

Risk Analysis of the Real Estate Market in Switzerland (Diagnostic as of 2016-Q2)

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Background

This work is a collaboration between the chair of Entrepreneurial Risks at the Department of Management, Technology and Economics (D-MTEC) of ETH Zurich and comparis.ch AG. It has benefited from funding by the Swiss Federal Commission for Technology and Innovation (CTI) in its launching phase in 2012 and is partially funded by comparis.ch. The goal of this project is to analyze the real estate market in Switzerland in order to empower the buyers and sellers of this market with critical information on price dynamics in every Swiss district.

Data and Methodology

The data used in this analysis has been collected by comparis.ch between 1 January 2005 and 30 June 2016. The property market division of comparis.ch gathers data from the 17 largest property portals in Switzerland, creating a rich view on the market, but also introducing a large number of duplicate ads (7 million records are present in the raw data). These duplicate ads advertise the same property, during the same period, and sometimes, with conflicting information. Within the scope of this study, the identification of the duplicates is crucial, as they could potentially affect the price indices. Before performing any analysis, duplicates in the aggregated data set have been automatically removed using a classification procedure based on the Support Vector Machine (SVM) algorithm and string distance measures. The application of the de-duplication procedure to the comparis.ch database classified approximately 761'000 apartments and 809'000 houses for sale between 2005-Q1 and 2016-Q2, which amount to a total of about 1'570'000 residential properties (about 160'000 new advertisements since the previous report of 2015-Q2, after removing the duplicate ads). This does not represent all the properties that were on the market in this period. However, it is assumed that the data collected by comparis.ch represents the market very closely. **One important fact about this data set is that the prices are asking prices and not the final transaction prices.**

Table 1: Categorization of properties based on the number of rooms.

Property Type	Houses		Apartments	
Measure	Median Asking Price		Median Asking Price per Square Meter	
Size	Min # of Rooms	Max # of Rooms	Min # of Rooms	Max # of Rooms
Small	1	4.5	1	3.5
Medium	5	6.5	4	5.5
Large	7+		6+	

We have studied the development of prices in 166 Swiss districts (see disclaimer). In order to analyze the market, the ads in each district were categorized by type (i.e. apartment or house), and subsequently subdivided in three groups, according to the number of rooms, as described in Table 1.

The properties in each subgroup were aggregated quarterly using the median asking price and the median asking price per square meter for houses and apartments respectively.

Commentary on Asking versus Transaction prices:

The main data source for the property prices of this report is the comparis.ch database of ask prices. Although this database contains a timely and rich view of the Swiss real estate market, a valid concern is whether it appropriately reflects the developments of the market prices. To examine this issue, we compared the comparis.ch database against the Swiss Real Estate Datapool (SRED) database for apartments in the 2005-Q1/2015-Q2 period (the overlapping period for which we had access to both databases). SRED is an association that aims to promote market efficiency and transparency in the Swiss housing market. Its database covers approximately 40% of all residential transactions in Switzerland, and it is arguably the highest quality data source available for the most liquid part of the market.

Table 2 compares the two databases for the period 2005-Q1/2015-Q2. As it can be observed, the two databases differ substantially in terms of volume. There is roughly a 5:1 ratio between their respective total number of observations (4.9 at district level and 5.7 at national level). The corresponding price developments, on the other hand, seem to behave alike. The ratio of average growth rate of prices per district per quarter is close to unity at the national and cantonal level, though it diverges significantly at the district level (with a ratio of 0.6).

Table 2: Volume and price change aggregates for asking and transaction prices of apartments.

Level	Source	Average #Obs.	Average #Obs. per quarter	Min. average #Obs. Per quarter	Max average #Obs. Per quarter	Average quarterly price growth rate	Std. deviation price growth rate
National	Tx	120'000	2'100	1'100	3'500	0.93	2.16
	Ask	680'000	16'200	4'800	29'100	1	1.59
	Ask/Tx	5.7	7.7	4.2	8.3	1.1	0.7
Cantonal	Tx	5'000	81	35	146	0.91	12.65
	Ask	26'000	624	186	1216	0.9	5.05
	Ask/Tx	5.5	7.7	5.4	8.3	1.0	0.4
District	Tx	850	14	4.9	32	1.25	20.36
	Ask	4'000	98	27	203	0.76	10.96
	Ask/Tx	4.9	6.8	5.4	6.4	0.6	0.5

Tx: Transaction price (SRED); Ask: Asking price (comparis), #Obs.: Number of observations.

Despite the observed heterogeneities, evidence suggests that asking and transaction prices have a tendency to reflect one another. Figure 1 shows the development of asking and transaction prices of apartments at the national level. Each index corresponds to an average of median logarithmic prices, comprising the 32 districts in which at least five transactions per quarter were observed. The transaction and asking prices are shown to be co-integrated¹; meaning that the two time series are expected to move together in the long term. It is interesting to notice the discrepancy between the indices starting in 2013. This price premium might be a consequence of the measures issued by the SNB to mitigate the bubble risk in the housing market (see also “Macroeconomic Analysis” section below). With prices expected to stop rising and demand remaining unassuaged, a gap between asking and transaction prices emerged in which transactions were (on average) conducted at higher prices than those originally advertised.

¹ Statistical tests for co-integration confirm this conclusion.

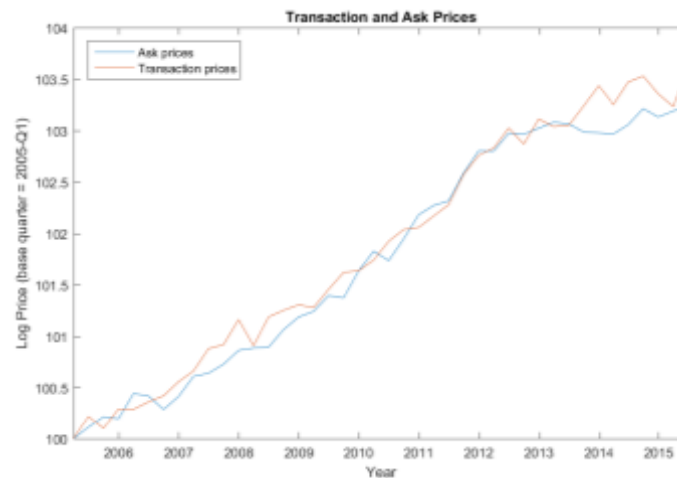


Figure 1: Transaction and asking prices for apartments (national aggregate).



Figure 2: Transaction and asking prices for apartments in Zurich.

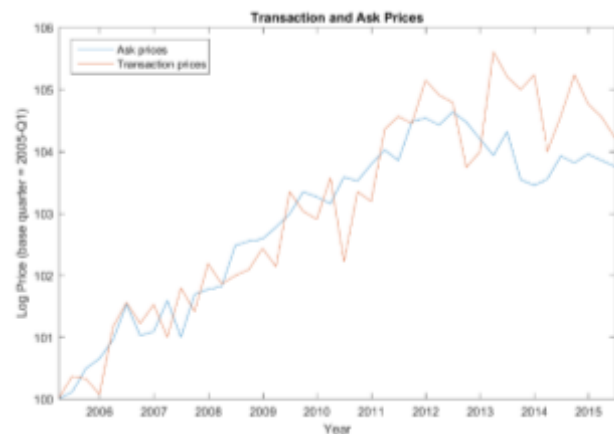


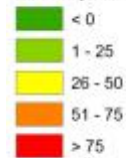
Figure 3: Transaction and asking prices for apartments in Geneva.

