Construction sector: full order books, good growth prospects

By Martin Gornig, and Claus Michelsen

A significant rise in Germany's construction volume is expected for this year and the next, even if the growth is not as pronounced as it was in 2016. According to DIW Berlin's latest construction volume calculations, the sum of all new construction and building refurbishments will increase in real terms by 1.6 and 2.4 percent in 2017 and 2018, respectively, from a rate of 2.5 percent in 2016. New housing construction and public civil engineering are currently the primary growth drivers, but refurbishments are also likely to gain in prevalence.

Yet it is also becoming apparent that the construction industry is reaching the limits of its production capacities, with high utilization levels in many places. Government subsidization of construction investment is thus inappropriate in this context: given the full construction capacities, measures intended to promote new construction will only catalyze the price acceleration. The focus should instead be on approaches to stabilizing investment, which can be achieved through instruments for urban redevelopment or the creation of a reserve in public budgets for infrastructure investment.

According to DIW Berlin's annual construction volume calculations[1]—which include non-value-enhancing maintenance in addition to construction investment[2]—the construction sector remains an important pillar of the German economy. Apart from the "construction industry" in the narrower sense, industries such as steel and light metal construction, prefabricated building manufacturing, smithery, planning services, and other services are also taken into account. Unlike the statistical offices, DIW Berlin also differentiates between new construction measures and refurbishments of the existing building stock.

In addition to calculating and documenting the construction volumes from the past few years, DIW Berlin forecasts the values for this year and the next. This prognosis (Box)—especially the projections concerning future investment activity—is integrated into DIW Berlin's economic forecast.[3] As a supplement to the Federal Statistical Office's calculations, DIW Berlin's construction investment development estimates are now separated according to whether they pertain to new construction volumes or renovation volumes and residential or non-residential buildings.[4] As well, the development of both the main construction industry and the finishing trades are projected.

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1 The construction volume calculations are funded by the Future Building Research Initiative *(Zukunft Bau)* of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). For more on the term "Bauvolumen," consult the DIW glossary (available online, in German).

2 Martin Gornig et al., "Strukturdaten zur Produktion und Beschäftigung im Baugewerbe – Berechnungen für das Jahr 2015," report commissioned by the Federal Office for Building and Regional Planning in the context of the Future Building Research Initiative *(Zukunft Bau)* of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, final report, German Institute for Economic Research, Berlin (2016).

3 Ferdinand Fichtner et al., "Despite Weaker Job Market, Germany's Economic Upswing Continues," *DIW Economic Bulletin* 50 (2016), 587–593.

4 Claus Michelsen and Martin Gornig, "Prognose der Bestandsmaßnahmen und Neubauleistungen im Wohnungsbau und im Nichtwohnungsbau," BBSR-Online-Publikation no. 7 (2016).

Box

DIW Berlin's methodology for forecasting construction volume

Construction volume is calculated and projected in several steps. Calculations for renovations and new constructions are always made on an annual basis. The first step involves the calculation over the course of a year. The refurbishment volume is adjusted using a quadratic minimization[1] of the current quarterly volume of installation and other construction trades. To ensure consistency within the construction volume calculations, the volumes for new constructions are calculated as the difference between the total volume and the refurbishment volume. These series are then seasonally adjusted using the ARIMA-X12 method.

The second step involves now-casting the new construction and renovation series based on available synchronous indicators. Figures sourced from the monthly reports of the construction sector and its employees, as well as weather data, are used for this purpose.[2] Data for the year preceding the forecast period (in this instance, 2016) thus initially represents only a provisional estimate of the construction volumes. Final values are published in the following year, when the statistical offices report all relevant series in full.

The third step involves the prognosis of the individual series. The volumes for new constructions and for refurbishments are estimated separately using indicator-based statistical models. To this end, the desired parameter, e.g. the volume of commercial construction, is regressed to an autoregressive term and the delayed values of the corresponding indicator. The resulting predictive equation corresponds to the following template:

$$y_t = \alpha + \sum_{i=1}^{n} \beta_i y_{t-i} + \sum_{j=1}^{m} \gamma_j x_{t-j} + \varepsilon_t$$

Here, y_t represents the projected value; x_t the indicator; and ε_t the statistical error term. The parameters α, β_i and γ_j are estimated. The optimal lag structures n und m are determined by means of the auto-correlation or cross-correlation function. In addition, the different specifications are evaluated according to information criteria. The approach has been shown to be effective for estimating a large number of individual models and applying the average value to the forecast. Up to 50,000 individual models are estimated for each individual series. Indicators include building permits, incoming orders, production, interest rates, credit volumes, and employment and income development, as well as surveys among construction companies and freelance architects. Capacity utilization is also considered in the estimates.[3] The difference between total volume and the building volume is the expected civil engineering output.

In a final step, the results are translated to the template of the construction volume calculation. Here, demand-side development trends are favored while allowing for the idiosyncrasies of noninvestment construction services in the business cycle. The subdivided information on construction permits and order volumes enables further differentiation by structural characteristics, such as different development trends in East and West Germany or between producer groups like the main construction industry and the finishing trades.

1 For more on this, see Denton (1974).

2 For documentation of this methodology, see Michelsen und Gornig (2016).

3 Michelsen and Gornig (2016).

Housing construction remains construction industry's primary growth driver

After a decade of upward growth, housing construction remains the foundation of the construction industry. With the exception of a short-lived slump in 2013, growth rates have been especially strong since 2010.

