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The end of an era

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Editorial

Dear readers

The era of relentless upward price spirals for owner-occupied housing is now a thing of the past. At the end of 2016, prices for owner-occupied housing were for the first time lower than they had been a year earlier. This phase of price growth lasted an exceptionally long 14 years. Many real estate agents have never been confronted by falling housing prices in their professional career, and must adjust to the new constellation. For example: how do you persuade a homeowner with a property to sell that his asking price is simply too high? This is the kind of challenge facing housing estate agents today. Nonetheless, the market is quite stable. We expect price growth in the housing segment to be only slightly negative or flat in the coming quarters. Against the backdrop of surging prices in the past and fears – more audible since 2010 – of another real estate crisis in Switzerland, the latest development seems made to order from a regulatory point of view. Approvals of mortgage loans have also decelerated. Despite record-low interest rates, growth in mortgage volumes is as low today as it was at the end of the 1990s when the long-term price rally was just beginning to take off (page 7).

Another new facet today is that prices for single-family dwellings have taken the lead. For many years, condominiums reported higher growth in prices. This is no longer the case. Over the last four quarters, prices for condominiums in the medium segment in Switzerland have fallen appreciably, while price growth for single-family homes in the medium segment is still just inside positive territory. In our view, the main factors driving this change are the shift in demand for housing from the overly expensive centers to peripheral regions, and a lack of demand from borderline households (page 5). The lower demand for owner-occupied housing is reflected in fewer projects to build condominiums. Over the last 12 months, 18% fewer condominiums were approved for construction than in the year-earlier period (page 7).

But there are even more changes ahead for real estate agents. Real estate is going mobile. The use of augmented and virtual reality is revolutionizing real estate marketing. A virtual world can be created with a mix of video, photography and 3D renderings. This makes the properties accessible to anyone, anytime, and eliminates the need for potential buyers and agents to travel to a property for a viewing. These technologies offer enormous potential. The real estate market could become one of the most lucrative areas for applications in virtual reality (page 8).

Thanks to enhanced computer performance and more user-friendly programs, the options for calculating property valuations are also changing. In the discounted cash flow method typically used for real estate, the uncertainty attached to the forecast inputs is ignored for the sake of simplicity. The resulting property valuation thus pays too little heed to these uncertainties, and provides a mere perception of certainty. Monte Carlo simulations, in which computers factor in thousands of different scenarios, can depict the resulting risks and deliver the relevant information to investors (page 12).

On behalf of our authors, I hope you find our publication informative and inspiring.

Fredy Hasenmaile
Head Real Estate Economics

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Owner-occupied housing

Single-family dwellings take the lead

After 14 years of gains, price growth in the owner-occupied housing segment has come to a standstill. We expect prices to stagnate over the coming quarters. Prices for single-family dwellings should outpace those for condominiums, mainly since demand for homeownership is shifting away from unaffordable centers and the value of land is typically higher with single-family homes.

Slightly lower or flat prices expected

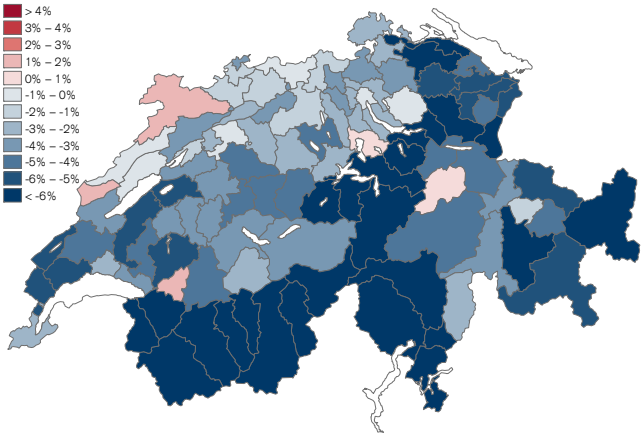
For nearly one and a half decades, condominium prices have moved in just one direction: north. The high price level and stricter regulations have cooled price growth for several years and, most recently, even brought it to a halt. Prices of owner-occupied housing are currently edging down in most regions of Switzerland, and should be more or less flat for the foreseeable future. Very low interest rates and a reduction in construction output argue against a sharper price correction. However, since ever fewer households meet the stricter regulatory requirements for financing, a surge in prices in the coming quarters is equally unlikely. In recent quarters, prices have risen most appreciably in regions where prices were still manageable. As a result, households with less than above-average income are increasingly unable to fulfill the affordability criteria for homeownership in these regions too.

Price development for single-family dwellings currently stronger

Prices have moved in divergent trends lately depending on the residential format. While prices for condominiums have fallen 4.1% over the last four quarters, prices for single-family homes were just inside positive territory with growth of 0.4%. Single-family dwellings reported stronger price growth in nearly all regions (cf. fig. 1 and 2). The picture was different in only two regions: prices for condominiums rose more than prices for single-family homes in Zug, and fell less sharply in Geneva. This was the norm for many years, since demand was narrowly focused on homes in urban settings, which typically boosts demand for condominiums (cf. fig. 3). Since the second half of 2014, however, single-family dwellings have reported stronger price growth (cf. fig. 4). In the next section, we discuss several different reasons behind this.