A closer look to the indices of Zurich and Geneva also suggests a long-term relationship between the two data sources (Figure 2 and Figure 3). Furthermore, regardless of the individual heterogeneities that can be observed at the district level, ask and transaction prices have shown similar responses to new developments in the market. In particular, both time series exhibited a change of dynamics surrounding 2013, and have continued progressing similarly since then. Ask prices in Zurich have tended to remain above the median transaction Level (contrary to the national aggregate), whereas median transaction prices in Geneva have tended to stay below the median ask level (consistent with the national aggregate).

Real Estate Market in Switzerland

Figure 4 shows the change in median asking price per square meter between the first quarter of 2007 and the second quarter of 2016 for all apartments listed on comparis.ch. The district of Horgen, labeled 1, shows the highest price increase, where the median asking price of apartments per square meter has increased by 76% since the first quarter of 2007.

Median Asking Price Change per Square Meter (%), Apartments
2007-Q1 to 2016-Q2



* Data on Cantonal Level

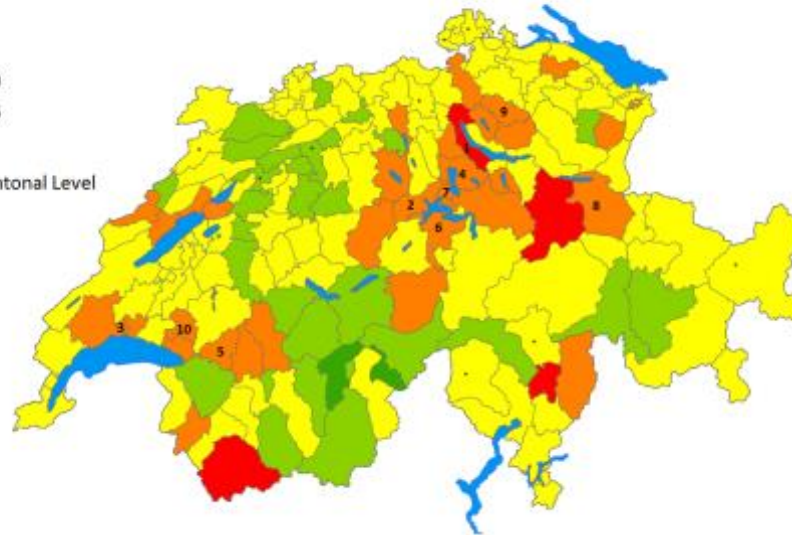


Figure 4: Change in median asking price per square meter for apartments in all Swiss districts between 2007-Q1 and 2016-Q2.

The regions marked with “*” represent the districts with not enough listings in either 2016-Q2 or 2007-Q1. The cantonal median price change per square meter values are shown for those districts. The top ten districts with the highest increase in the apartments’ asking price per square meter between 2007-Q1 and 2016-Q2 are labeled in Figure 4 and listed in Table 3. For these top ten districts, the median increase in asking price per square meter since last year is also reported in Table 3 (between 2015-Q2 and 2016-Q2). The prices in the districts of Riviera, D’Entremont, Glarus, and Zurich, although marked in red in Figure 4, were based on either too few advertised properties or the data has been too noisy to be included in the top 10 districts with the highest asking price per square meter. **Please note that the reported numbers are based on asking prices and not the final transaction prices.**

Table 3: Ten districts with the highest increase in median asking price per square meter for apartments between 2007-Q1 and 2016-Q2.

Rank	District Name	Median increase in asking price per square meter 2007-Q1 and 2016-Q2	Median increase in asking price per square meter 2015-Q2 and 2016-Q2
1	Horgen	76%	10%
2	Luzern	67%	-5%
3	L'Ouest lausannois	65%	5%
4	Zug	65%	2%
5	Riviera-Pays-d'Enhaut	62%	0%
6	Nidwalden	61%	-5%
7	Küssnacht (SZ)	59%	-5%
8	Sarganserland	58%	14%
9	Pfäffikon	58%	5%
10	Veveyse	57%	0%

On the other hand, the ten districts with the lowest increase in the apartments' asking price per square meter between 2007-Q1 and 2016-Q2 with **enough listings** are listed in Table 4. For these bottom ten districts, the median increase in asking price per square meter since last year is also reported in Table 4 (between 2015-Q2 and 2016-Q2). The prices in the district of Unterklettgau although marked in dark green in Figure 4, were based on too few advertised properties to be included in the bottom 10 districts with the lowest change in median asking price per square meter.

Table 4: Ten districts with the lowest increase in median asking price per square meter for apartments between 2007-Q1 and 2016-Q2.

Rank	District Name	Median increase in asking price per square meter 2007-Q1 and 2016-Q2	Median increase in asking price per square meter 2015-Q2 and 2016-Q2
1	Raron	-10%	0%
2	Goms	11%	-4%
3	Liestal	16%	-9%
4	D'Aigle	20%	3%
5	Kulm	20%	-7%
9	D'Hérens	20%	-1%
7	Lebern	21%	0%
8	Leuk	22%	9%
9	Burgdorf	22%	0%
10	Büren	23%	5%

Figure 5 shows the median asking price per square meter for apartments as of 30 June 2016. The districts with "*" marks represent the districts with not enough listings in the second quarter of 2016. The cantonal median prices per square meter for apartments are shown for these districts. The top ten most expensive districts as of 30 June 2016 are labeled in Figure 5 and listed in Table 5. The ten districts with the lowest median prices per square meter for apartments as of 30 June 2016 are listed in Table 6. The prices in the district of Saanen, although marked in red in Figure 5, were based on too few advertised properties to be included in the top 10 districts with the highest asking price per square meter.

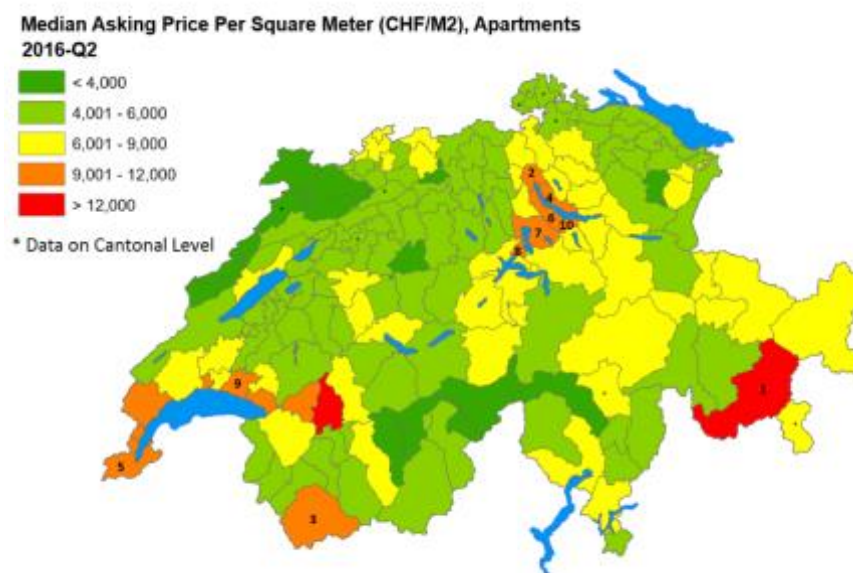


Figure 5: Median asking price per square meter for apartments in all Swiss districts as of 2016-Q2.

