Exploring supply and demand-driven imbalances in Austria's housing market

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This article explores supply and demand imbalances in Austria's housing market over time. In the period under review, which starts in 1980, excess demand for housing emerged in the early 1990s and peaked in 1993, when demand exceeded the number of available housing units by a number of 41,000. A construction boom in the late 1990s tipped the market back toward excess supply, which rose to 27,000 homes until 1998. By 2016, a combination of shrinking household sizes, rising net migration and weak construction activity had created another peak in excess housing demand, with demand exceeding supply by 65,000 homes. Since 2017, Austria's housing market has been easing again. Increased construction activity and weaker demand are expected to eliminate backlog demand by 2020. With the growth rates of household numbers decreasing steadily, housing demand will continue to weaken until 2030.

Data on housing supply and demand are key indicators for the real estate market. They imply whether the market may be heading toward excess demand and hence a housing shortage, or whether housing production exceeds demand, thus possibly creating more housing vacancies. Projections of housing demand are needed for numerous purposes. They provide important input for spatial planning. They are relevant for estimating the quantities of construction units required and the resulting demand for housing loans. And they are useful for estimating trends in real estate prices. Bank Austria (2017), for instance, estimated that Austria had a housing need of 60,000 units in 2017 and expects that some 45,000 to 50,000 new homes will need to be built each year to fulfil Austria's long-term housing need. This compares with a housing need of slightly more than 60,000 homes per year identified by the Austrian Institute for Real Estate, Construction and Housing (Institut für Immobilien, Bauen und Wohnen GmbH – IIBW).

The aim of this paper is to explore the housing supply-and-demand balance in Austria with a special focus on housing demand. The paper is organized as follows. Section 1 provides definitions of housing demand and housing need, while section 2 offers a detailed discussion of the components of demand for housing in Austria, covering the period from 1980 to 2030. Section 3 provides estimates of the housing supply based on housing completion data collected by Statistics Austria, as adjusted for incomplete coverage of construction activity. A detailed description of these adjustments is included. Section 4 compares total housing demand with total housing supply and calculates the resulting backlog demand and the associated housing vacancy rates. Section 5 discusses the main results.

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1 Definition of housing demand and housing need

In the literature, *housing demand* and *housing need* are often used synonymously, even though the two terms are based on different concepts. Generally speaking, there are *economic concepts* and *urban and regional planning concepts*. The *economic concepts* of housing demand are *positive concepts*, as they use variables such as demographics, house prices, income or interest rates to explain housing demand.[2] *Urban and regional planners* identify the normative need for socially desirable housing and forecast future housing needs.

Housing need is a normative concept, which means that a given housing need is identified by comparing the living conditions of individuals or households with normatively derived standards. Any shortfall from these standards indicates a need for additional housing[3] and serves as the basis for estimating the level of socially desirable housing.

However, the term housing need is not used exclusively for the normative identification of a desired level of housing. Many forecasts use housing need synonymously with housing demand. Moreover, forecasts tend to include positive and normative features, and they reflect demographic forecasts as well as projections for household size, income, vacancy rates and replacement needs as a result of depreciation.[4] Housing demand forecasts are often made at a highly disaggregated level. A case in point is the housing demand forecast published by the Austrian Conference on Spatial Planning (Die Österreichische Raumordnungskonferenz – ÖROK) in 2005.

2 Components of housing demand in Austria

This section seeks to quantify demand for housing in Austria for the period from 1980 to 2030 in terms of the annual changes in demand (rather than in terms of absolute figures). The key data source for this exercise is the annual change in the number of households until 2030, as published by Statistics Austria in its 2018 projections. For the purpose of our analysis, we decompose the respective changes in the number of households – and thus the respective changes in the number of main residences – into different drivers of change (household size, net migration and residual). Apart from main residences, we also look at demand for secondary residences, changes in vacancy rates and the net loss of housing. Thus, the analysis at hand broadly follows the method used by ÖROK in its 2005 housing demand forecast.[5]

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[2] Zabel (2003) divides the economic literature on housing demand into four categories: (1) papers modeling aggregate housing demand as a function of house prices, household spending not related to housing costs, and other socio-economic variables; (2) papers discussing housing demand on the basis of specific housing attributes; (3) papers modeling tenure choice ("rent or buy"); and (4) papers addressing the issue of locational choice.

[3] Bramley et al. (2010) identified and defined seven distinct needs categories or drivers of housing need: (1) concealed households, i.e. adults who continue to live with their families; (2) sharing households; (3) unsuitable accommodation, in particular in the case of elderly or disabled people with mobility problems living in inappropriate dwellings; (4) overcrowding, as measured in terms of the "bedroom standard" or in terms of house size in relation to the number of household members; (5) affordability problems, which arise when households are forced to spend more than a given share of the household income on housing; (6) homelessness; and (7) house condition.

[4] See e.g. Statistics Austria (2013), Henger et al. (2015).

[5] Some normative components, such as housing undersupply in quantitative and qualitative terms, or additional vacancies required to maintain the optimum vacancy rate (see section 2.3) were not taken into account.

2.1 Number of households

This section explores the changes in the number of households as a key driver of housing demand by decomposing these changes into a range of underlying factors. To begin with, the number of households is defined as the number of main residences. In micro census records, the number of households has corresponded to the number of main residences since 2001. Before 2001, several households sharing a given main residence were recorded as separate households. Given that realized demand for main residences is the relevant indicator for the present analysis, we equate the number of households with the number of main residences also for the period before 2001.

In the period from 1980 to 2010, the number of households increased by 29,800 per year on average.[6] This was followed by a marked increase in the annual growth rate in the period from 2011 to 2017 (38,000 households per year), with the number of additional households peaking at 48,300 in 2016. According to Statistics Austria's household projections from 2018, the number of Austrian households is expected to keep growing by 22,900 per year on average from 2019 to 2030. Over time, annual household growth is expected to decelerate; by 2030, the annual rate of household growth will have gone down to 18,700.

The decomposition[7] of household growth established the decreasing size of households as the single biggest driver of change. While Austrian households consisted of 2.55 people on average in 1990 (with the number of households corresponding

Chart 1

Change in the number of households

Thousands per year

Due to changing household size | Due to net migration | Residual | — Total

Source: Statistics Austria, author's calculations.

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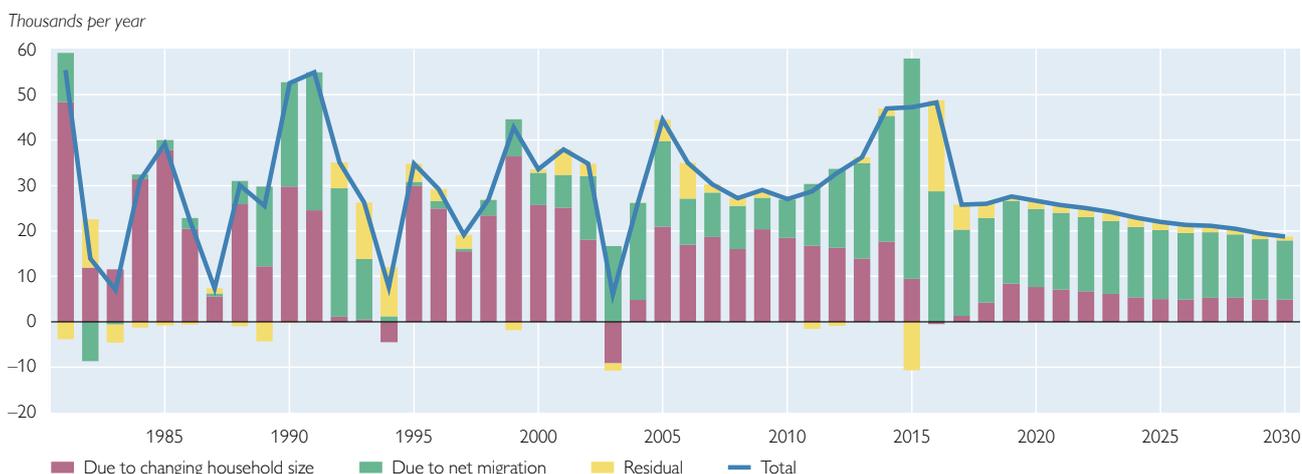
[6] *Changes to the conceptual framework of the micro census led to a break in the time series on the number of main residences in 2004. Therefore, the change from 2003 to 2004 was replaced with the average change in household numbers from 2005 to 2010.*

