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UNITED NATIONS

A photograph of a wooden cabin interior, viewed from below looking up at a large skylight window. The window is framed in black and has a metal latch. Outside the window, a large pine tree is visible against a blue sky. The interior walls and ceiling are made of light-colored wood planks.

Chapter 10

HOUSING AND CONSTRUCTION

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Highlights

Real house prices rose by 2.2% in the euro area in 2018.

The median price for new single-family units in the US was \$326,200 in 2018, an increase of nearly 1% from 2017 (\$323,100).

The European housing markets continued their positive trend in 2018, recording a fifth consecutive year of growth. New residential spending increased by 26% between 2015 and 2018, a €72.3 billion improvement.

On average, 80 million m² of new housing has been commissioned annually in recent years in the Russian Federation, but analysts suggest that 120 million m² is needed per year to meet demand and replace ageing housing stock.

Most construction sectors of the US housing market flatlined in 2018. Beginner or starter housing remains weak, and the quantity of dwellings being built is insufficient to accommodate population growth.

The number of US household formations increased in 2018 but remains less than the historical average.

The Canadian housing market is projected to be stable to 2021.

In Canada, nationwide mortgage guidelines, have helped stem price acceleration.

The US and Euroconstruct region's new-construction markets appear to have normalized at a lower level than their respective historical averages.

With growing urban and suburban populations and the underbuilding of new housing in Europe and North America, factory-built housing may be the segue needed to move towards affordable housing.

10.1 Introduction

Housing prices have generally performed better than economies in most countries in the UNECE region. Economic projections and house-price analysis can provide insights into the housing construction, sales and remodelling markets and subsequently into wood product demand. The Bank of International Settlements (BIS) reported that residential housing prices increased by 1.9% globally in 2018, year-on-year, and by 2.2% in the euro area, 2.0% in the US and 1.0% in the Russian Federation. Canadian house prices retreated, however, by 0.06%. According to BIS, real residential prices (adjusted for inflation) are still substantially higher than in the wake of the global financial crisis (BIS, 2019).

10.2 European construction market

10.2.1 Review and outlook

Housing markets continued their growth in 2018, recording a fifth consecutive year of growth (ECB, 2019). New residential building remains a value driver in the Euroconstruct region, accounting for nearly 25% (€342 billion) of the construction market value, and residential remodelling comprised 26% (€422 billion) of the volume. Combined, new residential and residential remodelling comprised 48% of construction value in 2018. New residential spending has increased by 26% (€72.3 billion) since 2015 (Euroconstruct, 2019).

Although housing construction estimates and forecasts are somewhat tempered, investors appear to have increased interest in the residential sector. A recent survey by PwC (2019) found that 60% of respondents (compared with 28% in 2015) are investing in residential real estate (e.g. student and social housing, co-living, multifamily dwellings, retirement/assisted living, and private rented residential) in some form, and 66% desire to increase their holdings.

France and Germany are the two largest housing markets in the euro area. In France, 2017 and 2018 were record years for housing sales but, even so, new housing is insufficient to meet demand, in areas under strain (quickly developing cities such as Paris and regional metropolises). Building permits are declining, construction costs are up, and legal challenges to permits issued are impediments to new construction (Barros, 2019).

Möbert (2019) estimated that a housing shortage of more than 1 million units has arisen in Germany since 2009 and that 350,000 to 370,000 new apartments per year would have to be built between 2018 and 2020 to alleviate this. Thus, the German housing deficit is unlikely to contract in the near term.



Building permit forecasts for 2019 to 2021 in the Euroconstruct¹⁴ region indicate reduced permit applications, however short run forecasts suggest a slight increase. Total housing completions increased in 2018, year-on-year, but new residential completions per inhabitant were divergent across countries. For example, average housing completions per 1,000 inhabitants was 0.7 in Portugal and 6.5 in Switzerland. The Euroconstruct area average was 3.2 completions per 1,000 persons (Euroconstruct, 2019).

Affordable housing is an often expressed refrain in Europe and North America. Not only have increasing house prices deterred many potential buyers from house purchases, builders have experienced lacklustre profit margins due to increasing material and labour costs, regulations, and a lack of land availability. The population in the Euroconstruct area is growing by an average of 1.46 million people per year and is forecast to increase, in aggregate, by 0.9% over the next three years (decreases are projected in only three of the 19 Euroconstruct countries); the number of households is forecast to grow by 1.5% (Euroconstruct, 2019). According to PwC (2019), "Every major city in Europe has the same issue: lack of affordable housing." With growing urban and suburban populations and the underbuilding of new housing in Europe and North America, factory-built housing may be the segue needed to move towards affordable housing.

¹⁴ The Euroconstruct region comprises 19 countries. The western subregion consists of Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK. The eastern subregion comprises the Czech Republic, Hungary, Poland and Slovakia.

10.2.2 Total, civil-engineering and non-residential construction spending

The total turnover of the Euroconstruct region's construction industry was estimated at €1,610 billion in 2018, up by 3.1% from 2017. Non-residential construction constituted 33.2% and civil engineering 23.7% of the 2018 total. Annual aggregate construction growth is forecast to remain below 1.9% in the Euroconstruct region until 2021 (table 10.2.1) (Euroconstruct, 2019).

