

# AI and metaverse: hype or revolution?

Real Estate Monitor Switzerland | June 2023

ChatGPT and co.  
**Is AI revolutionizing  
the real estate sector?**

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Rental apartments  
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# Imprint

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# Soft landing in sight

**The Swiss real estate market remains on course for a soft landing. Although price corrections are unlikely to be avoided altogether, they should be of a limited nature thanks to the scarcity in supply of both owner-occupied housing and residential investment properties.**

## **Persistent inflation, further interest rate rises**

The Swiss real estate market is currently dominated by the overarching themes of inflationary and interest rate developments. The persistence of inflation has been underestimated by many market participants, and the latest figures show that this problem will not be so swiftly eradicated. Second-round effects, such as the impending increases in rents as a consequence of the rise in the reference interest rate (page 17), are preventing any rapid deceleration in price growth. As a result, the Swiss National Bank can be expected to push through further increases in key interest rates in June and September this year. Despite this challenging market environment, the Swiss real estate market is holding up much better than many of its counterparts elsewhere. Although its development going forward is unlikely to be without stumbling blocks, Switzerland remains on course for a soft landing.

## **Steady cooling of prices in owner-occupied housing segment**

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Although higher interest rates are weighing heavily on demand, the supply of residential property to buy is increasing only slowly due to its previous scarcity. The supply rates for condominiums and single-family homes remain at low levels, namely 1.8% and 1.6% respectively. However, price growth weakened significantly in the first quarter of 2023 due to the decline in demand. The prices of condominiums recorded a year-on-year rise of 3.5%, those of single-family homes 3.6%. We are expecting price growth to remain (just) in positive territory by the end of the year. However, due to the persistent waning of demand, we are anticipating annual price declines in low single-digit percentage territory from 2024.

## **Finding a rental apartment becomes more challenging**

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In the case of multi-family homes containing rental apartments, by contrast, investors should be anticipating a decline in prices before the current year is out. Improving rental income prospects will cushion any price correction, however. The Swiss rental apartment market continues to move at high speed into a situation of scarcity. The term “housing crisis” would be an exaggeration for the current situation, but finding rental accommodation in Switzerland has become much more challenging. We are therefore expecting a further significant decline in vacancies and a surge in rental price growth – for both new and existing rental agreements.

## **ChatGPT and co. Is AI revolutionizing the real estate sector?**

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For some months now, ChatGPT has been firmly established as a topic in the media and many a Swiss conversation. Many of us are now likely to have playfully experimented with this form of artificial intelligence (AI) for the first time. But what benefits do such AI tools bring to the real estate sector? We have tried to answer this question using various application examples. Even as things stand, large language models and other AI applications are ripe for use in practice. Their benefit remains limited, however, and in some cases they can deliver unusable or erroneous results. On the other hand, when combined with other technologies we see enormous potential here in the coming years.

## **Metaverse: Between hype and disillusion**

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By contrast, public interest in the metaverse – which rode a wave of hype as recently as the end of 2021 – has recently dwindled considerably. After all, the metaverse has not yet delivered the results expected of it. The transition to this new technology involves substantial costs, and is therefore taking place only slowly. Despite the opportunities for the real estate industry, there are also various risks that need to be kept sight of with any presence in the metaverse. For the time being, therefore, it would be wrong to talk of a metaverse revolution. That said, it would be premature to write the metaverse off completely, as there is a very real possibility that it will experience a similar development to the internet, to the point where we might not be able to imagine life without it in a few years' time.

# Is AI revolutionizing the real estate sector?

**Chatbots are already being used in practice in the real estate industry. Their benefit remains limited, however, and in some cases they can deliver unusable or erroneous results. On the other hand, when combined with other technologies we see enormous potential here.**

## Chatbots conquer the world

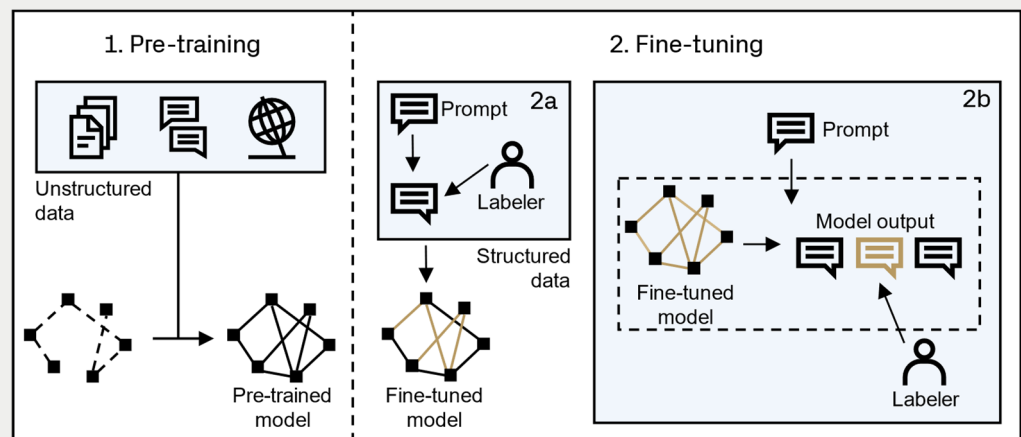
ChatGPT has attracted huge media attention in recent months. To better understand the reasons for this, we take a look at the underlying technology in greater detail over the next few pages, highlighting potential areas of application in the real estate sector. Thanks to fast-paced technological progress, chatbots have made rapid strides recently, which is opening up new potential forms of use for them.

## Interaction with AI using natural speech

The likes of ChatGPT and Bard are chatbots that users can interact with using natural speech. The user asks a question (“prompt”) – in text form, or now even as an image along with a formulated task. The input is then processed internally by artificial intelligence (AI), which is based on so-called “large language models” (LLMs). The AI model then generates the resulting output in text or image form. If the same question is entered into the system multiple times, different responses will be returned on each occasion. The questions are stored and then taken into consideration for any following questions. This facilitates natural dialogue. Chatbots of this kind are already used in all sorts of areas, including customer service and product advice, for example.

### Architecture of large language models (LLM)

Simplified illustration of the functioning of a large language model.



Source: OpenAI: <https://openai.com/>; Google: LaMDA: Language Models for Dialog Applications; Credit Suisse

Large language models are typically trained in two steps. In the first step, the model analyzes a huge volume of unstructured data and learns on the basis of the identical correlations between words. The aim here is to predict words in sentences with great accuracy on the basis of context.

The second step then revolves around the fine-tuning of the model. This involves the instructions of users (“labelers”) being answered in line with the rules established by developers (2a). This then results in a structured dataset that forms the basis for helping the model understand what desirable answers look like. In addition, a second group of labelers are tasked with evaluating various answers of the model to the same prompt and ranking these in order of quality. In the first step these labelers are human. The resulting assessment data is then used later to train so-called reward models to take over this evaluation process. The goal of the LLM is to maximize this value (reward) and thereby provide the user with the best possible response to his or her prompt.



## Areas of application in the world of real estate

Modern chatbots can generate well-formulated text in an extremely short space of time and provide answers to complex questions. As such, a large number of potential areas of application in the world of real estate can be identified. We take a look at various specific areas of application and evaluate the results and usability in each case.

### Application 1: Real estate marketing and management

The marketing/letting process involves regular communication between landlord and tenant. In many cases, similar questions of both tenants and landlords have to be answered manually. This gives rise to a significant workload. In addition, the marketing process also requires the creation of property adverts, information brochures, websites, etc. Thanks to modern technology, many of the working steps can be accelerated and simplified nowadays. Let's take the example of a property advert to illustrate this.

#### Example 1: Creation of property advert



Prepare me a property advert for an apartment in Basel with 3.5 rooms and 100m<sup>2</sup> of floorspace, monthly rent of CHF 2,500, 2 bedrooms



Handsome and spacious 3.5-room apartment in Basel to let. The apartment is located on the second floor of a well-kept apartment block and has floorspace of 100m<sup>2</sup>. The apartment offers you the following benefits:

- Bright and modern kitchen with glass ceramic hob, dishwasher, and plenty of storage space
- Large living room with parquet flooring and balcony access
- Two bedrooms with parquet flooring and built-in cupboards
- Bathroom with bathtub, shower, WC, and washing machine
- Separate guest WC
- Basement area and bike room for shared use
- Elevator in building

The apartment is located in a quiet, green residential area close to the right bank of the Rhine and the city center. Shopping options, public transport, schools and kindergarten are just a few minutes' walk away. The monthly rent is CHF 2,500, including ancillary costs. A parking space can additionally be rented for CHF 100 per month. Have we sparked your interest? Contact us today for a non-binding viewing appointment

Source: ChatGPT-4, prompt in German language

Last data point: 05/2023

### Property advertisement – conclusion

At first glance the result is impressive, as it closely resembles the kind of property advertisement commonly found on major platforms. The language comes across as natural, and in the German version (not evident in the English) various subtle local terms were used (e.g. "velo" for bicycle, "Rheinufer" for the Kleinbasel side of the Rhine, for example). But upon closer inspection, there are certain flaws. Much of the information provided in the above text does not correspond to the input prompt. For example, the kitchen specifications, the location of the apartment, and additional option of a rentable parking space were simply "made up" by the model. To achieve better results, it is therefore important for the prompt to provide specifications in as much detail as possible and formulate additional restrictions. Otherwise there is a risk that the advert will contain false information.