[7] *The contribution of household size was derived by subtracting the number of residents in year t as divided by the size of households in year t−1 from the actual number of households in year t. The contribution of migration reflects the difference between the number of immigrants divided by the household size of non-Austrian citizens and the number of emigrants divided by the household size of Austrian citizens. The residual refers to the effect of domestic demographics and approximation errors resulting from assumptions about the household size of the migration component.*

to the number of main residences), this figure had dropped to 2.26 by 2017.[8] In the 1990s, this decline alone accounted for 57% of the annual rate of household growth (averaging 31,100 per year). Further, close to one-third of the additional households can be traced back to net migration, leaving a fairly small residual of 12% (attributable mainly to domestic factors). The decline in household size subsequently decelerated in the 2000s.

This pattern has changed in recent years, though, reflecting the large additions to the population due to the liberalization of the Austrian labor market[9] and the high number of refugee arrivals in 2015. Thus, the number of households increased by 36,500 per year on average in the period from 2011 to 2018. Thereof, only 27% were attributable to shrinking household size, whereas net migration accounted for as much as 67%, which leaves an even smaller residual of 6%. Statistics Austria projects net migration to continue to account for the bulk of household growth (67%) from 2019 to 2030 as well, while 26% are expected to result from the decreasing size of households.

Table 1

Decomposition of the change in the number of households

	Total	Change in household size	Net migration	Residual
	Thousands or % of total changes per period			
1981–1990				
Absolute figures	285	235	54	−4
Per year	28.5	23.5	5.4	−0.4
%	100	83	19	−1
1991–2000				
Absolute figures	311	178	95	38
Per year	31.1	17.8	9.5	3.8
%	100	57	31	12
2001–2010				
Absolute figures	298	150	123	25
Per year	29.8	15.0	12.3	2.5
%	100	50	41	8
2011–2017				
Absolute figures	292	79	194	18
Per year	36.5	9.9	24.3	2.3
%	100	27	67	6
2018–2030				
Absolute figures	275	72	185	19
Per year	22.9	6.0	15.4	1.6
%	100	26	67	7

Source: Statistics Austria, author's calculations.

The decline in household size has basically been driven by three trends, namely declining fertility rates, rising life expectancy and more one-person households. The decline in fertility has led to smaller families, and hence to a decline in the size of multi-person households.[10] Fertility rates were characterized by a steady decline from the 1960s onward (2.82 children per woman in 1963) until 2001 (1.33). This trend reversed in 2002, and by 2016, the annual fertility rate had rebounded to 1.53. As a result of shrinking fertility rates, multi-person households have since become smaller, decreasing from 3.25 individuals per household in 1991 to 2.95 in 2017. Rising life expectancy has driven up the number of senior citizens living in one-person or two-person households. Further drivers of shrinking household size include higher job mobility and current trends in society, such as the increasing number of couples living together apart. These trends aside, household numbers and hence also average household size are dependent on life cycle decisions. Moving out of one's parents' home, setting up home with one's partner, having children or moving into a care home all have a bearing on household numbers. Depending on age cohort size, the general trends may, however, be masked by different effects in some years.

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[8] In urban areas, however, household size has been on the rise again since 2015.

[9] Austria fully liberalized its labor market first in May 2011 for citizens from eight Central, Eastern and Southeastern European countries (Czechia, Hungary, Slovenia, Slovakia and Poland as well as the three Baltic countries Estonia, Latvia and Lithuania) and then in January 2014 for Romanian and Bulgarian citizens.

[10] A decline in fertility feeds through to housing demand with a lag, as it only starts to affect demand until the point in time when the children of the smaller families start to leave their parental homes.

One-person households in Austria

	Up to 15 years	15 to 29 years	30 to 44 years	45 to 59 years	60 years and over	Up to 15 years	15 to 29 years	30 to 44 years	45 to 59 years	60 years and over
	% of all one-person households					*% of age cohort*				
1984	0.0	13.8	14.1	13.4	58.7	0.2	8.1	6.8	8.0	30.3
1991	0.0	14.5	16.0	14.8	54.8	0.2	8.9	8.1	9.3	30.5
2001	0.0	13.2	23.4	18.2	45.2	0.2	13.0	12.0	12.6	28.2
2005	0.0	13.1	23.8	19.9	43.2	0.2	15.0	14.4	15.1	29.7
2011	0.0	14.2	20.9	22.3	42.7	0.2	17.3	15.5	16.1	29.8
2017	0.0	11.8	18.8	24.6	44.7	0.2	14.8	15.6	17.6	31.1

Source: Statistics Austria (micro census).

Changes in household size and real property prices
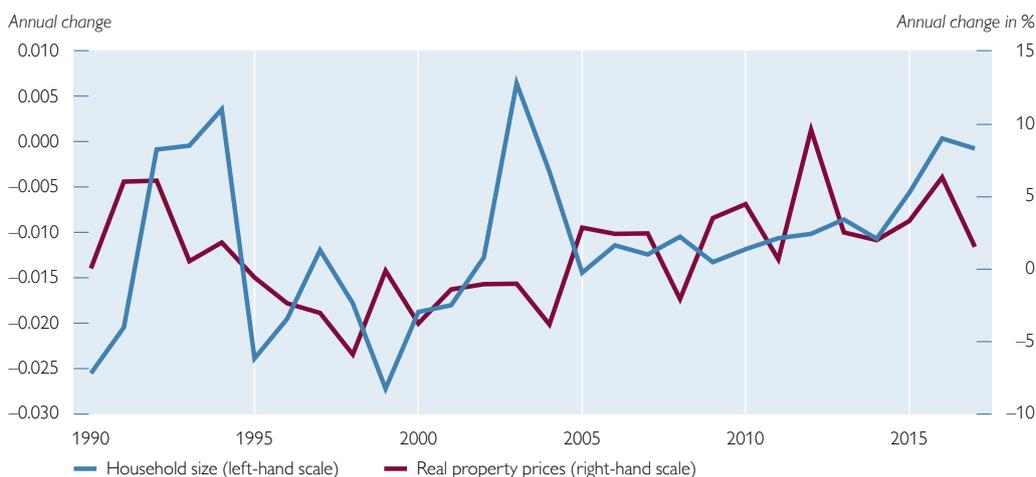
Source: Statistics Austria, author's calculations.