Grandovska (2019) reported that construction spending increased by 6.3% and in the euro area and by 5.8% in the EU28 between March 2018 and March 2019. Euroconstruct (2019) projected total civil-engineering spending to increase by 4.2% in 2019, 3.1% in 2020 and 2.9% in 2021 and total non-residential expenditure to grow by 1.3% in 2019 and by 1.2% in both 2020 and 2021.

10.2.3 Residential construction and remodelling

New housing construction remains tepid in the Euroconstruct region, although spending volume increased by 5.3% in 2018, year-on-year. New residential and remodelling construction spending accounted for 47% of total construction spending (residential remodelling accounting for 26% and new residential for 21%). New residential construction is projected to increase slightly to €347.9 billion in 2019 and €351.2 billion in 2021. Forecasts for new residential and remodelling construction growth are subdued in the Euroconstruct region (table 10.2.1) (Euroconstruct, 2019).

Residential remodelling is forecast to be a driver in construction spending, increasing from €425.2 billion in 2019 to €434.5 billion in 2021 (table 10.2.1). Remodelling continues to present opportunities, in western and northern Europe, due to ageing housing stock. As in the US, many euro-area homeowners are opting to age in place rather than relocate. Historically, government programmes have supported house remodelling (Euroconstruct, 2019). In several countries, remodelling is a priority investment in the framework of climate change mitigation strategies, seeking at improving the number of buildings with good thermal insulation, thus reducing energy consumption.

An estimated 1.786 million new-housing permits were issued in the Euroconstruct region in 2018. The number of permits issued is a leading economic indicator because it is forward-looking, and it is therefore used in several countries to gauge future economic activity and housing supply. In 2018, permits were issued in the Euroconstruct region for 1.118 million flats and 668 thousand 1+2 family units. Table 10.2.2 shows estimates and projections for issued building permits for the top five countries in 2018; graph 10.2.1 displays total permits,

TABLE 10.2.1

Construction spending forecast, Euroconstruct region, 2019-2021 (€ billion)

	2019e	2020f	2021f	2018	2017	2016
New residential construction	347.9	350.0	351.2	1.7	0.6	0.3
Residential remodelling	425.2	430.6	434.5	0.8	1.3	1.1
Non-residential – new	275.2	278.2	281.5	1.3	1.1	1.2
Non-residential – remodelling	245.3	248.7	251.7	1.4	1.4	1.2
Civil engineering – new	204.6	212.6	220.2	5.5	3.9	3.6
Civil engineering – remodelling	142.3	144.7	147.6	2.3	2.0	2.0
TOTAL	1,640	1,665	1,688	1.9	1.5	1.4

Notes: in 2018 prices; e = estimate; f = forecast.

Source: Euroconstruct, 2019.

TABLE 10.2.2

Top five Euroconstruct region countries for total housing permits, 2018-2021

	2018e	2019f	2020f	2021f
(THOUSAND HOUSING PERMITS)				
France	455.7	427.4	367.6	330.9
Germany	347.3	335.0	320.0	305.0
Poland	251.1	225.0	215.0	220.0
Italy	89.9	91.9	92.5	92.8
Spain	80.0	95.0	98.0	90.0

Notes: e = estimate; f = forecast. UK data are unavailable.

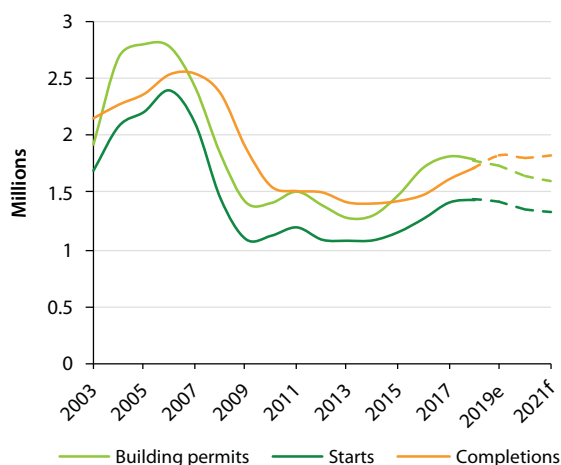
Source: Euroconstruct, 2019.

starts and completions in the Euroconstruct region in the period 2002-2021.

New housing starts in the Euroconstruct area were estimated at 1.434 million units in 2018, comprising 827 thousand flats and 607 thousand 1+2 family dwellings. Start data can be used for assessing housing demand and for forecasting future construction employment, consumer-based product

GRAPH 10.2.1

Building permits, starts and completions, Euroconstruct region, 2003-2021



Notes: * = estimate; ** = forecast.

Sources: Euroconstruct, 2004, 2019.