Table 5: Ten districts with the highest median asking price per square meter for apartments as of 2016-Q2.

	District Name	Median asking price per square meter (CHF/m ²)
1	Maloja	13'000
2	Zürich	11'500
3	Entremont	11'500
4	Meilen	11'000
5	Genève	11'000
6	Horgen	10'500
7	Zug	10'000
8	Küssnacht (SZ)	10'000
9	Lavaux-Oron	10'000
10	Höfe	9'500

Table 6: Ten districts with the lowest median asking price per square meter for apartments as of 2016-Q2.

	District Name	Median asking price per square meter (CHF/m ²)
1	Raron	3'000
2	Leventina	3'000
3	La Chaux-de-Fonds	3'500
4	Delemont	3'500
5	Goms	4'000
6	Trachselwald	4'000
7	Hinterland	4'000
8	Gösigen	4'000
9	Leuk	4'000
10	Porrentruy	4'000

The median asking prices for medium size houses (5 to 6.5 rooms) as of 2016-Q2 are shown in Figure 6. Districts with "*" marks represent the districts with not enough listings in the second quarter of 2016. The cantonal median asking prices for medium size houses are shown for these districts. The top ten districts with currently most expensive medium size houses are labeled in Figure 6 and listed in Table 7. The ten districts with the lowest median prices for medium size houses as of 30 June 2016 are listed in Table 8. Please note that the absence of districts such as the city of Zurich in this list does not necessarily mean that the asking prices in those districts were lower than the ones listed in Table 4, but that there was not enough medium size houses listed for sale during the second quarter of 2016 in those districts.

**Median Asking Price (CHF), Medium Size Houses (5-6.5 Rooms)
2016-Q2**



* Data on Cantonal Level

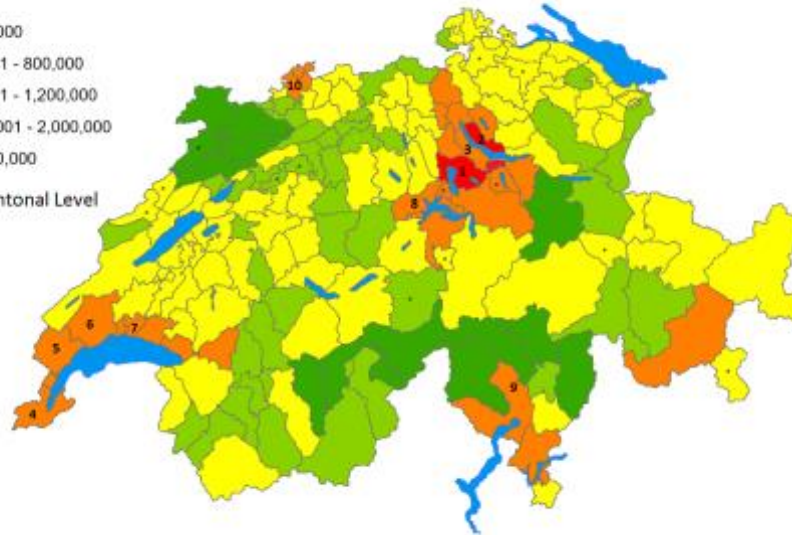


Figure 6: Median asking price of medium size houses (5 to 6.5 rooms) in all Swiss districts as of 2016-Q2.

Table 7: Ten districts with the highest median asking price for medium size houses as of 2016-Q2.

	District Name	Median asking price (CHF)
1	Zug	2'250'000
2	Meilen	2'250'000
3	Horgen	1'800'000
4	Genève	1'600'000
5	Nyon	1'600'000
6	Morges	1'400'000
7	L'Ouest lausannois	1'400'000
8	Luzern	1'400'000
9	Locarno	1'400'000
10	Arlesheim	1'400'000

Table 8: Ten districts with the lowest median asking price for medium size houses as of 2016-Q2.

	District Name	Median asking price (CHF)
1	Porrentruy	450'000
2	Blenio	450'000
3	Leventina	450'000
4	Leuk	500'000
5	Courtellary	550'000
6	Delémont	600'000
7	Thal	600'000
8	Aarwangen	650'000
9	Brig	650'000
10	Wasseramt	650'000

Macroeconomic Analysis:

Classic economic measures suggest that house prices in Switzerland have increasingly misaligned from their fundamentals. Figure 7 shows that during the last years, residential Swiss real estate prices have gradually become less affordable, as evidenced by a positive trend in the price to disposable income ratio. Prices have also deviated steadily from the income that real estate can earn over time, as suggested by the increasing price to rent ratio.

Macroeconomic Indicators. Source: Thomson Reuters, OECD, SNB (2016)



Figure 7: Price to income and price to rent ratios.

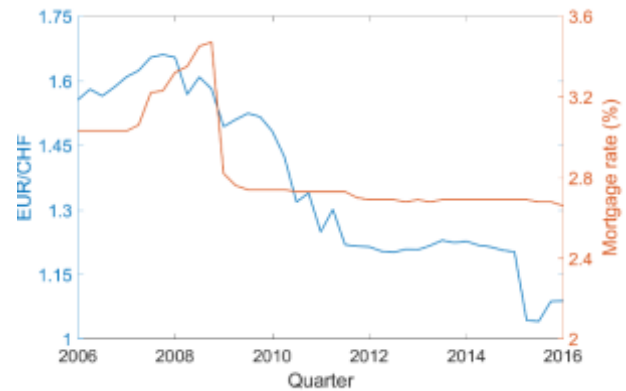


Figure 8: EUR/CHF and Swiss variable mortgage rate.

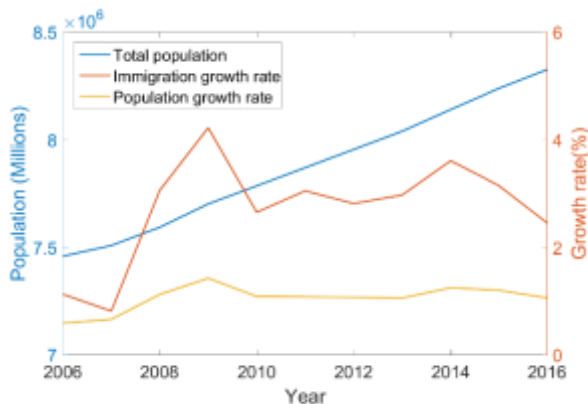


Figure 9: Swiss population and immigration, year on year growth rates.



Figure 10: Swiss Quarterly Real GDP (2010 prices, USD), year on year growth rate.