The shrinking household size manifests itself in a decline in the average size of multi-person households as well as in an increase in the number of one-person households. The share of one-person households has surged in Austria in recent years, rising from 29.7% in 1991 to 37.0% in 2017. According to the housing need forecast made by ÖROK, this share is projected to rise further, to 38.1%, until 2030. Regarding the age structure of one-person households, people aged 45 to 59 accounted for the strongest increase among all one-person households (from 14.8% in 1991 to 24.6% in 2017). In contrast, population ageing played a more limited role. The share of people aged 60 and above in the total population rose from 20.1% in 1991 to 24.6% in 2018; yet, this rise occurred primarily among multi-person households. Among one-person households, the share of people aged 60 and above declined from 54.8% in 1990 to 44.7% in 2017.

While motivated by people's personal circumstances, decisions like setting up a new home or separate households after a divorce also depend on the affordability of housing. Contrasting the change in household size with the growth of real house prices, chart 2 shows that those two factors are closely correlated. The sharpest

decline in household size was observed in the first half of the 2000s. This period was characterized by shrinking real house prices (as well as declining interest rates for housing loans), which made housing more affordable. Following a steady rise in price pressures from the mid-2000s onward, the decline in average household size has since decelerated visibly.

The number of one-person households is also heavily influenced by the prevailing divorce rates. In Austria, divorce rates were rising steadily for decades before starting to decline in the mid-2000s. Rising house prices can be expected to have had an impact on this decline.[11]

2.2 Demand for secondary residences

Another component of housing demand is the demand for secondary residences. The number of secondary residences plus the number of homes not identified as either primary or secondary totaled 796,500 according to the housing records for 2011. This corresponds to a share of 17.9% of all housing units. Unlike the earlier housing censuses, the housing records for 2011 did not distinguish between secondary residences and residences not identified as either primary or secondary. The 2001 housing census listed 40.4% of all homes not identified as primary residences as secondary residences. By approximation, a share of 40.4% corresponds to 322,100 homes based on the housing records for 2011. In the period from 2001 to 2011, the number of secondary residences or homes not identified as either primary or secondary rose by 24,900 per year. However, the housing records for 2011 and the 2001 housing census are not comparable (Statistics Austria, 2013). Thus, the difference between the 1981 housing census and the 1991 housing census provides a more reliable indication of the estimated demand for secondary residences. In the period from 1981 to 1991, the number of secondary residences or homes not identified as either primary or secondary rose by 6,700 per year. This figure, as adjusted for the changes in the number of households, was used to establish corresponding figures for the period after 1991.

2.3 Housing vacancy

Housing vacancy rates are an important but often unknown indicator of developments in the housing market. For the housing market to function properly, a given amount of vacant homes is needed to offset short-term increases in demand, provide temporary housing during periods of refurbishment and modernization, and facilitate housing transactions. Marked upward deviations of actual vacancy rates from this "optimum vacancy rate"[12] indicate a housing oversupply, either as a result of excessive construction activity or as a result of regional depopulation. High vacancy rates may also point to a high incidence of homes that are not marketable. In turn, vacancy rates that are well below the optimum vacancy rate indicate a housing undersupply.

Measuring vacancy rates is a big challenge. No current data were available for Austria as a whole at the time of writing. The 2001 housing census had yielded a count of 326,314 residences not identified as either primary or secondary, which corresponds to 8.4% of the housing stock. However, the number of residences not identified as

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[11] *The international empirical literature provides robust evidence for the relationship between the development of house prices and divorce rates (Farnham et al., 2010; Milosch, 2014).*

[12] *Also known as "natural vacancy rate" or "long-run equilibrium vacancy rate."*

either primary or secondary says very little about actual housing use. In fact, the actual vacancy rates are likely to be well below this ratio, as the results of vacancy rate surveys made in individual provinces of Austria imply.[13] More accurate estimates could be produced – subject to considerable efforts – with sample surveys, local property inspections or survey methods tailored to different property use categories (see Amann and Mundt, 2018).

For the purpose of this paper, vacancy stocks and their changes are explored in three parts, namely additional vacancies required to maintain the optimum vacancy rate, additional vacancies in shrinking areas, and vacancies offsetting short-term fluctuations in demand.[14]

2.3.1 Additional vacancies needed to maintain the optimum vacancy rate

In a growing market, additional homes are needed to help maintain the long-run equilibrium at which the vacancy rate equals the optimum, or natural, vacancy rate. The optimum vacancy rate is an integral part of housing demand. According to international empirical evidence, 3% to 5% of the housing stock must be vacant for the housing market to function adequately (Rink and Wolff, 2015).[15] Hence, this paper starts from the assumption that it takes a vacancy rate of 3% of the housing stock – corresponding to 117,000 homes in 2017 – for the housing market to keep working. Looking ahead, the optimum vacancy rate is expected to keep rising at the same rate as the number of households in the period from 2019 to 2030. This translates into an average annual growth rate of 0.7% (or 900 homes) per year.

2.3.2 Additional vacancies in shrinking areas

Shrinking areas are characterized by a declining number of households, which leads to housing vacancy. A growing number of households in most parts of Austria coinciding with a shrinking number of households in other regions causes overall housing demand to be underestimated, as the vacancies developing in shrinking areas cannot be used to meet housing demand in other areas.

Hence, it is necessary to adjust the household numbers accordingly for this type of vacancies ("regional mismatch"). The corresponding figures were derived as follows:

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[13] *Property vacancy studies have, however, been carried out for some of Austria's provinces in recent years. Straßl and Rieder (2015) provided an analysis for the city of Salzburg. Using electricity meter readings, they came up with a vacancy stock of 4,800 homes (= 5.5% of the housing stock). A residential property vacancy survey conducted by the Vienna city administration in 2015 yielded 25,000 homes that were vacant and marketable (i.e. available for use), subject to a vacancy duration of up to 2½ years. Longer vacancies, resulting among other things from refurbishments, were reported for about 10,000 marketable homes. The total vacancy stock was found to be equivalent to 3½% of the housing stock (approximately 1 million homes) in Vienna. This survey is the latest survey conducted in more than two decades, following a vacancy survey made on the basis of the 1991 housing census. A survey conducted by IIBW (2018) for the province of Vorarlberg on housing vacancy and the inclination of home owners to put homes on the market yielded a vacancy rate of 4% (some 8,500 homes). The number of vacant homes that could be made available for use within a short period of time was estimated at 2,000.*

[14] *A common way of defining the vacancy stock further is to distinguish between the marketable vacancy stock (which may be made available for occupancy in the short to medium term) and the nonmarketable vacancy stock. For alternative breakdowns, see Straßl and Riedler (2015) as well as Amann and Mundt (2018). A further category in the ongoing debate on housing vacancy are homes purchased for investment purposes but hoarded temporarily in anticipation of a further rise in asset prices. At the time of writing, no data were available for this category.*

[15] *Categorizing vacancy rates for Germany's housing market, Rink and Wolff (2015) moreover found vacancy rates to become problematic once they reach or exceed 7%. Vacancy rates within this range already indicate a buyers' or renters' market. Vacancy rates within the 2% to 3% range indicate a landlords' market and a tightening of housing supply, while vacancy rates of 2% or less indicate a housing shortage.*

The total change in household numbers across all political districts was adjusted for the development in shrinking districts by setting the change in those districts to zero. This approach is based on the implicit assumption that any vacant homes accumulating in shrinking districts will not be sought after by households from other districts. The same calculations were made at the municipal level. In sum, the regional mismatch-related vacancy count for the period from 2003 to 2018 was 500 homes per year at the district level and 3,500 homes per year at the municipal level. The estimate for the municipal level certainly constitutes an upper bound, as it is likely that some of the vacant homes may be filled by inhabitants from other municipalities. In contrast, the estimate for the district level constitutes a lower bound, as there is no perfect mobility within a district. Therefore, the regional mismatch was assumed to be equivalent to the mean amount of the district estimates and the municipality estimates, yielding 2,000 homes in the period from 2003 to 20018. According to the housing demand forecast published by ÖROK (2017) for the period from 2014 to 2030, this regional mismatch is set to increase until 2030, as household numbers are expected to shrink in a number of Styrian and Carinthian districts.[16] From 2019 onward, the mean amount of the municipal estimate and the district estimate was projected to keep growing in line with the change of the mismatch as projected in the ÖROK housing demand forecast. This exercise yielded an average increase in housing vacancy of 3,200 homes per year in the period from 2019 to 2030 as a result of the regional mismatch of housing vacancy and demand. This corresponds to close to 1% of the housing stock.