Three factors have contributed to this development. Firstly, Germany is in a generally sound financial position, from a macroeconomic perspective: employment is growing steadily, capacities are mostly fully utilized, and household incomes have risen considerably.[5]

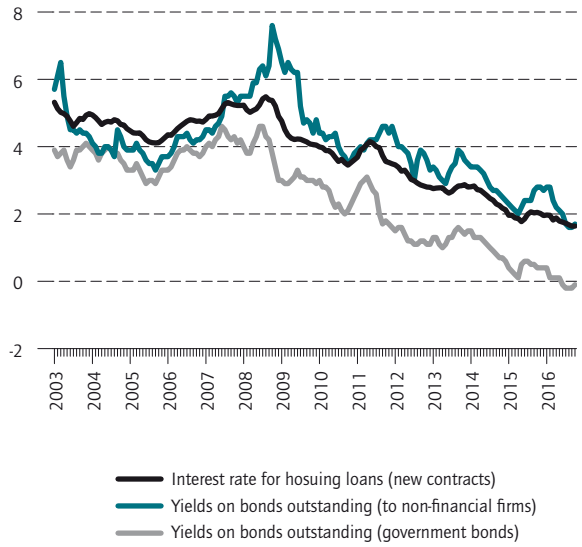
Secondly, interest rates on housing loans are at a historic low, and alternative investments are currently generating very low yields (Figure 1). Due to increases in real estate demand, the interest rate advantage is already clearly reflected in rising real estate prices (Figure 2); but since the U.S. Federal Reserve raised the benchmark this past December, there are concerns that further U.S. interest rate increases as well as rising European rates will create larger, medium-term problems with the follow-up financing of credit agreements, thus leading to an adjustment in real estate prices. That this is already an important factor for investors is evidenced by the fact that market capitalization of German real estate companies has been declining substantially since this past summer.[6] In

5 Fichtner et al. (2016), p. 1185.

6 For example, the stock market value of housing association Vonovia has dropped by just under 20 percent since mid-August 2016.

Figure 1

Interest rates and yields
In percent

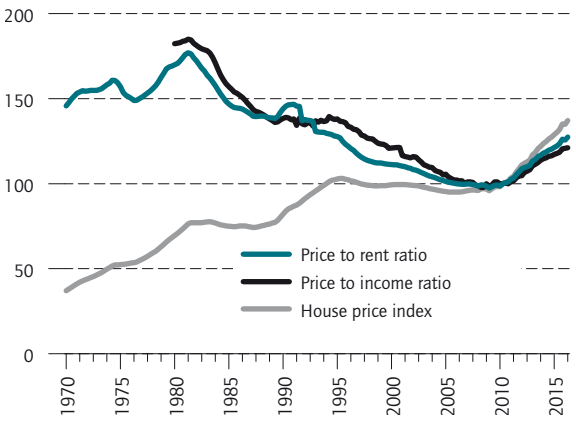


Sources: Bundesbank, authors' own calculations.

Interest rates are on an all time low.

Figure 2

House prices, price to rent and price to income ratios
Index 2010 = 100



Sources: OECD, authors' own calculations.

House prices have gained momentum recently.

the short term, however, the rising interest rates should continue to stimulate construction activity: contractors of already approved projects have a powerful incentive to build quickly so that they can spend their building funds in favorable conditions. A stimulus for investment in the existing building stock is also expected to arise from the interest rate developments. In the medium term, however, the rising interest rates will lead to a downturn in construction activity.

Thirdly, there has been a strong influx—mostly from abroad—into Germany's metropolitan areas in recent years.[7] Large cities are thus experiencing significant housing market bottlenecks that will initially have to be addressed with the creation of additional apartments in multi-family housing over the next few years. With regard to renovation and modernization, the growth in the major cities has both a stimulating and dampening effect. On the one hand, the demand for residential property has risen sharply, and when a property changes ownership, there is usually a restructuring or at least a renovation. In the current interest rate environment, a full utilization of the modernization levy in the amount of eleven percent of the construction costs to increase comfort is accompanied by relatively high yields in the rental sector. On the other hand, the situation allows landlords in tight housing markets to rent out lower-quality apartments with relatively high returns. The renovation incentive—and with it, a "filtering-up"[8]—is thus currently lower than it is in times in which many low-quality apartments are empty.

Overall, the housing construction volume is expected to increase by roughly 4.9 percent in the current year and nearly 5.7 percent in 2018 (Table 1), following an increase of just under five and a half percent in 2016.

Residential construction experiencing strong expansion

The most powerful growth is still taking place in residential construction: over the past five years, growth rates consistently exceeded five percent and recently surpassed the ten-percent mark (Figure 3).

But that high figure has also been influenced by one-time effects, and the momentum is expected to drop off somewhat over the course of the forecast period. The authorities' approval of an extraordinary number of new residential buildings in the first half of 2016 can be traced to a special development that resulted from the tighten-

7 Konstantin Kholodilin, "Wanderungen in die Metropolen Deutschlands," Mimeo (2016).

8 Richard J. Arnott and Ralph M. Braid, "A filtering model with steady-state housing," *Regional Science and Urban Economics* 27(4) (1997), 515–46.