### Application 2: Construction and planning of real estate

In addition to the option of creating text, there are also various tools – such as DALL-E, Midjourney, and Stable Diffusion – that can be used to generate images from text prompts. This opens up many interesting areas of application, such as changing a building's image material to show a verdant facade or to visualize photovoltaic apparatus on the roof. Below we analyze the example of a floorplan in more detail.

### Floorplans – conclusion

It is abundantly clear that the suggested floorplan is implausible. The number of rooms does not correspond to the prompt, doors and windows are not shown in the right place, and some areas are inaccessible. In addition, furniture or furniture parts have been generated. Even after the input of real additional floorplans, the results do not improve greatly. The model currently understands only what a floorplan looks like. It does not understand contextual relationships – such as the way rooms are connected and the number of rooms, doors and windows. This would suggest that an insufficient amount of training data has been analyzed. The result is unusable. However, this poor result is not surprising. Floorplans are typically not described in text form, but are graphically displayed in accordance with clear rules. So in this case we are looking at an overly specific form of use that DALL-E is not advanced enough to handle – without being linked to a specialized tool. Today's PropTech industry is already showing the possibilities offered by artificial intelligence based on algorithms specifically geared around floorplans.

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### Example 2: Creation of floorplan

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Design a floorplan for a 4.5-room apartment with 120 m<sup>2</sup> of living space. The kitchen is open to the neighboring living room. The apartment has two bathrooms, one with a shower, the other with a bath tub. In addition, the apartment has a balcony and a small storage area.



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Source: DALL-E-4, prompt in German language

Last data point: 05/2023

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### Application 3: Market analysis and apartment search

Even today, chatbots can provide valuable assistance when researching a regional real estate market. Depending on the model used, however, the latest market trends may not yet be taken into consideration, and the responses need to be reviewed to ensure they are up to date. ChatGPT can also be used for an apartment search, as the following example shows.

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### Example 3: Searching for a rental apartment by municipality

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I am looking for a three-room apartment close to Zurich with around 90 m<sup>2</sup> of living space. My maximum rental budget is CHF 1,900 per month. I do not want to commute for more than 30 minutes. What municipalities are suitable for me?



If you want a 3-room apartment close to Zurich, you have a number of options. The desired living space of 90m<sup>2</sup> is somewhat above-average for this kind of apartment, but is not impossible to find. However, the maximum rent of CHF 1,900 per month is rather low for the Zurich region, particularly if you want to commute in less than 30 minutes. You must therefore accept certain compromises or adjust your criteria.

One option would be to look in the outer Zurich suburbs that have excellent public transport connections. For example, you could find a suitable apartment in Dietikon, Schlieren, Urdorf, or Dübendorf. These municipalities are all within a 20-minute train ride of Zurich's main station. However, rents are quite high even here, and you should expect your search to be prolonged.

Another option would be to move further away from Zurich and look for an apartment in a more rural area. For example, you could find a cheaper apartment in Wohlen, Bremgarten, Muri, or Lenzburg. These municipalities are all within a 30-minute train ride of Zurich's main station. However, apartments in these locations are often smaller with a less modern fit-out. Moreover, you should also expect a lower selection of local shops, restaurants, and leisure opportunities.

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Source: ChatGPT-4, prompt in German language

Last data point: 05/2023

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### Apartment search – conclusion

The contextualization of the question in the regional real estate market is plausible. Over the last 12 months, properties in municipalities in the catchment area of Zurich with a rental price of less than CHF 1,900 month were found in around 30% of advertisements that met the criteria (3 rooms/90 m<sup>2</sup>). Let's now scrutinize some of the proposed municipalities in somewhat more detail. Dietikon is around 15 minutes away from Zurich main station by public transport. The average rental price for an apartment of this type is around CHF 1,950. The criteria are also a fit for the municipalities of Schlieren (10 min./CHF 1,850), Urdorf (10 min./CHF 2,000), and Dübendorf (12 min./CHF 2,050). However, travel times from the municipalities of Wohlen, Bremgarten, Muri, and Lenzburg are not always less than 30 minutes. The sentence "However, apartments in these locations are often smaller with a less modern fit-out" is wrong, and taken out of context. The overall result, however, is good and usable. One problem does emerge here, however: The more frequently the algorithm finds a text combination, the higher the value it assigns to it. In our

specific case, this leads to ChatGPT only recommending larger municipalities that meet the relevant criteria. Smaller municipalities that likewise meet the criteria are in most cases not proposed to the user.

#### **Application 4: Property valuation**

Nowadays, owner-occupied housing is almost exclusively valued using hedonic valuation models, i.e. in a very automated way. Let's now see if ChatGPT has access to such models and what kind of responses it generates.

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##### **Example 4: Property valuation**

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I live on Steghofweg in Lucerne in a 100m<sup>2</sup> apartment with 3.5 rooms, built in 2022. What is the approximate value of my apartment?



You want an estimate of the value of your apartment on Steghofweg in Lucerne. Your apartment has floor space of 100m<sup>2</sup> and was constructed in 2022. The value of an apartment depends on many factors, such as location, condition, fit-out, and demand. One way of arriving at a rough estimate is to determine the average price of apartments in your area by square meter, and to multiply this figure by the size of your apartment. According to immowelt.ch, the average square-meter price of apartments in Lucerne stands at CHF 9,500. This means that your apartment may be worth roughly CHF 950,000. This is only an estimate, however, and the actual figure may vary, depending on the individual characteristics of your apartment. In order to obtain a more precise valuation, we recommend you contact a professional real estate broker.

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Source: ChatGPT-4, prompt in German language

Last data point: 05/2023

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#### **Real estate valuation – conclusion**

The output shows that “only” a simple analysis of the average real estate price in the city of Lucerne, namely CHF 9,500, was used. One positive aspect is that the source is given. This is often not the case, however. Validating the source is not possible as the information cannot be found. There is no attempt to take into account the precise location of Steghofweg in Lucerne. The answer generated can therefore only be viewed as a very rough, snapshot market estimate for the average price level of a municipality. If established valuation models were to be incorporated into ChatGPT in the future, this could lead to a much more user-friendly result, as an estimate could be obtained through natural speech.

#### **Summary: Practical benefits already apparent, ...**

The above examples give a small insight into what is already possible even without task-specific data input or the corresponding specialist knowledge. It is apparent that, even today, AI tools can in some cases already deliver a clear benefit and simplify many processes. However, the results must always be critically scrutinized. A further aspect worth stressing is how simple it is to interact with the above-mentioned tools. Each tool was ready to be deployed in less than ten minutes, and questions could be entered in a variety of languages. That said, the best results are generated in English.

#### **... but there are still problems with quality, validation, and data protection**

As things stand, the difficulties currently lie above all in the risk of erroneous answers and validation of the corresponding output, as it is typical for no sources to be provided. However, solutions to these problems are already available with other providers. As an additional factor, it is not evident what is being done at the moment with the input data used. Only recently this prompted Italy, for example, to block access to ChatGPT for a short period of time. The input of confidential data is not recommended for now, as all input data is currently being saved and used to improve the model. Accordingly, an increasing number of companies are banning the use of such chatbots in order to preserve their commercial interests as well as ensure data protection.

#### **AI revolution has only just begun**

The advances made by chatbots and their underlying models have been huge recently, and are likely to persist over the coming years. Even today, there are all sorts of opportunities for greatly accelerating and automating processes. In many cases, this will significantly change daily office life in the future. However, a strong basis of data is crucial if high-quality results are to emerge, and in many cases this is unfortunately still lacking. If language models were to be combined with databases or specialized algorithms and tools, the potential opportunities should reach new levels from a quality standpoint. It will also be fascinating to see how regulators respond to rapid advances in this area, as such technology also harbors any amount of potential for abuse. Furthermore, the question also arises whether output generated through AI should be designated as such, as in many cases a human will hardly be able to distinguish whether the content was produced by a human or by a machine.