2.3.3 Change in vacancies needed to meet short-term fluctuations in demand

Changes in housing demand will rarely match changes in housing supply. If additional demand exceeds additional supply, the vacancy stock will shrink; if additional supply exceeds additional demand, the vacancy stock will increase. The corresponding change in vacancies is neither part of demand nor part of supply but results from the difference between the growth of supply and the growth of demand (see section 4).

2.4 Net loss of housing stock

The housing stock decreases whenever residential space is lost as housing units are demolished, reclassified, or merged with other homes. In March 2018, Statistics Austria published data on the net loss of housing, broken down by provinces, with the time series starting in November 2011. These data have filled a long-standing data gap. According to these data, the net loss of housing came to 9,700 homes on average in the period from 2012 to 2017, which corresponds to 0.26% of the housing stock in Austria. This ratio is in line with the figures typically used in housing need projections for Germany (ranging from 0.1% to 0.3%; Henger et al., 2015). Accordingly, we used the ratio of 0.26% also for the period up to 2012.

2.6 Total housing demand

Total housing demand is the sum total of demand for primary and secondary residences, changes in the vacancy stock required to maintain the optimum vacancy rate,

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[16] *However, the mismatch as suggested by the ÖROK housing demand forecast lies well below the mismatch according to historical evidence, as ÖROK's forecast for the shrinking areas is based on a sharp decline in household size, which has an offsetting effect on total housing demand.*

Table 3

Housing demand in Austria

	Total	Primary residences				Secondary residences	Vacancies in shrinking areas	Vacancies needed to maintain the optimum vacancy rate	Net loss of housing
		Total	Change in household size	Net migration	Residual				
Change in number of housing units (thousands per year)									
1981–1990									
Housing units in thousands per year	44.1	28.3	23.4	5.4	−0.4	6.1	4.7	1.0	6.5
% of total demand	100.0	60.7	50.1	11.5	−0.9	13.1	10.1	2.2	13.9
1991–2000									
Housing units in thousands per year	48.5	28.3	23.4	5.4	−0.4	6.1	4.7	1.0	6.5
% of total demand	100.0	60.7	50.1	11.5	−0.9	13.1	10.1	2.2	13.9
2001–2010									
Housing units in thousands per year	47.9	28.3	23.4	5.4	−0.4	6.1	4.7	1.0	6.5
% of total demand	100.0	60.7	50.1	11.5	−0.9	13.1	10.1	2.2	13.9
2011–2018									
Housing units in thousands per year	57.9	28.3	23.4	5.4	−0.4	6.1	4.7	1.0	6.5
% of total demand	100.0	60.7	50.1	11.5	−0.9	13.1	10.1	2.2	13.9
2019–2030									
Housing units in thousands per year	42.4	28.3	23.4	5.4	−0.4	6.1	4.7	1.0	6.5
% of total demand	100.0	60.7	50.1	11.5	−0.9	13.1	10.1	2.2	13.9

Source: Statistics Austria, OeNB calculations.

Chart 3

Housing demand in Austria

Housing units in thousands
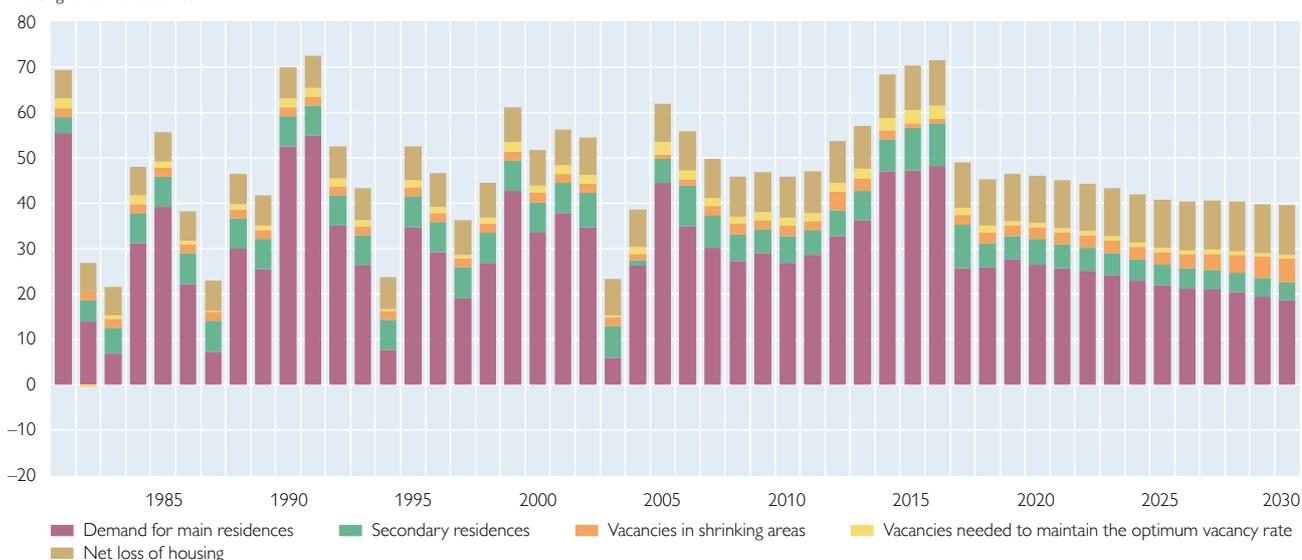
Source: Statistics Austria, author's calculations.

additional vacancies accumulating in shrinking areas, as well as the net loss of housing stock. In the 1990s, housing demand increased by 44,400 homes per year on average (see table 3). Close to two-thirds thereof (64% or 28,300 homes) are attributable to the demand for primary residences. Demand for secondary residences amounted to 6,100. The (estimated) increase of the vacancy stock (regional mismatch and vacant homes required to maintain the optimum vacancy rate) came to 2,800 homes. The estimated annual net loss of housing amounted to 7,100 homes. In the 1990s and 2000s, the growth of total housing demand thus increased to around 48,000 homes per year.

In the period from 2011 to 2018, the growth of total housing demand jumped to 57,900 homes per year as a result of net migration. Demand for primary residences accounted for 63% of this amount. Looking ahead, total housing demand is projected to decrease to 42,400 homes per year on average in the period from 2019 to 2030. By 2030, this figure is expected to have dropped to 39,700.