Table 1

Residential construction in Germany

	2010	2011	2012	2013	2014	2015	2016	2017	2018
	In billion euros at the respective year's prices								
New construction volume[1]	32.9	41.0	44.3	47.8	53.0	58.3	64.9	70.7	75.9
Construction on existing buildings[2]	118.9	123.9	127.2	127.2	130.3	130.8	134.9	139.0	145.8
Total residential construction volume	151.8	164.8	171.5	175.1	183.3	189.2	199.8	209.7	221.7
	Change on the previous year in percent								
New construction volume[1]		24.6	8.1	7.9	10.9	10.0	11.2	9.0	7.3
Construction on existing buildings[2]		4.2	2.7	0.0	2.4	0.4	3.1	3.0	5.0
Total residential construction volume		8.6	4.1	2.0	4.7	3.2	5.6	4.9	5.8
	Shares in %								
New construction volume[1]	21.7	24.9	25.8	27.3	28.9	30.8	32.5	33.7	34.2
Construction on existing buildings[2]	78.3	75.1	74.2	72.7	71.1	69.2	67.5	66.3	65.8
Total residential construction volume	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1 Proxied using the estimated construction costs (construction activity statistics), plus surcharges for architects' services and fees, Exterior facilities and internal activities of investors.
2 Buildings and housing modernization (incl. conversion and extension measures) as well as repair services in the construction industry.

Sources: Federal Statistical Office, author's own calculations.

ing of the EnEV (Energy Saving Ordinance) that took place on January 1, 2016. Prior to this update, builders of private residences in particular were required to have submitted building applications by the end of each year in order to secure building rights. A correspondingly marked dynamic can also be found in high-rise construction, although the growth is still trending upward (Figure 4). The recently issued building permits are likely to be utilized in 2017, thus boosting construction activity.

Another sign that residential construction is on the rise is that the number of intake orders has increased overall (Figure 5). Order backlogs (Figure 6) also indicate a significant expansion in construction activity, with construction companies facing difficulty in handling the volume of incoming orders. This also corresponds with the data provided by the contractors—who maintain that most construction industry capacities are being utilized—as well as the freelance architects surveyed by the Ifo Institute (Figure 7), whose order books, measured in months, have reached record levels. The new construction activity amounted to around 11 percent in 2016; against this background, DIW Berlin projects that investment in new construction will grow by roughly nine percent in the current year and by another seven percent in 2018.

Renovations gaining in prevalence

The slightly lower projected growth rate for new construction in 2017 and 2018 will likely be balanced out by an increase in renovations to the existing building stock. Renovations had been declining in popularity, with a stagnation in 2013 and low rates in 2014 and 2015, after which the dynamic picked up once again. Energy costs, for one, play a decisive role here: the sharp drop in oil prices over the past few years had led to considerable investment restraint in this area. But since positive signs emerged in 2015, when the volume of energy-related refurbishments picked up again slightly,[9] this trend is starting to reverse, with the recent increase in energy prices making energy-related refurbishments even more attractive.

The reduced dynamic in new construction also plays a role, as it frees up capacities for renovations. Refurbishments of existing buildings are often smaller in scale[10] and less lucrative than contracts in new construction. Restructurings and renovations are already common in property transfers, and the backed-up demand for them will be met more and more. Last year, the growth in refurbishments amounted to three percent; for 2017 and 2018, DIW Berlin projects an increase of three percent and a powerful five percent, respectively.

Non-residential construction: the government must address it

The growth in non-residential construction is much weaker: in the past, this was mostly due to minimal investment activity in commercial construction. Recently, public sector construction has been expanding power-

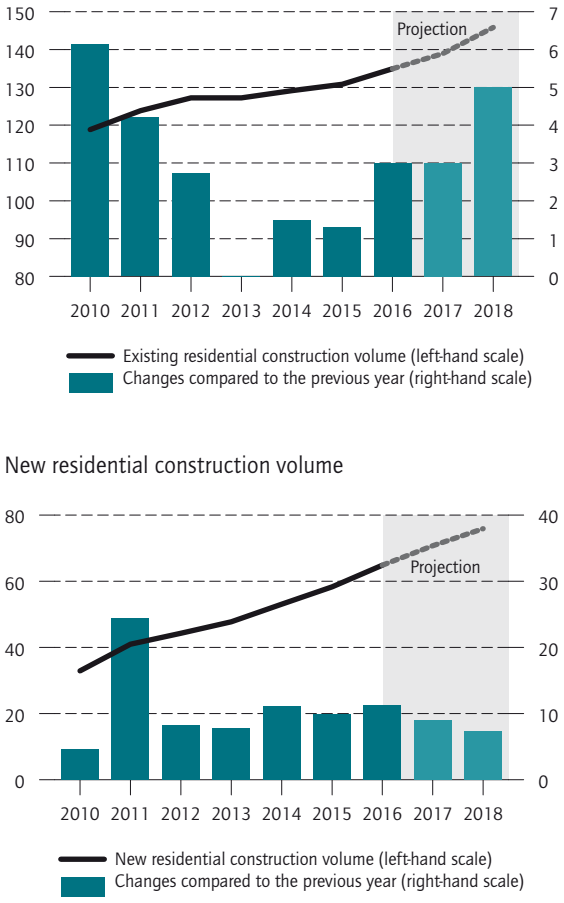
9 Martin Gornig et al., "Strukturdaten zur Produktion und Beschäftigung im Baugewerbe – Berechnungen für das Jahr 2015," study conducted on behalf of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) as well as the Federal Institute for Research on Building; Urban Affairs and Spatial Development (BBSR) (2016).

