Construction in Germany: Structural Data on Production and Employment –

2013 Calculations

Summary of Final Report

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Agents:
The German Institute for Economic Research (DIW Berlin):
Martin Gornig, Bernd Görzig, Hendrik Hagedorn, Claus Michelsen, and Hella Steinke
Heinze GmbH, Celle:
Christian Kaiser and Katrin Klarhöfer

1 Purpose

The purpose of the present analysis is to portray the construction industry using basic data outlining the composition of companies in the industry as a whole and also by branch, based on their turnover and number of employees. As the industry statistics only reflect part of the construction industry, we can only paint a complete picture by comparing with other sources and using additional calculations. This also contributes to achieving a second objective, i.e., to accurately present the development of employment in this sector of the economy. DIW Berlin's construction volume calculations use a similar methodological approach to the national accounts (*Volkswirtschafliche Gesamtrechnungen, VGR*) to calculate investment in the construction industry. However, DIW's calculations go beyond the national accounts definition as they also include non-investment construction services.

One perspective which is gaining in significance from an economic policy point of view is the organization of structural engineering production which distinguishes between the construction of new buildings and construction work on existing buildings. Construction work on existing buildings includes conversion and extension work, modernization, refurbishment, and maintenance of buildings. On the one hand, DIW's calculations refer to residential construction. On the other hand, model calculations on the volume of new construction compared with construction on existing buildings in the non-residential sector are also required.

2 Development Trends

In 2013, construction volume declined by approximately 0.5 percent in real terms. This downturn was primarily due to the very long cold winter which had a clear impact on construction output in the first half of the year. Commercial construction in particular suffered with an annual average decline of almost two percent compared to 2012 (see Table 1). This reflects a general lack of corporate investment, primarily triggered by the uncertainty in the euro area. Compared to 2012, public and residential construction showed slight gains in real terms. Municipal authorities in particular were able to increase their investment in public construction due to their improved cash flow positions. Residential construction continued to benefit from the extremely favorable financing conditions and the lack of investment alternatives. There were only minimal changes to construction on existing buildings, the volume of which remains the most significant by far.

Table 1

Key Figures for Construction Volume Development in Germany

	2010	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
	In billion euros at the respective year's prices						Change in percent				
Total construction volume	283.30	305.73	308.82	313.60	332.98	345.46	7.9	1.0	1.5	6.2	3.8
Price development							3.3	2.5	2.0	2.0	1.9
	Chain index (real) 2005 = 100										
Total construction volume	106.58	111.47	109.84	109.35	113.92	116.06	4.6	-1.5	-0.4	4.2	1.9
By construction industry sector											
Residential construction	103.44	108.64	110.07	110.26	115.01	117.10	5.0	1.3	0.2	4.3	1.8
Commercial construction	112.97	119.72	117.04	114.73	115.68	118.61	6.0	-2.2	-2.0	0.8	2.5
Public construction	105.76	106.05	95.63	96.13	106.92	107.83	0.3	-9.8	0.5	11.2	0.9
By producer groups											
Core construction industry	99.63	107.32	106.01	107.65	112.97	114.98	7.7	-1.2	1.5	4.9	1.8
Finishing trades	115.59	117.43	114.67	112.46	117.21	119.38	1.6	-2.4	-1.9	4.2	1.9
Other construction services	104.13	108.80	109.01	108.71	112.42	114.69	4.5	0.2	-0.3	3.4	2.0

Sources: construction volume calculation by DIW Berlin; national accounts; DIW Berlin Spring Economic Development Trends, 2014 (*Frühjahrsgrundlinien*).

The prevailing circumstances lead us to expect that residential construction volume will continue to experience strong growth. The momentum for this stems from new construction, particularly the construction of apartment buildings, evidenced by the increasing number of building permits. A key reason for this development is that real estate is perceived as a very attractive capital investment. Uncertainty resulting from the euro crisis, low interest rates, and poor returns on alternative investments continue to stimulate foreign investment activity on the German real estate market. Moreover, after years of stagnation, we are beginning to observe significant increases in housing rents, particularly in agglomerations. However, price development is also driven by economic fundamentals: there has been migration growth in urban centers, with their particularly high rental and pricing dynamics, for quite some time now. Currently, the labor market situation and the development of real income are also extremely positive.