3 Housing supply

The annual increase in housing supply is based on the number of newly completed homes. However, housing completion data are fraught with a number of problems, which may cause the actual number of newly developed homes to be underestimated. This section explores the underlying problems and illustrates the adjustments made to deal with those problems.

3.1 Adjustments for the completion of existing housing

Housing completion data also contain housing units completed as a result of splitting, merging, increasing, decreasing or otherwise reconstructing existing residential space; i.e. housing units that do not qualify as newly developed homes. The corresponding numbers need to be deducted from the housing completion statistics; yet, these numbers are only available for the years from 2010 to 2016. In this period, as much as 58% of all housing completions in existing buildings do not qualify as newly developed homes, because they resulted from some sort of redevelopment. For the period before 2010, the housing completion statistics were adjusted accordingly with this percentage.

3.2 Estimates of missing data on housing additions or alterations for Vienna

Since 2005, housing completion data reported by the city of Vienna have only referred to newly completed homes in newly constructed buildings, but no new homes created through additions to existing housing or alterations thereof. Having analyzed old housing data for Vienna for the period from 1980 to 2002, which were based on different definitions, we find the share of housing additions or alterations to have been on the rise. While this share was as low as 3% in 1984, it had risen to 17% by 2002. Projections based on multiplying the available housing completion data with this percentage yields estimates of the amount of housing additions or alterations made in Vienna. However, these figures also include housing units that were created through splitting or merging homes, through increasing or decreasing existing residential space, or through other alterations. Since data on housing additions or alterations were not available for Vienna, the available housing completion figures were adjusted for the share of not newly developed homes for Austria (58%). This exercise yielded 500 additional housing completions per year on average for Vienna.

3.3 Smoothing of housing completion peak in Vienna in 2008

The exceptionally high number of housing completions in 2008 reported by the city of Vienna also reflects more than 5,100 homes for which no completion dates were on record.[17] For the purpose of this paper, these 5,100 homes were reallocated to the years from 2005 to 2008 on a pro rata basis.

3.4 Adjustments for missing data on Vienna

When we compare the number of housing completions recorded in line with former definitions for the 1980–2002 period with the number of building permits, we find that, on average, housing completions correlate with 97% of the building permits issued two years earlier; in other words, only 3% of the housing projects approved in a given year were not completed before the end of the year. The same relationship is evident from the statistics compiled since 2005 for Austria's provinces excluding Vienna. For Vienna, however, the time series starting in 2005 exhibit a sizeable gap. On average, the number of housing completions falls 37% short of the number of building permits issued two years earlier. This is why the available data on housing completions in Vienna were increased by 34% starting with the year 2005, to bring the data in line with the relationship between housing completions and building permits (97%) observed for the rest of Austria. On average, this brings up the number of annual housing completions by 1,600 from 2005 onward.

3.5 Missing data for 2003 and 2004

No data on housing completion have been published by Statistics Austria for 2003 and 2004, as delays in the legislative process led to temporary coverage gaps. For the purpose of this analysis, the missing data for 2003 and 2004 were replaced with the mean values for the period from 2002 to 2005.

3.6 Overall adjustments

In sum, the adjustments caused the available housing completion data to be reduced by 2,600 homes per year on average. Following weak housing completion growth in the 1981–1990 period – with just 39,600 homes completed per year – the 1990s saw a rapid acceleration of construction activity. From 1991 to 2000, the number of homes completed (as adjusted) totaled 47,800 per year on average. Thereafter, construction activity bottomed out in 2004 with 36,500 new homes being completed. In 2017, 57,400 new homes were completed.

3.7 Projections for the period from 2018 to 2020

At the time of writing, housing completion data were available until 2017. Given the significant correlation between housing completion growth in a given year and building permit growth two years earlier, this correlation can be used to project future housing completion growth. The projections for 2018, 2019 and 2020 are based on an estimation equation that regresses building completion growth in year t on building permit growth in year t-2.[18] At the time of writing, building permit data were

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[17] For further details see http://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/wohnen/wohnungs_und_gebaeudeerrichtung/fertigstellungen/045273.html (available in German only).

[18] d(log(completions)) = 0.0101 + 0.5635*d(log(housing completions(-2))) − 0.3032*dummy2009. R2=0.537, DW=1.978.

available up to the fourth quarter of 2018. These data show that the number of building permits declined by 14% in 2018 as a whole. Accordingly, we project 63,900 housing completions for 2018, 67,000 for 2019, and 63,000 for 2020.

4 Changes in excess demand

This section explores the demand-supply balance, i.e. the level of excess annual demand (or supply) that arises as additional demand exceeds the new supply (or vice versa, see the dotted line in chart 5). In the period from 1980 to 2020, annual demand averaged 49,000 homes, thus exceeding annual supply (45,800 homes) by 3,200 homes each year.

It is a known phenomenon that housing completions tend to underestimate actual construction activity.[19] In the absence of other useful benchmarks, we use an *equilibrium approach* to solve this data problem. Under the (plausible) assumption that

Chart 4

Adjustments to housing completion data

Housing units in thousands per year

Adjustments to long-term equilibrium
Smoothing of data for Vienna (2005–2008)
Minus completions of existing housing (additions, etc.)
Adjusted time series

Adjustments for missing data for Vienna since 2005
Secondary residences
Completions (Statistics Austria)
Total adjustments
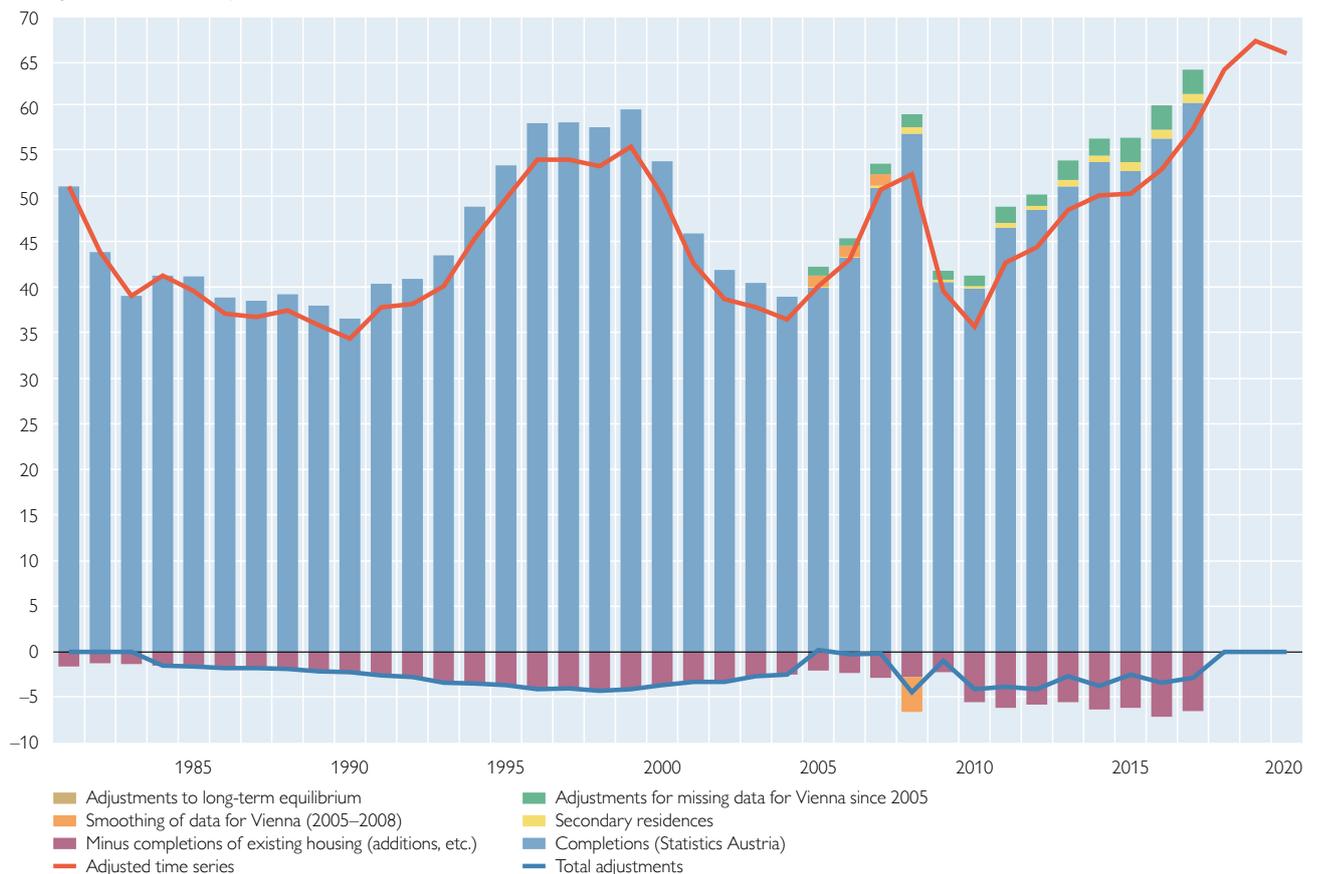
Source: Statistics Austria, author's calculations.