Fig. 1: Price growth in condominiums

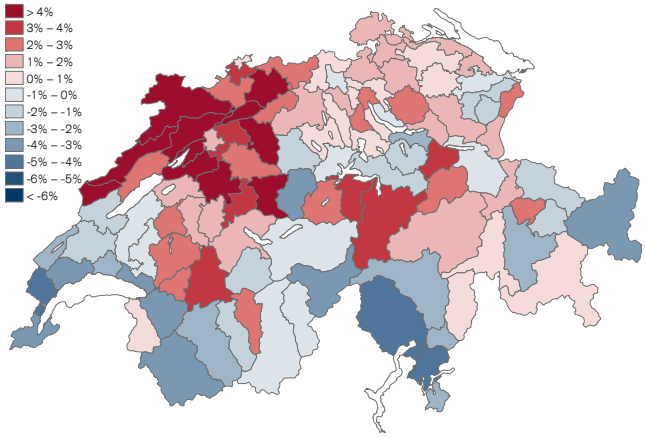
Change in transaction prices for condominiums (medium segment) in Q1 2017 compared to the previous year's quarter



Source: Wüest Partner, Geostat

Fig. 2: Price growth in single-family dwellings

Change in transaction prices for single-family dwellings (medium segment) in Q1 2017 compared to the previous year's quarter



Source: Wüest Partner, Geostat

Demand concentrates on inexpensive houses in peripheral regions

Homeownership is still more affordable in peripheral regions. Consequently, there is more demand from households in these regions for owner-occupied housing. Besides this local interest, there is additional demand from households in more expensive regions who are seeking homes at lower prices. Since single-family homes tend to dominate the market in peripheral regions, where condominiums are underrepresented, the aggregate demand tends to lift prices for single-family homes. In contrast, demand for homeownership has eased in urban areas, especially

among borderline households. This hits condominiums hardest, since they are more numerous in cities.

Single-family dwellings now extremely rare in urban areas

It is increasingly rare to find single-family homes in urban markets. The high price of land means that few single-family dwellings are built in cities. At the same time, existing homes are disappearing, most often in order to make room for new multi-family buildings comprising numerous condominiums. The scarcity of single-family homes in cities specifically supports their prices.

Stricter zoning has a positive impact on prices for development land

Under the new Spatial Planning Act, the requirements for designating zones as development land have become significantly stricter. This makes existing development land comparatively scarcer, both in and outside urban centers. In future, the pressure to develop land will have a more concentrated effect on existing building zones. The increasing scarcity, combined with expectations of greater exploitation due to a push to densify, inflate land prices. And since prices for single-family dwellings typically include a greater share of land value, their rise is currently steeper than prices for condominiums.

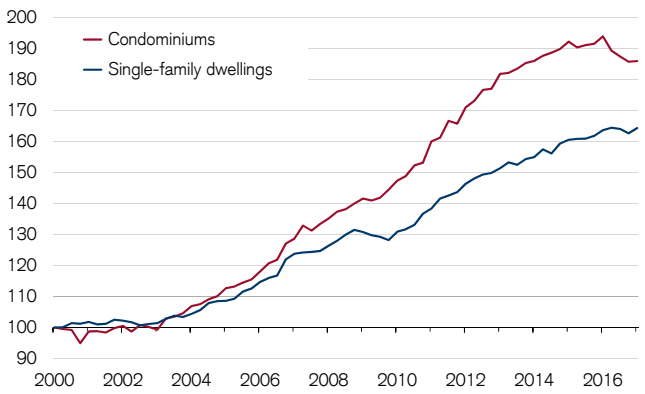
Falling interest rates boost value of single-family homes

Last year, the markets were surprised by a further drop in interest rates. Lower interest rates give a disproportionate boost to the value of single-family dwellings, since these homes retain their value longer. Here the value of the land accounts for a greater proportion of the property value, since unlike buildings, land is not subject to the same depreciation over time. So the value of single-family homes depends to a greater extent on events in the future: the further a certain value is projected into the future, the greater its exposure to interest rates. This is illustrated by simple present value calculations. Lower interest rates thus lift the value of single-family homes to a greater extent than the value of condominiums.

It is difficult to judge which of the factors mentioned above carries most weight. The fact that interest rates have been declining for some time suggests that the trend is more likely to be driven by the shift in demand to areas where single-family homes predominate, or by the increasing scarcity of building land.

Fig. 3: Comparison of single-family dwelling index and condominium index

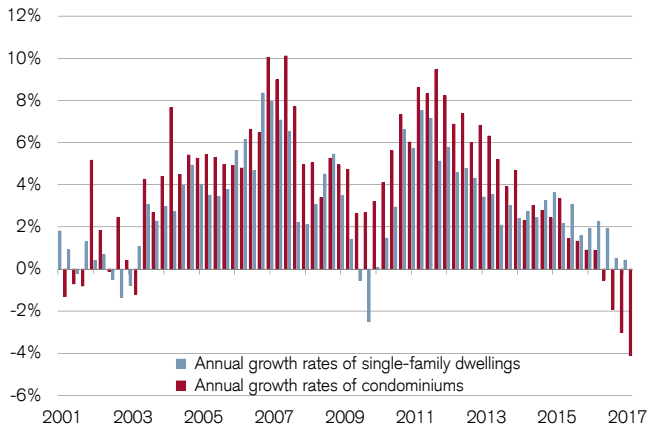
Transaction price indices for condominiums and single-family homes, Q1 2000 = 100