# Between hype and disillusion

**At the end of 2021 there was considerable hype surrounding the metaverse, but interest in this phenomenon then waned significantly the following year. Despite the opportunities for the real estate industry, there are also a number of different risks that need to be kept sight of with any presence in the metaverse. For the time being, therefore, it would be wrong to talk of a metaverse revolution.**

## Increasing interest in the metaverse – including in Switzerland

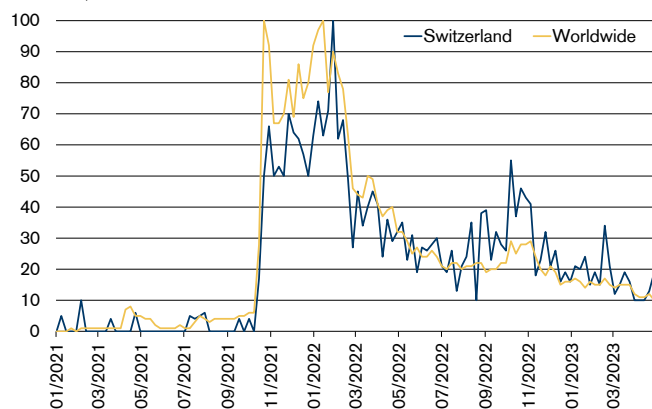
When Facebook founder Mark Zuckerberg announced at the end of October 2021 the change in the name of the parent company to Meta Platforms and sketched out the new strategic focus of his company with a huge amount of investment to be channeled into the further development of virtual platforms, interest in the metaverse surged worldwide. This hype also extended to Switzerland (Fig. 1). However, interest in this theme has since subsided.

## What is the metaverse?

But what exactly should we understand by the term metaverse? The metaverse is essentially a virtual platform on which users can interact with each other and with a virtual environment as avatars. For example, they can communicate and work with one another, take part in virtual events, and make purchases. In addition, the user experience can be enhanced through virtual reality (VR) glasses. To this extent, the metaverse is a further development of the internet and the so-called Web 2.0, which rose to prominence in parallel with the emergence of social media. A metaverse gives interested companies various opportunities for outsourcing their business models from the physical world to a virtual platform.

**Fig. 1: Interest in the metaverse has waned recently**

Google Trends: Relative frequency of "metaverse" search queries, Switzerland and worldwide, maximum = 100

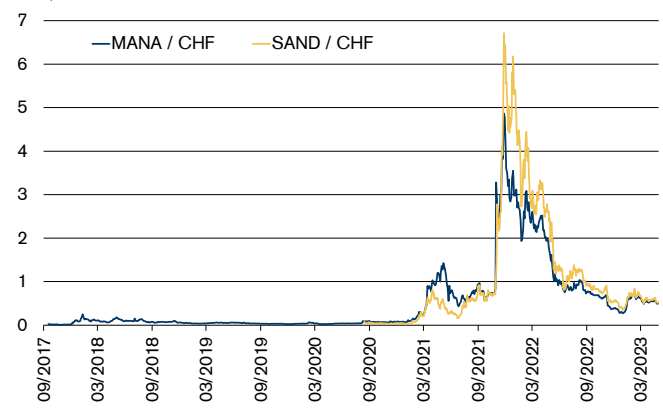


Source: Google, Credit Suisse

Last data point: 30.04.2023

**Fig. 2: Volatile exchange rates**

MANA exchange rate (Decentraland) and SAND exchange rate (The Sandbox) vs. CHF, 01.09.2017 – 30.04.2023



Source: CoinMarketCap, Credit Suisse

Last data point: 30.04.2023

## Acquiring real estate in the metaverse

Real estate developers and companies from other sectors are already investing millions in the acquisition of virtual parcels of land on platforms such as "Decentraland" and "The Sandbox".<sup>1</sup> At first glance, the purchase of such plots closely resembles the purchase of real estate in the physical world. In particular, location influences price in the metaverse too: To acquire land in attractive locations, investors have to delve deeper into their wallets. Metaverse users can inspect "plots of land" offered for sale on a quasi-official map and submit an offer to the seller at the click of a mouse. The means of payment in the metaverse are cryptocurrencies – in the case of Decentraland "Mana", for The Sandbox "SAND". The acquired digital goods are secured via so-called NFTs (non-fungible tokens) – digital certificates that verify the ownership of virtual assets such as plots of land, buildings, and other objects on a blockchain. To this extent, the blockchain acts as a kind of digital and decentralized land register when it comes to the purchase of virtual property. Once a virtual plot of land has been acquired, the investor will typically construct a property for commercial use.

<sup>1</sup> A bewildering array of different metaverse platforms have already been established, and new platforms are continually being added. But according to the Blockchain Council, "Decentraland" and "The Sandbox" are among the most popular and the best-established platforms to spring up in recent years.

## Key risks for property buyers in the metaverse:

### (1) Price volatility

The use of cryptocurrencies to settle transactions harbors clear risks, as such means of payment are subject to extreme value fluctuations. For example, in late 2021 the value of SAND surged by almost 1,000% in a month – from CHF 0.70/SAND to CHF 6.96/SAND (Fig. 2). However, the SAND exchange rate has since fallen back below CHF 0.50. Moreover, the price of virtual property is already very volatile even before exchange rate volatility is taken into account: Although from a fundamental perspective these virtual plots of land still have no intrinsic value, the metaverse hype in the fall of 2021 triggered a price rally in virtual property that also attracted speculators. Furthermore, the metaverse is still in its infancy, and the future direction of virtual environments is uncertain in any number of respects. For example, the interplay of various factors is likely to have been responsible for the severe decline in the price of virtual land on Ethereum-based platforms: At the end of November 2021, the average price per unit on The Sandbox amounted to around USD 16,000. But by mid-June 2022 this figure had collapsed to around USD 1,800 – a decline of some 90% (Fig. 3).

### (2) Uncertainty over future development of the metaverse market

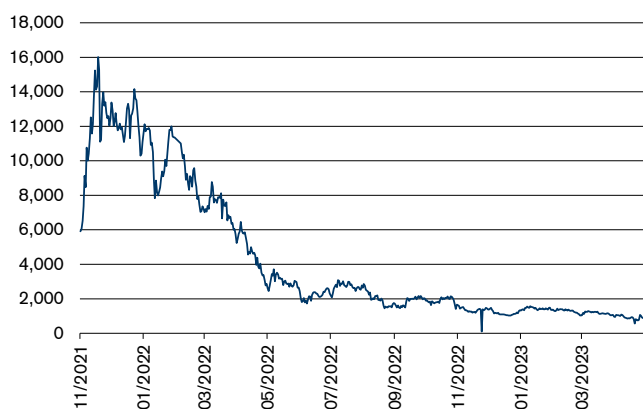
As there are now numerous metaverses on which avatars can romp about, the question for real estate investors is where precisely they should buy and manage virtual plots of land. As things stand, many metaverses are not connected to one another and are also not technically compatible, which creates clear hurdles for users. Experts believe that, due to network effects, just a small number of platforms will establish themselves in a lasting way, namely those with the most attractive offering for companies and users.<sup>2</sup> This “winner-takes-all” effect increases the power of individual providers to design their economic ecosystems according to their own rules and to set new standards in the metaverse. This should increase pressure on other providers to adopt similar standards in order to make their platforms interoperable.<sup>3</sup> In addition to uncertainties over the future development of metaverse platforms, the scalability of digital worlds presents its own problem: In contrast to the physical world, new virtual terrain can be created in the metaverse with just a few clicks. For real estate owners this brings with it the additional uncertainty that existing virtual assets might suddenly lose value.

### (3) Legal uncertainty

The necessity of protecting metaverse users in areas such as data protection, monopoly abuse, digital property protection, and the approach to gamification elements (i.e. gambling) has increasingly led to calls for stricter regulation. Efforts are currently under way to regulate metaverses. For example, in the fall of 2022 the European Commission announced its intention to implement new standards for the metaverse in May 2023. These regulations can also be expected to have significant repercussions for legislation in Switzerland.

**Fig. 3: Massive price slump at start of 2022**

Average price of virtual land on “The Sandbox”, in USD

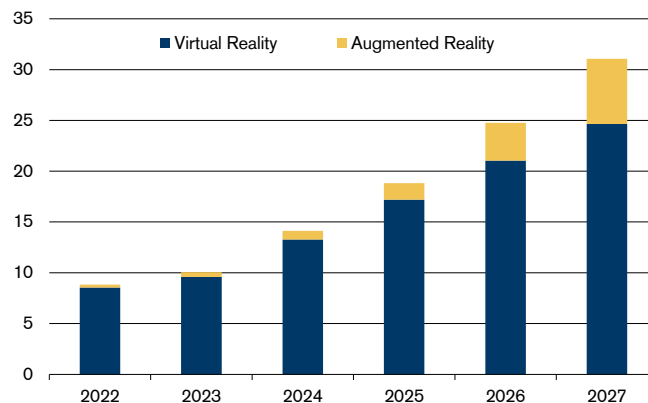


Source: CoinGecko

Last data point: 10.05.2023

**Fig. 4: Greater dissemination of VR and AR technology expected**

Forecast number of globally sold units of VR and AR glasses, in millions



Source: International Data Corporation

## New sales market for retailers

Although the metaverse has its doubters, it does offer companies all sorts of benefits. For one thing, retailers can sell their products in the metaverse – essentially making it a supplement to the traditional business in physical stores. By shifting business to the virtual environment, retailers can also tap into an additional sales market, as any existing geographical hurdles are removed. In addition, the metaverse enables companies to build up a whole new kind of business. They can make virtual products available in metaverses that users can then buy for their avatars. These virtual status symbols (e.g. “skins”) represent a multi-million-dollar business, with which game developers

<sup>2</sup> Cf. Goldberg, M. and Schär, F. (2023). Metaverse governance: An empirical analysis of voting within Decentralized Autonomous Organizations. *Journal of Business Research*, 160, 113764.