10 Martin Gornig, Christian Kaiser, and Claus Michelsen, "German Construction Industry: Refurbishment Lacks Momentum, New Residential Construction Gets Second Wind," *DIW Economic Bulletin* no. 49 (2015), 639–648.

Figure 3

Volume of construction on existing residential buildings

Billion Euro in current prices; year over year changes in percent



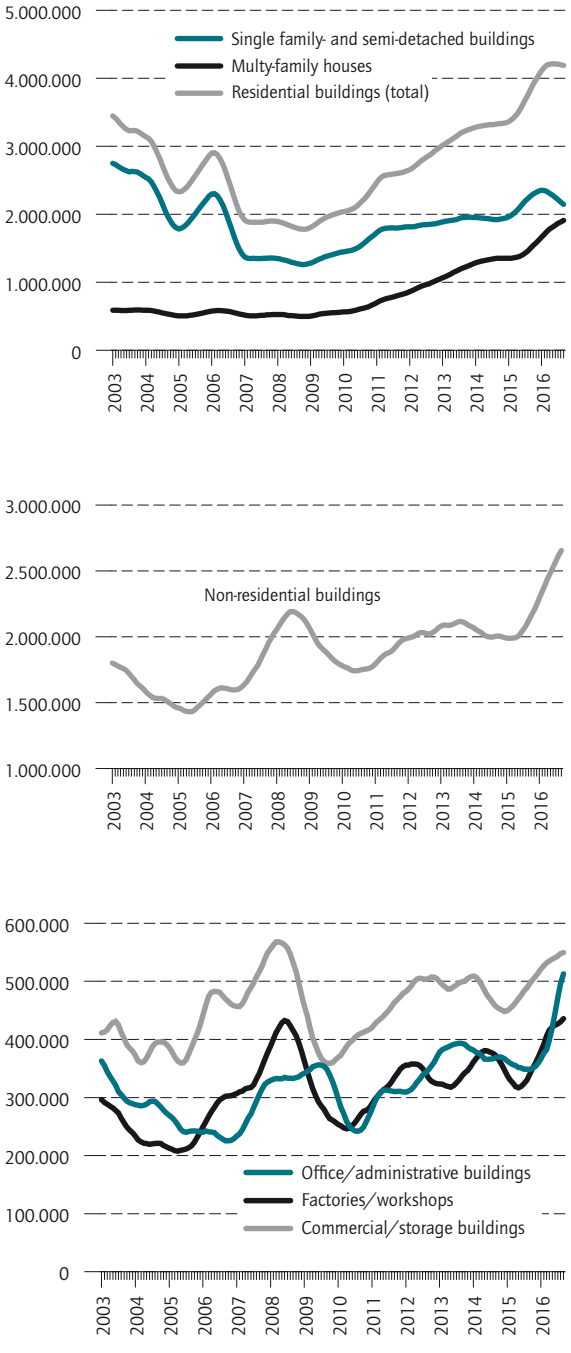
Source: Author's own calculations.

Residential construction expands strongly.

Figure 4

Building permits

Monthly, in billion euros; trend components



Sources: Federal Statistical Office, author's own calculations.

Particularly in residential construction, building permits have increased substantially in the first half of 2016.

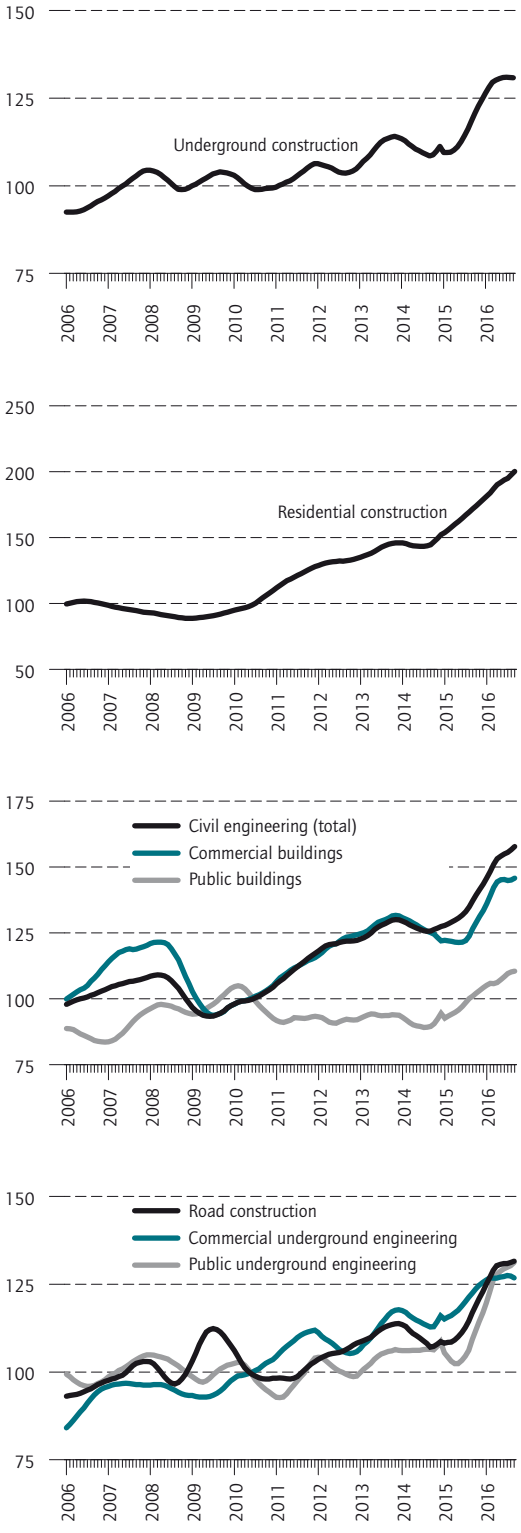
fully; various investment initiatives, such as the expansion of childcare offerings or the earmarking of funds for financially disadvantaged municipalities from the Municipal Investment Promotion Fund, have had a positive impact. As well, municipalities' financial situations have experienced a clear improvement in recent years.[11] At the same time, the government's net fixed investment in non-residential construction has continued to