TABLE 10.2.3

Top five Euroconstruct region countries for housing starts, 2018-2021

	2018e	2019f	2020f	2021f
(THOUSAND HOUSING STARTS)				
France	419.0	389.6	359.1	319.5
Poland	221.9	230.0	210.0	220.0
UK	189.6	193.0	198.0	207.0
Spain	100.7	118.0	120.0	110.0
Sweden	58.4	46.1	41.4	45.9

Notes: e = estimate; f = forecast. Germany data are unavailable.

Source: Euroconstruct, 2019.

demand, and potential recessions. Table 10.2.3 presents forecasts for the top five countries for housing starts in the Euroconstruct region in 2018.

Total completions were estimated at 1.72 million units in 2018, comprising 996 thousand flats and 724 thousand 1+2 family units. Completion data indicate the quantity of houses finished and available for sale or rent; as with starts, they can be used in estimating sales for consumer-based products. Table 10.2.4 shows estimates and projections for housing completions in the top five Euroconstruct countries in 2018-2021 (Euroconstruct, 2019).

TABLE 10.2.4

Top five Euroconstruct region countries for total housing completions, 2017-2020

	2018e	2019f	2020f	2021f
(THOUSAND HOUSING COMPLETIONS)				
France	396.0	430.0	399.0	376.0
Germany	300.0	310.0	315.0	320.0
UK	189.1	190.0	195.0	203.0
Poland	180.9	200.0	210.0	222.0
Italy	83.5	87.0	89.7	91.7

Notes: e = estimate; f = forecast.

Source: Euroconstruct, 2019.

TABLE 10.2.5

Top five Euroconstruct region countries for new construction and remodelling expenditures, 2018-2021 (€ billion)

	2018e	2019f	2020f	2021f
NEW CONSTRUCTION				
Germany	68.2	70.6	70.2	69.2
UK	56.0	57.0	58.7	62.0
France	47.2	45.2	43.7	39.3
Spain	36.1	39.5	41.9	42.1
Switzerland	21.0	20.2	19.9	19.9
REMODELLING				
Germany	131.2	130.6	129.9	129.3
Italy	68.7	69.2	69.8	70.7
France	62.3	63.0	64.8	65.3
UK	39.7	40.0	41.1	41.9
Netherlands	20.7	21.0	21.6	22.1

Notes: in 2018 prices; e = estimate; f = forecast.

Source: Euroconstruct, 2019.

Table 10.2.5 presents estimates and projections for new construction and remodelling valuations for the top five countries in 2018-2021. Germany is top-ranked in expenditure for both new construction and remodelling (Euroconstruct, 2019).

10.2.4 Top five new-housing-permit countries in focus

Below are insights into the top five permit-issuing countries in the Euroconstruct region in 2018.

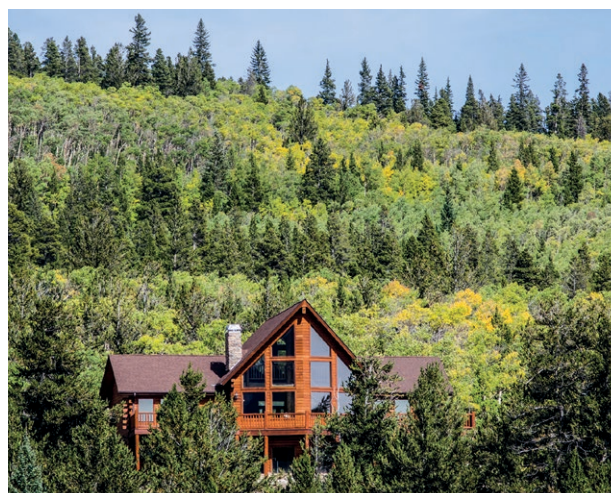
France. INSEE (2019) data indicate the average size of one-family dwellings at 87.2 m². The European Commission's European Construction Sector Observatory (ECSO, 2018a) forecasted French construction spending to increase by 2.5% in 2018.

Germany. Germany's housing market remains robust (Delmendo, 2018), with housing prices increasing by 3.2% in 2018 (FRED, 2019a). Spending in Germany's construction sector was projected to increase by 4% in 2018 (ECSO, 2018b).

Poland. The Polish housing market is robust due to a strong economy, rising employment and wages, and historically low interest rates. The "Apartments for the Young" plan spurred demand but is being phased out in 2019. In 2018, dwelling permits were reported at 251,030 units, a 3.3% increase, year-on-year; starts rose by 7.7%, to 221,907 units, and completions grew by 3.8%, to 185,170 units (Delmendo, 2019a). There was an estimated 14.4 million households in Poland in 2017, an increase of 9.0% over 2010. In 2018, 83.7% of dwellings were owner-occupied. Spending in Poland's housing construction subsector was €12.6 billion in 2017 (47.6% of total construction spending). The housing outlook for Poland is positive, with continued low interest rates, rising incomes and subsidy programmes expected to increase housing demand (ECSO, 2019a).