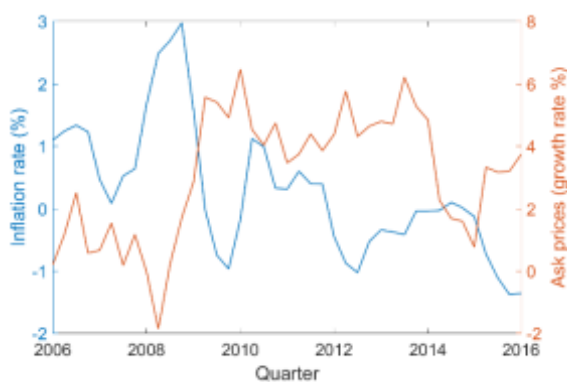


Figure 11: Swiss inflation and housing asking price, year on year growth rates.

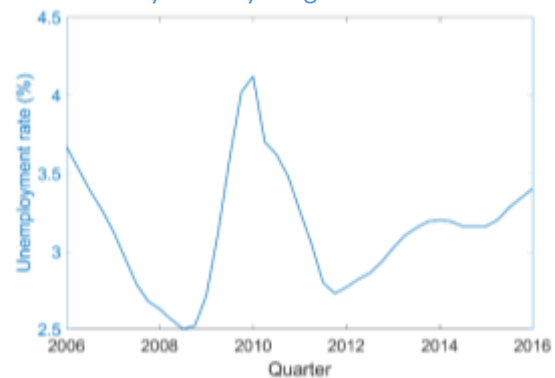


Figure 12: Swiss unemployment rate.



Figure 13: Macro-prudential policies aimed to curtailing the boom.

The housing demand in Switzerland has been predominantly exposed to two competing set of forces. On the one hand, the introduction of negative interest rates by the SNB in 2015 to halt the overvaluation of the Swiss Franc as a result of the removal of the CHF/EUR peg in January 2015 pushed the mortgage rates slightly down. Figure 8 shows that the Swiss average mortgage rate has been going down since the 2008 financial crisis. The introduction of negative rates by the SNB in January 2015 pushed the mortgage rate even lower. This downward pressure, added to the housing demand from the increasing population and the slight increase in real incomes due to deflation, constitute a fundamentally positive push to the demand for real estate. Figure 9 shows that over the past decade the population has been growing at a rate close to 1%. This is mainly driven by immigration, which has had a growth rate higher than 2% over the past decade. Figure 10 shows that the Swiss real GDP has been increasing since 2011, partially attributed by deflation. As shown in Figure 11, Switzerland is in a deflationary environment since mid-2012.

On the other hand, the regulatory measures and the associated greater financial requirements regarding the purchase of owner-occupied housing as summarized by Figure 13, in addition to the increasing unemployment rate (which has been going up since mid-2011 - mainly attributed to the strong Franc), are exerting a major negative dampening effect. Figure 12 shows the unemployment rate has been increasing since mid-2011, the peak of the Euro debt crisis, when the CHF/Euro rallied. The SNB took measures to cool down the Swiss housing market. They include requiring Swiss banks to hold 2 percent extra capital against mortgage risk-weighted assets from June 30, 2014, up from the 1 percent they were required to hold previously. In addition, from July 2012, households must provide at least 10% of the house value as "hard" equity not taken from pension assets. Furthermore, new borrowers are required to reduce their LTV ratio to a maximum of two-thirds within 15 years, countering Swiss tax incentives to keep debt high as long as allowed by the mortgage contract.

Consequently, these factors cause the housing asking prices and inflation rate to behave in an inconsistent way. Figure 11 shows the diverging behavior of inflation and asking prices growth, which shows how the mentioned competing factors are affecting the housing prices beyond the inflation rate.

The Log-Periodic Power Law (LPPL) Model

The term "bubble" refers to a situation in which excessive future expectations cause prices to rise above long-term trends and/or above what would be justified by rent prices, incomes, demographics and other fundamental factors. Sornette and Woodard (2010) illustrate the concept of housing price bubble as follows: "During a housing price bubble, homebuyers think that a home that they would normally consider too expensive for them is now an acceptable purchase because they will be compensated by significant further price increases. They will not need to save as much as they otherwise might, because they expect the increased value of their home to do the saving for them. First time homebuyers may also worry during a housing bubble that if they do not buy now, they will not be able to afford a home later." Furthermore, the expectation of large price increases may have a strong impact on demand if people think that home prices are very unlikely to fall, and certainly not likely to fall for long, so that there is little perceived risk associated with an investment in a home.

We employed the log periodic power law (LPPL) bubble model to diagnose the risk of real estate bubbles in Switzerland. The LPPL model diagnoses a bubble as a transient, faster than exponential growth process, decorated with ever increasing oscillations representing the developing low frequency price volatility. Speculative bubbles are caused by 1) precipitating factors that change public opinion about markets or that have an immediate impact on demand and 2) amplification mechanisms that take the form of price-to-price positive feedback: the larger the price, the higher the demand and ... the

larger the price! The behavior of the market no longer reflects any real underlying value and a bubble is born. According to the LPPL model, a crash occurs because the market has entered an unstable phase and any small disturbance or process may reveal the existence of the instability. Like a ruler held up vertically on your finger, any small disturbance can trigger the fall. The LPPL model diagnoses also the end of bubbles, which signals a change of regime, in which the prices stop rising, and take a different dynamics. This can be a swift correction, like a crash, but also a slow deflation or stagnation. In fact, a less violent and slower end of bubbles is a better representative characteristic of real estate markets since properties are durable goods that people tend to hold whenever falling prices are observed. The tendency to hold is also due to significant friction and transaction costs. In this case, the crash is more in the volume of transactions than in the price itself, which may take a long time to show a significant correction. Moreover, a crash is not a particular event but is characterized by a probability distribution: the critical time is the most probable time of a crash (the end of the bubble). This is an essential ingredient for the bubble to exist, as it is only rational for financial agents to continue investing when the risk of the crash to happen is compensated by the positive return generated by the financial bubble, and when there exists a finite probability for the bubble to disappear smoothly. In other words, the bubble is only possible when the public opinion is not certain about its end and when its end may be smooth. Many examples of forecasting financial and real estate bubbles with the LPPL model have been reported and listed at:

http://www.er.ethz.ch/media/publications/social-systems-finance/bubbles_and_crashes_theory_empirical_analyses.html.

The following classification is used to express the status of the districts based on the LPPL analysis:

Critical: a strong bubble signal from the LPPL analysis. This is an indication that a change of regime is imminent. The bracket of the expected time of the change of regime is only reported for this status.

To Watch: a bubble signal from the LPPL analysis. However, the signal is not as strong as the “Critical” case.

To Monitor: This status is only obtained after a district has been previously depicted as a “Critical” or “To Watch” district. The price could be increasing without (anymore) a bubble signal or decreasing but there are not yet enough data points to declare a confirmation of a change of regime.