11 Kristina van Deuverden, "Öffentliche Finanzen bis 2025: Nur auf den ersten Blick günstig," *DIW Wochenbericht* no. 50 (2016), 1193-202.

Figure 5

Incoming orders in core construction industry

Value index 2010=100, trend components



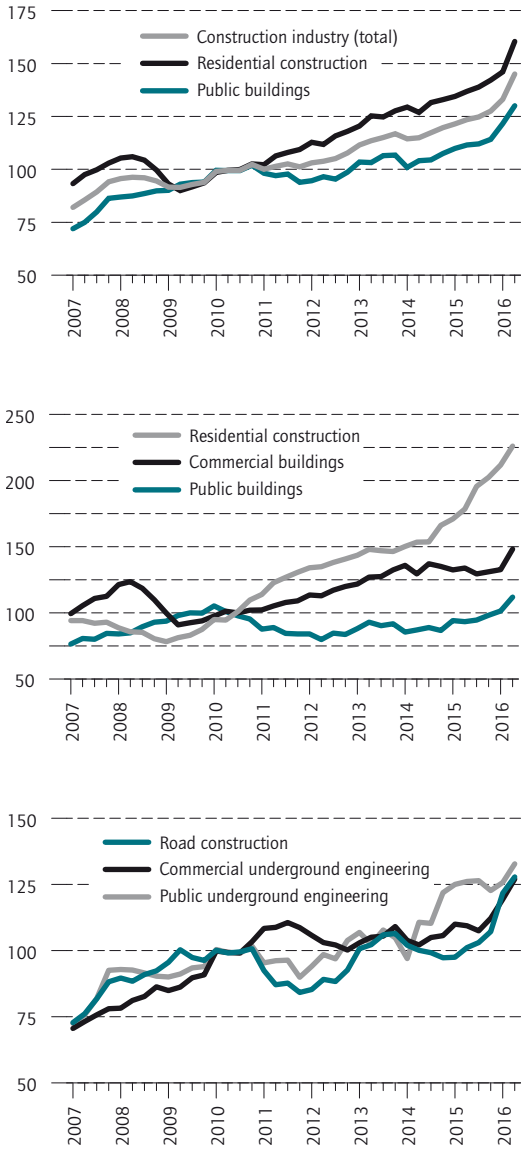
Sources: Federal Statistical Office, author's own calculations.

The trend of incoming new orders has flattened recently..

Figure 6

Volume of orders in core construction industry

Value index 2010 = 100; trend components



Sources: Federal Statistical Office, author's own calculations.

Volume of orders is increasing.

be negative,[12] which suggests that the attrition of existing infrastructure has yet to be halted.

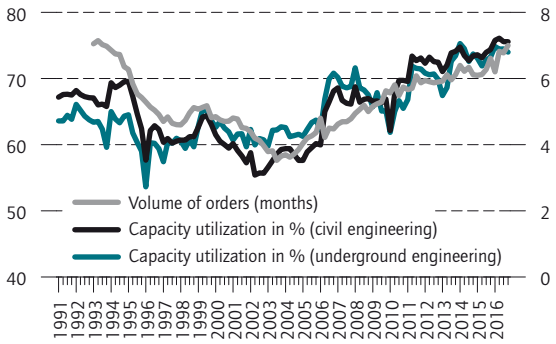
Companies are significantly more reluctant to expand their construction activity, which corresponds to the fact that investment in new plants and machinery has been

12 Federal Statistical Office, national accounts, investments working paper, third quarter 2016, Wiesbaden (2016).

Figure 7

Capacity utilization on the construction industry

Capacity utilization in percent,
volume of orders (month) seasonally adjusted



Sources: ifo Institut, author's own calculations.

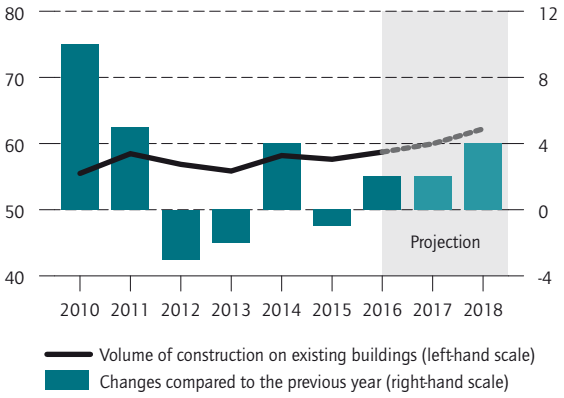
Capacity utilization is very high in historical comparison.