However, since the euro crisis is petering out, a normalization of the currently extremely positive financing conditions is to be expected, despite the fact that the most recent interest rate decisions made by the European Central Bank initially give the opposite impression. Yet increasing investor confidence in the recovery of the euro area economy means that the demand for mortgage bonds, an important instrument for the refinancing of banks, tails off. The

real estate policy decisions made by Germany's ruling Grand Coalition are also having a dampening effect on growth: the brake on rent prices is likely to lead to a cooling off of the investment climate. The lack of decisions regarding the future shape of energy-efficient refurbishment is also likely to contribute to disillusionment. An alliance for affordable housing, initiated by the Federal Environment Ministry (BMUB), has called for an increase in new construction activity. According to the alliance, there are plans to build at least 300,000 new residential properties every year. However, this demand has not yet been underpinned by specific measures, such as the construction of social housing.

After a sharp fall in 2009, commercial construction has recovered again in recent years. However, significant fluctuations and differences between the individual types of building prevail. For example, the construction of production, trade, and storage facilities has not managed to regain the significance it enjoyed in 2008. This is primarily due to considerable uncertainty among manufacturing companies heavily influenced by global economic development. After experiencing a marked rise in 2011, with the volume of commercial construction recording a real increase of more than six percent, 2012 saw an almost two-percent downturn which can be interpreted as the result of a re-emergence of the euro crisis. At least, a high degree of uncertainty prevailed in the second half of 2011. Commercial construction also experienced a major decline in production due to adverse weather conditions which go some way to explaining the significant drop in construction volume recorded in 2013. However, the outlook is now noticeably brighter. The positive macroeconomic growth prospects for 2014 and 2015 are likely to provide momentum for capacity increases – this is also signaled by the rise in the number of building permits for production, trade, and storage facilities. We can also expect this to be gradually reflected in an increase in construction activity: expectations regarding the development of credit volume and particularly also the investment climate also point in this direction.

In 2013, there was only a slight increase in the volume of public construction despite an improved cash flow situation. Investment in public infrastructure to help repair the damage caused by flooding contributed to this. These resources will continue to finance construction projects in 2014. The provision of public funds for infrastructure construction and for building child daycare facilities set out in the German government's coalition agreement, is likely to provide further positive stimulus for a construction industry which is already on an upward trend due to the favorable public-sector cash flow.

3 New Construction

Table 2 below shows the results of the latest calculations on new residential construction volumes in Germany. According to these figures, in 2009 the new residential construction volume amounted to a nominal 31.4 billion euros – perhaps the lowest result recorded since the country's reunification. This downward trend in new residential construction volume developed in several surges: periods of relatively stable new construction activity were followed by years of significant decline. One of those years was 2008; compared to 2007, new construction output dropped by over 13 percent.

Table 2
Composition of Residential Construction in Germany

	2007	2008	2009	2010	2011	2012	2013
Germany	In billion euros at the respective year's prices						
Volume of new construction[1]	37.03	32.16	31.39	32.90	40.98	44.30	47.07
Private residential buildings	28.31	23.99	23.00	24.16	29.41	30.61	31.84
Apartment buildings	8.72	8.17	8.39	8.74	11.57	13.69	15.23
Construction on existing buildings[2]	104.99	112.41	111.97	118.87	123.86	126.98	127.83
Total volume of residential construction	142.02	144.57	143.36	151.77	164.84	171.28	174.90
	Change in percent						
Volume of new construction[1]		-13.2	-2.4	4.8	24.6	8.1	6.3
Private residential buildings		-15.3	-4.1	5.0	21.7	4.1	4.0
Apartment buildings		-6.3	2.7	4.2	32.4	18.3	11.2
Construction on existing buildings[2]		7.1	-0.4	6.2	4.2	2.5	0.7
Total volume of residential construction		1.8	-0.8	5.9	8.6	3.9	2.1
	Structure in percent						
Volume of new construction[1]	26	22	22	22	25	26	27
Private residential buildings	20	17	16	16	18	18	18
Apartment buildings	6	6	6	6	7	8	9
Construction on existing buildings[2]	74	78	78	78	75	74	73
Total volume of residential construction	100	100	100	100	100	100	100

1 Projections on the basis of estimated construction costs (construction activity statistics), plus additional costs for architectural fees and services, outdoor facilities, and investors' own contributions.

2 Modernization work on buildings and residential properties (incl. conversion and extension work) and also repair and maintenance services carried out by the construction industry.

Sources: German Federal Statistical Office, construction activity statistics; construction volume calculation by DIW Berlin; survey of architects by Heinze GmbH; model calculation by DIW Berlin (2014).