<sup>3</sup> Cf. Wired (2022). The crazy economics of metaverse real estate.

have been earning good sums of money for years now. With the rise of the metaverse, companies with no previous history in this sector have an opportunity to generate an additional source of income – like the food company Nestlé, which sells virtual costumes of Lion Cereals in Decentraland and uses the revenues to make charitable donations. Last but not least, a company can strengthen its brand with its presence in the metaverse, as a business generates additional visibility in a virtual environment.

### **Outsourcing work to virtual platforms**

The metaverse is also opening up new opportunities for the workplace of the future. In time it will be possible to hold meetings and workshops online using avatars, without the need for physical office premises or for employees to make long journeys. Furthermore, the metaverse is conducive to more immersive and interactive exchanges than a conventional video call via Zoom, Skype or Teams. In view of the rising volume of work carried out from home ever since the pandemic, it is not surprising that Meta Platforms Inc. is focusing heavily on these applications in the metaverse.

### **Additional forms of interaction**

There are further promising areas in which the real estate market can engage with the metaverse. For example, real estate service providers can create a virtual twin of a physical apartment in the metaverse, which interested parties can then visit with VR glasses from the comfort of their own homes, even to the point of installing virtual furniture. The potential areas of application offered by the metaverse for the real estate industry appear multifaceted, but they have one thing in common: Offers of this kind can already be implemented with existing technologies, and it appears that the demand for expansion to the metaverse is not yet that strong. Real estate service providers in Switzerland already offer virtual apartment viewings on their websites, and offerings in combination with VR glasses are already present in Switzerland.<sup>4</sup> At the same time, recent experience with AltspaceVR – a virtual platform on which users were able to socially interact and collaborate – suggests that social VR platforms do not yet have the necessary penetrative power. On March 10, 2023, Microsoft announced that it would be shutting down Altspace VR.

### **Conclusion: A metaverse revolution is not (yet?) taking place**

There are a number of factors influencing the future of the metaverse and its repercussions for the traditional real estate market. On the one hand, the success of metaverses will depend on whether people really will spend more time in the virtual world in the future and end up making purchases or holding meetings there. On the other, precisely how companies weigh up the opportunities and risks of a presence in the metaverse will be crucial. High price volatility, a lack of clarity over the penetrative power of virtual platforms, and legal uncertainties pose obvious hurdles for companies wanting to use the metaverse as a supplement to their existing (digital) offerings in the real estate market. Last but not least, the availability of the technologies (e.g. VR glasses) that are crucial to the metaverse will play a role. Although the International Data Corporation is anticipating greater dissemination of virtual and augmented reality glasses going forward (Fig. 4), the example of AltspaceVR shows that the metaverse is not yet generating the expected results. It is important to bear in mind that the transition to any new technology entails substantial costs, and will therefore only unfold slowly. Accordingly, it would be misleading to say from today's standpoint that a metaverse revolution is taking place. That said, it is too early to write off the metaverse altogether. After all, the metaverse could well experience a similar trajectory to the internet: After a great deal of initial hype, the collapse of the dotcom bubble in March 2000 seemed to be a serious blow to the evolution of the internet, yet fast-forward to today and life is simply unimaginable without it.

<sup>4</sup> As early as 2017, the real estate service provider Privera became the first company to open a showroom in which prospective tenants could view an apartment using VR glasses.

# Soft landing expected

**The market for owner-occupied residential property is on course for a soft landing. Despite plummeting demand, supply is rising only gradually due to the prevailing housing shortage, while prices are still heading upward for the time being.**

## Supply increasing but still low

The available supply of owner-occupied residential property is increasing slowly but steadily. The number of condominiums climbed by 2,300 to more than 21,750 units in the first quarter of 2023. In the same period, 16,650 single-family homes were advertised online, which equates to a rise of 970 homes since the end of last year. In other words, waning interest in property ownership due to the sharp jump in mortgage rates is increasingly leading to greater supply. However, at 1.8% for condominiums and 1.6% for single-family homes, supply rates remain low compared to the historical averages since 2006, namely 2.1% for condominiums and 2.4% for single-family homes, despite the recent increase (Fig. 5).

## Virtually no regional differences

Compared to the prior year, supply has increased in 76 of Switzerland's 110 economic regions (Fig. 6). Regional differences are few and far between. Supply has largely picked up of late in both expensive residential locations and peripheral regions. Declining supply rates, on the other hand, are quite rare. Decreasing supply is still evident in regions with tourist destinations – such as the Upper Engadine – due to a smaller drop in demand for second homes. Supply in French-speaking and Italian-speaking Switzerland is significantly higher in general. The highest levels of supply recorded by us are in Ticino, where construction activity remained vigorous over a prolonged period and has only contracted in recent years. This and shrinking demand are responsible for the region's relatively high supply rate.

## Time-on-market remains low for the time being

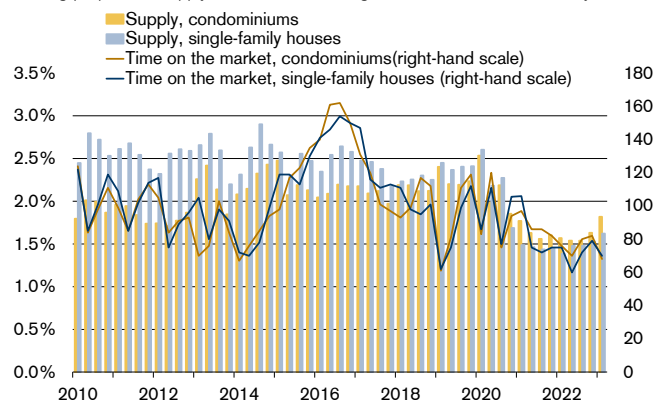
In terms of marketing, the drop in demand has been primarily reflected by a lower number of potential buyers interested in an individual property. Meanwhile, the average time of a property on the market remains historically very low despite the uptick in supply. In the first quarter of 2023, condominiums were advertised for sale for 68 days on average, compared to 70 days for single-family homes (Fig. 5). It is therefore not the case that the properties being advertised are failing to attract any buyers. However, the sharp drop in the number of interested parties is making the marketing process more challenging. This is particularly noticeable when setting prices, which can be crucial to a sale's success and requires more sensitivity in the current market environment.

## Demand down again in 2023

Demand for owner-occupied property also cooled at the beginning of 2023. The demand indices for condominiums have fallen 22% from their peak, compared to a decline of 27% for single-family homes (Fig. 7). This means that demand in both segments is now back below the level of 2019, before the Covid-19 pandemic really kick-started demand.

**Fig. 5: Supply rises from its lows**

Existing properties, supply rate in % of housing stock, time on market in days

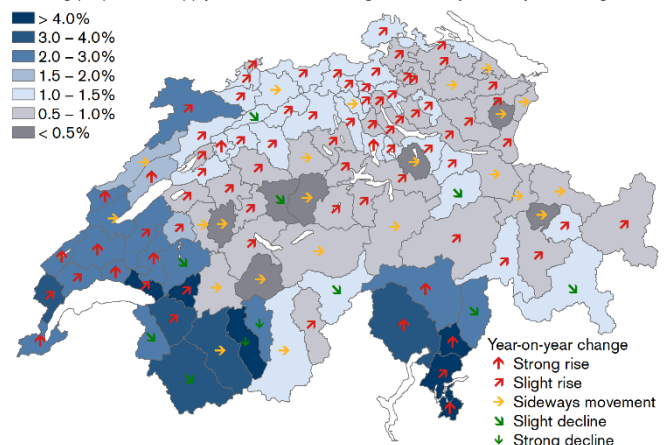


Source: Meta-Sys, Credit Suisse

Last data point: Q1 2023

**Fig. 6: Higher supply in more than two-thirds of regions**

Existing properties, supply rate in % of housing stock and year-on-year change



Source: Meta-Sys, Credit Suisse, Geostat

Last data point: Q1 2023

## Price growth softening considerably

Thanks to the pronounced scarcity of housing, properties are generally still finding buyers despite evidence of declining demand, and prices are continuing to rise. As we expected, however, growth slowed significantly in the first quarter of 2023, with the annual growth rate for condominium prices falling from 5.2% to 3.5% (Fig. 8). For the first time in years, this was lower than the long-term average since 2000 (3.8%). For single-family homes, the growth rate of 3.6% was slightly above the average of 3.4%. In this segment of the market too, however, there was evidence of a marked slowdown within a single quarter (Q4 2022: +5.5%).