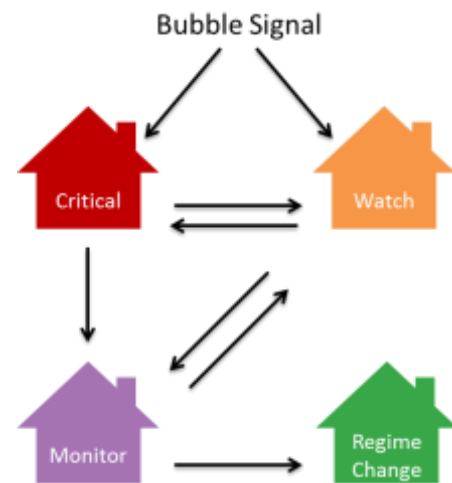


Figure 7: Classification of the districts.

Regime Change: This status is only obtained after a district has been previously depicted as a “To Monitor” district and the latest data points confirm a change of regime.

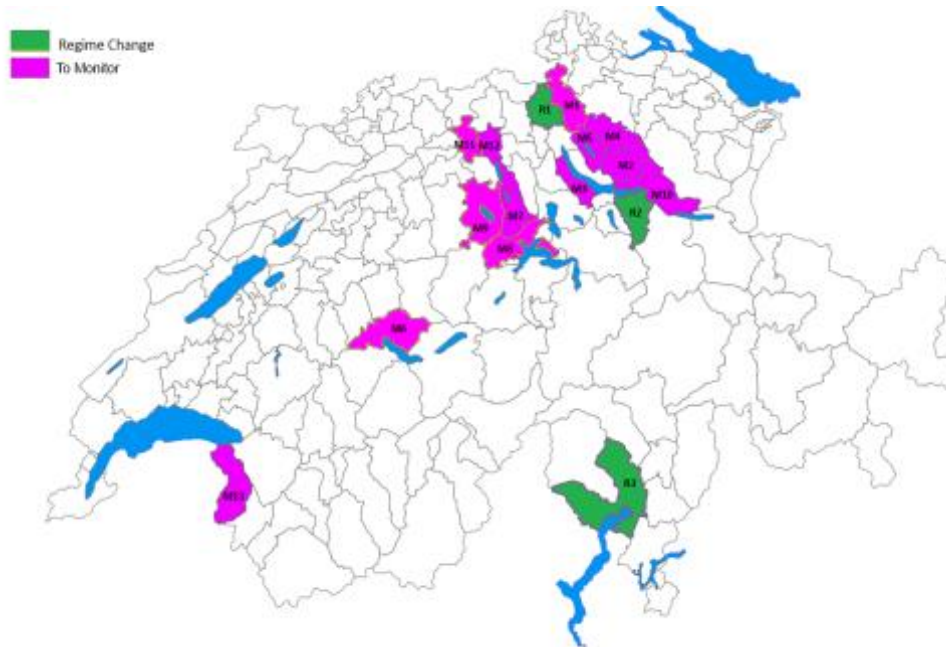
- A “Critical” district can downgrade into a “To Watch” (respectively a “To Monitor” district), reflecting a weakening of the presence/strength of the bubble signals (respectively a preliminary diagnostic of a change of regime).
- A “To Watch” district can become a “Critical” (respectively a “To Monitor” district) when the strength of the bubble indicators increases (respectively when there is evidence of an on-going change of regime).

- A “To Monitor” district can become a “To Watch” (respectively a “Regime Change” district) when the presence of bubble signals is more strongly confirmed (respectively when the price dynamics has validated the end of the bubble).

We applied the LPPL methodology to all subcategories of properties defined in Table 1, as well as to the aggregated index for apartments over the period of 2005-Q1 to 2016-Q2. The results of the LPPL analysis on the real estate market in Switzerland using the comparis.ch data from 2005-Q1 until 2016-Q2 are summarized in Figure 8 and are as follows:

- **Critical:** currently, none of the districts show signals that fall in this category.
- **To Watch:** currently, none of the districts show signals that fall in this category.
- **To Monitor:** prices in districts labeled M1 through M13 should be monitored. There are five new “To Monitor” districts compared to 2015-Q2, which had been previously reported as “To Watch”: Bülach (all size apartments, labeled M1), Thun (all size apartments, labeled M6), Luzern (all size apartments, labeled M8), Sursee (medium size houses/ all size apartments, labeled M9), and Aarau (medium size houses/ all size apartments, labeled M11). Districts still in the “To Monitor” category are: Hinwil (medium size houses/ all size apartments, labeled M2), Horgen (all size apartments, labeled M3), Pfäffikon (all size apartments, labeled M4), Uster (all size apartments, labeled M5), Hochdorf (medium size houses/all size apartments, labeled M7), See-Gaster (all size apartments, labeled M10), Lenzburg (medium size houses/all size apartments, labeled M12), and Monthey (all size apartments, labeled M13).
- **Regime Change:** the price dynamics in the districts labeled R1 to R3 conclusively show a change of regime. Districts in the “Regime Change” category are: Dielsdorf (all apartments, labeled R1), March (all apartments, labeled R2), and Locarno (all apartments, labeled R3). All these districts were previously reported in the “To Monitor” category, after being downgraded from “To Watch”.

Detailed results of these analyses are presented in Appendices A and B. In addition, the development of the reported districts in 2013-Q2, 2013-Q4, 2014-Q2, 2014-Q4 and 2015-Q2 can be found in Appendix C.



Label	District Name	Status	Property Type	Property Size
R1	Dielsdorf	Regime Change	Apartments	All
R2	March	Regime Change	Apartments	All
R3	Locarno	Regime Change	Apartments	All
M1	Bülach	To Monitor	Apartments	All
M2	Hinwil	To Monitor	Houses/Apartments	Medium/All
M3	Horgen	To Monitor	Apartments	All
M4	Pfäffikon	To Monitor	Apartments	All
M5	Uster	To Monitor	Apartments	All
M6	Thun	To Monitor	Apartments	All
M7	Hochdorf	To Monitor	Houses/Apartments	Medium/All
M8	Luzern	To Monitor	Apartments	All
M9	Sursee	To Monitor	Houses/Apartments	Medium/All
M10	See-Gaster	To Monitor	Apartments	All
M11	Aarau	To Monitor	Houses/Apartments	Medium/All
M12	Lenzburg	To Monitor	Houses/Apartments	Medium/All
M13	Monthey	To Monitor	Apartments	All

Figure 8: Results of the LPPL analysis as of 2016-Q2.

The median asking prices per square meter for apartments in two geopolitically important Swiss districts (city of Zurich and the canton of Geneva) are presented in Figure 9. Asking prices for apartments have stayed relatively constant since a year ago (2015-Q2) in Geneva and Zurich. The same (relative asking price stagnation) trend seems to be present in many other districts: in two-thirds of the districts, apartments' asking price per square meter has increased less than 5 percent compared to 2015-Q2).