[19] *According to the 2005 housing demand forecast published by ÖROK (2005), the number of housing completions fell visibly short of the number of housing completions calculated with the building period method in the 1990s. Based on plausible adjustments for the net loss of housing, the building period method interprets all changes in the stock of housing constructed in the previous decade as new homes. As this survey method has since been replaced by a housing register, it cannot be used for later periods. Schremmer et al. (2015) discuss the data problems taking the province of Vorarlberg as an example.*

the property market will be in equilibrium in the long term, any changes occurring to supply in the long term (from 1980 to 2020 in our case) would be expected to equal the growth in demand. Therefore, we adjust excess annual demand for its mean (3,200 homes). In line with this estimation, demand growth exceeded supply growth in the years before 2016. In the period from 2009 to 2016, excess annual demand totaled 9,000 homes. By 2017, the number of housing completions exceeded demand by 11,400 homes according to our estimation, and in 2018 by 21,700 homes. In 2019 and 2020, the number of housing completions is expected to exceed demand by 23,700 and 23,200 homes, respectively.

The calculations made so far relate to the *additional demand or supply* emerging in a given year, without providing any indication of the absolute value of excess demand

Chart 5

Backlog housing demand in Austria

Housing units in thousands per year
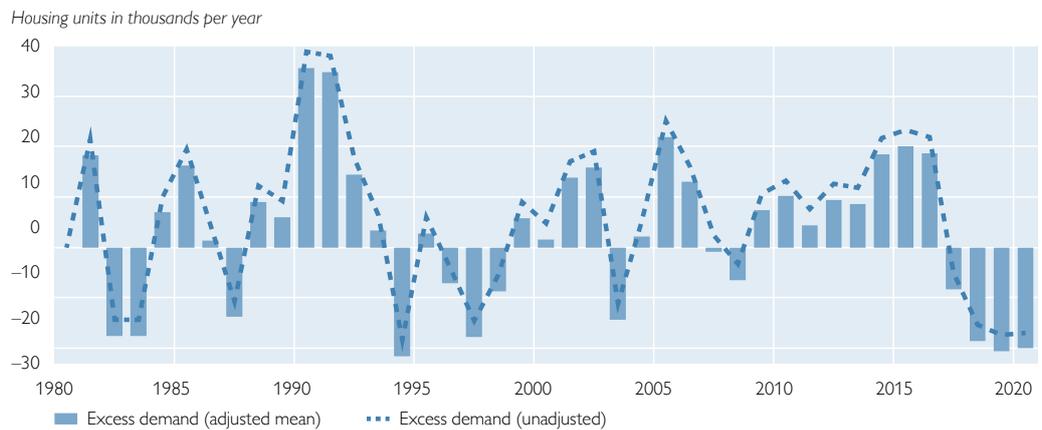

Source: OeNB, Vienna University of Technology, Statistics Austria, author's calculations.

Chart 6

Backlog housing demand in Austria

Housing units in thousands

Vacancy rate deviation from long-term equilibrium

*% of stock of housing units*
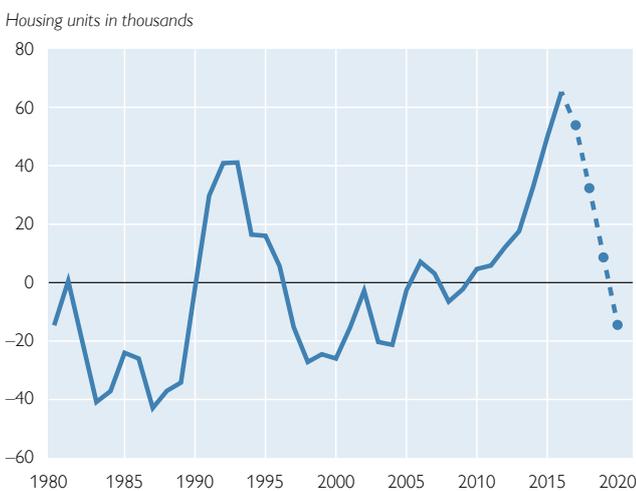
Source: Statistics Austria, author's calculations.

Note: Dotted line (2017–2020) includes projected completions.
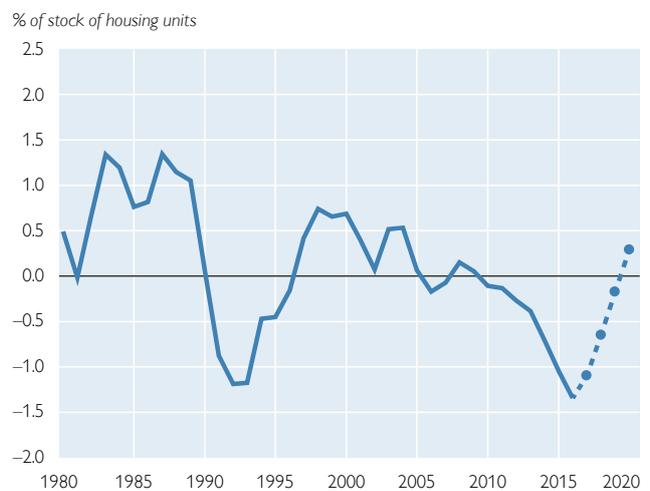
or supply. In a next step, we calculate t by cumulating the annual excess demand figures (left panel of chart 6). A zero result would indicate the absence of backlog demand or supply, and the vacancy rate would be in its long-term equilibrium. The right panel of chart 6 shows the resulting deviation of the vacancy rate from its long-term equilibrium value, which is calculated by dividing the inverted negative backlog demand by the housing stock.