## Steepest price rises in tourist regions

The highest growth rates were recorded in the popular tourist cantons of Graubünden and Valais, in which the advertised supply has remained comparatively stable. In central Switzerland, the highest growth was recorded in the cantons of Zug and Zurich. That said, price growth is losing momentum almost everywhere in the country. On the other hand, other than in the half-cantons of Appenzell Ausserrhoden and Innerrhoden and the regions of Schwarzwasser and Val-de-Travers, price growth remains in positive territory across all regions.

## Further interest rate hikes to trigger sustained increase in supply

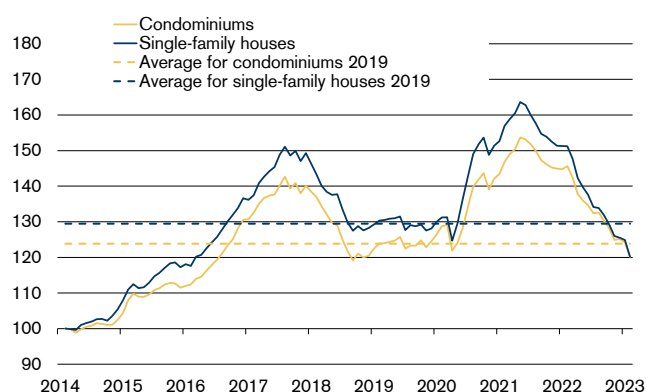
We are expecting the Swiss National Bank to raise interest rates further. Specifically, we are anticipating a rate move of 50 basis points in June and then a final hike of 25 basis points in September. Money market mortgages in particular are set to become more expensive again as a result, which will probably lead to an ongoing decline in demand. As a consequence, we expect supply to keep growing over the coming quarters, hence marketing will become more challenging. Although vacancy rates are likely to remain modest, they can be expected to rise from their current lows of 0.45% (condominiums) and 0.50% (single-family homes).

## Prices set to fall from 2024 onward

As supply increases, the slowdown in price appreciation is likely to continue as the year goes on. However, we still expect positive growth up to the end of this year. We are reaffirming our forecasts set out in the 2023 real estate study, namely price growth of 0.5% for condominiums and 1.5% for single-family homes. However, due to the ongoing contraction in demand we expect annual price declines in low single-digit percentage territory from 2024 onward. The trend in the first few months of this year confirms our view that the owner-occupied residential property market is likely to experience a soft landing with limited price corrections, following a remarkable period of growth in which prices climbed almost continuously for 21 years.

**Fig. 7: Demand now back below level of 2019**

Demand indices for residential property; index: February 2014 = 100

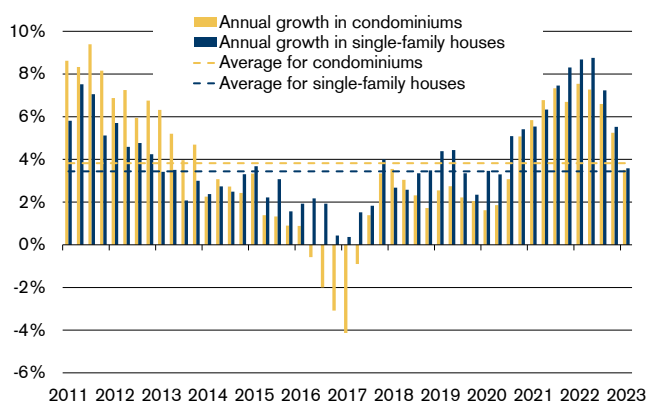


Source: Realmatch360, Credit Suisse

Last data point: 02/2023

**Fig. 8: Price growth halves within the space of a year**

Transaction prices for owner-occupied homes, annual growth rates for average properties



Source: Wüest Partner

Last data point: Q1 2023



# The growing challenge of finding a home

**The Swiss rental home market remains hot, with growing signs of a scarcity of available properties. While it would be exaggerating things to describe the current situation as a housing crisis, it has become much more difficult for prospective tenants to find a property.**

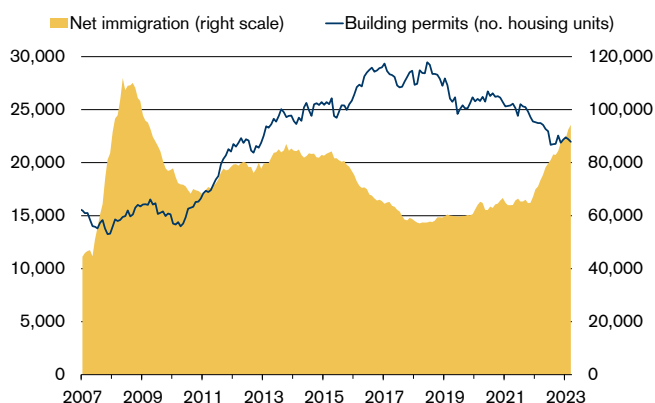
## Growing gulf between supply and demand

As in the last two years, the residential rental market remains on a sharp upward trajectory, with demand buoyed by Switzerland's relatively robust economy. This is unsurprising in view of the net migration data for the foreign resident population, which increased by almost one-third last year alone. In the first quarter of this year, 29,000 arrivals were recorded on balance, a year-on-year rise of 24%. At the same time, there is little evidence of any near-term reversal of the current slump in construction activity. In the last twelve months, the number of building permits issued for rental properties was down by another 1,700 on the prior-year period. The gulf between supply and demand in the residential rental market is therefore still widening (Fig. 9).

## Fewer adverts, shorter marketing times

While the supply rate – i.e. the percentage of all rental homes currently being advertised – rose from 3.8% to 4.3% in the first quarter of 2023 (Fig. 10), this is likely to be a seasonal effect. Meanwhile, the moving average for the supply rate calculated over a one-year period declined further to 4.4% – the lowest level since 2016. At the same time, the metric of time-on-market continues to decline. This rate measures the average (median) amount of time that a property is advertised. While it generally took between 40 and 50 days for landlords to find a tenant between 2016 and 2020, the time-on-market for rental properties now averages only 25 days. Those looking for their dream rental property are therefore under increasing time pressure. However, from a long-term perspective these levels are not exceptionally low. Oversupply was an issue in many locations between 2015 and 2020, but has steadily diminished of late.

**Fig. 9: Less construction activity, more inward migration**



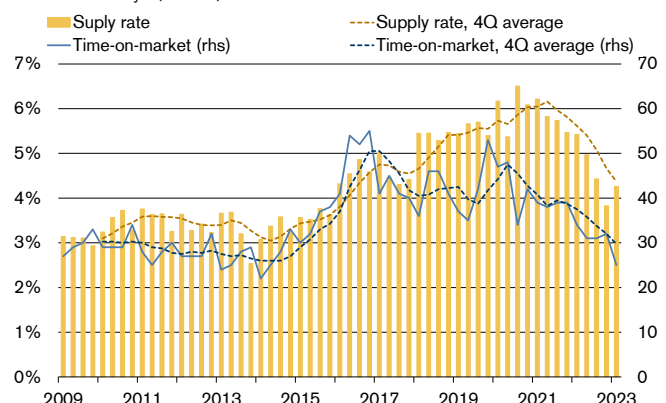
Source: State Secretariat for Migration, Baublatt, Credit Suisse  
Last data point: March 2023

## Turnaround more advanced in German-speaking Switzerland

However, the market situation varies appreciably from region to region. Time-on-market data for the various cantons confirms the divide between German-speaking Switzerland and the rest of the country highlighted in our Swiss Real Estate Market 2023 study (published in March) on the basis of regional vacancy rates. Compared to the German-speaking region, the residential rental market elsewhere is at an earlier stage of recovery (Fig. 11). The time-on-market is close to the long-term average in all cantons of French-speaking Switzerland, while it is even slightly higher in the cantons of Neuchâtel, Jura and Ticino. Conversely, advertising periods in many German-

**Fig. 10: Shrinking supply, shorter time-on-market**

Residential rental market indicators: supply rate in % of rental housing stock, time-on-market in days (median)



Source: Meta-Sys, Credit Suisse  
Last data point: Q1 2023

speaking cantons have fallen sharply relative to the long-term average. This trend is most pronounced in the cantons of Zug (–71%), Schwyz (–49%), Nidwalden and Uri (–44%) in central Switzerland, as well as in the eastern canton of Graubünden (–57%).

### Scarcity in the city of Zurich increases pressure on conurbation

The heated market in the wider Zurich conurbation is particularly noticeable. Three regions bordering the city of Zurich – Zimmerberg, Limmattal and Pfannenstiel – all exhibit a time-on-market more than 40% below the long-term average (Fig. 13). The median time after which residential properties in the regions of Zimmerberg and Limmattal are taken off the market is now 13 and 14 days respectively, which is similar to the situation in the city of Zurich (14 days). This is probably a result of excessively low construction activity in Zurich, which is unable to keep pace with the high level of demand. Demand is therefore shifting to surrounding regions, an effect that has likely been heightened by the greater prevalence of home working.