Source: Wüest Partner

Fig. 4: Comparison of growth rates for single-family dwellings and condominiums

Growth in transaction prices compared to the previous year's quarter



Source: Wüest Partner

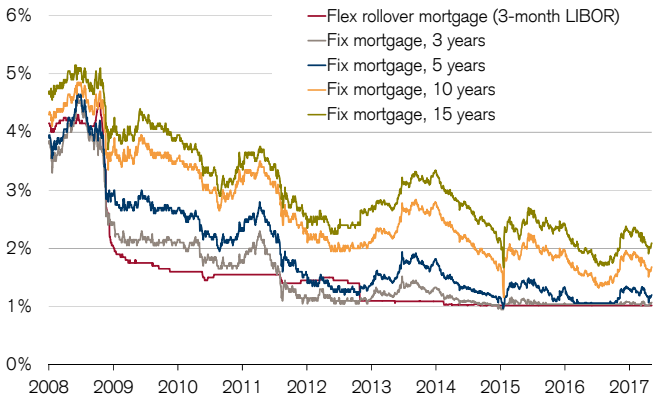
Owner-occupied housing

Mortgage rates remain low

Interest rates for Fix mortgages dipped in the early months of 2017, offsetting part of the rate increase that followed the US presidential election at the end of 2016. We expect the Swiss National Bank to leave the target range for policy rates unchanged at –1.25% to –0.25% over the next 12 months. Hence we expect a flat movement for Libor mortgages and Fix mortgages with short maturities. In contrast, interest rates for Fix mortgages with long maturities should begin to rise again in the coming 12 months, but on a volatile path.

Fig. 5: Mortgage rates for various terms

Mortgage rates for new loans, in %



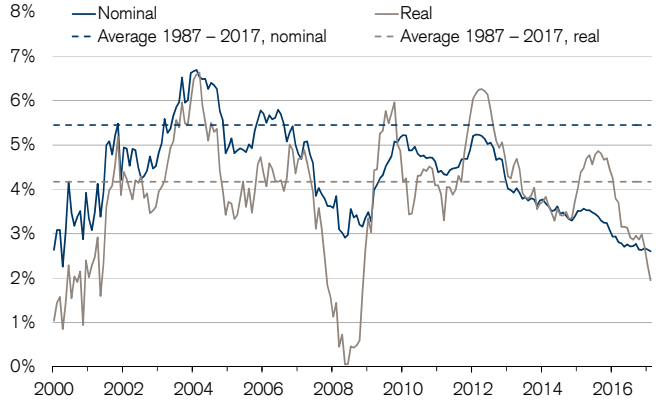
Source: Credit Suisse

Little growth momentum in mortgage volumes

Although mortgage rates are still very low, increasingly few households can afford to own their own home due to current price levels and stricter requirements for mortgage approvals. This depresses demand for owner-occupied housing and reduces the need for mortgages, as is evident in the development of mortgage volumes. Growth in mortgage volumes for private households is currently at 2.61% compared to the previous year. In real terms, the growth is just 1.95%, similarly well below the long-term average. The decline in nominal growth, however, has decelerated somewhat in recent months.

Fig. 6: Growth in mortgage volumes for private households

Growth in mortgage volumes compared to the previous year's month, in %



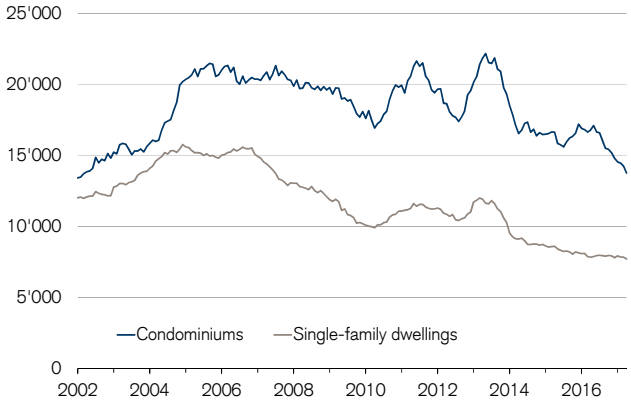
Source: Swiss National Bank, Credit Suisse

Normalization of construction activity

The momentum in construction of owner-occupied housing continues to decelerate. Over the last 12 months, building permits have been approved for nearly 14,000 condominiums and 7700 single-family homes. This is a decline of 18% year-on-year for condominiums and 1.6% for single-family dwellings. Rates of decline are highest in the centers, but many regions report cooling prices, even outside the high-price areas. Nonetheless, the expansion in owner-occupied housing remains at an average level in historical context. Hence it is more of a normalization phase than a collapse in construction activity.

Fig. 7: Planned construction of owner-occupied housing

Building permits, moving 12-month total



Source: Baublatt, Credit Suisse

Digitization

Real estate goes mobile

The use of augmented and virtual reality is revolutionizing real estate marketing. These technologies enhance the efficiency of the market and reduce risk for property developers.

Real estate market discovers AR and VR

To date, the augmented reality (AR) and virtual reality (VR) technologies have been mainly associated with video games. AR is the term for technologies that project virtual objects into the real world. The best known application using AR is Pokémon GO, the blockbuster smartphone game. VR is a computer-generated simulation of a real environment. In China, in particular, a growing number of business applications are springing up outside the gaming segment, including several for use in the real estate market. Following video games and entertainment, live events, healthcare and engineering applications, it is now the turn of the real estate market to unlock the greatest monetary potential for AR/VR applications. In Switzerland, too, both established companies and start-ups have begun to commercialize technologies for the real estate market.

From online tours to virtual commerce

AR and VR can spark fundamental change, particularly in the marketing of properties. Today, real estate agents can already show customers properties in faraway locations thanks to showrooms outfitted with VR devices. The first step into the virtual world is the virtual tour. Agents can walk potential buyers through properties available for rent or sale by means of a 360-degree video. The next level of technology is the interactive virtual visit, in which the user's movements are replicated in the virtual world. The most basic requirement for the user is a smartphone, but a VR headset can enhance the customer experience. A virtual world can be created with a mix of video, photography and 3D renderings. During the digital tour, the customer can enjoy a new experience, sensing the room's lighting and depth in a way not possible with standard videos and photography. This makes the properties accessible to all interested parties at any time of day, and eliminates the travel time and expenses for potential buyers and agents. It is easy to foresee the further development towards virtual commerce. During the virtual tour, changes to furnishings and other specifications can be made, and the customer can purchase the property at the same time.