Italy. Although the Italian economy is weak, the country's housing market is recovering (Delmendo, 2019b); nevertheless, dwelling building permits declined by 52.2% between 2010 and 2016 (Istat, 2019). The value-added share of gross GDP held by real estate activities was 12.6% in 2017, with an estimated value of €18.2 billion. There has been a continued increase in households since 2010, reaching 25.9 million in 2017. A number of factors are hindering new-housing demand, including an ageing population; high unemployment among potential first-time house buyers (i.e. young people); and the apparent risk-aversion of households, many of which are exhibiting cautious saving and investment behaviours. New residential construction is the lone subsector forecast to decrease in Italy to 2021 (ECSO, 2019b).

Spain. Delmendo (2019c) reported that Spanish house prices increased by 6.5%, year-on-year, in 2018. Housing demand is rising, with sales forecast to increase from 500,000 units in 2018 to 625,000-650,000 in 2019. According to INE (2019a), Spain had 25.7 million residences in 2018, of which 19.2 million (75%) were primary residences. In total, housing stock increased by 67,644 units in 2018. As in



several other countries, Spain overbuilt new housing before the global financial crisis. INE (2019b) recorded that 17,062 new uninhabited houses were absorbed in 2018, reducing the available new housing stock to 459,876 units. ECSO (2018c) reported that real estate activities contributed 12.3% (€14.1 billion) to the Spanish GDP in 2016.

10.2.5 Non-residential buildings and civil engineering

Non-residential construction accounted for 32% of aggregate construction value in the Euroconstruct region in 2018. Overall economic conditions and government spending (e.g. on buildings for education and health) influence demand. New non-residential construction is predicted to increase by 1.3% in 2019, 1.1% in 2020 and 1.2% in 2021 (table 10.2.1). Germany, the UK, France, Italy and Spain (in descending order, by value) were the five largest non-residential construction markets in 2018 (Euroconstruct, 2019).

The new non-residential building valuations for 2018 were as follows: commercial buildings – €54.0 million (19.9% of the total); office buildings – €47.5 million (17.5%); industrial buildings – €43.4 million (16.0%); miscellaneous construction – €36.6 million (13.5%); educational buildings – €30.2 million (11.1%); storage buildings – €23.3 million (8.6%); health buildings – €20.4 million (7.5%); and agricultural buildings – €16.3 million (6.0%) (Euroconstruct, 2019).

Civil-engineering projects are affected by different factors in different countries, and modest spending increases are forecast through 2021 (table 10.2.6; graph 10.2.2). Germany, France, Italy, the UK and the Netherlands (in descending order, by value) were the five largest civil-engineering markets in 2018 (Euroconstruct, 2019).

TABLE 10.2.6

Civil-engineering construction spending estimate and forecasts, Euroconstruct region, 2018-2021

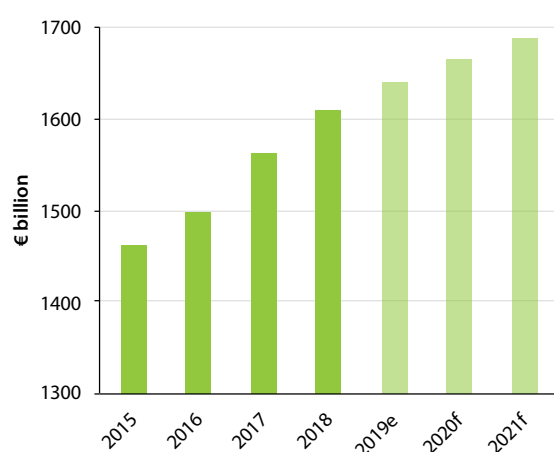
(€ billion)

	<i>New civil-engineering construction</i>	<i>Civil-engineering renovation</i>	<i>Total civil engineering</i>
2018	193.9	138.7	332.6
2019e	204.6	142.3	346.5
2020f	212.6	144.7	357.4
2021f	220.2	147.6	367.8

Notes: in 2018 prices; e = estimate; f = forecast.

Source: Euroconstruct, 2019.

GRAPH 10.2.2

Euroconstruct region construction spending, 2015-2021

Notes: in 2018 prices; e = estimate; f = forecast.

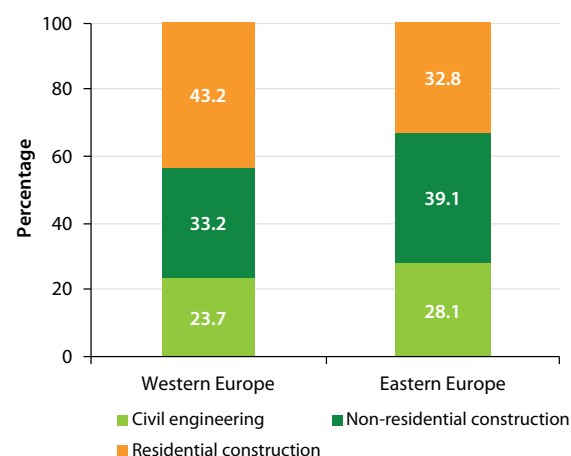
Source: Euroconstruct, 2019.

10.2.6 Construction-sector shares and growth: contrasting western and eastern Europe

Total residential construction expenditure in the Euroconstruct's western subregion¹⁴ is projected to increase from €743.9 billion in 2019 to €755.6 billion in 2021. Total residential construction spending in the eastern subregion is forecast to increase from €29.2 billion to €31.1 billion over the same period (Euroconstruct, 2019).