In 2009, however, the industry showed signs of new residential construction stabilizing at a relatively low level. In new multi-story residential construction, the first tentative signs of recovery were even observed. After prolonged lean times, new construction of owner-occupied buildings also experienced a marked upturn in 2010. This heralded an upward trend in the entire new residential construction sector. New construction volume increased by almost five percent. Then 2011 saw more than just a continuation of this positive trend in new construc-

tion – a dramatic acceleration in growth was actually observed. In 2011, growth rates for multi-story residential construction were over 30 percent and the corresponding figure for construction of owner-occupied homes was more than 20 percent. In the subsequent years, the upwards trend continued but at a slower pace. Compared to the previous years, there was a good 8 percent (2012) and 6 percent (2013) growth. Residential construction of new apartment blocks also exhibited particularly strong growth in both 2012 and 2013.

A total new residential construction volume amounting to over 47 billion euros is assumed for 2013. Despite dynamic growth, the share of residential construction output accounted for by new construction activities was a mere 27 percent in recent years. At 35 percent, the new construction share of the residential construction volume was substantially higher in 2005. In the mid-1990s the figure was as high as almost 50 percent.[1]

As part of its model calculations, DIW Berlin also compiles estimates on new construction volume in the non-residential construction sector. For Germany overall, the DIW model calculation shows new construction activity with a nominal value of almost 32 billion euros for 2013 (see Table 3). By way of comparison, new residential construction activity for the same year was approximately 15 billion euros, or almost 50 percent higher.

The development of new residential construction has generally followed an upward trend since the overall economic recovery in the mid-1990s, increasing by as much as 10 percent in both 2007 and 2008. However, these growth rates are partly a reflection of sharp price increases in construction services in general. However, in 2009 overall, new non-residential construction declined slightly (by at least two percent), triggered by a drop in the new construction of production, trade, and storage facilities due to the export crisis. And while other areas of new construction enjoyed encouraging momentum in 2009, by 2010 these sectors were also affected by the repercussions of the crisis. Office and administration buildings as well as hotels, restaurants, and institutions registered double-digit declines. Across Germany, new non-residential construction dropped by more than nine percent.

[1] See Martin Gornig and Bernd Görzig: Entwicklungsszenarien für die Bauwirtschaft. *Merseburger Schriften zur Unternehmensführung*, vol. 14 (Aachen: 2013).

Table 3
Calculations for Volume of New Non-Residential Construction in Germany

	2007	2008	2009	2010	2011	2012	2013
	In billion euros at the respective year's prices						
Volume of new construction	27.88	30.78	30.11	27.32	30.24	30.03	31.94
Offices, administrative buildings	4.93	5.13	5.54	4.34	5.04	4.97	6.20
Hotels, restaurants, and institutions	4.22	4.10	4.48	3.99	3.94	3.71	4.05
Production, trade, and storage facilities[1]	13.21	15.37	13.09	11.98	14.10	14.41	14.05
Other non-residential buildings[2]	5.52	6.19	7.00	7.00	7.16	6.95	7.64
Construction on existing buildings	46.01	50,24	50,52	55,59	57,86	55,55	54,09
Total volume of non-residential construction[3]	73.89	81.02	80.63	82.90	88.10	85.58	86.03
	Change on the previous year in percent						
Volume of new construction		10.4	-2.2	-9.3	10.7	-0.7	6.4
Offices, administrative buildings		4.0	8.0	-21.6	16.1	-1.5	24.8
Hotels, restaurants, and institutions		-2.9	9.3	-10.8	-1.3	-6.0	9.2
Production, trade, and storage facilities[1]		16.4	-14.9	-8.5	17.6	2.2	-2.4
Other non-residential buildings[2]		12.1	13.2	0.0	2.3	-2.9	9.9
Construction on existing buildings		9.2	0.6	10.0	4.1	-4.0	-2.6
Total volume of non-residential construction[3]		9.7	-0.5	2.8	6.3	-2.9	0.5
	Share of total in percent						
Volume of new construction	37.7	38.0	37.3	33.0	34.3	35.1	37.1
Offices, administrative buildings	6.7	6.3	6.9	5.2	5.7	5.8	7.2
Hotels, restaurants, and institutions	5.7	5.1	5.6	4.8	4.5	4.3	4.7
Production, trade, and storage facilities[1]	17.9	19.0	16.2	14.5	16.0	16.8	16.3
Other non-residential buildings[2]	7.5	7.6	8.7	8.4	8.1	8.1	8.9
Construction on existing buildings	62.3	62.0	62.7	67.0	65.7	64.9	62.9
Total volume of non-residential construction[3]	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1 Including agricultural buildings.

