Construction sector: end of the boom at new buildings

By Martin Gornig and Claus Michelsen

New residential construction, in particular apartment complexes, has driven the growth in Germany's construction industry in recent years. In 2018 and 2019 the volume of new construction will continue to expand. However, its rate of expansion will decrease and the boom of recent years will come to an end. After years of strong growth, having even occasionally surpassed the ten-percent mark, the German Institute for Economic Research expects to see a definite slowdown in the growth rates for new residential construction. Taking into account the sharply rising construction prices the real growth rates drop on to approximately one percent. The additional momentum in new non-residential construction is not likely to compensate for the end of the boom in new residential construction. Therefore the focus will shift to renovation and modernization of the existing building stock. By 2019 at the latest, these should have a higher growth rate than that of new housing. In nominal terms, the German Institute for Economic Research anticipates growth in renovation activity of around 7.5 percent for the existing housing stock and 3.5 percent growth in the non-residential sector. The greater momentum of activity around the building stock, including energy efficiency upgrades, will also help meet Germany's climate targets. In view of the nation's tight urban housing market, policy makers would do well to counteract the foreseeable end of the boom in new housing construction by establishing incentives for urban development and redensification as well as supporting the construction of additional residential space in urban development zones.

The construction industry will continue to drive Germany's business cycle in the coming two years. This is the result of the German Institute for Economic Research (DIW Berlin) calculations on construction volume.[1] In addition to building investment the construction volume include repairs that do not directly increase value.[2] Alongside the construction industry in the literal sense, it encompasses related sectors such as steel and light metal construction, the manufacture of prefabricated buildings, planning services, and other services. Supplementing the investment calculation of the statistical offices, DIW Berlin differentiates between new housing construction activity and modernizing the building stock.

DIW Berlin not only calculates and documents the construction volume in past years; it also forecasts corresponding values for the current and subsequent years. This forecast (see Box) is integrated into DIW Berlin's Economic Outlook, with a particular focus on investment activity.[3] In addition to the present estimates regarding the development of construction investment, our construction volume calculation includes forecasts on the development of newbuildings and activities to existing buildings volumes in the residential, and non-residential sectors.[4] The forecast also includes trends for the mainstream construction industry and building trades.

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1 The construction volume calculation is financed with funds from the *Zukunft Bau* research initiative of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (*Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit*, BMUB).
See the definition of "Bauvolumen" in the DIW glossary (in German; available online, accessed January 8, 2018; this applies to all other online sources in this report unless stated otherwise).

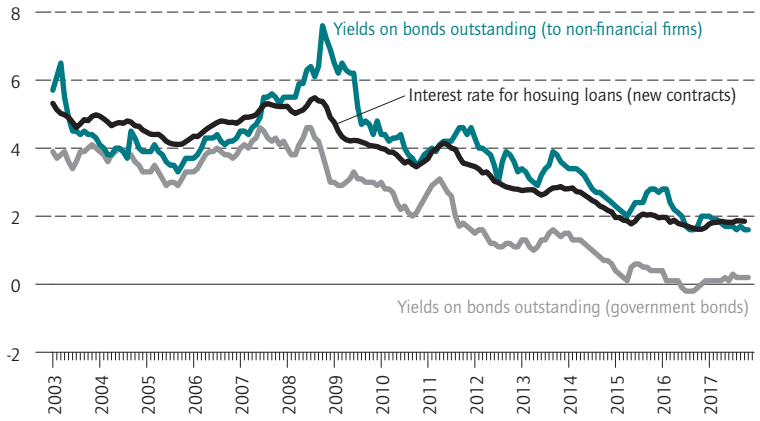
2 Martin Gornig et al., "Strukturdaten zur Produktion und Beschäftigung im Baugewerbe – Berechnungen für das Jahr 2016," *Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) Online Publication* no. 15 (2017).

3 See Ferdinand Fichtner et al., "German economy: upswing has gained breadth but will not hold pace," *DIW Economic Bulletin*, no. 50 (2017): 549-555 (available online).

4 See Claus Michelsen et al., "Prognose der Bestandsmaßnahmen und Neubauleistungen im Wohnungsbau und im Nichtwohnungsbau," *Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) Online Publication* no. 07 (2016).

Figure 1

Interest rates and yields
In percent

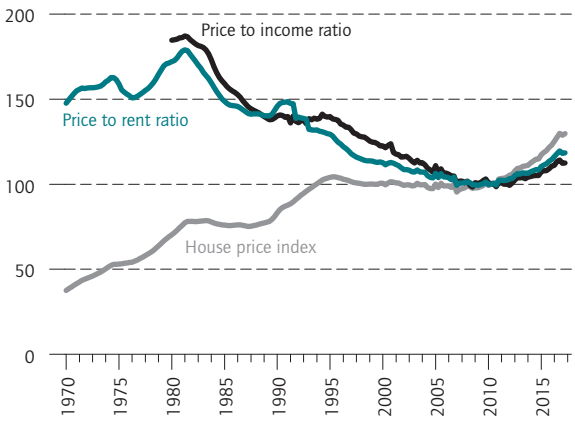


Sources: Bundesbank; authors' own calculations.