New residential expenditure led the construction sector in the Euroconstruct western subregion (43.2% of total construction

GRAPH 10.2.3

Share of new construction, by Euroconstruct subregion and sector, 2018

Source: Euroconstruct, 2019.

spending), followed by new non-residential (33.2%) and new civil engineering (23.7%). Expenditure in the eastern subregion was led by new non-residential (39.1%), followed by new residential (32.8%) and new civil engineering (28.1%) (graph 10.2.3) (Euroconstruct, 2019).

10.3 Russian Federation and Commonwealth of Independent States construction markets**10.3.1 Housing construction in the Russian Federation**

Completions of residential buildings in the Russian Federation in 2018 declined by 4.6% over the previous year. The estimate for total buildings (residential plus non-residential) put in place was down by 4.8% over 2017. The total floor area of new housing put in place in the Russian Federation is expected to increase substantially in 2019 over the average since 1996 (+30%). (Trading Economics, 2019a).

Flats and apartments commissioned in the Russian Federation are forecast to see a 1.0% increase in 2018 (Iambl et al., 2018). The rate of homeownership averaged 80.3% from 2000 to 2016 and is forecast to reach 84% in 2020 (Trading Economics, 2019b). Analysis of Russian Federation housing price data indicates that aggregate prices increased by 4.9% between the fourth quarter of 2017 and the fourth quarter of 2018 (FRED, 2019b).

lambla *et al.* (2018) reported that new-house commissions were driven by multidwelling units and that a lack of real wage growth may not stimulate residential housing completions in the near future. Fedyaikov (2018) stated that 120 million m² of new housing is needed because of the ageing housing stock; on average, 80 million m² has been commissioned annually for the past few years.

The Russian Federation's Ministry of Economic Development's long-term plan, introduced in 2015, is for public agencies to construct wooden houses to stimulate the Russian wood products industry and provide public housing. The latter comprised 20% of all housing in 2016, 25% in 2017 and 30% in 2018 (Kochkurova, 2016). The Russian construction market was valued at €133,673 million in 2017, and it was forecast to grow by 0.5% in 2018, decline by 0.8% in 2019 and increase again by 1.1% in 2020 (Gáspár, 2019).

10.3.2 Construction in the Commonwealth of Independent States

10.3.2.1 Armenia

Armenia reported an estimated 441,591 multiple dwellings in place in 2016. The average size of housing per inhabitant was 31.9 m² in 2017, a slight increase over 2016 (31.4 m²). The total area of dwelling stock was 94.8 m² in 2017, an increase of 1.1% from 2016 (93.8 m²) (1,000 m² basis). There were 396,948 houses in 2017, up by 3,338 units from 2016. In 2018, 268,041 m² of dwelling space was put in place (Statistical Committee of the Republic of Armenia, 2018).

10.3.2.2 Azerbaijan

An estimated 154,000 dwellings were put in place in Azerbaijan in 2017, an increase of 5.4% over 2016, and 2,017 m² floor space was added (1,000 m² basis), down by 4.9% compared with 2016. The average living area was 130.8 m² in 2017, a decrease of 9.7% (from 144.9 m²) in 2016. In 2017, 1.6 dwellings per 1,000 persons were put in place, up from 1.5 in 2016 (State Statistical Committee of the Republic of Azerbaijan, 2019).

10.3.2.3 Belarus

Belarus reported 258.6 million m² of housing stock in place in 2018, an increase of 0.8% from 2017. This equated to 27.3 m² per inhabitant, an increase of about 1.1% (from 27.0 m²) in 2017. There were 25,420 apartment units in Belarus in 2018, up by 8.6% from 2017 (when there were 23,398 units). (National Statistical Committee of the Republic of Belarus, 2019).

10.3.2.4 Kazakhstan

In Kazakhstan, 12.5 million m² of residential building floor space was started in 2018, an increase of 12.1% from 2017 (11.17 million m²). The area of residential floor space per person was 21.3 m² in 2016, up by 1.4% from 2015 (when

it was 21.0 m²) (Ministry of the National Economy of the Republic of Kazakhstan Committee on Statistics, 2019).

10.3.2.5 Kyrgyzstan

An estimated 1.30 million flats and housing units were in place in Kyrgyzstan in 2018, up by 0.8% in 2017 (when there were 1.29 million units). The total floor area put in place decreased by 33.3% in 2018, when 1.0 million m² was commissioned (compared with 1.5 million m² in 2017). The average size per person was 13.1 m² in 2018, down from 13.2 m² in 2017 (National Statistical Committee of the Kyrgyz Republic, 2018).

10.3.2.6 Moldova

Moldova reported that an estimated 700,400 m² of dwelling space was put in place in 2017, up by 35.8% from 2016 (when 515,500 m² was put in place). The number of dwellings built was 92,000 in 2017, an increase of 50.8% from 61,000 in 2016. Average floor space put in place decreased by 10.8% in 2017, to 75.7 m², down from 84.9 m² in 2016. There were 1.29 million dwelling units in January 2018, with a total area of 87.27 million m². An estimated 1,212 dwellings (apartments and individual residences) with a total area of 104.4 m² were put in place in January to March 2019 (National Bureau of Statistics of the Republic of Moldova, 2019).