Figure 8

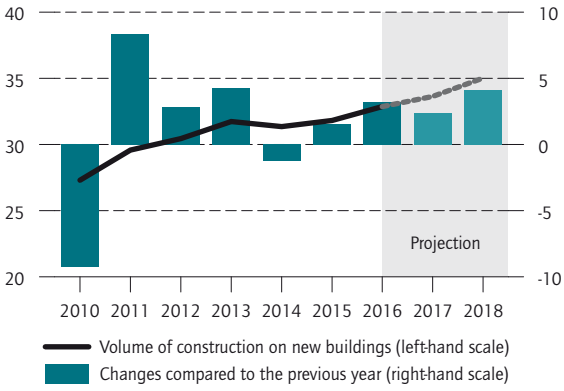
Volume of construction on non-residential buildings

Billion Euro in current prices; year over year changes in percent

Existing non-residential buildings



New non-residential buildings



Sources: Author's own calculations.

New construction volume is also expected to rise.

weak for some time. The overall economic capacities—especially the capacities of manufacturers—are well utilized according to both the output gap as well as the surveys conducted as part of the *ifo Konjunkturtest* (Business Survey of the Services Sector).

Nevertheless, companies keep putting off their investment plans. This is also likely due to the significant uncertainty characterizing the current commercial economy. Although domestic demand is high, sales prospects abroad continue to deteriorate. The Brexit decision from last June has given way to a higher degree of uncertainty; this is likely to significantly reduce companies' investment propensity,[13] as will the political uncertainty surrounding the EU's political cohesion brought about by the recent referendum in Italy and the forthcoming elections in France.

This investment restraint affects more than just new construction projects: typically, the failure to retrofit or replace machinery and equipment also has a negative effect on the growth rate for renovations to existing buildings. Companies' wait-and-see attitude when it comes to investing in new machinery thus has a direct impact on renovation investment. Against this backdrop, DIW Berlin expects an expansion of the non-residential construction volume by just over two percent for the current year, after 2016's growth rate of just under 2.5 percent. A slightly higher dynamic will not emerge until 2018 (Figure 8 and Table 2), at which point an increase of almost four percent is expected.

New constructions: primarily commercial and office buildings

For new buildings, impulses should come primarily from sectors related to the domestic economy and public administration. This is evidenced by the significant increase in the number of issued permits for commercial and warehouse construction as well as offices and administrative buildings (Figure 4). For factory and workshop buildings, however, the number of new approvals has been on the decline. This development is only partially apparent in additional orders, which have been trending sideways. Nonetheless, order backlogs are extremely high, especially in non-residential commercial construc-

13 Malte Rieth, Claus Michelsen, and Michele Piffer, "Unsicherheitsschock durch Brexit-Votum verringert Investitionstätigkeit und Bruttoinlandsprodukt im Euroraum und Deutschland," *DIW Wochenbericht* no. 32–33 (2016), 695–703.

Table 2

Non-residential construction volume in Germany

	2010	2011	2012	2013	2014	2015	2016	2017	2018
	In billion euros at the respective year's prices								
New construction volume	27.3	29.6	30.4	31.7	31.4	31.8	32.9	33.6	35.0
Construction on existing buildings	55.6	58.5	56.8	55.8	58.2	57.6	58.7	60.0	62.2
Total construction volume[1]	82.9	88.1	87.3	87.6	89.5	89.5	91.6	93.6	97.2
	Change on the previous year in percent								
New construction volume		8.4	2.8	4.3	–1.2	1.5	3.2	2.4	4.1
Construction on existing buildings		5.2	–2.8	–1.8	4.2	–0.9	1.9	2.1	3.8
Total construction volume[1]		6.3	–0.9	0.3	2.2	0.0	2.3	2.2	3.9
	Shares in percent								
New construction volume	33.0	33.6	34.9	36.2	35.0	35.6	35.9	35.9	36.0
Construction on existing buildings	67.0	66.4	65.1	63.8	65.0	64.4	64.1	64.1	64.0
Total construction volume[1]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1 Construction volume in commercial and public construction.

Sources: Federal Statistical Office, author's own calculations.

tion. This also signals a growing shortage in construction companies' capacities.

At the same time, given the increase in the number of permits being issued, DIW Berlin anticipates growth in new non-residential construction. Expansions of almost two and a half percent and just under four percent are expected for the current year and the coming year, respectively (Figure 8).

Initially, a low growth rate for renovations

A more dynamic expansion of refurbishments in the commercial construction sector will only happen after investment has been made in new plants and machinery. The [current] political uncertainty,[14] which has been weakening impulses, will subside only gradually—which means that stronger impulses will not materialize until 2018. In public building construction, the need for refugee housing has been creating additional demand, especially when it comes to refurbishments of existing structures. This is a one-time effect, however: when the refugee accommodations are completed, this kind of construction will no longer play a major role. It does mean, however, that administrative planning capacities will be freed up for pursuing and coordinating necessary measures for other buildings. According to KfW Municipal Panel *(KfW-Kommunalpanel)*, municipal investment in schools and public administration buildings is way too low.[15] But given the good financial situation and the additional funds from the assets reserved for supporting financially disadvantaged municipalities, increased investment is expected in this area.