Interest rates remain extremely low despite slight increases.

Figure 2

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



Sources: OECD; authors' own calculations.

House prices have stagnated recently.

The writing is on the wall for residential construction

Residential construction continues to be the bedrock of the building sector boom. Macroeconomic circumstances continue to be excellent: Germany is booming with no sign of overheating. The nation's overall capacity utilization is at a high level, and employment is still pn the rise – this should lead in turn to jumps in wages.[5]

However, key stimuli are gradually receding. The main central banks have begun to segue into tighter monetary policy. The U.S. Federal Reserve has already implemented cautious increases in the interest rate. The Bank of England is under increasing pressure to raise its prime interest rate in response to the rising inflation rate. And the European Central Bank (ECB) has announced that it will end its asset purchase program and pursue monetary policy normalization. This has already revealed itself in a slight rise in the interest rate for housing loans (see Figure 1). And this is not the only reason why price increases are slowing down in the key real estate markets of the seven largest cities in Germany (see Figure 2). The change in financing conditions should weaken the momentum of new housing construction activity during the forecast horizon. A substantial expansion in the supply of undeveloped land could counteract this trend, since this would rein in skyrocketing land prices.[6]

After all, demand for living space remains high in cities, even though many households are again migrating to surrounding areas nearby.[7] The slight easing imminent on the demand side could also mean that not every piece of real estate, regardless of its condition, will find a buyer. If the momentum behind the increasing price of used buildings in the market slows down, more flexibility for extensive modernization measures should be the result in the deteriorated real estate segment. This should be an additional stimulus for housing stock activity.

Overall, after a plus of 7.4 percent in 2017, DIW Berlin expects the housing construction volume to rise by around 6.7 percent this year and by 6.3 percent in 2019 (see Table 1).

Boom in new housing construction at peak

In recent years, the activity in new housing construction picked up speed dramatically. In 2017, the momentum was also strong in this segment (see Figure 3). However,

5 See Ferdinand Fichtner et al., "German economy booming but not to the point of overheating," *DIW Economic Bulletin*, no. 50 (2017): 543-545 (available online).

6 See Konstantin Kholodilin and Claus Michelsen, "No Germany-wide housing bubble but overvaluation in regional markets and segments," *DIW Economic Bulletin*, no. 25 (2017): 255-264 (available online).

7 See Konstantin Kholodilin, "Wanderungen in die Metropolen Deutschlands," (computer printout; no further information available).

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).

the high rate of growth will visibly lose momentum during the forecast horizon. Since mid-2016, the number of construction permits has not increased, and the trend in the construction of single-family homes and apartment complexes has noticeably plateaued (see Figure 4). This is due to the fact that the Energy Saving Ordinance (*Energieeinsparverordnung*, EnEV) was tightened at the beginning of 2016, leading to pull-forward effects: more applications were submitted in order to safeguard the right to build according to older, more favorable energy efficiency standards. The number of permits should rise for apartment complex construction to some extent in the near future as a result of the pent-up demand that exists in Germany's urban centers. Single-family home construction, on the other hand, lacks fresh stimulus.

The incoming orders for new residential construction also argue in favor of a slowdown in the growth rate (see Figure 5). Contracts for new construction services are declining, owing in part to extremely high construction activity at the beginning of 2017. At the beginning of the year, contracts were at an all-time high (see Figure 6) but months later had returned to a slightly lower level. Capacity utilization in structural engineering is also somewhat lower. The architects last surveyed by the Ifo Institute for Economic Research in September 2017, on the other hand, reported an order book record calculated on a monthly basis (see Figure 7).

Table 1

Residential construction in Germany

	2011	2012	2013	2014	2015	2016	2017	2018	2019
	In billion euros at the respective year's prices								
New construction volume[1]	41.0	44.3	47.8	52.9	57.9	64.3	72.6	78.4	81.6
Construction on existing buildings[2]	123.9	127.2	127.3	129.3	130.8	135.7	142.1	150.6	161.8
Total residential construction volume	164.8	171.5	175.1	182.2	188.7	200.0	214.7	229.0	243.3
	Change on the previous year in percent								
New construction volume[1]		8.1	7.9	10.6	9.5	11.0	12.9	8.0	4.0
Construction on existing buildings[2]		2.7	0.0	1.6	1.2	3.7	4.7	6.0	7.4
Total residential construction volume		4.1	2.1	4.1	3.6	6.0	7.4	6.7	6.3
	Shares in %								
New construction volume[1]	24.9	25.8	27.3	29.0	30.7	32.2	33.8	34.2	33.5
Construction on existing buildings[2]	75.1	74.2	72.7	71.0	69.3	67.8	66.2	65.8	66.5
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.

After an expansion of 13 percent in new construction activity in 2017 and given the circumstances described above, DIW Berlin expects a further increase in new housing investment of eight percent in the current year and an additional four percent in 2019.