10.3.2.7 Tajikistan

The total floor area in Tajikistan was 96.3 million m² in 2017, up by 3.2% from 2016 (when it was 93.3 million m²). There were 283,500 privatized apartments in 2017, up by about 1.3% from 2016 (TAJSTAT, 2018).

10.3.2.8 Ukraine

Ukraine's construction market was valued at €7.1 billion in 2017, and the forecast was for a rise of 4.4% in 2018, 2.8% in 2019 and 3.1% in 2020 (Gáspár, 2019). An estimated 103,141 residential units were put into service in 2018, with an average size of 84.2 m². The total area of residential buildings in 2018 was 8.69 million m², a decline of 5.7% from 2017 (when it was 9.22 million m²). An estimated 26,554 single-



family units were put in place in 2018, with an average floor area of 160.0 m²; there were also 76,587 new apartment units with a mean area of 57.9 m² (SSSU, 2019a). In 2017, 39,970 residential buildings were started, an increase of 1.5% from 2016 (when there were 39,360 starts). The average size of starts also increased, from 10,014 m² in 2016 to 11,368 m² in 2017 (SSSU, 2019b). According to KHL (2019), housing units are oversupplied, with supply exceeding demand by 18-20 units. This overbuilding is a result of addressing Ukraine's past housing deficit with new housing stock. Looking forward, the residential construction sector is projected to decline. KHL (2018) reported better growth prospects for civil-engineering construction due to budget increases for transportation and energy infrastructure.

10.3.2.9 Uzbekistan

In 2018, 79,200 houses were put in place, an increase of 0.6% over 2017, when 78,700 houses were completed. The total floor space put in place increased by 5.4% in 2018, to 1.21 million m² (State Committee of the Republic of Uzbekistan on Statistics, 2018).

10.4 North American housing markets

The US housing market has improved since 2009 and the Canadian market has been steady (graph 10.4.1).

Although, overall, the US housing market has grown, new single-family house construction and sales are still far below their historical averages. In Canada, the primary concerns are housing overvaluation (with prices at historic highs, even after adjusting for inflation), consumer debt and mortgage regulations.

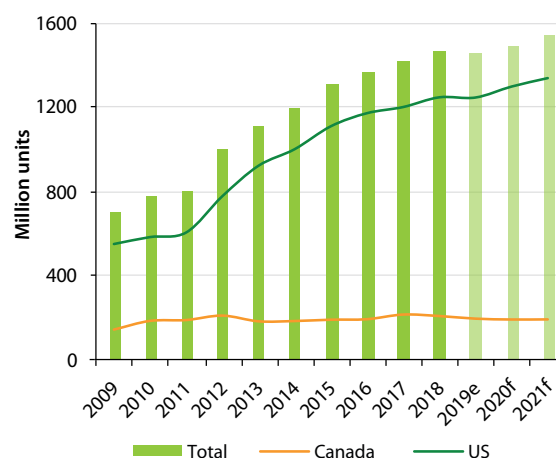
10.4.1 US housing market

The US housing construction market continued to grow moderately in 2018, but total new housing starts remained below the 1959-to-2007 average of 1.547 million total units and 1.102 million single-family units. Housing starts were estimated at 1.250 million in 2018, a 3.9% increase from 2017 (graph 10.4.2) (US Census Bureau, 2019a).

US sales of newly constructed single-family houses were 617,000 units (seasonally adjusted annualized rate – SAAR) in 2018 (US Census Bureau, 2019b). This was much less than the 1963-to-2007 average (697,000 units) and similar to the average in 1963-1970, a period in which the civilian non-institutional population averaged 176.5 million, compared with 257.8 million in 2018 (FRED, 2019b). The number of single-family units being built is insufficient to meet the need created by population growth, and there is a shortage of “starter houses” (typically 1,400 square feet – 133.8 m² – or less). New single-family sales and starts are crucial for the

GRAPH 10.4.1

Housing starts, North America, 2009-2021

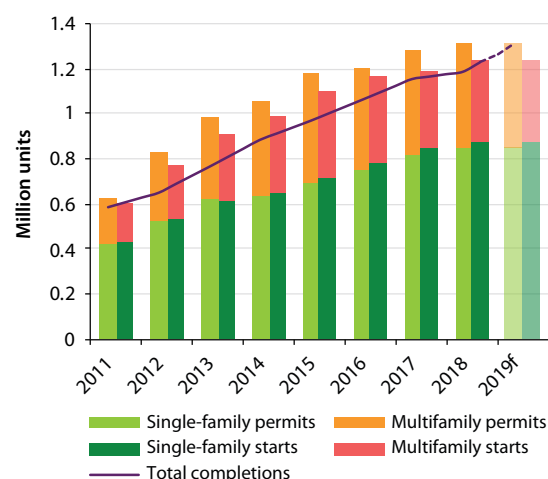


Notes: e = estimate; f = forecast.