For refurbishments in non-residential construction, DIW Berlin expects a two-percent increase this year; for next year, that figure amounts to just under four percent (Figure 8).

Civil engineering: growth stabilizes

Over the past few years, the civil engineering construction volume has been subject to significant fluctuations (Table 3). For example, the strong growth of 2014—at over 6 percent—was followed by a stagnation of the nominal construction volume in 2015. In 2016, a moderate increase in the civil engineering volume amounted to 3 percent, with decisive impulses coming from public civil engineering.

Public civil engineering is likely to pick up momentum in 2017, primarily due to the significant growth in the incoming orders and backlogs related to road construction (Figures 5 and 6). Along with a slight increase in commercial civil engineering, 2017's total building construction volume is expected to amount to just under four percent (nominally).

In the following year, the civil engineering volume is expected to grow even more, with industrial civil engi-

14 Political uncertainty can be measured using the "Economy Policy Uncertainty" index, for example. See Scott R. Baker, Nicholas Bloom, und Steven J. Davis, "Measuring economic policy uncertainty (No. w21633)," National Bureau of Economic Research (2015).

15 KfW, "KfW-Kommunalpanel 2016," Frankfurt am Main, 2016.

Table 3

Civil Engineering in Germany

	2010	2011	2012	2013	2014	2015	2016	2017	2018
	In billion euros at the respective year's prices								
Commercial civil engineering	25.5	27.8	28.1	28.1	29.3	29.5	29.8	30.3	31.3
Public civil engineering	23.1	25.0	24.5	25.2	27.4	27.3	28.8	30.5	30.9
Total civil engineering volume	48.6	52.8	52.6	53.3	56.7	56.9	58.6	60.8	62.2
	Change on the previous year in percent								
Commercial civil engineering		9.0	1.0	0.2	4.3	0.7	0.9	1.8	3.2
Public civil engineering		8.0	–2.0	2.9	8.6	0.0	5.3	6.1	1.3
Total civil engineering volume		8.6	–0.4	1.4	6.3	0.3	3.0	3.9	2.2
	Shares in percent								
Commercial civil engineering	52.4	52.7	53.4	52.7	51.7	51.9	50.8	49.8	50.3
Public civil engineering	47.6	47.3	46.6	47.3	48.3	48.1	49.2	50.2	49.7
Total civil engineering volume	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Federal Statistical Office, author's own calculations.

neering experiencing significantly more growth than public civil engineering. A further expansion of digital infrastructure, among other things, should create impulses. In public civil engineering, however, a tendency to consolidating the issuing volume is expected. Overall, the civil engineering volume is expected to grow by roughly two percent in 2018.

Growth in the construction industry continues—in real terms as well

According to DIW Berlin's building volume calculations, 2016's nominal construction volume rose significantly—to roughly 350 billion Euros, which represents a 4.3 percent increase over the previous year (Table 4). Despite the higher utilization levels in the construction sector—which have now exceeded that of the mid-1990s construction boom following Germany's reunification—there have only been moderate increases in construction costs. This is mainly due to fact that commodities prices are currently favorable, especially that of crude oil. All in all, prices are estimated to have risen by just 1.9 percent in 2016, which means that the real building volume will have been nearly 2.5 percent higher than in 2015. This represents the highest growth rate since 2011.

Positive developments are also expected for 2017 and 2018: the construction volume is expected to grow by more than four percent in the current year and by almost five percent next year, at which point it will exceed 380 billion Euros. At the same time, prices will probably start to increase. Firstly, this is due to the fact that commodities prices—especially energy prices—are on the rise again, on average. Standard wages have also started to pick up noticeably. Secondly, increasing capacity utilization is expected to expand construction companies' pricing power. A price-increase rate of around 2.5 percent per year is expected for 2017 and 2018, respectively. The real construction volume is thus expected to rise by 1.6 percent in 2017 and 2.4 percent in 2018 (Table 4). The more restrained dynamic in the next two years is mainly due to the fact that there are fewer working days.

Growth in the current year will be driven by both public and residential construction with an expected increase of over four percent and roughly two percent, respectively. In commercial construction, on the other hand, the real construction volume is expected to keep shrinking. As in the preceding years, the decline is expected to amount to roughly one percent.

A slightly different growth pattern will emerge in 2018. The housing construction volume will continue to increase considerably: by more than three percent in real terms, while spending on public buildings, is expected to drop by roughly one percent. Commercial construction, on the other hand, could finally start to grow again: by more than two percent in real terms.