2 Including all other non-agricultural buildings.

3 Construction volumes in commercial and public structural engineering.

Sources: German Federal Statistical Office; construction volume calculation by DIW Berlin; survey of architects by Heinze GmbH; model calculation by DIW Berlin (2014).

However, 2011 also saw new non-residential construction resume its growth course. Compared to 2010, growth was a nominal 11 percent. Expansion was particularly marked in the construction of offices and administrative buildings as well as production, trade, and storage facilities, sectors that had previously been badly affected by the global economic crisis. Across Germany, new construction of hotels and restaurants continued to experience negative development, however. In 2012, the impact of some economic stimulus packages expiring became more apparent with an anticipated decline in non-residential new construction of one percent. Only the construction of production, trade, and storage facilities has demonstrated positive development. In 2013, the more favorable overall economic development also stimulated new construction activity with particularly dynamic growth recorded in the construction of office and administrative buildings.

The relative significance of new construction compared to construction work on existing buildings continued to decline, also in the non-residential construction sector, particularly in

the aftermath of the 2009 economic crisis. 2010 saw the most dramatic changes in the distribution of shares of overall construction volume. While, partly as a result of the economic stimulus package, the volume of construction on existing non-residential buildings enjoyed double-digit growth, new construction declined by almost ten percent where there was surplus capacity, and its share of commercial and public construction volume dropped to approximately one-third its previous level. In the following years, however, the share of new construction increased. This was not only the result of growth in new construction activity but also due to the negative development in construction on existing buildings. At 37 percent, new construction still plays a far more significant role in non-residential than in residential construction, where it accounted for only 27 percent in the same year.

4 Construction on Existing Buildings

Economic policy-makers are increasingly focusing on existing buildings and the construction work carried out on them. This field is particularly important with regard to energy saving potential and the change in household structures.[2] According to calculations by DIW Berlin, the volume of residential construction in 2010 was almost 152 billion euros and in the same year, an estimated 33 billion euros went into new residential construction. Thus, in 2010, construction work on existing buildings accounted for around 119 billion euros. According to DIW calculations, the value of non-residential construction was almost 83 billion euros in 2010. New construction accounted for an estimated 27 billion euros of this, leaving an estimated 56 billion euros for work on existing non-residential buildings (see Table 3).

2011 saw another strong increase in the volume of construction on existing buildings. Growth of around four percent was recorded both in residential and non-residential construction. 2012 and 2013 saw further increases in the volume of construction work on existing residential buildings to almost 128 billion euros. The end of economic stimulus programs resulted in a slight drop in the volume of non-residential construction (see Table 4).

In residential construction, work on existing buildings continued to be dominated by partial modernization projects. In 2013, 106 billion euros was invested in this sector. Nevertheless, a good 17 billion euros was still spent on general maintenance work such as repairs. Com-

[2] S. Rein: Struktur der Bestandsinvestitionen. *BBSR-Berichte KOMPAKT* 12 (Bonn: 2011).

Table 4

Structure of Construction on Existing Buildings in Germany from 2010 to 2013

	Residential construction				Non-residential construction				Total construction			
	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013
	In billion euros at the respective year's prices											
Comprehensive modernization measures	7.28	7.84	6.44	4.50	14.17	15.13	14.71	14.20	21.45	22.97	21.15	18.70
Partial modernization measures	91.93	99.17	102.65	106.02	28.02	29.86	29.04	28.04	119.95	129.03	131.70	134.06
Maintenance	19.66	16.84	17.89	17.31	13.39	12.87	11.79	11.85	33.05	29.71	29.68	29.16
Total	118.87	123.86	126.98	127.83	55.59	57.86	55.55	54.09	174.46	181.72	182.52	181.92
Share of energy-efficient refurbishment	38.60	39.66	37.99	39.52	14.93	16.03	15.59	15.32	53.52	55.69	53.59	54.84
	Share of total in percent											
Comprehensive modernization measures	6.1	6.3	5.1	3.5	25.5	26.1	26.5	26.3	12.3	12.6	11.6	10.3
Partial modernization measures	77.3	80.1	80.8	82.9	50.4	51.6	52.3	51.8	68.8	71.0	72.2	73.7
Maintenance	16.5	13.6	14.1	13.5	24.1	22.2	21.2	21.9	18.9	16.4	16.3	16.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Share of energy-efficient refurbishment	32.5	32.0	29.9	30.9	26.9	27.7	28.1	28.3	30.7	30.6	29.4	30.1

Sources: German Federal Statistical Office; new construction volume calculation by DIW Berlin; modernization volumes by Heinze GmbH; model calculation by DIW Berlin (2014).

prehensive modernization might account for the lowest expenditure in this particular construction sector, yet it still managed to attract an estimated 4.5 billion euros in 2013. Compared with new residential construction volumes (over 47 billion euros) this is a major factor in the provision of living space of new-build quality.