Sources: CHMC, 2019; Mortgage Bankers Association, 2019; TD Bank, 2019; US Census Bureau, 2019a.

GRAPH 10.4.2

US housing permits, starts and completions, 2011-2019

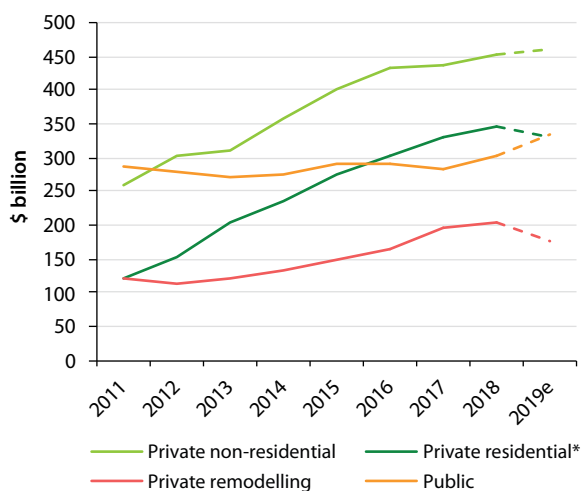


Notes: e = estimate; f = forecast; January-March 2019 data; seasonally annualized adjusted rate.

Sources: US Census Bureau, 2019a; MBA, 2019.

wood products industry, with these units consuming more value-added products than any other wood-utilizing sector.

The median price for new single-family units in the US was \$326,200 in 2018, up by nearly 1% from 2017 (when the median price was \$323,100). The mean price in 2018 was

GRAPH 10.4.3**US construction spending, 2011-2019**

Notes: *Private residential spending less remodelling expenditure (SAAR); nominal values and in millions; e = estimate (January-March 2019 data).

Source: US Census Bureau, 2019d.

almost unchanged from the previous year at roughly \$385,000. The median size of completed new single-family houses decreased slightly in 2018, to 2,354 square feet (218.7 m²), down from 2,385 square feet (221.6 m²) in 2017. The mean size was 2,537 square feet (235.7 m²), down from 2,599 square feet (241.4 m²) in 2017 (US Census Bureau, 2019 b, c).

Sales of existing (i.e. previously owned) homes declined by 3.1% in 2018, to 5.340 million units (5.510 million units in 2017). The median existing-house sales price in April 2019 was \$267,300, up by 3.6% from April 2018 (\$257,900) (FRED, 2019c).

US total private residential construction spending (i.e. single-family + multifamily + remodelling) increased by 2.8% in 2018, to \$539.8 billion. New single-family construction spending increased by 5.2%, to \$284.3 billion; multifamily expenditure decreased by 0.3%, to \$60.1 billion; and house



renovation spending increased by 0.3%, to \$195.4 billion (all SAAR; nominal US dollars) (graph 10.4.3) (US Census Bureau, 2019d). The Joint Center for Housing (2019) estimated that \$326.2 billion was spent on remodelling in the US in 2018 and forecast this to rise to \$347.3 billion in 2019 and \$347.4 billion in 2020. Note that the estimates of the Joint Center for Housing and the US Census are calculated differently and thus values differ.

Private non-residential spending increased by 2.0% in the US in 2018, to \$461.6 billion, and public expenditure grew by 10.6%, to \$333.4 billion (US Census Bureau, 2019d) (graph 10.4.3).

Historically, US housing construction and sales have been a major component of US GDP. Before the housing crash and the global financial crisis, the contribution of housing to GDP averaged 17-19%; it was 14.9% in 2018, compared with 18.6% in 2005. Residential investment peaked in 2005 at 6.5% of total GDP and averaged 4.9% from 1963 to 2006. It was 3.2% of US GDP in the first quarter of 2019 (US Bureau of Economic Analysis, 2019 a, b, c), an indication that the new-housing construction sector has potential to expand.

10.4.2 US construction outlook

The common themes hindering the development of a robust US housing construction and sales market include a deficient inventory of new and existing houses for sale; a lack of available lots for new construction and, in some locations, of construction workers; regulatory burdens; a lack of builder financing; student-loan debts accrued from higher education; shifting attitudes towards house ownership; underemployment; and stagnant-to-declining median incomes. There remains a tendency for millennials (adults born in 1982 or later) to live with their parents. The number of household formations increased in 2018 but remains less than the historical average.