All construction categories will profit from the projected developments, primarily due to the expected growth in residential refurbishments. However, the 2016 construction industry growth rate was likely to have been significantly above the average, since companies in this sector were more likely to benefit from the growth impulses, primarily those that came from public civil engineering. In 2016, the construction industry's real building volume and finishing trades volume are thus expected to

Table 4

Key figures for development of construction volume in Germany

										Change on the previous year in percent							
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2011	2012	2013	2014	2015	2016	2017	2018
	In billion euros at the respective year's prices																
Total construction volume	283.30	305.73	311.38	315.92	328.36	335.49	349.93	364.12	381.19	7.9	1.8	1.5	3.9	2.2	4.3	4.1	4.7
By construction sector																	
Residential construction	151.77	164.84	171.54	175.06	183.29	189.16	199.80	209.67	221.74	8.6	4.1	2.0	4.7	3.2	5.6	4.9	5.8
Commercial construction	87.36	95.39	97.32	97.17	100.66	100.88	102.04	103.14	107.70	9.2	2.0	–0.2	3.6	0.2	1.2	1.1	4.4
Public construction	44.17	45.50	42.52	43.69	45.54	45.45	48.09	51.31	51.76	3.0	–6.5	2.8	4.2	–0.2	5.8	6.7	0.9
Price development										3.3	2.5	2.0	2.0	1.7	1.9	2.5	2.3
	real, chain index, 2005=100																
Total construction volume	106.58	111.47	110.76	110.12	112.20	112.70	115.46	117.27	120.05	4.6	–0.6	–0.6	1.9	0.4	2.5	1.6	2.4
By construction sector																	
Residential construction	103.44	108.64	110.21	110.16	112.22	114.44	118.62	121.21	124.98	5.0	1.4	0.0	1.9	2.0	3.7	2.2	3.1
Commercial construction	112.97	119.72	119.25	116.85	118.75	117.15	116.36	115.44	118.11	6.0	–0.4	–2.0	1.6	–1.3	–0.7	–0.8	2.3
Public construction	105.76	106.05	96.84	97.45	99.95	98.24	102.21	106.37	105.28	0.3	–8.7	0.6	2.6	–1.7	4.0	4.1	–1.0
By producer group																	
Core construction industry	99.63	107.32	107.32	108.02	112.55	112.81	116.51	118.63	120.98	7.7	0.0	0.7	4.2	0.2	3.3	1.8	2.0
Finishing trades	115.59	117.43	115.79	114.03	114.81	115.07	117.27	118.76	122.41	1.6	–1.4	–1.5	0.7	0.2	1.9	1.3	3.1
other producers	103.04	108.80	108.50	107.80	109.60	110.90	114.20	116.70	118.60	5.6	–0.3	–0.6	1.7	1.2	3.0	2.2	1.6

Sources: Federal Statistical Office, author's own calculations.

have grown by 3.3 percent and 1.9 percent, respectively. Given the decline in demand for public builders later on in the forecast period—especially in civil engineering—growth is likely to shift more and more towards the development sector with the result that the ratio will be reversed in 2018: a real building volume increase of more than three percent is expected for the finishing trades, while the construction industry is expected to have just over two percent.

Conclusion

The construction industry's upward growth trend will continue throughout this year and into the next. At the moment, however, it is becoming clear that the limits of its production capacities are being reached. Evidence of this includes the increasing order backlogs as well as utilization levels within the individual construction sectors, as reported in surveys.

The expansion of the existing capacities is currently not keeping pace with the increased demand.

At the same time, construction demand is still high in many areas: according to estimates, 350,000 to 400,000 new homes would have to be built every year in order to eliminate the housing shortage,[16] but the current construction output only amounts around 270,000 completed apartments. This is not due to a lack of investors; rising real estate prices[17] indicate that housing investment is still high. Rather, the lack of suitable construction sites is creating bottlenecks. Municipalities must therefore create more opportunities for investment in land for building.

Anticipated demographic changes in and influxes into Germany's large cities creates a need for practical new strategies for developing urban areas from within. The densification of certain neighborhoods, addition of new storeys to existing structures, and corresponding renovations to accommodate the elderly seem preferable to the rapid construction of new buildings on "green pastures." Given the fact that construction capacities are already fully utilized, comprehensive funding for new construction does not seem very expedient, and would likely accelerate the price increase.

16 Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (2015): "Bündnis für bezahlbares Wohnen und Bauen," Berlin.

17 Konstantin Kholodilin and Claus Michelsen, "Weiter steigende Immobilienpreise, aber keine flächendeckenden Spekulationsblasen," *DIW Wochenbericht* no. 49 (2015), 1164–73.

A less extensive yet targeted support from investment in the existing building stock, however, could create additional living space in sought-after locations; here, we could draw from the varied experiences gained from the district-oriented promotion of measures in redevelopment areas. It also makes sense to provide additional resources—at least partially—solely for the expansion of public housing construction.

Public infrastructure investment is still too low to compensate for the current level of attrition.[18] Again and again, it has been reported that a significant number of capacities have been being reduced directly in the municipal building and planning offices over the past few years, which is affecting the public sector's ability to execute plans. On the one hand, the use of central consulting capacities—for example, a municipal infrastructure company—would be helpful here. On the other hand, the earmarked funds should remain available in the longer term. The funds needed for preserving and renovating buildings could be sourced from an investment reserve,[19] a possibility that has recently been under discussion. This would also provide planning security for construction companies and could accelerate the growth of capacities, which has been somewhat sluggish.

18 Martin Gornig, Claus Michelsen, and Kristina van Deuverden, "Local Public Infrastructure Showing Signs of Wear and Tear," DIW *Economic Bulletin* 42–43 (2015), 561–567.

19 Stellungnahme der Expertenkommission im Auftrag des Bundesministers für Wirtschaft und Energie, Sigmar Gabriel (2016): "Stärkung von Investitionen in Deutschland," Presented on December 12.

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