Also in non-residential construction, the lion's share of expenditure went on the partial modernization of existing buildings, with approximately 28 billion euros being invested in this sector in 2013. At the same time, partial modernization only accounts for 52 percent of all construction on existing non-residential buildings, which is far less significant than in residential construction where partial modernization claims almost 83 percent. In non-residential construction, comprehensive modernization and general maintenance play a far more prominent role. According to DIW Berlin's model calculations, which were consistent with the national accounts and Heinze GmbH's projections, comprehensive modernization attracted over 14 billion euros in 2013. These data also indicate that, in 2013, comprehensive modernization amounted to almost half the total sum spent on new construction of non-residential buildings (32 billion euros).

Energy-efficient refurbishment played a major part in elevating the significance of construction on existing buildings. According to the construction volume calculation, almost 55 billion euros were spent on increasing energy efficiency in 2013. Of this sum, the energy-efficient refurbishment of residential buildings accounts for almost 40 billion euros, while non-residential improvements claim a 15-billion-euro share. In comparison with previous years, the nominal values have barely changed.

This illustrates just how important energy-efficient refurbishment has already become for the construction industry as a whole. Approximately one-fifth of the total building construction volume falls into this category. At the same time, other motives for retrofitting such as change of usage or enhanced comfort are also important, since, nevertheless, around 70 percent of all construction on existing residential buildings and on non-residential structures are not directly attributable to energy-related incentives.

5 Employment in the Construction Industry

Ever since the mid-1990s, the development of employment in the construction industry has followed a downward trend. However, over the last few years, circumstances have changed: employment in the construction industry has either remained stable or even enjoyed a

marked increase. Notwithstanding, a comparison of different statistical sources reveals considerable disparities in this trend reversal.[3]

DIW Berlin's calculations and industry statistics reach similar conclusions regarding the upturn in employment in the construction industry observed in 2010 (see Table 5). The data reveal an increase in the number of employed of more than 40,000, or as much as two percent, in comparison with the previous year. However, the national accounts estimate the increase at less than one percent. Construction industry statistics, on the other hand, are likely to have significantly overestimated employment growth for 2011 and 2012. A number of companies expanded during the economic upswing and reached or exceeded the statistical detection limit. Thus, the official statistics capture a larger share of the total without it having in fact grown to the same extent. Drawing on VAT statistics, DIW Berlin's analyses indicate a slowing of employment growth as early as 2011. In the finishing trades, employment even declined slightly in 2012. As a result, according to DIW's calculations, employment in the construction industry remained stable overall.

Table 5
Comparative Data on Employment in the Construction Industry

	2009	2010	2011	2012	2013
	Figures per 1,000 individuals				
Official census (TE)[1]	1,149	1,172	1,203	1,238	1,264
Core construction industry	715	727	745	755	769
Finishing trades	434	445	458	483	495
Calculations by DIW[2]	1,840	1,881	1,907	1,906	-
Core construction industry	717	729	746	757	-
Finishing trades	1,123	1,151	1,161	1,149	-
Difference between census and DIW Berlin's figures[3]	-691	-708	-704	-668	-
National accounts[4]	2,355	2,371	2,423	2,460	2,478
Difference between DIW Berlin's figures and national accounts[5]	-515	-490	-516	-554	-

1 Employees working for construction companies and self-employed individuals. Data for the reference month of June.

2 Employees working for construction companies and self-employed individuals. Data for the reference month converted into annual mean values.

3 Figures primarily correspond to estimated employees in companies in the finishing trades with fewer than ten employees.

4 Individuals employed in Germany – irrespective of working hours or other main sources of employment. Annual average.

5 Figures correspond roughly to the number of individuals in marginal employment in the construction industry.

Source: German Federal Statistical Office, Fachserie 4, Reihe 5.1, *Beschäftigung und Umsatz der Betriebe im Baugewerbe*; Fachserie 14, Reihe 8 *Umsatzsteuer*; Fachserie 18, Reihe 1.4, national accounts; calculations and estimates by DIW Berlin (2014).

[3] Martin Gornig, Bernd Görzig, Henrik Hagedorn, and Hella Steinke: Construction in Germany: Structural Data on Production and Employment – 2011 Calculations. *BMVBS Online Publication*, no. 21 (2012).