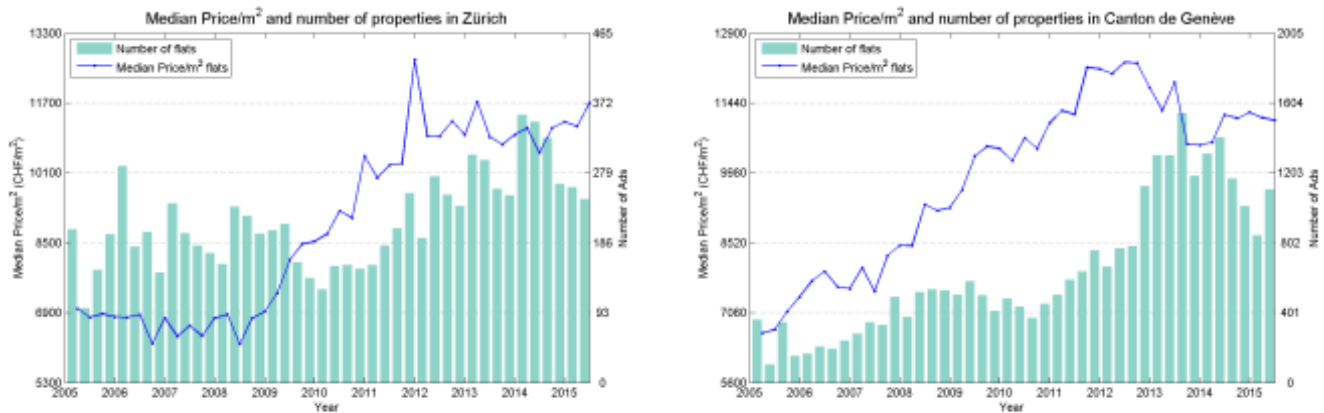


Figure 9: Median asking price per square meter for apartments. Left: City of Zürich, Right: Canton of Geneva.

Despite the continued low interest rate regime and the persistent appetite for the Swiss Franc, the Swiss real estate market, for the time being, seems to have cooled down. The fact that we have been able to conclude that three districts (Dielsdorf, March, and Locarno) have shifted to a new regime also hints in this direction. Moreover, the application of our methodology to the national housing index² (data up to 2016Q1) does not identify a bubble signal at the national level (though as a reminder, bubbles signals were identified using data up to 2014Q1 and 2014Q2).

Recommendations

In general and in the absence of exogenous shocks, the “Regime Change” districts offer potential buying opportunities as the price dynamics have already changed into a new regime. The households who can afford to wait, may choose to postpone the purchase of their home in the “To Monitor” districts, in the hope of profiting from a slight deflation.

Given the moderate warnings that our LPPL analysis flags, together with the persistent extremely low interest rates, the still unstable European geopolitics and lack-luster European economic recovery, we expect the Swiss real estate to remain in general stable with only moderate adjustments for the rest of 2016. Nevertheless, households are advised to follow the development of medium-term events, such as the handling of BREXIT and the negotiations with the EU in order to implement the Swiss immigration referendum of 2014 (with legally binding deadline in February 2017), as these developments could impact the internal conditions of the Swiss real estate market.

Disclaimer

The districts map provided by the Swiss Federal Statistical Office (Bundesamt für Statistik, BFS) based on 2009 districts' divisions has been used as a basis for performing this study. The Swiss districts' borders regularly evolve (districts merge or split) and current districts name and borders might vary from the ones used in the presented maps. Therefore, the borders plotted in the maps presented in this study should be consulted when referring to the districts' names and the appropriate map(s) should always be accompanied with the district name when referring to the status of a district in this report.

² SNB Economic data July 2016, Real Estate Price Indices, <https://data.snb.ch/en/publishingSet/B>

Appendix A: Review of 2016-Q2 “Regime Change” Districts.

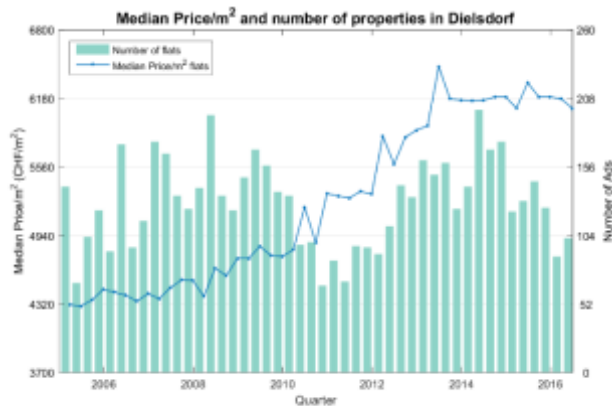


Figure A. 1: District: Dielsdorf, Status: Regime Change, Property type: all apartments.

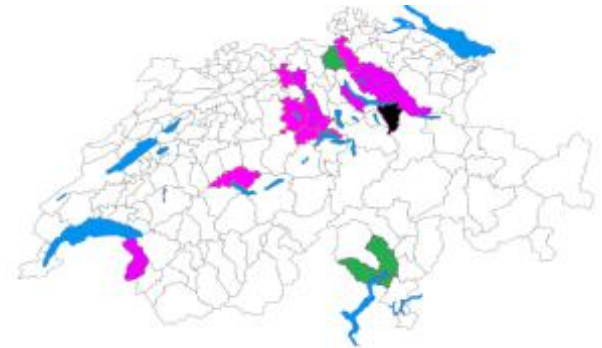
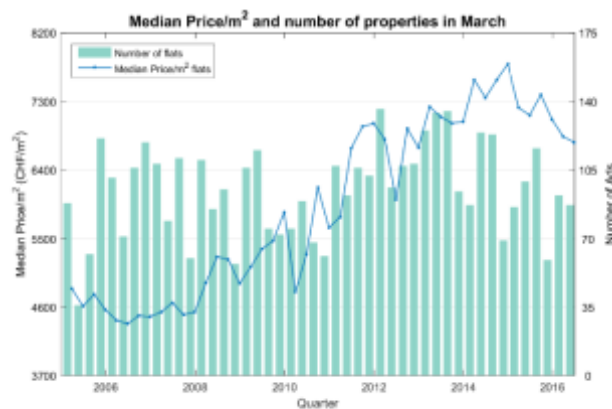


Figure A. 2: District: March, Status: Regime Change, Property type: all apartments.

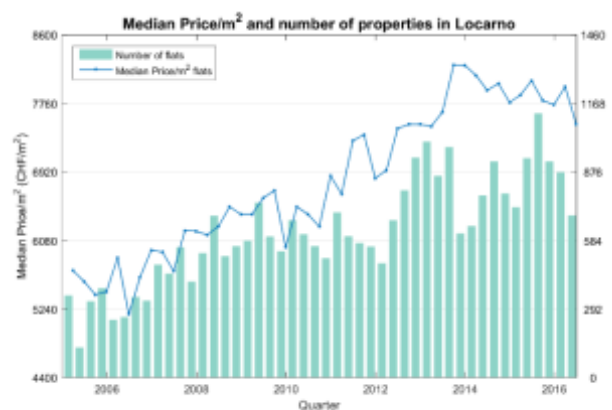


Figure A. 3: District: Locarno, Status: Regime Change, Property type: all apartments.

Appendix B: Review of 2016-Q2 “To Monitor” Districts.