Pre-marketing with 3D models

Another application for VR is to combine floor plans and a visualization of spatial models based on them. As long as the object exists only on paper, software solutions can be used to create a 3D model that enables agents to show the property pre-construction. Furthermore, the developer can present his project in an intuitive and understandable way that simplifies communication with his customers. The customer can enter right into the building before it is built and – if necessary – suggest changes. This helps to preclude misunderstandings and creates greater security for the construction work.

Enhance market efficiency, reduce risks

The key to the success of the technology is the customer experience for potential buyers and the level of realism of the virtual tours. Note that there is just as great a risk of manipulation in the virtual world, with a view to attracting more potential customers. Moreover, costs represent a barrier to entry, since it takes at the least a 360-degree camera to create a digital experience. As these costs subside, the scales are likely to tip in favor of the competitive advantages gained, since properties can be offered to a larger pool of potential buyers and house viewings become less important. And in the case of transactions involving large portfolios, the individual objects can be viewed virtually thanks to VR, obviating the need to plan physical visits to each site. The real estate market as a whole can gain in efficiency since these innovations reduce transaction costs. Moreover, development risk would diminish since projects could be marketed even before breaking ground, providing an early test of market appeal. Applications of AR and VR should ultimately benefit all market participants.

Rental apartments

Reference interest rate: Low for long

On June 1, 2017, the Federal Housing Office announced that the reference interest rate was being cut from 1.75% to 1.50%. The rate is likely to stay at this record-low level for quite some time now.

Lower reference interest rate despite rising tendency in long-term interest rates

The uptick in long-term interest rates in autumn 2016 and another increase in the base rate in the USA provide clear evidence that the era of ultra-accommodative central bank monetary policy is drawing to a close. But while the trend is gradually reversing on the capital markets and in mortgage lending, the reference mortgage rate, which dictates the trend in existing rents, is still moving south (cf. Fig. 8). What is good news for many tenants comes at a bad time for landlords who are facing rising refinancing costs, higher vacancies and increasing pressure on market rents when contracting with new tenants.

Movement in the average interest rate is very sluggish

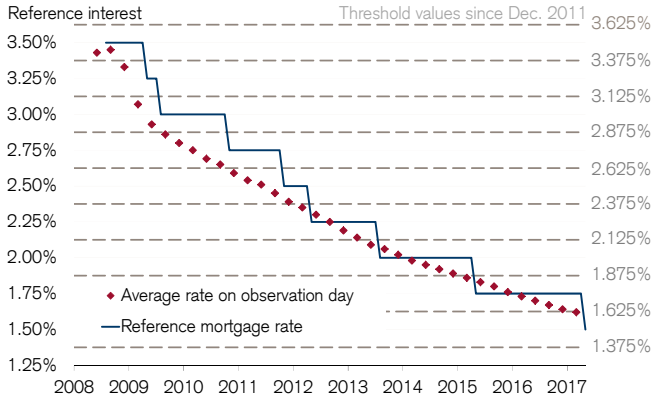
The contradictory movement by the reference interest rate is due to the inherent lethargy of the average interest rate upon which it is based (cf. Fig. 9). This is calculated from the average of all outstanding mortgages. Since Fix mortgages, which account for a large share of the total, are included in the calculation for their entire term, the average interest rate reacts extremely slowly to changes. The pace is further impeded by the behavior of borrowers, who respond to changes in the yield curve by adjusting their maturity mix.

Further decline unlikely, but so is a rapid rise

The average interest rate has been falling steadily since 2009, though the pace of its decline has tapered off lately. For a further decrease in the reference interest rate to 1.25%, the average interest rate would have to drop below the 1.375% threshold. We consider such a scenario highly unlikely, since longer-term maturities have probably already bottomed out and lower rates are not expected for short maturities – even in the improbable case of a further cut in key interest rates by the Swiss National Bank. At the same time, a rapid rebound in the reference interest rate is equally unlikely, since the effect of cheaper credit extensions would outweigh that of a return to slightly rising rates for new borrowers. For example, the interest rate on a ten-year Fix mortgage is around 270 basis points lower than it was ten years ago. So we expect the reference interest rate to remain at 1.5% into the second half of 2019 at least, and thereafter to rise at a very slow pace.

Fig. 8: Mortgage reference interest rate

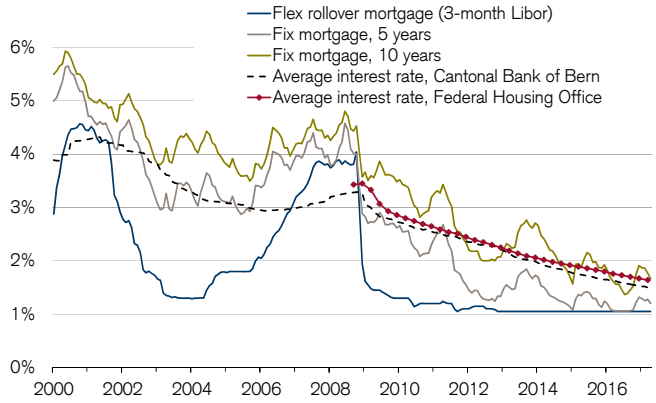
Reference interest rate and relevant average interest rate