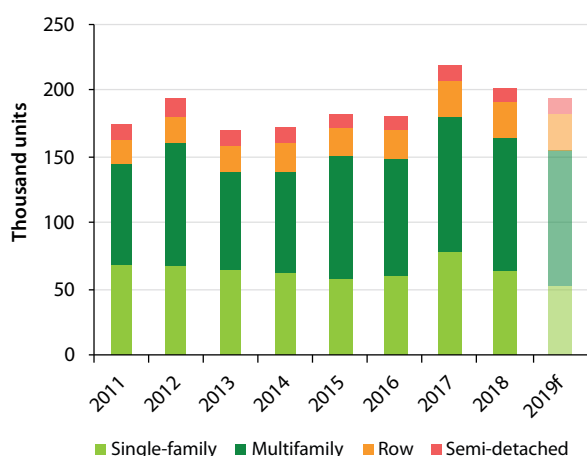
Looking forward, the Mortgage Bankers Association (MBA) (2019) projected that US single-family housing starts will total 0.92 million units in 2019 and increase to 0.99 million units in 2020 and 1.03 million units in 2021. Projections for starts are 1.31 million units in 2019, 1.38 million units in 2020 and 1.41 million units in 2021. MBA (2019) also forecast new single-family sales of 0.65 million units in 2018, 0.67 million units in 2019 and 0.70 million units in 2020. Sales of existing houses are projected at 5.56 million units in 2019, 5.77 million in 2020 and 5.93 million in 2021.

10.4.3 Canadian housing market

New-housing construction is steady in Canada, but there are increasing concerns. Both the International Monetary Fund (IMF, 2019) and the Canada Mortgage and Housing Corporation (CMHC, 2019a) are concerned with rising risk

GRAPH 10.4.4

Housing starts, Canada, 2011-2019



Notes: f = forecast.

Sources: BMO, 2019; CMHC, 2019a; Scotia Bank, 2019; TD Bank, 2019.

in the Canadian housing market. The primary concerns are affordability, household debt, overbuilding in some provinces, and price acceleration. The nationwide mortgage guidelines, including the B-20 stress test (simply, “can a borrower afford an increased payment if mortgage rates rise in the future?”), have helped in stemming price acceleration but critics claim it has also hindered Canadian housing sales. Vecina (2019) reported that the mortgage volume decreased by C\$13 to C\$15 billion dollars between the first quarter of 2017 and the corresponding period in 2018 due to B-20 implementation.

Even so, the number of new Canadian housing starts is projected at 194,000 units in 2019 and 197,000 units in 2020 (averaged from BMO, 2019; RBC, 2019; Scotia Bank, 2018; TD Bank, 2019). TD Bank (2019) forecast 197,000 starts in 2021. Of starts in 2018, 63,490 were single-family detached; 27,146 were row-house; 11,373 were semidetached units; and 100,365 were multifamily (graph 10.4.4) (CMHC, 2019b). The number of housing sales was estimated at 457,600 units in 2018, and projections are for 450,400 units in 2019 and 459,400 units in 2020 (CREA, 2019).

10.5 Modular housing

Factory-built (also called modular or off-site) housing is not a new technique. In some ways, the Sears & Roebuck kit houses (Sears Archives, 2019) that were manufactured and sold from 1908 could be considered a forerunner to today's modular housing concept. The kits were marketed by catalogue and, when a purchase was made, the kit was shipped to the buyer.

Housing affordability and availability are problems in Europe and North America, with insufficient new buildings to meet population growth. To many observers, off-site manufacture might enable the building and sale of less-expensive housing units. Conceptually, modular houses can be built in shorter-time frames, and more houses could potentially be delivered to buyers. Thus, modular construction has promised to offer reduced project completion times and material costs, greater quality control, mitigation of labour shortages, improved safety and year-round manufacturing (Meyers, 2019).

Modular housing encompasses prefabricated houses (prefab), panelized components, and modular fabrication. According to Gonzalez (2018), “prefab” is the term for off-site, factory-built constructed houses. Panelized construction involves the fabrication, in a factory, of the house wall structure and roof trusses, which are then shipped to the site (in Europe, flooring is also panelized). Modular construction involves the manufacture of house components (e.g. “cartridge units, typically six-sided boxes”) in a factory. Prefinished, self-contained structural units are constructed in the factory and then shipped to the site, where the various units are assembled into a house. There are modular associations and builders in Canada, Europe and the US.

Builder and consumer acceptance of off-site manufacturing is in its early stages in the US and established in Europe, as illustrated by expenditures and market shares. In 2016, US off-site expenditure was estimated at \$3.3 billion, and this is forecast to grow by 39% by 2023, to \$157 billion (Slowey *et al.*, 2019); some expect prefabricated home construction in the US to grow to match the level of developed European markets (The Charlotte Post, 2019).

A study by Roland Berger (2018), which encompassed Austria, Denmark, Germany, Norway, Poland, Sweden, Switzerland and the UK, indicated that 15% of 1+2 family housing units in Europe were prefabricated, and future growth was estimated at 3.2% per year through 2022. These countries rely primarily on timber-framed modular homes (around 74% of their total prefabricated construction in 2018). Projections suggest that timber will remain the primary framing material of prefabricated homes in all of these countries moving forward, with the exception of the UK who rely on alternative materials (Roland Berger, 2018).

Although modular construction is promising, there are uncertainties. Questions include: Is the demand for off-site modular construction robust? What are the limitations in design flexibility? Can efficient production methods be realized? Fisher and Ganz (2019) suggested that, unless significant cost savings can be achieved, contemporary off-site housing manufacture may repeat previous, failed attempts in the US. If such questions can be addressed, however, modular approaches could remedy housing underbuilding and concerns about affordability.

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