### Sharp drop in supply even in regions some distance from population centers

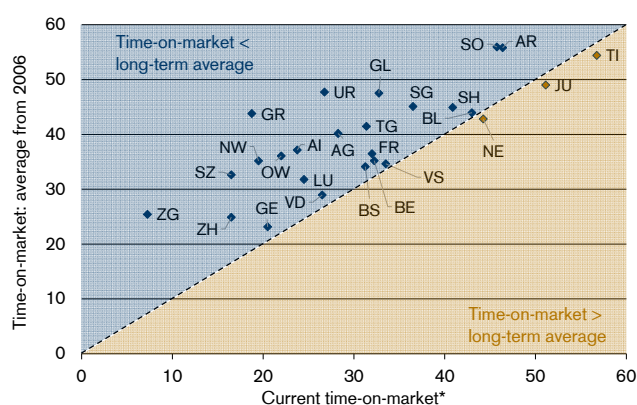
The trend in some regions located a long way from the major urban centers is particularly surprising, with supply rates and time-on-market even setting new record lows. For example, at just ten days the Bündner Rheintal – i.e. the region surrounding the cantonal capital of Chur in the Rhine valley – has recorded the third-lowest time-on-market of any of Switzerland's 110 economic regions over the past four quarters (Fig. 13). The top 20 regions with the shortest time-on-market also include tourist centers such as Davos (14 days) and Brig (21 days). These regions too are likely to be benefiting from the home-working effect. Furthermore, the Brig region has received a boost from the significant expansion of the Lonza pharmaceuticals and chemicals group in the nearby town of Visp, where the length of time dwellings are marketed for has also almost halved. Moreover, additional pressure on the residential rental market is also evident in regions popular with tourists due to the rebound in demand for second homes. Due to the Federal Act on Second Homes, this demand can only be met by existing properties, which in some cases means that primary residences constructed under previous legislation need to be repurposed.

### Sharp growth in rents in central Switzerland

The decline in the supply of homes and the geographical structure of the supply are directly reflected in market rents. Growth in rents has accelerated of late. 2022 saw advertised rents across Switzerland rise by 1.6%, with the central Switzerland region experiencing the sharpest increase of 3.9% (Fig. 12). The regions in which French and Italian are spoken lie at the other end of the spectrum. For example, in the Lake Geneva region rents were up by just 0.3%, while in the wider French-speaking Switzerland region advertised rents actually fell slightly by 0.2%. As the gap between supply and demand is unlikely to close in the medium term, a further acceleration in rent rises can be expected across Switzerland (forecast for 2023: +3.0%).

**Fig. 11: Finding a rental apartment taking longer in most cantons**

Current median time-on-market (\*four-quarter average, as at Q1 2023) compared to the long-term average, by canton

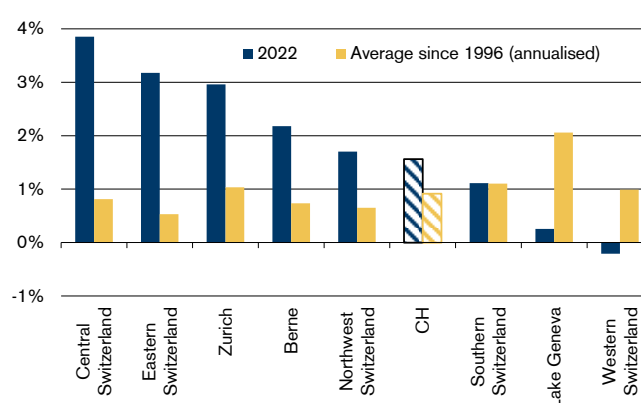


Source: Meta-Sys, Credit Suisse

Last data point: Q1 2023

**Fig. 12: Trend in rents reflects supply situation**

Annual growth rates in advertised rents by market region (Wüest Partner)



Source: Wüest Partner, Credit Suisse

Last data point: Q4 2022

### Conclusion: no housing crisis yet, but market is increasingly tight

The days when landlords were complaining about rising vacancy rates, prompting some to offer tenants rent-free months, are therefore over. These are tougher times for people seeking a rental property, who are facing dwindling supply and higher rents. Nevertheless, in most regions it would be wrong to talk about a housing crisis in our view. That said, from the tenant perspective what is more concerning than current supply levels is the fact that there is not yet any prospect of easing in sight. The scarcity trend is likely to persist over the coming quarters, even reaching regions that currently have an adequate supply of housing. This is because construction activity is set to remain

too low over the next couple of year, while the urgently required process of building densification has so far been too sluggish.

**Fig. 13: Top 20 regions with the shortest time-on-market for rental apartments**

Rental apartments, median time-on-market (number of days) and supply rate; \* 4-quarter average, \*\* 2006 – 2022

Ranking	Economic region	Time-on-market Q1 2023*	Change versus long- term average	Supply rate Q1 2023*	Change versus long- term average **
1	Lorzenebene/Ennetsee	7	-71%	1.4%	-57%
2	Zuger Berggemeinden	8	-74%	1.5%	-62%
3	Bündner Rheintal	10	-77%	1.3%	-72%
4	Zimmerberg	13	-47%	2.5%	-27%
5	Limmattal	14	-48%	2.4%	-27%
6	Zürich-Stadt	14	-27%	2.2%	-2%
7	Domleschg/Hinterrhein	14	-70%	1.8%	-56%
7	Davos	14	-65%	2.1%	-48%
9	Glattal	15	-40%	2.5%	-29%
9	Knonaueramt	15	-55%	3.0%	-33%
11	Winterthur-Stadt	15	-29%	2.8%	-12%
12	Pfannenstiel	16	-49%	2.6%	-35%
13	March/Höfe	16	-49%	2.4%	-40%
14	Innerschwyz	18	-47%	1.7%	-51%
15	Einsiedeln	18	-51%	2.3%	-43%
16	Nidwalden/Engelberg	19	-47%	2.0%	-33%
16	Furttal	19	-36%	3.2%	-15%
18	Genève	21	-11%	2.5%	+26%
19	Brig	21	-41%	1.8%	+35%
20	Oberland-West	21	-27%	3.1%	-21%
	<b>Switzerland</b>	<b>30</b>	<b>-14%</b>	<b>4.4%</b>	<b>+6%</b>

Source: Meta-Sys, Credit Suisse

Last data point: Q1 2023

# Interest rate trend reversal to impact reference interest rate

**On June 1, 2023, the reference interest rate has climbed to 1.5 percent. Another rise could follow toward the end of the year, triggering rent increases of up to 10% in total.**

**Reference interest rate increased for the first time on June 1, 2023 ...**

Inflation in Switzerland, which though moderate by international standards remains stubborn, has prompted the Swiss National Bank (SNB) to hike its policy rate from -0.75% to +1.5% within the space of just nine months. This rapid-fire series of rate hikes has now resulted in an increase in the mortgage reference interest rate, which determines the trend in rents for existing rental agreements. On 1 June 2023, the Federal Office for Housing has announced an increase in the reference interest rate to 1.5%. After a number of years in which longstanding tenants in particular benefited from rent reductions on several occasions, they now face rising costs. In most cases, the increase will take effect from October 2023 onward.

**...with another hike likely by the end of this year**

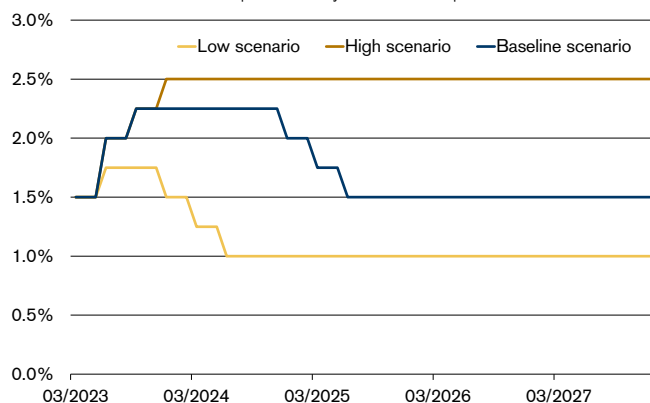
There are likely to be further increases in the reference interest rate. We have envisaged three different policy rate scenarios for the period up to end-2027 (Fig. 14) and modeled their implications for the reference interest rate trend. In our baseline scenario, we expect only a slow decline in inflation and two further rate moves to a peak of 2.25%, followed by a gradual fall back to 1.5% from end-2024 onward. Under this scenario, which we see as the most likely, a second increase in the reference interest rate to 1.75% can be expected as early as December 2023, with a third and final rise set to follow a year later (Fig. 15). In the alternative "low" and "high" scenarios we likewise anticipate a second increase toward the end of the year. Under the "low" scenario this would mark the peak, whereas in our "high" scenario we envisage a total of five hikes by early 2027.