Source: Federal Housing Office, Credit Suisse

Fig. 9: Mortgage rates and average interest rate

Mortgage rates (new loans, monthly average) and effective average interest rates



Source: Credit Suisse, Federal Housing Office, Cantonal Bank of Berne

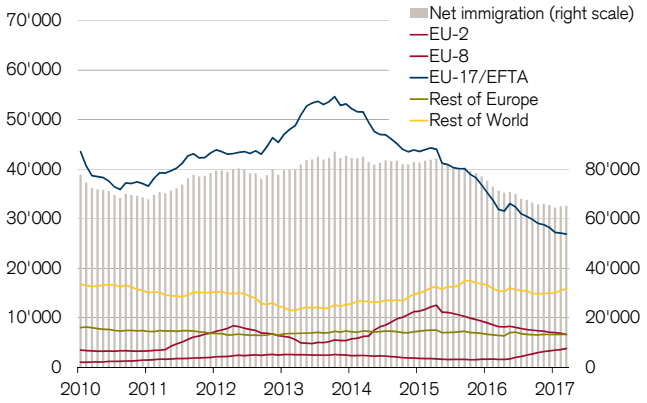
Rental apartments

Immigration stabilizing at a lower level

After the sharp drop in immigration last year that brought the rate to its lowest level since Switzerland introduced the free movement of persons with the EU, immigration stabilized in the first quarter of 2017. This was partially due to a slight increase in net immigration from non-EU nations and more migrants from the EU-2 states of Bulgaria and Romania. The latter should taper off over the course of the year, however, especially since the Federal Council has imposed temporary restrictions on workers from these EU-2 states under the safeguard clause. On balance, we expect net immigration in 2017 to be roughly equal to last year's figure.

Fig. 10: Net immigration

Permanent foreign residential population, by nationality and total (excluding registry corrections), 12-month totals



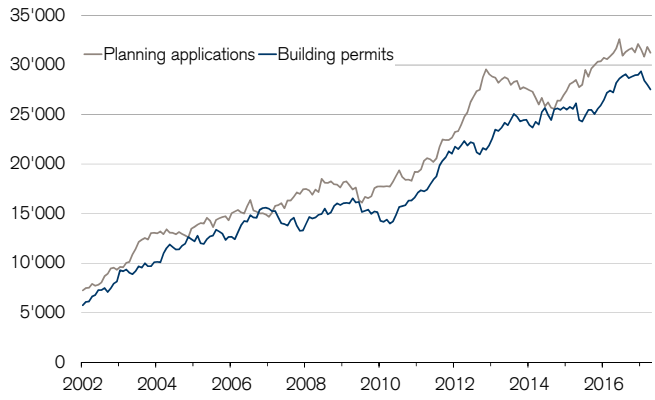
Source: State Secretariat for Migration, Credit Suisse

Construction still booming

The boom in construction of rental apartments is likely to continue beyond the current year. Recently, there was a slight decline in the number of housing units approved for construction. As vacancies rise, marketing new apartments becomes more challenging – a fact that should gradually penetrate investors' consciousness. But for now, the relatively attractive cash flow yields are too tempting to resist. The ongoing high number of planning applications also suggests that a trend reversal has not kicked in yet. Over the last 12 months, planning applications for 31,000 housing units have been submitted, a figure that is only slightly lower than last year's peak.

Fig. 11: Construction of rental apartments

Planning applications and building permits, 12-month totals, in number of housing units



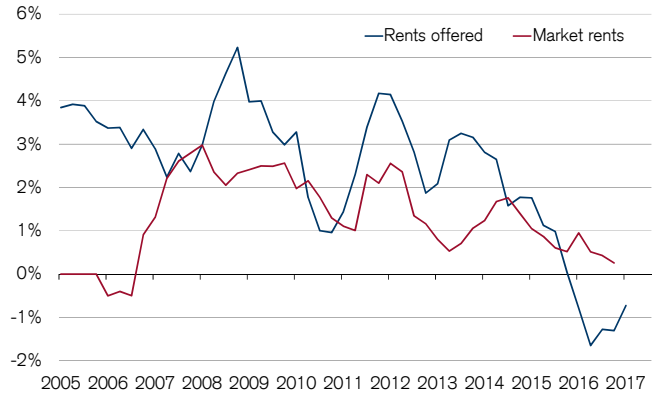
Source: Baublatt, Credit Suisse

The end of the era of rising rents

A multi-year phase of rising rent prices came to a close last year. The decrease in immigration and a spate of new construction are making it a tenant's market. This is particularly evident in rents offered, which were 0.7% lower in the first quarter of 2017 than they were a year earlier. The lowering of the reference interest rate from 1.75% to 1.50% announced on June 1 suggests that growth in existing rents will also diminish by the end of the year, if not before.

Fig. 12: Market rents

Annual growth (nominal)



Source: Wüest Partner, Credit Suisse

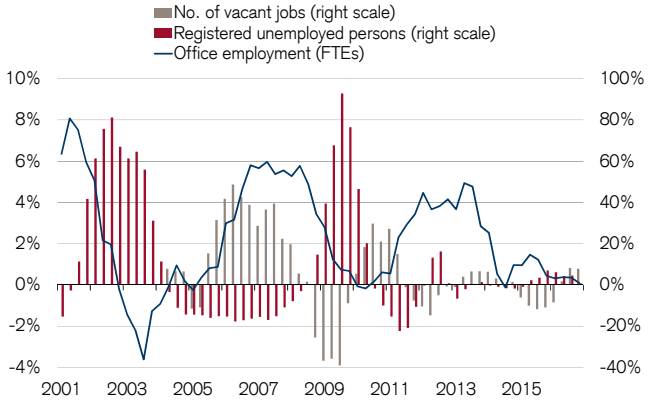
Commercial real estate

Office property: Demand should pick up again slightly

Demand for office space continues to face challenges. In the fourth quarter of 2016, jobs growth in the traditional office businesses hit its lowest level in two years (+0.1% year-on-year). Meanwhile the number of registered job-seekers has been rising, albeit moderately, for seven quarters (+0.7% year-on-year). In contrast, positive signals can be seen in the number of vacant jobs. Supported by a brightening economic outlook, this indicator made a sizable leap (+7.8% year-on-year), suggesting that a pick-up in employment momentum is taking place.