Following oversupply of housing, the market tipped into a state of increasing backlog demand in the first half of the 1990s, with demand exceeding supply by as much as 41,000 homes in 1993. Rising backlog demand was fueled by the strong net migration that emerged after the fall of the Iron Curtain and the breakup of Yugoslavia in the 1989–1993 period. Thereafter, backlog demand reversed again in the second half of the 1990s, turning into a backlog supply of 27,000 homes in 1998. From the early 2000s onward, the backlog supply was depleted gradually due to strong demand but little construction activity, resulting in demand slightly exceeding supply. Construction activity rebounded from 2006 to 2008 but was cushioned by the economic and financial crisis thereafter. From 2009 onward, the level of backlog demand rose steadily, peaking at about 65,000 homes in 2016. Since then, the amount of backlog demand has been shrinking again, given stronger construction activity and lower demand. The remaining backlog demand is expected to have been removed by 2020.

The housing vacancy rate was 0.6 percentage points below the optimum vacancy rate (ranging from 3% to 5%) in 2018. These figures are a good match for results from housing vacancy studies made for Vienna (2015) and Vorarlberg (2018), according to which the vacancy rates currently come to 3½% and 4%, respectively. During the review period, the vacancy rate fluctuated within a range of 2½ percentage points. This implies that the housing market has remained relatively stable in Austria, exhibiting neither vacancy crises nor a pronounced housing shortage.[20]

5 Discussion of results

The purpose of this paper was to estimate the level of backlog demand in the Austrian housing market.[21] Due to missing data, assumptions had to be made for a number of factors, including the number of secondary residences, the net loss of housing and specific housing completions, thus leading to a certain degree of imprecision in the results. The biggest unknown were missing data for the city of Vienna. The missing data were replaced with estimates derived on the basis of old housing data, which used different definitions. Given the pace of construction activity in Vienna, the risk remains that activity was underestimated nonetheless, especially with regard to housing additions and alterations. This would imply that backlog demand

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[20] According to a comparison of similar calculations for all EU countries (except Malta and the U.K.) based on the number of households and housing completions, the national vacancy rates fluctuated within a range of 5 percentage points on average in the period from 2000 to 2017. Ireland was the country with the highest volatility (12.3 percentage points) and Poland the country with the lowest volatility (1.4 percentage points). In Austria, the vacancy rate varied by 2.2 percentage points during this period, which put Austria on rank 11 (in ascending order) among the 26 EU countries under review.

[21] Compared with an earlier version of this paper (Schneider, 2019a), this article has taken on board the household forecast published by Statistics Austria in 2018 as well as incoming information on the number of primary residences and building permits. Furthermore, adjustments have been made for a break in the time series for the number of households in the early 1980s.

in Austria may be eliminated even before 2020. Furthermore, like all forecasts, the household forecast published by Statistics Austria is fraught with a high degree of uncertainty. The assumptions regarding net migration have typically been subject to major revisions. Likewise, the absolute figures for backlog demand should also be interpreted with caution, as these figures depend not only on the assumption that the housing market will indeed be in equilibrium in the long term but also on the length of the review period. Other factors to be considered when interpreting the results include the fact that using the key component of demand – i.e. changes in the number of households – as an indicator for housing need is fraught with at least two problems. First, the number of households is dependent on the supply of housing, as households have separate homes by definition. In other words, the number of households can only go up as the housing supply increases or as the vacancy rate goes down. Second, the pace of household creation is also driven by the availability of affordable housing. In other words, household numbers are also dependent on property or rent prices. Hence, the estimated figures tend to understate demand in periods of rising property prices and tightening supply, as some household preferences will remain unmet in times of rising prices and housing undersupply. However, estimates on unmet demand come with a high normative share and are beyond the scope of this paper. At any rate, the data show that the years with the highest levels of excess demand (1992 and 2016) coincided with periods in which fewer households were established. At the same time, construction activity increased, which caused backlog demand to be removed within a period of about four years, or which may cause backlog demand to have been removed by 2020 as forecast.

Given the strong segmentation of property markets, the results for Austria as a whole do not allow conclusions to be drawn for individual market segments or regions. The housing market will always be tighter in metropolitan areas than in rural areas, some of which are characterized by shrinking population figures. Last but not least, the housing market is also tighter in the subsidized segment than in the unsubsidized segment, in which the supply has been growing at a faster pace.

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6 Appendix

Housing supply and demand in Austria

	Demand								
	Total	Demand for main residences (= change in number of households)				Secondary residences	Vacancies in shrinking areas	Vacancies needed to maintain the optimum vacancy rate	Net loss of housing
		Total	Change in household size	Net migration	Residual				
	Change in number of housing units (thousands per year)								
1981	69.4	55.4	48.4	10.9	−3.8	3.7	2.0	2.0	6.3
1982	26.3	14.0	12.0	−8.7	10.7	4.7	2.0	−0.6	6.2
1983	21.6	7.0	11.5	−0.6	−3.9	5.7	2.0	0.6	6.3
1984	48.2	31.2	31.4	1.1	−1.2	6.7	2.0	1.8	6.4
1985	55.8	39.2	37.8	2.1	−0.8	6.7	2.0	1.4	6.5
1986	38.3	22.3	20.5	2.4	−0.5	6.7	2.0	0.8	6.6
1987	22.9	7.4	5.6	0.7	1.1	6.7	2.0	0.3	6.6
1988	46.4	30.0	25.9	5.1	−1.0	6.7	2.0	1.1	6.6
1989	41.8	25.5	12.2	17.6	−4.3	6.7	2.0	0.9	6.7
1990	70.0	52.6	29.8	23.0	−0.2	6.7	2.0	1.9	6.8
1991	72.6	54.9	24.6	30.4	−0.0	6.7	2.0	2.0	7.0
1992	52.5	35.1	1.1	28.3	5.7	6.7	2.0	1.7	7.1
1993	43.4	26.3	0.6	13.3	12.4	6.7	2.0	1.3	7.2
1994	23.9	7.6	−4.4	1.2	10.9	6.7	2.0	0.4	7.2
1995	52.5	34.8	30.0	0.8	4.0	6.7	2.0	1.7	7.3
1996	46.7	29.3	24.9	1.6	2.7	6.7	2.0	1.4	7.4
1997	36.2	19.1	15.5	0.6	3.0	6.7	2.0	0.9	7.5
1998	44.5	27.0	23.4	3.4	0.1	6.7	2.0	1.3	7.6
1999	61.2	42.8	36.4	8.2	−1.8	6.7	2.0	2.1	7.7
2000	51.7	33.6	25.7	7.1	0.8	6.7	2.0	1.6	7.8
2001	56.3	37.9	25.1	7.2	5.6	6.7	2.0	1.8	7.9
2002	54.5	34.8	18.1	14.0	2.7	7.6	2.0	2.1	8.1
2003	23.4	6.0	−9.1	16.7	−1.6	6.9	2.0	0.4	8.1
2004	38.7	26.3	4.8	21.3	0.1	1.2	1.4	1.6	8.2
2005	62.0	44.5	21.0	18.7	4.8	5.2	1.2	2.7	8.4
2006	55.9	35.0	16.9	10.2	7.8	8.9	1.4	2.1	8.5
2007	49.9	30.3	18.7	9.8	1.8	7.0	2.2	1.8	8.7
2008	46.0	27.3	16.0	9.5	1.8	6.0	2.3	1.6	8.8
2009	47.0	29.0	20.4	6.9	1.7	5.4	1.9	1.7	8.9
2010	45.8	27.0	18.5	8.4	0.1	5.8	2.4	1.6	9.0
2011	47.1	28.8	16.8	13.5	−1.6	5.4	2.1	1.7	9.1
2012	53.8	32.8	16.3	17.4	−0.9	5.7	4.1	2.0	9.3
2013	57.1	36.3	13.9	21.0	1.3	6.5	2.7	2.2	9.4
2014	68.5	47.0	17.6	27.7	1.7	7.2	1.8	2.8	9.6
2015	70.4	47.3	9.4	48.5	−10.7	9.4	1.1	2.8	9.8
2016	71.5	48.3	−0.5	28.8	20.0	9.4	1.0	2.9	10.0
2017	49.1	25.8	1.3	19.0	5.4	9.6	2.1	1.5	10.1
2018	45.4	26.0	4.3	18.6	3.1	5.1	2.5	1.6	10.2
2019	46.4	27.6	8.4	18.2	1.0	5.2	2.4	1.0	10.3
2020	46.1	26.6	7.6	17.2	1.8	5.5	2.5	1.1	10.4
2021	45.0	25.7	7.1	17.0	1.7	5.3	2.6	1.0	10.4
2022	44.4	25.1	6.7	16.3	2.1	5.1	2.7	1.0	10.5
2023	43.4	24.1	6.2	16.1	1.9	5.0	2.8	1.0	10.6
2024	42.0	23.0	5.4	15.4	2.1	4.8	2.6	0.9	10.6
2025	40.9	22.0	5.0	15.2	1.8	4.6	2.8	0.9	10.7
2026	40.4	21.3	4.9	14.6	1.8	4.4	3.1	0.8	10.7
2027	40.6	21.1	5.3	14.5	1.4	4.2	3.6	0.8	10.8
2028	40.3	20.5	5.4	13.9	1.3	4.2	4.0	0.8	10.9
2029	39.9	19.4	4.9	13.3	1.2	4.1	4.7	0.8	10.9
2030	39.7	18.7	4.9	12.9	0.9	3.9	5.4	0.7	11.0