Room for more renovation activity

Next year, the slowdown in new housing construction will provide owners with more room for renovation and modernization activity. After all, despite the flurry of transactions in the real estate market for existing housing there has been no sign of expansion in housing stock. However, changes in building ownership typically go hand in hand with modernization measures, either immediately or with a slight delay. Renovation and modernization measures are frequently of smaller scope[8] and less lucrative than contracts for new housing construction. In recent years demand has surely built up in this segment and should be satisfied as capacity gradually becomes available.

Energy-efficiency upgrades should again provide more stimulus for the construction industry. Due to the sharp drop in energy prices, heating costs were even lower in recent accounting periods.[9] However the trend has now reversed, increasing the profitability of modernization measures. This should also raise awareness of the importance of heating, operating, and ancillary costs. We saw the first positive signals in 2015, when the volume of energy upgrades rose slightly again. And last year as well, energy upgrades rose faster than did the overall volume of renovation and modernization measures.[10] We also expect new stimuli in this direction during the forecast horizon: most political parties have announced their intention to expand funding for energy-efficiency upgrades. Most likely, policy makers will make a renewed attempt to implement special deductions for this type of investment.[11]

After achieving 4.7 percent growth in 2017, DIW Berlin expects renovation and modernization activity to expand to six percent this year and grow by a strong 7.5 percent in 2019.

Non-residential construction lacks public sector stimulus

The development in the non-residential construction sector was much less dynamic. The state has made extensive funds for construction investment available, but businesses have restrained themselves in their activities.

8 See Martin Gornig, Christian Kaiserr, and Claus Michelsen, "Construction industry: Refurbishment lacks momentum, new residential construction gets second wind," *DIW Economic Bulletin*, no. 49 (2017): 639-648 (available online).

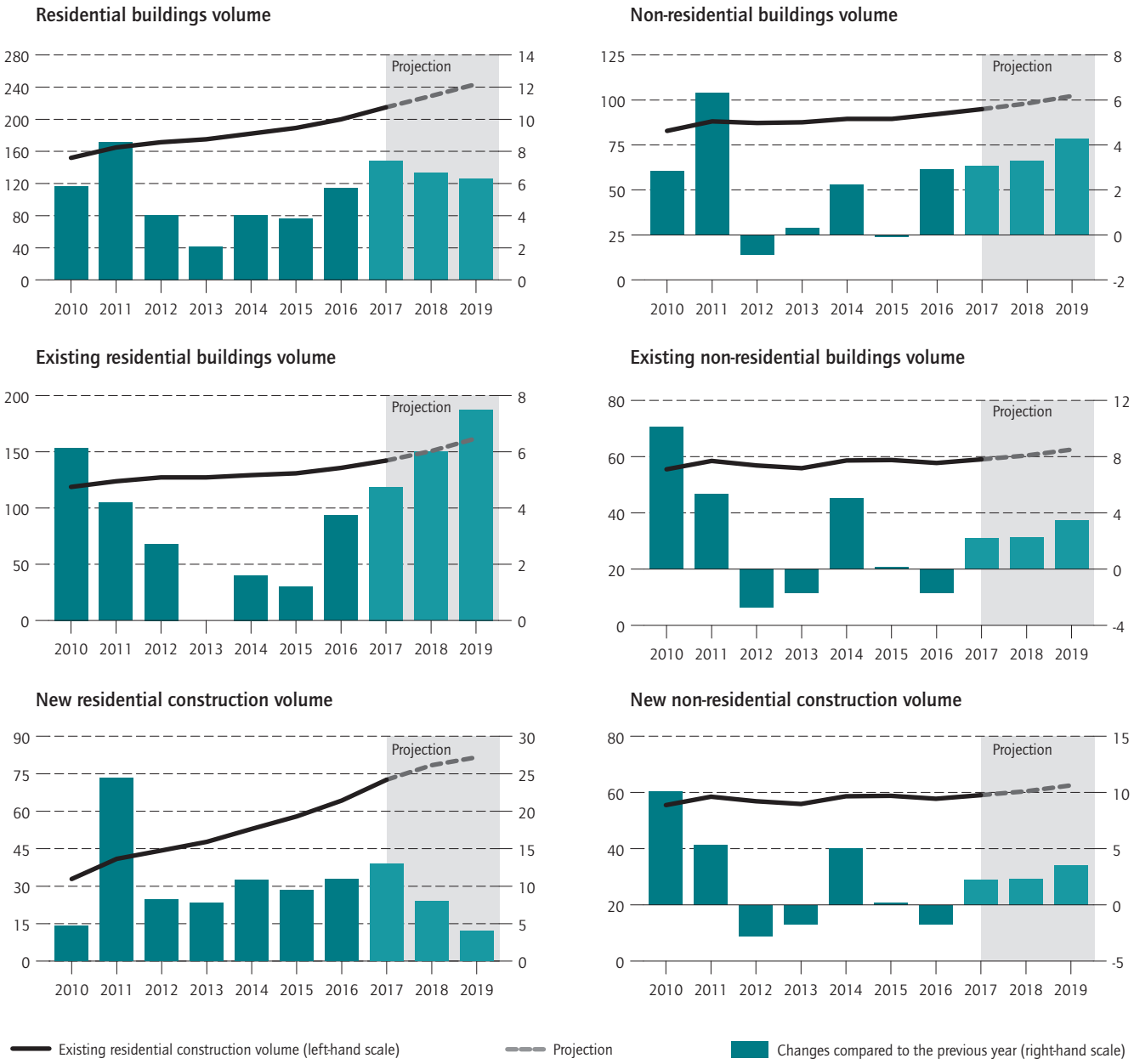
9 See Claus Michelsen and Nolan Ritter, "Heat Monitor 2016: 'second rent' lower despite higher heating energy consumption," *DIW Economic Bulletin*, 38 (2017): 377-385 (available online).