Fig. 13: Office employment, vacant jobs and unemployment

Annual growth in vacant jobs, unemployment and office employment



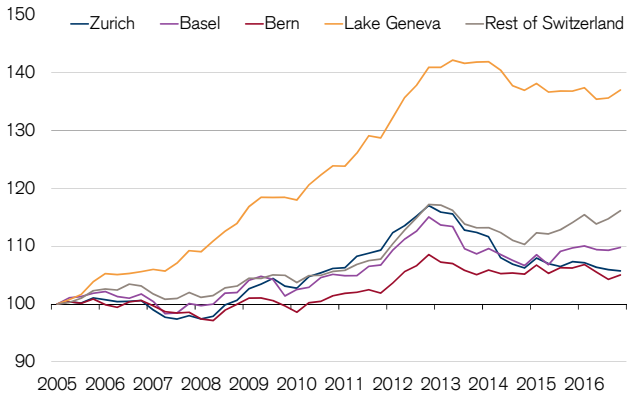
Source: SFSO, Credit Suisse

Office property: Lease price correction not over yet

The downward trend in office lease prices that has been in effect for over four years is still evident in numerous regional markets. In the fourth quarter of 2016, lease prices in the Zurich region were 1.5% lower than they were a year earlier, a result of weak demand. The Bern region also reported a decline of 1.1%, while lease prices around Lake Geneva and Basel remained stable. The persistently high supply and moderate demand momentum argue against a trend reversal anytime soon.

Fig. 14: Office leases

Hedonic leasing price index in various regions: Q1 2005 = 100



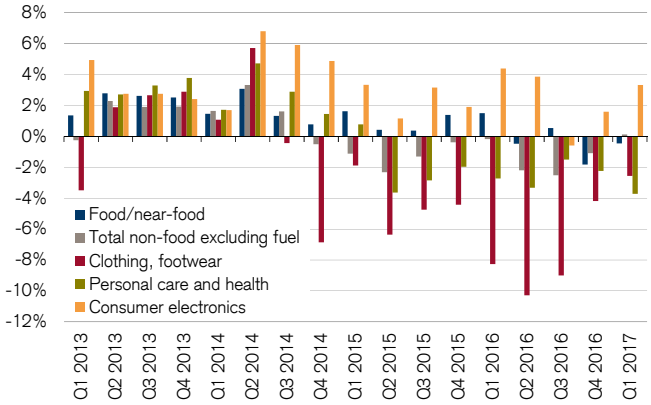
Source: Wüest Partner

Retail property: Retail sales take a breather

Barely a week goes by lately without unsettling headlines from the Swiss retail sector. In the first quarter of 2017, real sales at least held stable year-on-year. In fact, the non-food segment posted an increase (albeit marginal) in sales compared to the previous year's quarter for the first time since the third quarter of 2014. This was attributable to sales growth of 3.3% in the consumer electronics segment, combined with less drastic declines in the apparel segment. The relatively stable food and near-food segment, in contrast, reported a slight 0.5% dip in sales.

Fig. 15: Retail sales

Real sales by product group, change compared to previous year's quarter, in %



Source: GfK, SFSO, Credit Suisse

Property valuations

Depicting uncertainties in the DCF model

The Discounted Cash Flow method (DCF) is a well established element in real estate valuations. Since the inputs for the DCF valuation relate to the future, they must be forecast. These forecasts are necessarily fraught with uncertainties that are inadequately taken into account in the resulting DCF property values. Monte Carlo simulations can depict the resulting risks.[1]

Valuation is the key for every property

A valuation represents the estimated value of a property and provides the basis for numerous real estate ratios (such as yield figures). The property valuation is accordingly crucial for investment and disinvestment decisions. At the same time, it also serves as a monitoring tool for indirect real estate investments. Given the heterogeneity of investment properties and their long life, performing a property valuation is a complex undertaking.

DCF valuations are based on forecasts – supposing these do not materialize?

The established methods for appraising income-producing property are the capitalized value method and the DCF method. The capitalized value method is particularly appropriate for multi-family dwellings and smaller-scale investors. For professional investors and commercial properties, however, the DCF method is applied. In the DCF valuation, the present value of a property's future income streams is calculated by means of a discount rate. When the DCF method is applied, various assumptions must be made regarding the development of inputs such as interest rates, rental income and maintenance costs. The quality of the valuation stands and falls with the accuracy of these forecasts. However, forecasts are by definition uncertain. These uncertainties are not taken into account under the deterministic approach that is typically applied, in which each input variable can only be ascribed a certain value. The result is a merely perceived certainty, since the owner has no information about the risk of possible deviations from the valuation results.

Simulation approaches allow for forecasting risks

Simulation approaches such as the Monte Carlo simulation (MCS) can solve the dilemma of such forecasting uncertainties. These approaches define the inputs as random variables that can be ascribed different values with a range of probabilities (cf. fig. 16). The property value is then recalculated multiple times, with each calculation taking a different randomly assigned value for the input depending on the probability distribution. As a result, the output is not represented by a single figure, but by a range of possible outcomes (cf. fig. 17). In this way, the forecasting risks can be quantified and interpreted. This approach can be used to appraise an individual property as well as an entire real estate portfolio.