**Rents for existing tenancy agreements likely to rise by up to 10% in a year**

It is highly likely that the reference interest rate will climb to 1.75% by December 2023. As a result of this increase, net rents calculated at a reference interest rate of 1.25% are set to rise by 6% by April 2024. However, as landlords can also claim 40% of cumulative inflation as well as (typically) general cost increases of 0.5% per year, rents may rise by as much as 10%. However, tenants frequently have to actively push for rent reductions after any fall in the reference interest rate. Around half of all tenancy agreements are therefore likely to be based on a reference rate higher than the existing figure of 1.25%. As a consequence, the average rise in rents is likely to be lower and no more than 7%. Nevertheless, it will come at a bad time for many tenants, who are already facing huge increases in ancillary and energy costs. At the same time, however, higher rental income for landlords will go some way toward offsetting the pressure on property values exerted by higher interest rates.

**Fig. 14: Scenarios for the SNB policy rate**

Three scenarios for the development of key interest rate up to late 2027

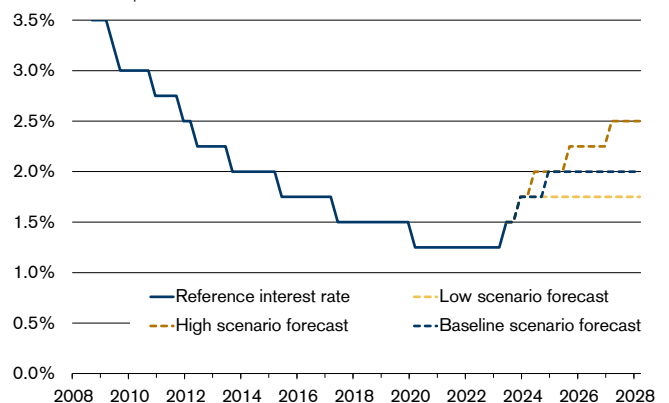


Source: Credit Suisse

Last data point: 03/2023

**Fig. 15: Reference interest rate set to rise twice in 2023**

Forecast development of reference interest rate – three scenarios



Source: Federal Office for Housing, Credit Suisse

Last data point: 06/2023

# Housing market

## Interest rates of SARON mortgages likely to rise further

SARON mortgages have become more expensive following a rise in Switzerland's key interest rate by a further 50 basis points (bps) in March 2023. SARON rates are therefore increasingly converging with those of medium-term and long-term fixed mortgages. In view of the anticipated increases in the key rate in both June and September (+50 bps and +25 bps respectively), the interest rate difference is likely to be almost eradicated. As before, however, the general development of fixed mortgage interest rates is likely to be accompanied by major movements both up and down. That said, as we are expecting a gradual decline in inflation over the next few quarters, the interest rates of fixed mortgages are unlikely to rise above the level recorded last fall.

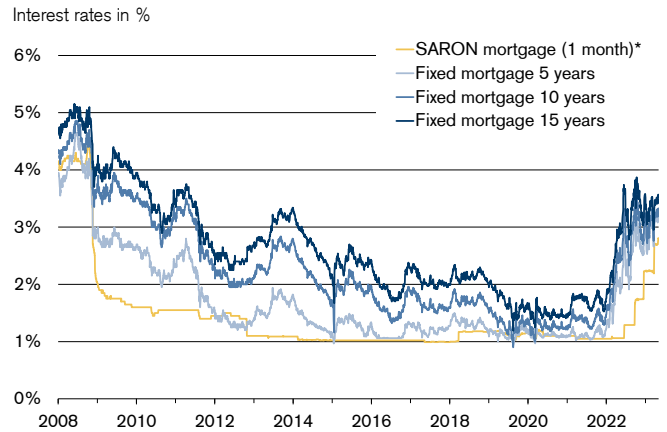
## Owner-occupied housing: Decline in construction stabilizes market

Newbuild activity in the owner-occupied housing segment continues to decline. Over the last 12 months, 9,800 condominiums and 6,020 single-family homes were approved for construction. This is equivalent to a year-on-year decline of a further 12% (CDM) and 5% (SFH) respectively. There is no sign of any trend reversal over the next two to three years. Planning applications for condominiums are below the prior-year level, despite a recent rise, and the rise in projected construction activity for single-family homes from 2021 onward has turned out to be unsustainable. Persistently low newbuild activity should prevent an excessive oversupply situation from arising, despite the strong decline in demand.

## Rental apartment construction: Planning applications halt prolonged slide

The number of annually submitted planning applications in Switzerland, which at one time exceeded 30,000, has been on a downward trajectory since the end of 2019. However, there have been signs of stabilization recently. Over the last 12 months, the number of projected new apartments has outstripped the prior-year figure by 3,000. However, it is too early to say whether this constitutes a reaction to the increasing problem of scarcity in the rental apartment market or just a temporary spurt. There have also been recent signs of stabilization in the number of building permits being issued, but the annual total is still more than 1,700 residential units below that of the prior-year period.

**Fig. 16: Historical development of mortgage rates**



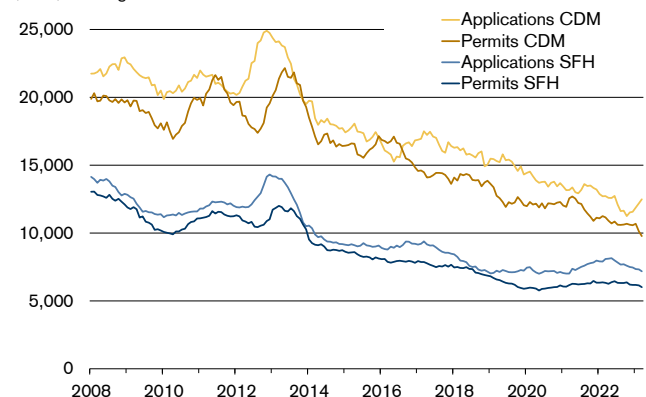
\* Interest rates for SARON mortgage from 21.09.2020. Earlier historic interest rates: flex rollover mortgage (3-month LIBOR).

Source: Credit Suisse

Last data point: 05.05.2023

**Fig 17: Planning applications / permits: owner-occupied housing**

Number of residential units (newbuilds), single-family homes (SFH) and condominiums (CDM), moving 12-month total

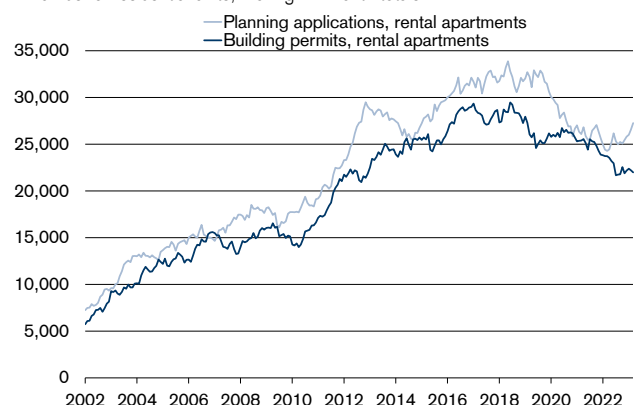


Source: Baublatt, Credit Suisse

Last data point: 03/2023

**Fig 18: Planning applications / building permits: rental apartments**

In number of residential units, moving 12-month totals



Source: Baublatt, Credit Suisse

Last data point: 03/2023



## Commercial real estate

### Office space: Economic stimulus wanes

Even with the end of the COVID-19 pandemic and the return of most workers to the office, some uncertainty remains over the future need for office space, and this is weighing on demand. Nonetheless, demand for office space has experienced an interim surge thanks to high employment growth. Total employment in Switzerland rose by 2.4% in 2022, the strongest rise since 2007. However, with the usual time lag the latest economic slowdown is having an impact on the labor market too – in the fourth quarter of 2022 employment recorded a quarter-on-quarter rise of just 0.2%. Of the various office sectors, the main source of support recently has been the public sector, whereas the likes of corporate services appear to have already passed their peak.