10 Martin Gornig et al., "German Construction Industry."

11 Barbara Hendricks (Social Democratic Party (*Sozialdemokratische Partei Deutschlands*, SPD)), the federal minister responsible, mentioned this possibility in summer 2017. The Bundestag election platform of the Christian Democratic Union (*Christlich Demokratische Union*, CDU) also included a corresponding tax break for energy upgrades.

Figure 3

Volume of construction on existing residential buildings
Billion Euro in current prices; year over year changes in percent



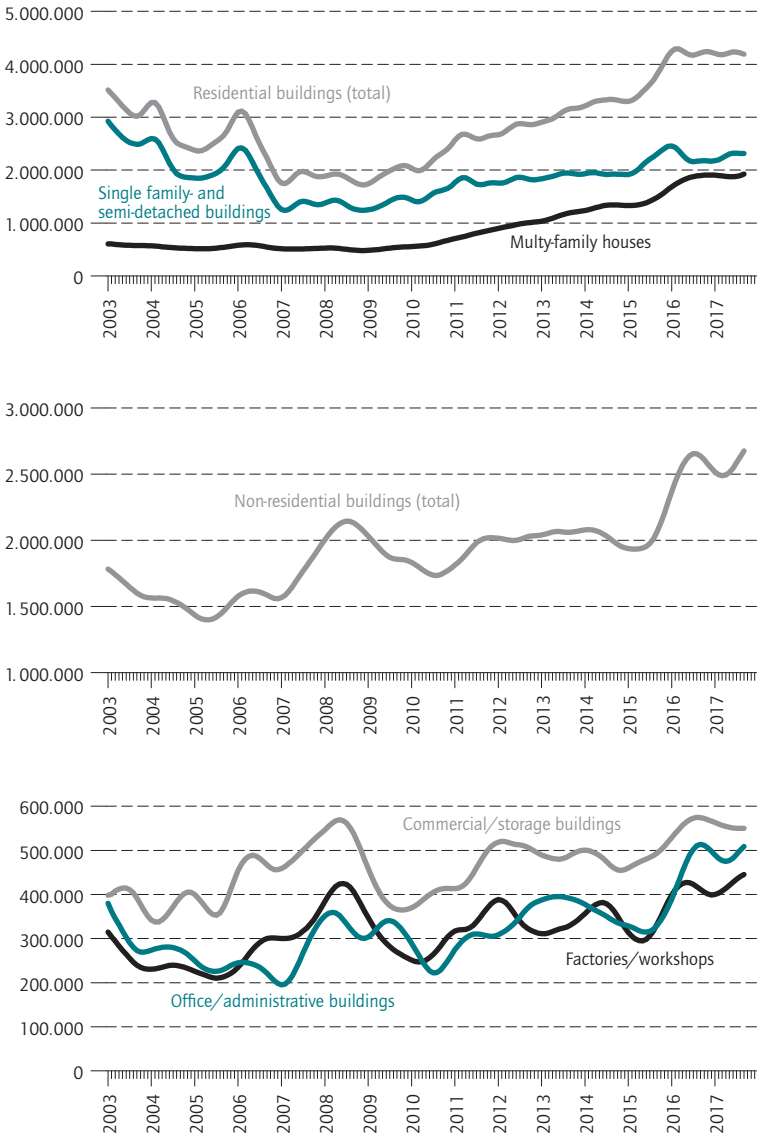
Source: Authors' own calculations.

Residential construction volume continues to grow strongly, the volume of refurbishments is likely to rise again, although new residential construction will noticeably lose ground.