Giving a face to uncertainty

While a standard DCF valuation gives only the present value of an individual object or portfolio, the distribution allows other ratios to be calculated. Besides the expected value, which represents the average value that can be anticipated, the standard deviation gives a distribution of values around this expected figure. Kurtosis provides information on the "peakedness" of the distribution, especially in comparison to a normal distribution (excess kurtosis). Finally, the skew indicates the asymmetry of the distribution and indicates whether the distribution left or right of the expected value is flatter. Asymmetrical risk ratios such as VAR (value at risk) can also be calculated. The VAR can indicate, for example, the value that a property is 95% unlikely to fall below. Such ratios provide investors or property owners with information that gives a face to the uncertainties inherent in forecasting input factors and their corresponding risks. This creates considerable added value for the end-user.

Difficulties in fixing distributions

The greatest challenge with a Monte Carlo simulation lies in selecting the distribution of the input factors. These can be drawn from historical values, but also from expert assessments. Since it is difficult and complex to fix a probability distribution, it is not worthwhile to simulate all input varia-

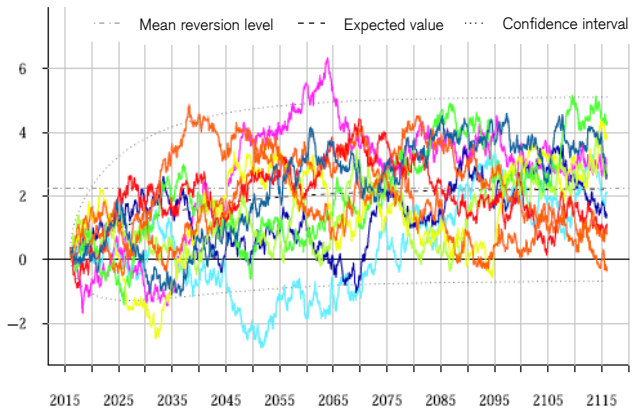
[1] This article is a summary of a 2016 MAS thesis that was awarded the CUREM research prize: Fries, D. (2016). Uncertainties and Risks in Property Valuations: Using the Monte Carlo Simulation for Valuations of Residential Property.

bles. Rather, the focus should be on the input variables that have the greatest influence on the property appraisal or that are most difficult to forecast. The key input variables can be determined via sensitivity analyses. Most important here is the discount rate, which has an enormous impact on the results of a property appraisal. Repair costs come next, with a less pronounced but still considerable impact. Then come growth in lease prices, operating costs, maintenance costs and the vacancy rate. In order to include the current uncertainties in the user markets in an appraisal, the discount rate, growth in lease prices and the vacancy rate should be simulated. Since operating costs and maintenance costs are relatively predictable and stable over time, it makes sense from a cost-benefit viewpoint not to simulate them, but to use fixed values.

MCS: a tool for better assessment of uncertainties and risks

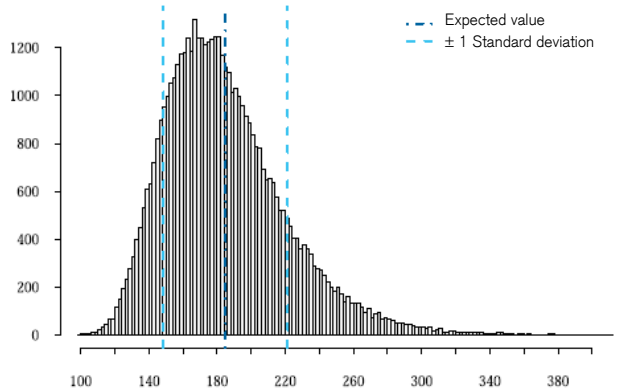
The Monte Carlo simulation is an effective complement to the standard valuation methods for income-producing property. Its greatest added value is that uncertainties can be taken into account, allowing the risks surrounding the value of a property to be quantified. Until now, this uncertainty concerning the future development of input variables has not been addressed. In the current market environment, real estate is sometimes sold at prices well above its estimated value. At the same time, the user markets are becoming increasingly demanding, and over the long term there is also considerable potential for rising interest rates. Given these conditions, the differentiated viewpoint of a Monte Carlo simulation is a sensible complement to a property appraisal that allows a consideration of potential risks to be included in an evaluation of development projects and transactions. Moreover, an investor can more easily judge how a property would fit into the risk-return profile of an existing portfolio.

Fig. 16: Uncertain development of risk-free interest rate
Development of real 10-year government bond yields based on ten randomly selected simulations, 2016 – 2115



Source: Fries, D. (2016)

Fig. 17: Frequency distribution replaces scoring system
Absolute frequency distribution of the simulated market value of a sample portfolio in CHF m



Source: Fries, D. (2016)

Real estate investments

Persistently high risk premiums on real estate investments

Real estate investments still enjoy investor favor. Despite growing difficulties in marketing properties, rising vacancies and declining rent prices, investor confidence in real estate remains unbroken. This confidence is based on the environment of negative interest rates and the rate trend reversal in the USA. Against this backdrop, it is unlikely that bonds will make a positive yield contribution in 2017, in contrast to 2016. This only fuels demand for real estate investments. The yield spread to fixed-income investments still averages around 280 basis points for real estate funds, and 380 basis points for real estate shares and direct investments in residential property.

