such deliberations mean uncertainty. Is capital expenditure on the specified technologies a good investment if some political factions are considering whether to ban them in the medium to long term? What financially viable technological alternatives are available? Does the government pay subsidies for new technologies and, if so, how much and for how long? Do the alternative technologies meet customers' requirements? Some of these questions are a part of business risk. In contrast to a purely market-economy process, the degree of uncertainty surrounding the 'Energiewende' is increased by (possible) government influence in the form of bans, laws and subsidies.

<sup>7</sup> See Heymann, Eric (2016). German 'Energiewende': Many targets out of sight. Deutsche Bank Research. Current Issues. Frankfurt am Main. And Weimann, Joachim (2015). Wissen wir, was wir tun? – Die deutsche Energiepolitik zwischen moralischem Anspruch und ökonomischer Realität [Do we know what we're doing? German energy policy caught between moral ambitions and economic reality]. Discussion paper no. 2015-10 of the Chair of Economic Ethics at Martin Luther University Halle-Wittenberg, Halle.



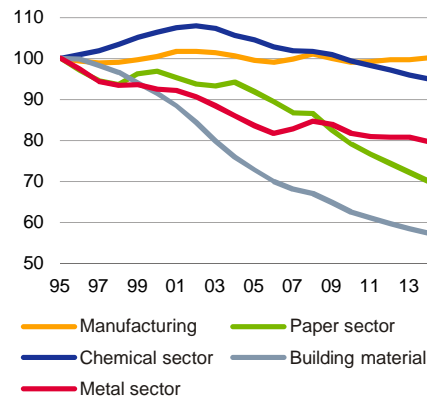
## Uncertainty is slowing capital expenditure

### Conclusion and outlook

Decrease of capital stock in energy-intensive industries

30

Germany, real net capital stock, 1995=100



Source: Federal Statistical Office

The level of uncertainty has recently reached new heights – depending on which measure is used. The largest severe uncertainties can be found outside Germany. They range from a strong headwind for global free trade and political turmoil in major sales markets to uncertainties about economic and political integration in Europe and the possible impact of significant movement in financial markets. Germany's strength as an exporter and its tight integration into global supply chains make it particularly vulnerable in this situation. The effects are compounded by domestic uncertainties.

We have shown that these factors and their effects can be quantified to some extent. This provides considerable support for our prediction that spending on capital equipment in Germany will decrease in 2017, not least because of the burden created by weak expenditure at the end of 2016 and despite the generally respectable level of capacity utilisation in industry.

The uncertainty relating to specific events in time (elections, government action such as in the United States) may decline in the second half of 2017. This is the assumption on which our forecast for capital expenditure is based. Reduced political uncertainty enables companies to forecast their profits more accurately, to which capital expenditure will then react – although possibly not immediately – if the global economy also gains momentum at the same time. We have not discussed extreme scenarios, such as a marked rise in international terrorism, cyberattacks, extreme weather conditions etc., here, but these would also have a sustained influence on the level of uncertainty.

Eric Heymann (+49 69 910-31730, eric.heyman@db.com)  
Oliver Rakau (+49 69 910-31875, oliver.rakau@db.com)



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