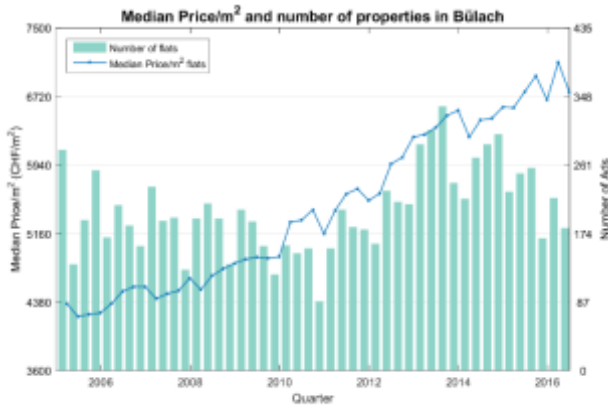


Figure B. 1: District: Bülach, Status: To Monitor, Property type: all apartments.

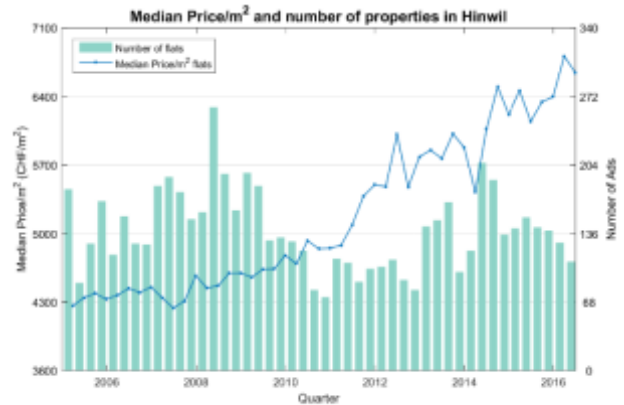
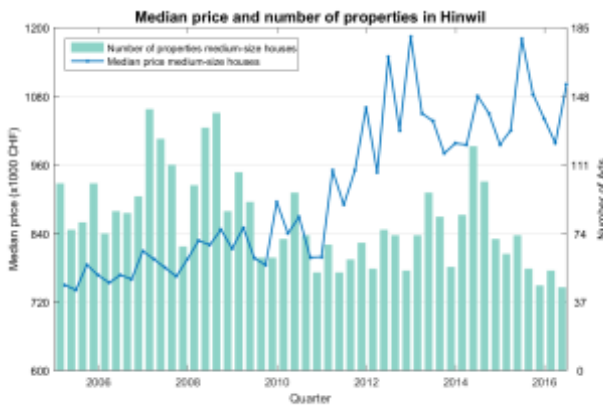


Figure B. 2: District: Hinwil, Status: To Monitor, Property type: medium size houses (top left), all apartments (top right).

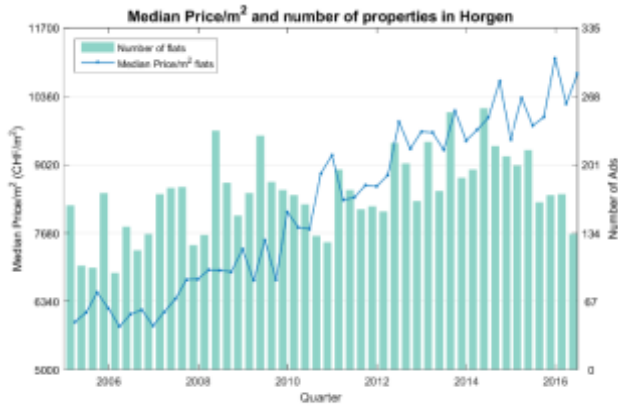


Figure B. 3: District: Horgen, Status: To Monitor, Property type: all apartments.

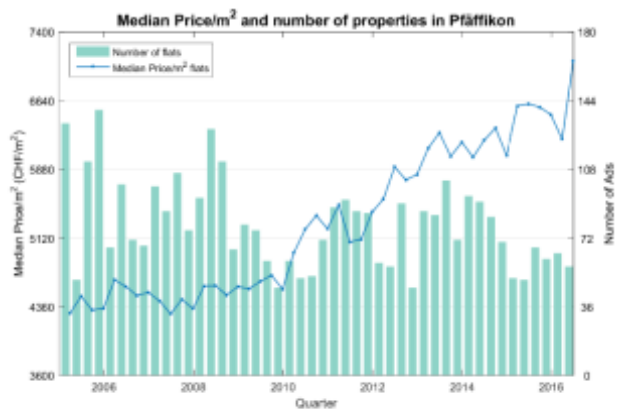


Figure B. 4: District: Pfäffikon, Status: To Monitor, Property type: all apartments.

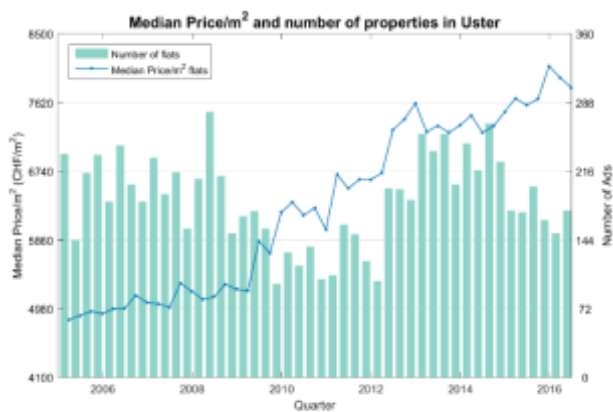


Figure B. 5: District: Uster, Status: To Monitor, Property type: all apartments.

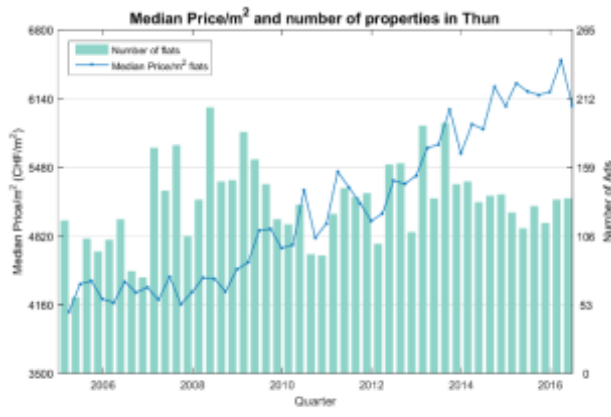


Figure B. 6: District: Thun, Status: To Monitor, Property type: all apartments.

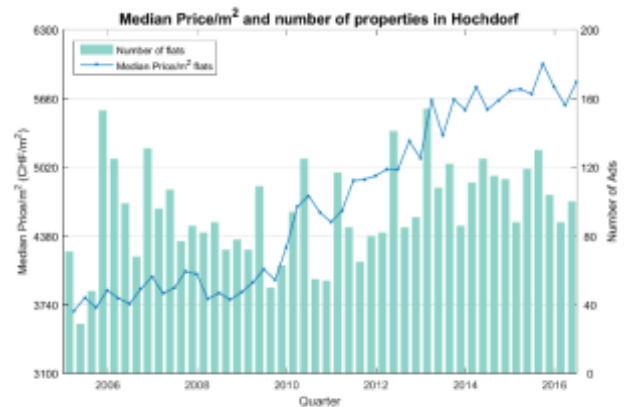
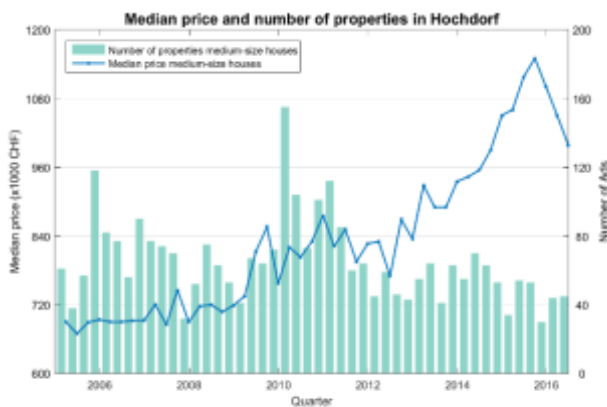


Figure B. 7: District: Hochdorf, Status: To Monitor, Property type: medium size houses (top left), all apartments (top right).