High valuation of Swiss real estate shares

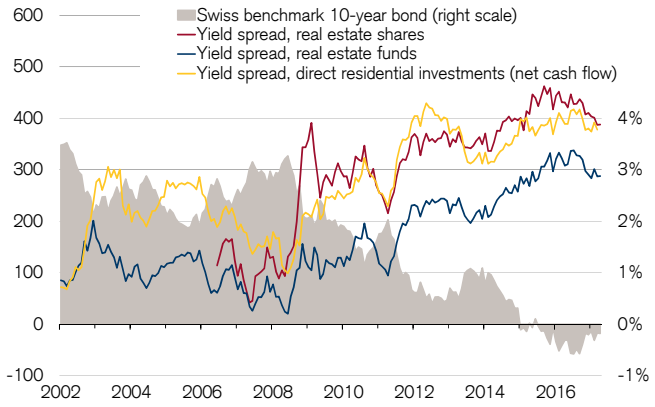
Since January 2016, investors have achieved a total yield of 23.7% with Swiss real estate shares, which represents surplus yield compared to the SPI stock index or real estate shares in the eurozone, the UK and the USA. Swiss real estate shares reacted relatively mildly to the rise in interest rates in the closing months of 2016. The strong performance continued into 2017. The relative performance has sagged a bit, though, with the total yield of +11.0% on Swiss real estate shares so far in 2017 below that of the SPI and real estate shares in the UK and the eurozone.

Agios back near historical highs

Currently around 34%, agios for Swiss real estate funds have risen back near the highs posted in 2015. Fund prices recovered quickly from the rise in long-term interest rates in the last quarter of 2016. This is particularly true for funds that focus on residential property. In these cases, agios are some 20 percentage points higher than those for commercial real estate companies. The market currently assigns a greater weight to the comparatively attractive dividend yields for funds than to the risks of default and value adjustments that are rising even in the residential segment. As long as interest rates remain negative, this situation is unlikely to change.

Fig. 18: Dividend yield on real estate investments

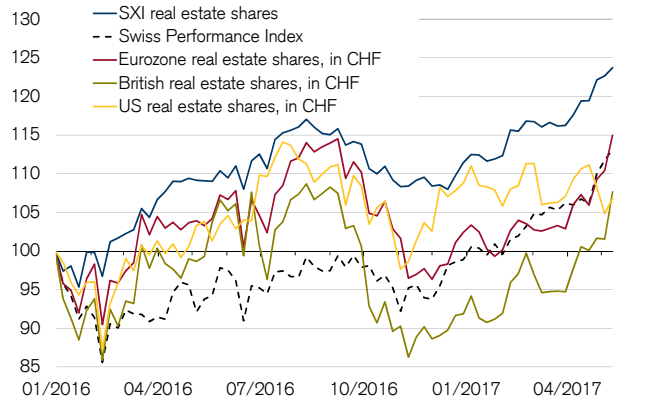
Yield spread to 10-year Swiss government bonds



Source: Datastream, IAZI, Credit Suisse

Fig. 19: Performance of real estate shares

Total returns, index: 01.01.2016 = 100

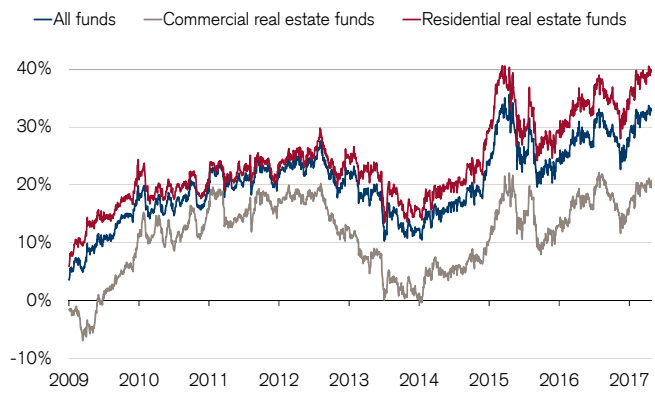


Past performance is no guarantee of future returns. Performance may be affected by provisions, fees and other costs, and exchange rate fluctuations.

Source: Datastream, Bloomberg, Credit Suisse

Fig. 20: Agios on Swiss real estate funds

Basis: SXI Real Estate Funds Index



Past performance is no guarantee of future returns. Performance may be affected by provisions, fees and other costs, and exchange rate fluctuations.

Source: Credit Suisse, Datastream, annual and semiannual fund reports

Risk warning

Every investment involves risk, especially with regard to fluctuations in value and return. If an investment is denominated in a currency other than your base currency, changes in the rate of exchange may have an adverse effect on value, price or income.

For a discussion of the risks of investing in the securities mentioned in this report, please refer to the following Internet link: https://research.credit-suisse.com/riskdisclosure

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Past performance is not an indicator of future performance. Performance can be affected by commissions, fees or other charges as well as exchange rate fluctuations.

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Investments may have no public market or only a restricted secondary market. Where a secondary market exists, it is not possible to predict the price at which investments will trade in the market or whether such market will be liquid or illiquid.

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Where this report relates to emerging markets, you should be aware that there are uncertainties and risks associated with investments and transactions in various types of investments of, or related or linked to, issuers and obligors incorporated, based or principally engaged in business in emerging markets countries. Investments related to emerging markets countries may be considered speculative, and their prices will be much more volatile than those in the more developed countries of the world. Investments in emerging markets investments should be made only by sophisticated investors or experienced professionals who have independent knowledge of the relevant markets, are able to consider and weigh the various risks presented by such investments, and have the financial resources necessary to bear the substantial risk of loss of investment in such investments. It is your responsibility to manage the risks which arise as a result of investing in emerging markets investments and the allocation of assets in your portfolio. You should seek advice from your own advisers with regard to the various risks and factors to be considered when investing in an emerging markets investment.

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Commodity transactions carry a high degree of risk and may not be suitable for many private investors. The extent of loss due to market movements can be substantial or even result in a total loss.

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