Additional federal funds for expanding the day care program, for example, or the resources from the municipal investment support fund for financially disadvantaged municipalities (*Kommunalinvestitionsförderungsfond*), have strengthened public demand for construction services in recent years. The current federal budget plan does contain higher levels of expenditures, but they are not high enough to compensate for price increases and

Figure 4

Building permits
Monthly, in billion euros; trend components

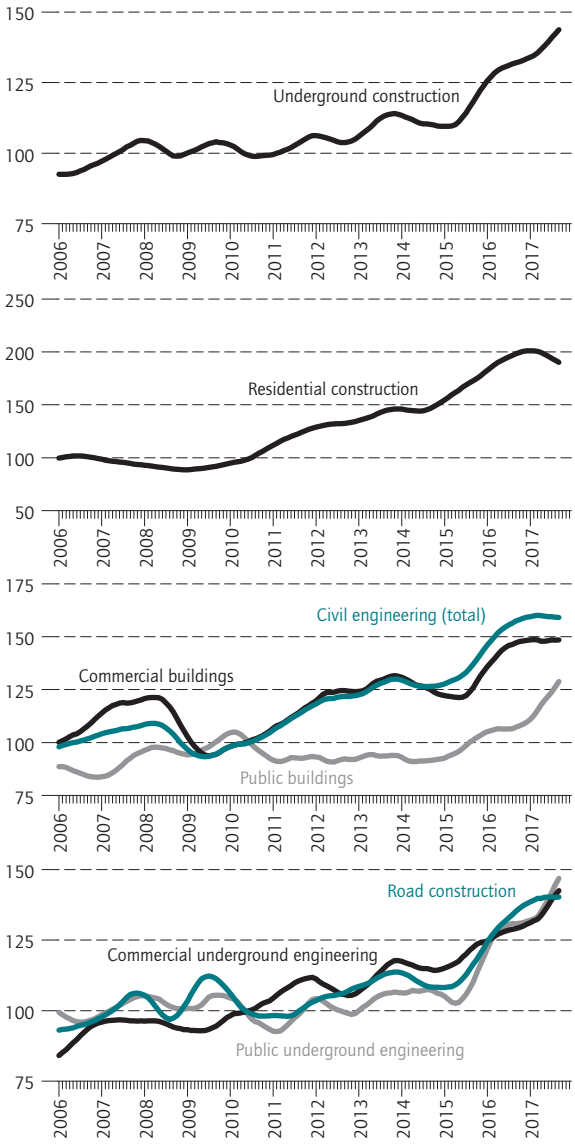


Sources: Federal Statistical Office; authors' own calculations.

Housing construction permits have been stagnating in trend since mid-2016.

Figure 5

Incoming orders in core construction industry
Value index 2010=100; trend components



Sources: Federal Statistical Office; authors' own calculations.

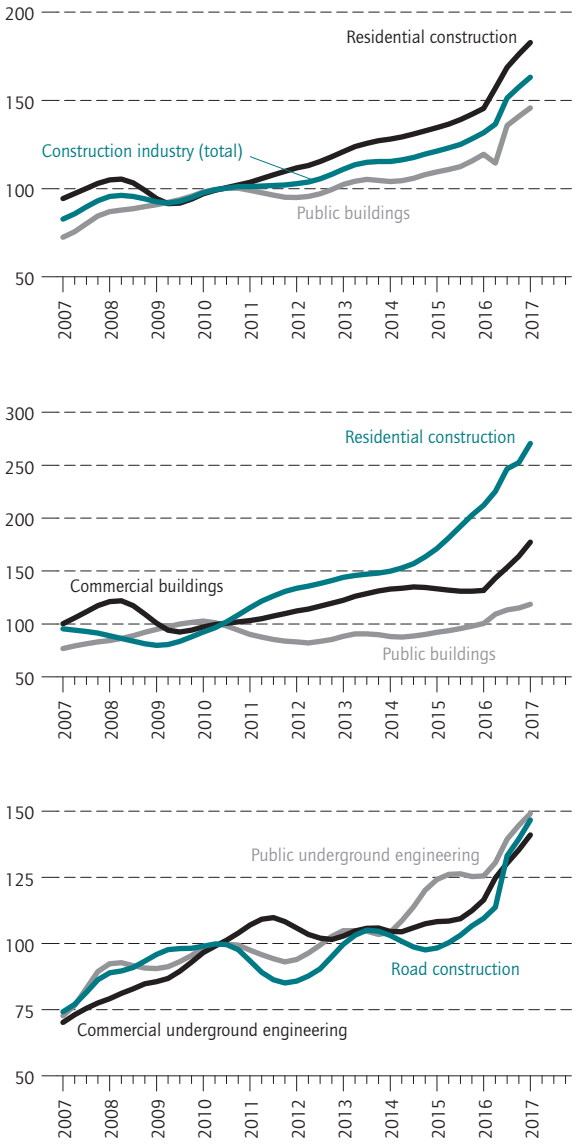
Orders in civil engineering have risen significantly.

are therefore unable to expand construction activity in real terms. Continued improvement in the financial situation of many municipalities alone should raise public construction investment.[12] The state's negative net fixed capital formation in the non-residential construction sector shows that the need for further public construction activity is great. Overall, Germany's public infrastructure is deteriorating inexorably; on the municipal level in particular, which is responsible for over 80 percent of construction investment. This is probably because in the past 20 years, the labor pool required for quickly pro-

12 See Kristina van Deuverden, "Hohe Haushaltsüberschüsse nutzen, um Wachstumschancen in der Zukunft zu erhöhen," *DIW Wochenbericht*, Nr. 50 (2017): 1183-1192 (available online).