### Office newbuild activity at nadir

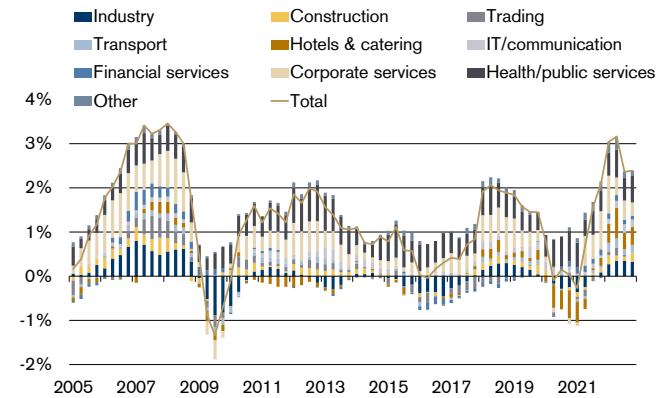
Despite weakening economic stimulus, the volume of office property being advertised for let can be expected to remain stable in 2023. One reason for this is the ongoing dearth of office newbuild activity. Over the last 12 months, the volume of building permit issuance in this sector was just CHF 1.35 billion despite higher construction costs – the lowest level for more than 20 years. Despite a slight recent recovery, the volume of newly submitted planning applications over the last 12 months is also 6% below its long-term average. By contrast, the trend for investments in existing housing stock is upward. This is likely to be attributable to the increasing focus on sustainability, along with changed requirements of office space in an era of multi-local working.

### Pressure on retail space persists despite recovery in sales

The Swiss retail trade recorded an overall decline in sales in 2022 (-2.9%), which was mainly due to the dwindling effects of the COVID-19 pandemic. For the current year we are expecting a recovery (+1.5%), with both the stable labor market and high immigration playing a supportive role. However, the expected increase in the food area in particular (+2.1%) is predominantly the result of high inflation. Following the powerful growth of online trading during the pandemic in 2020 and 2021, the migration of sales to the online channel took a pause last year. In the medium term, however, the trend of dwindling demand for retail space is likely to continue.

### Fig 19: Total employment growth by sector

Annual change in number of employed (full-time equivalents) in %

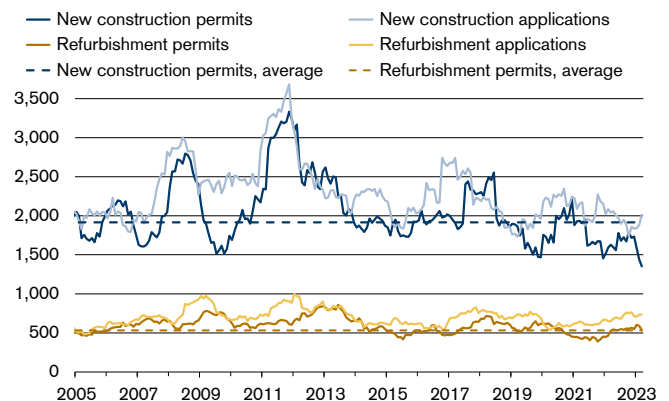


Source: Federal Statistical Office, Credit Suisse

Last data point: Q4/2022

### Fig 20: Planned expansion of office space

Planning applications and building permits, moving 12-month totals, in CHF mn

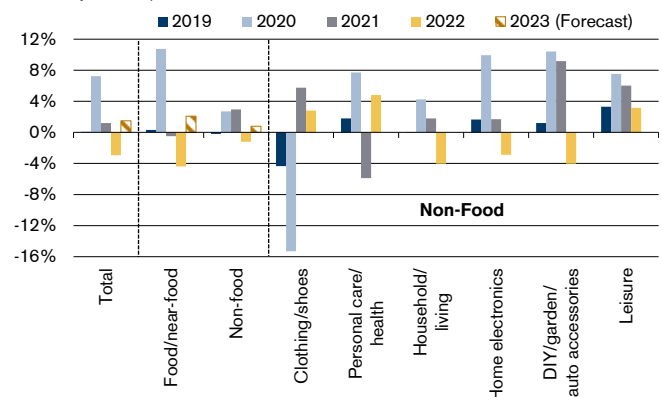


Source: Baublatt, Credit Suisse

Last data point: 03/2023

### Fig 21: Nominal retail sales

Year-on-year comparison, 2023: forecast



Source: GfK, Credit Suisse

Last data point: Q1/2023

## Real estate as investment

### Real estate investments: Protection against inflation is a trump card

With the end of the negative interest rate era, real estate investments have lost their cachet as the “no alternative” investment class. Over the period 2015 to 2021, listed Swiss real estate funds recorded an average yield premium of more than 290 basis points (bps) over 10-year government bonds. But as the interest rate trend went into reverse, this yield dropped sharply, at times falling below the 150 bps mark. However, this nominal view exaggerates the picture, as the income from real estate investment offers partial protection against inflation. Depending on expected inflation and the extent to which price rises can be passed on, the yield premium recently still amounted to some 250 bps when viewed in real terms.

### Listed real estate investments: Interest rate rises prevent recovery

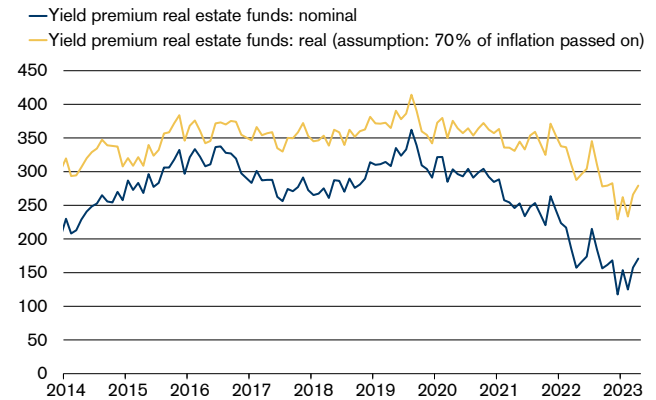
In contrast to the broad equity market (SPI: +11.0%), there has so far been little sign of recovery in the market for listed Swiss real estate investments this year. Rising interest rates have weighed on the performance of real estate investments globally, with the result that even Swiss real estate funds (+0.5%) and shares (+1.9%) have made little progress in reversing last year's slump. Investors worldwide are particularly skeptical of office property at the moment – the global index for Real Estate Investment Trusts (REITs) focusing on office space has declined by a further 11.1% this year. When measured against its value at the start of 2020, this cumulative correction is as much as –36.5%.

### Listed real estate investments: Correction anticipated

As recently as the start of 2022, investors were prepared to pay a premium of more than 40% to the net asset value of listed real estate funds. At the end of March 2023, the average premium had shrunk to just 12.8%. Indeed, various funds focusing on commercial real estate are even trading at a discount. Real estate investment companies, which are heavily invested in commercial property, are currently trading at an average discount of 4.0%. In other words, listed investments have already anticipated the correction hanging over direct investments. This opens up buying opportunities, particularly for investors with a longer-term investment horizon.

### Fig 22: Performance of Swiss real estate funds

Difference between distribution yield of listed real estate funds and yield on 10-year Swiss government bonds



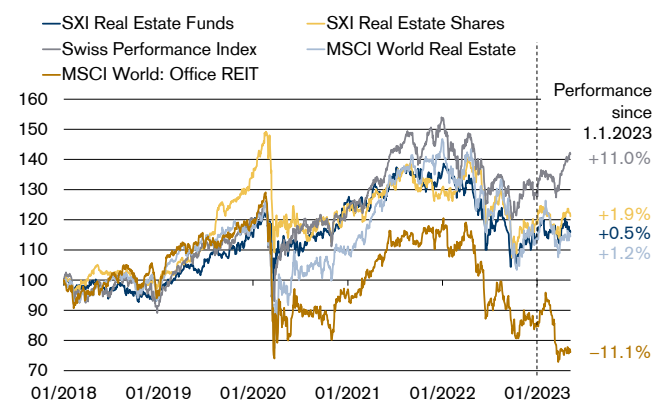
Historical performance data and financial market scenarios are no reliable indicator of future results.

Source: Refinitiv Datastream, Credit Suisse

Last data point: 04/2023

### Fig 23: Performance of indirect real estate investments

Total performance, index: January 1, 2018 = 100



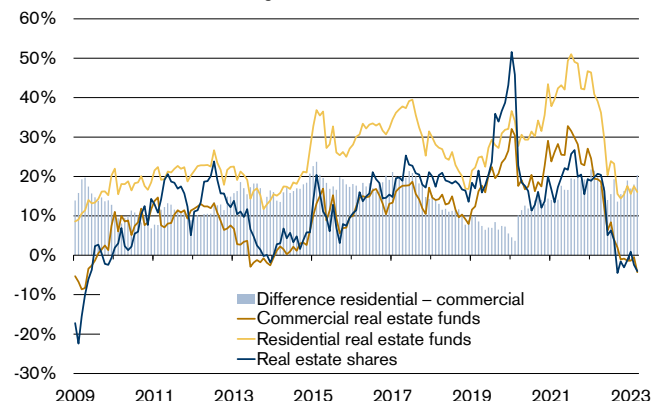
Historical performance data and financial market scenarios are no reliable indicator of future results.

Source: Refinitiv Datastream, Credit Suisse

Last data point: 09.05.2023

### Fig 24: Premiums of real estate funds and real estate shares

As % of net asset value, excluding mixed real estate funds



Historical performance data and financial market scenarios are no reliable indicator of future results.

Source: Refinitiv Datastream, Credit Suisse

Last data point: 03/2023

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