Source: Statistics Austria, author's calculations.

Housing supply and demand in Austria (continued)

	Supply (housing completions)							Excess demand (demand – completions)		
	Completions (Statistics Austria)	Minus completions of existing housing (additions, etc.)	Estimates of missing data on housing additions or alterations for Vienna since 2005	Smoothing of data for Vienna (2005–2008)	Adjustments for missing data for Vienna since 2005	Total adjustments	Adjusted time series incl. 2017–2020 projections	Per year (minus 1981–2020 mean)	Backlog demand (= cumulated demand minus 1981–2020 mean)	Vacancy rate deviation from long-term equilibrium
	Change in number of housing units (thousands per year)									*percentage points*
1981	51.0	−1.6	0.0	0.0	0.0	−1.6	51.0	15.2	0.5	−0.0
1982	43.9	−1.3	0.0	0.0	0.0	−1.3	43.9	−20.7	−20.2	0.7
1983	39.1	−1.3	0.0	0.0	0.0	−1.3	39.0	−20.7	−40.9	1.3
1984	41.3	−1.5	0.0	0.0	0.0	−1.5	41.3	3.7	−37.2	1.2
1985	41.2	−1.6	0.0	0.0	0.0	−1.6	39.5	13.1	−24.1	0.8
1986	38.8	−1.8	0.0	0.0	0.0	−1.8	37.1	−1.9	−26.0	0.8
1987	38.5	−1.8	0.0	0.0	0.0	−1.8	36.7	−17.0	−43.0	1.3
1988	39.2	−1.8	0.0	0.0	0.0	−1.8	37.4	5.9	−37.1	1.1
1989	38.0	−2.1	0.0	0.0	0.0	−2.1	35.8	2.8	−34.3	1.1
1990	36.6	−2.2	0.0	0.0	0.0	−2.2	34.4	32.4	−1.8	0.1
1991	40.4	−2.5	0.0	0.0	0.0	−2.5	37.8	31.6	29.7	−0.9
1992	40.9	−2.8	0.0	0.0	0.0	−2.8	38.1	11.2	41.0	−1.2
1993	43.5	−3.3	0.0	0.0	0.0	−3.3	40.1	0.1	41.1	−1.2
1994	48.9	−3.5	0.0	0.0	0.0	−3.5	45.4	−24.7	16.4	−0.5
1995	53.4	−3.7	0.0	0.0	0.0	−3.7	49.7	−0.4	16.0	−0.5
1996	58.0	−4.0	0.0	0.0	0.0	−4.0	53.9	−10.4	5.7	−0.2
1997	58.0	−4.0	0.0	0.0	0.0	−4.0	54.0	−20.9	−15.3	0.4
1998	57.5	−4.2	0.0	0.0	0.0	−4.2	53.2	−11.9	−27.2	0.7
1999	59.5	−4.0	0.0	0.0	0.0	−4.0	55.4	2.7	−24.5	0.7
2000	53.8	−3.7	0.0	0.0	0.0	−3.7	50.1	−1.5	−26.0	0.7
2001	45.9	−3.3	0.0	0.0	0.0	−3.3	42.6	10.6	−15.4	0.4
2002	41.9	−3.2	0.0	0.0	0.0	−3.2	38.7	12.6	−2.8	0.1
2003	40.4	−2.6	0.0	0.0	0.0	−2.6	37.8	−17.6	−20.4	0.5
2004	39.0	−2.5	0.0	0.0	0.0	−2.5	36.5	−1.0	−21.3	0.5
2005	39.9	−2.1	0.1	1.3	0.9	0.2	40.1	18.7	−2.7	0.1
2006	43.2	−2.3	0.1	1.3	0.8	−0.2	43.0	9.7	7.1	−0.2
2007	50.9	−2.8	0.2	1.3	1.1	−0.2	50.7	−4.0	3.1	−0.1
2008	56.8	−2.7	0.7	−3.8	1.4	−4.4	52.4	−9.6	−6.5	0.2
2009	40.5	−2.3	0.3	0.0	1.0	−1.0	39.5	4.2	−2.3	0.1
2010	39.8	−5.5	0.3	0.0	1.1	−4.1	35.7	7.0	4.7	−0.1
2011	46.5	−6.1	0.5	0.0	1.7	−3.8	42.7	1.2	5.9	−0.1
2012	48.5	−5.8	0.4	0.0	1.3	−4.1	44.4	6.2	12.1	−0.3
2013	51.0	−5.5	0.7	0.0	2.2	−2.6	48.4	5.5	17.6	−0.4
2014	53.7	−6.3	0.6	0.0	1.9	−3.7	50.0	15.3	32.9	−0.7
2015	52.7	−6.1	0.9	0.0	2.7	−2.5	50.3	17.0	49.9	−1.0
2016	56.3	−7.1	1.0	0.0	2.7	−3.4	52.9	15.5	65.3	−1.3
2017	60.2	−6.5	1.0	0.0	2.7	−2.8	57.4	−11.4	53.9	−1.1
2018							63.9	−21.7	32.3	−0.6
2019							67.0	−23.7	8.6	−0.2
2020							66.1	−23.2	−14.6	0.3
2021										0.0
2022										0.0
2023										0.0
2024										0.0
2025										0.0
2026										0.0
2027										0.0
2028										0.0
2029										0.0
2030										0.0

Source: Statistics Austria, author's calculations.