Figure 6

Volume of orders in core construction industry
Value index 2010 = 100; trend components

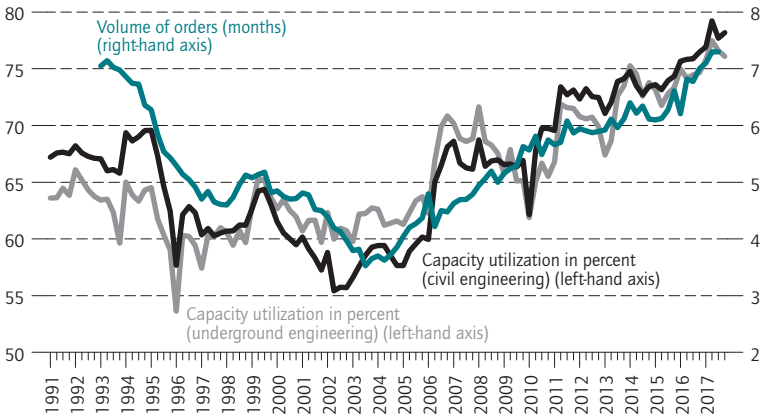


Sources: Federal Statistical Office; authors' own calculations.

Orders on hand have risen significantly.

Figure 7

Capacity utilization on the construction industry
Capacity utilization in percent, volume of orders (month) seasonally adjusted



Sources: ifo Institute; authors' own calculations.

Capacity utilization is higher than in the post-reunification boom.

cessing building applications and creating or planning municipal building projects has been largely depleted.[13]

Businesses were much more cautious than the public sector in recent years. At the beginning of 2017, the robust growth rate of GDP dispelled their wait-and-see attitude temporarily, but they purchased more machinery and vehicles and delayed investing in buildings. Above all, vigorous global demand for German products and the euro area recovery led to new levels of optimism among the companies surveyed by the Ifo Institute. Their production capacity utilization was considerably higher than in the previous year. Investment in expansion has become a more significant factor[14] and many limiting factors have disappeared. The sense of security created by the political developments in France, the progress made by the negotiations regarding Great Britain's exit from the European Union, and generally favorable economic development have probably had a positive effect on readiness to invest, leading to higher levels of building investment that compensate for the lack of stimulation on the part of the government.

In view of the above, DIW Berlin expects an expansion in the volume of non-residential construction by 3.3 percent for the current year, following its growth of 3.1 percent in 2017. In 2019, we expect growth of four percent (see Figure 3 and Table 2).

13 See Martin Gornig and Claus Michelsen, "Kommunale Investitionsschwäche: Engpässe bei Planungs- und Baukapazitäten bremsen Städte und Gemeinden aus," *DIW Wochenbericht* 11 (2017): 211-219 (available online).

14 See Annette Marquardt, ed., *ifo Konjunktur-Perspektiven*, 11/2017.

Table 2

Non-residential construction volume in Germany

	2011	2012	2013	2014	2015	2016	2017	2018	2019
	In billion euros at the respective year's prices								
New construction volume	28.8	29.7	30.7	30.9	31.1	34.3	35.9	37.7	39.7
Construction on existing buildings	59.3	57.5	56.8	58.7	58.8	57.8	59.0	60.4	62.5
Total construction volume[1]	88.1	87.3	87.6	89.5	89.9	92.1	94.9	98.1	102.2
	Change on the previous year in percent								
New construction volume		3.3	3.3	0.5	0.8	10.3	4.5	5.0	5.5
Construction on existing buildings		−3.0	−1.2	3.2	0.2	−1.7	2.2	2.3	3.5
Total construction volume[1]		−0.9	0.3	2.2	0.4	2.4	3.1	3.3	4.3
	Shares in percent								
New construction volume	32.7	34.1	35.1	34.5	34.6	37.3	37.8	38.4	38.9
Construction on existing buildings	67.3	65.9	64.9	65.5	65.4	62.7	62.2	61.6	61.1
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.

New factory and workshop construction should boost demand

Unlike previous years in which the service sector chiefly invested more in its buildings, the number of permits for factory and workshop buildings is increasing, promising rising demand for structural engineering services (see Figure 4). This supports the observation above about companies in the manufacturing industry regaining their readiness to invest. Permits for additional office and administration buildings remain on an upward trend as well, although the rate at which new permits for commercial buildings and warehouses are issued has been on a rather high plateau for a while.

This development currently manifests itself most clearly in the form of additional orders for structural engineering services from the public sector, but incoming orders from businesses are also currently on an upward trend. Given this information, DIW Berlin anticipates an increase in new construction services in the non-residential construction sector. For the current year, we expect an expansion of around five percent and for next year, a strong 5.5 percent (see Figure 3).

Renovation and modernization activity to show moderate growth

At first, construction activity on existing buildings will show little sign of expansion. Renovation and repairs on commercial buildings should provide initial support. Existing company buildings often require structural changes right as investment in new machinery expands at a fast pace.

The additional federal funds for school renovation, made possible by the partial abolishment of the prohibition of federal influence on state school systems (*Kooperationsverbot*), should later on also have a positive effect on the development of renovation and modernization measures. According to the latest *KfW Kommunalpanel* survey of city treasurers in cities and municipalities nationwide, municipalities still require major investments in schools and public administration buildings.[15] Their steadily improving financial circumstances and additional federal funds from the municipal investment support fund should lead to increased renovation and modernization activity in 2019.

Overall, DIW Berlin assumes an expansion in renovation and modernization activity in the non-residential construction sector of 2.3 percent for this year and around 3.5 percent in 2019 (see Figure 3).

Robust growth in civil engineering projects

Civil engineering has been a highly volatile factor in recent years (see Table 3). Last year saw an erratic expansion of activity by around 8.5 percent. It was primarily supported by an expansion in public expenditure, but commercial investment in civil engineering projects also sharply increased at the beginning of 2017.

We expect lower growth rates this year, due in particular to the lack of contracts for road construction services. The public sector already planned considerably more money

15 KfW Group, *KfW-Kommunalpanel 2017*, 2017.

Table 3

Civil Engineering in Germany

	2011	2012	2013	2014	2015	2016	2017	2018	2019
	In billion euros at the respective year's prices								
Commercial civil engineering	27.8	28.1	28.1	29.3	29.5	30.3	33.2	34.1	35.3
Public civil engineering	25.0	24.5	25.2	27.4	27.3	28.5	30.7	31.2	33.2
Total civil engineering volume	52.8	52.6	53.3	56.7	56.9	58.7	63.8	65.2	68.5
	Change on the previous year in percent								
Commercial civil engineering		1.0	0.2	4.3	0.8	2.4	9.7	2.7	3.6
Public civil engineering		–2.0	2.9	8.6	0.0	4.1	7.7	1.6	6.4
Total civil engineering volume		–0.4	1.4	6.3	0.4	3.2	8.7	2.2	5.0
	Shares in percent								
Commercial civil engineering	52.7	53.4	52.7	51.7	51.9	51.5	52.0	52.2	51.6
Public civil engineering	47.3	46.6	47.3	48.3	48.1	48.5	48.0	47.8	48.4
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.

for this sector and is initially unlikely to expand substantially from this level (see Figures 5 and 6). This is also reflected in the gloomy sentiment recently expressed by the civil engineering companies in the Ifo Institute survey.[16] For this reason, we only expect nominal growth of 2.2 percent in 2018.

The following year the existence of a new government coalition should provide renewed drive to expand and repair Germany's road network. And the expansion of the broadband network, which should stimulate an expansion of related activity, should also become a top priority on policy makers' agenda. In total, civil engineering projects should see more robust growth of just under five percent in 2019.

Construction prices to rise significantly

In 2017, construction volume is likely to have registered a nominal expansion of 6.5 percent. The value of construction services rose from just under 351 billion euros in 2016 to around 373 billion euros in 2017 (see Table 4). However, the jump in the construction industry's capacity utilization is putting upward pressure on prices. Lower energy and raw material prices are no longer holding down price increases, and the European construction industry is also recovering. In recent years it has been easy for Germany to recruit workers from the European Union, but this should become increasingly difficult. The resulting price increase is already perceptible: in 2017 construction prices rose by around three percent. In real terms, the construction volume probably rose by around 3.3 percent.

Prices should continue to rise due to robust demand, opening up further pricing flexibility for construction companies. This is also reflected in the fact that construction companies expect significantly higher prices in the future.[17] Due to the high capacity utilization levels construction companies are currently experiencing, standard wage increases should be higher than in the recent past. Coupled with higher purchase prices for energy and raw materials, this will put even more pressure on prices. Construction prices appear set to increase by over three percent annually in 2018 and 2019.

The nominal rate of increase in the construction volume to 392 billion euros in 2018 and 414 billion euros in 2019 will therefore translate into significantly weaker real rates of increase. They should be 1.8 percent in 2018 and 2.4 percent in 2019 (see Table 4). With real rates of increase of 3.5 percent this year and a further three percent in 2019, the housing construction sector should continue to be Germany's foundation of growth. Public construction will have negative growth this year (-1.6 percent) and recover only slightly in 2019 with a level of 0.6 percent. Commercial construction will grow slightly in 2018 (0.2 percent), but at two percent in 2019 it should make a visible contribution to growth.

All construction industry sectors should benefit from the forecast developments. This can primarily be attributed

16 Annette Marquardt, ed., *ifo Konjunktur-Perspektiven.*

17 Annette Marquardt, ed., *ifo Konjunktur-Perspektiven.*

Table 4

Key figures for development of construction volume in Germany

	2013	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
	In billion euros at the respective year's prices							Change on the previous year in percent					
Total construction volume	315.92	328.36	335.48	350.79	373.44	392.31	414.05	3.9	2.2	4.6	6.5	5.1	5.5
By construction sector													
Residential construction	175.06	182.16	188.72	199.99	214.69	229.01	243.33	4.1	3.6	6.0	7.4	6.7	6.3
Commercial construction	97.18	100.66	101.41	103.35	109.68	113.30	118.79	3.6	0.7	1.9	6.1	3.3	4.9
Public construction	43.69	45.54	45.35	47.44	49.07	50.00	51.94	4.2	−0.4	4.6	3.4	1.9	3.9
Price development								2.0	1.9	1.9	3.1	3.2	3.1
	real, chain index, 2010=100												
Total construction volume	103.32	105.27	105.57	108.40	112.00	114.06	116.82	1.9	0.3	2.7	3.3	1.8	2.4
By construction sector													
Residential construction	106.49	108.48	110.26	114.62	119.67	123.81	127.54	1.9	1.6	4.0	4.4	3.5	3.0
Commercial construction	103.43	105.12	103.84	104.00	106.82	107.02	109.19	1.6	−1.2	0.2	2.7	0.2	2.0
Public construction	92.14	94.51	92.79	95.57	95.50	94.07	94.65	2.6	−1.8	3.0	−0.1	−1.5	0.6
By producer group													
Core construction industry	108.43	112.97	112.85	116.70	120.40	122.52	124.87	4.2	−0.1	3.4	3.3	1.8	1.9
Finishing trades	98.66	99.33	98.86	100.81	103.01	104.50	108.15	0.7	−0.5	2.0	2.2	1.4	3.5
other producers	104.39	105.51	107.52	110.84	114.14	116.64	118.54	1.1	1.9	3.1	3.0	2.2	1.6

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

to the revival of renovation and modernization activity in housing construction. Last year the mainstream construction industry was supported by new housing construction and an expansion in civil engineering activity in the 3.3 percent range. At 2.2 percent, the volume of renovation activity also rose. A reversal is in store for 2019, when renovation and modernization should gain in importance. Real growth in the construction volume of over 3.5 percent can be expected for renovation activity, but for the mainstream construction industry, growth will be just under two percent.

Conclusion

Operating at peak production capacity at present, the construction industry will remain a pillar of cyclical development in Germany in 2018 and 2019. This should trigger an overall slowdown in the industry's real growth and put upward pressure on prices.

The end of the boom at new housing is in sight. Pull-forward effects aside, the number of permits has remained the same for some time. Single-family home construction is likely to suffer due to rising interest rates and significant land price increases in the near future. But the upswing in the construction of apartment complexes has also lost momentum. In view of the pressing need for additional residential space, this is not good news: certain calculations hold that between 350,000 and 400,000 new homes must be built each year in order to eliminate the housing market shortage.[18] However, hasty decisions in favor of generous funding measures, such as a special program for depreciation for wear and tear for the rental unit construction sector, would not be advantageous. The shortage of available undeveloped land remains a key limiting factor.[19] Municipalities are responsible for improving the general conditions in this area. If the situation with undeveloped land does not change, more attractive investment incentives would simply lead to higher prices for land and real estate.[20]

Providing systematic support for urban development is an alternative to general funding new housing. The potential inherent in building on vacant lots and adding floors to existing housing (redensification) has not been fully tapped and could make a substantial contribution to increasing the supply of living space in Germany's city centers. A key advantage of this strategy is that the lots already exist and must not be procured at

18 Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, 2015, *Bündnis für bezahlbares Wohnen und Bauen*, Berlin.

19 For example, committees of appraisers (*Gutachterausschüsse*) report significant price increases for undeveloped land, which clearly indicates that it is in short supply. See Arbeitskreis der Oberen Gutachterausschüsse, Zentralen Geschäftsstellen und Gutachterausschüsse in Deutschland (AK OGA), *Immobilienmarktbericht Deutschland 2017*, 2017.

20 See Claus Michelsen, "Stellungnahme anlässlich der öffentlichen Anhörung des Finanzausschusses des Deutschen Bundestags zum Gesetzentwurf der Bundesregierung, 'Entwurf eines Gesetzes zur steuerlichen Förderung des Mietwohnungsneubaus'," *DIW Berlin Lecture*, 2016 (in German only) (available online).

high prices. Instead, additional living space could be created on existing lots. However, a lack of equity capital or housing stock with high mortgage values could be a problem here. Subsidies for equity or subordinate loans are possible solutions targeted to building additional living space. The proven concept of urban development by district could fine-tune the strategy.

However, additional support for energy efficiency upgrades is also desirable. In view of the slowdown in new housing construction and the untapped renovation potential of recently purchased housing stock, federal funding could carry over the momentum from pending renovation and modernization measures into energy efficiency upgrades. This would also be preferable because buildings that are renovated and modernized today will not require major work for the next 30 years. Overdue energy efficiency improvements are tantamount to missed opportunities for a substantial contribution to climate protection. Alongside the tax benefits that are already part of the discussion, continued support for energy upgrades by district would contribute substantially to climate protection. Unlike supporting the renovation and modernization of individual buildings, at issue is the support for collaboration among several owners who would be following an integrated approach for multiple buildings or entire districts.

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