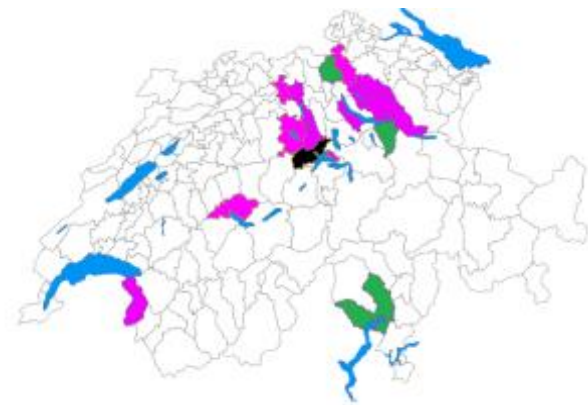
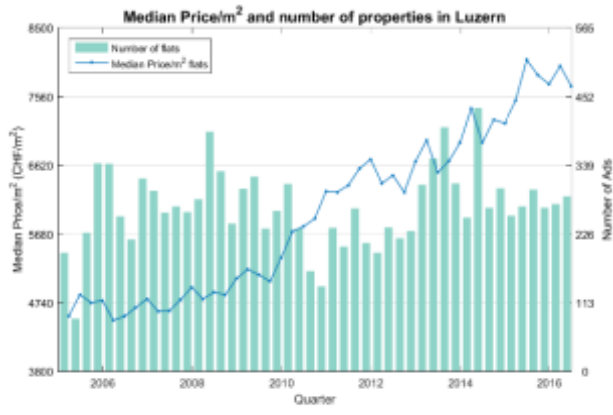


Figure B. 8: District: Luzern, Status: To Monitor, Property type: all apartments.

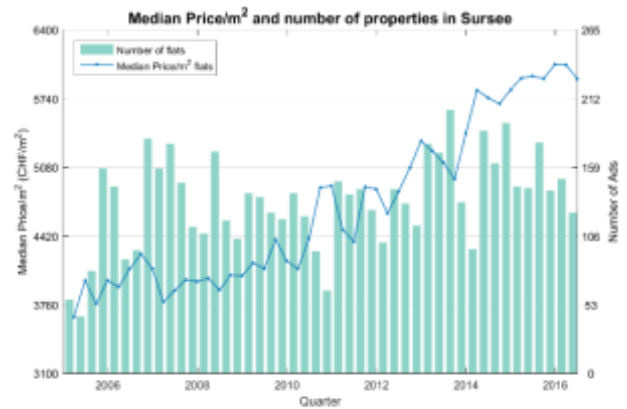
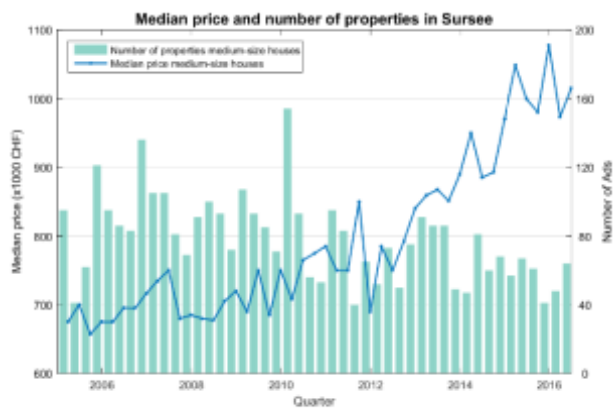


Figure B. 9: District: Sursee, Status: To Monitor, Property type: medium size houses (top left), all apartments (top right).

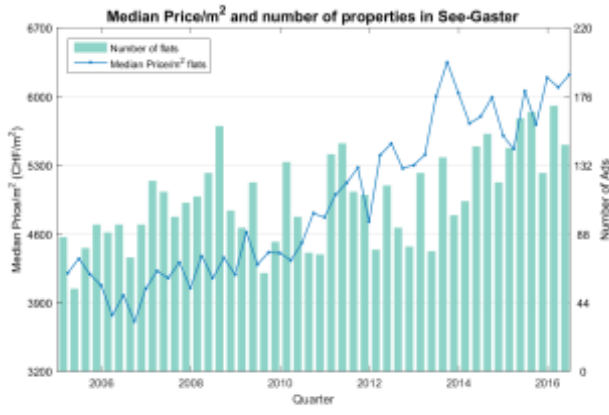


Figure B. 10: District: See-Gaster, Status: To Monitor, Property type: all apartments.

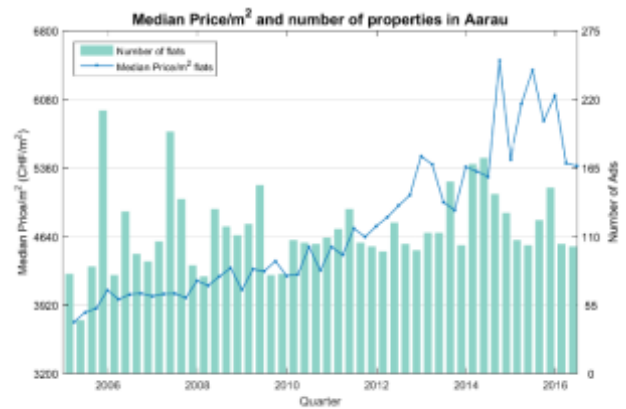
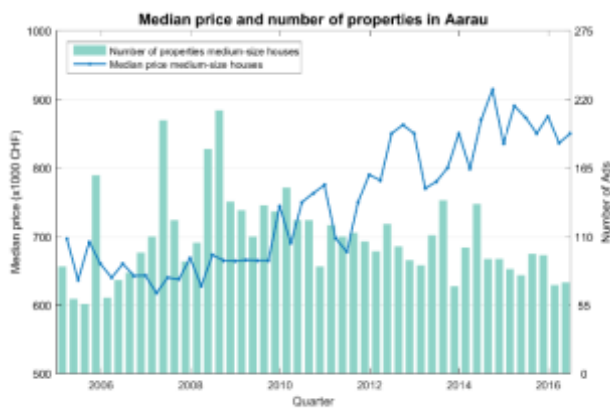


Figure B. 11: District: Aarau, Status: To Watch, Property type: medium size houses (top left), all apartments (top right).

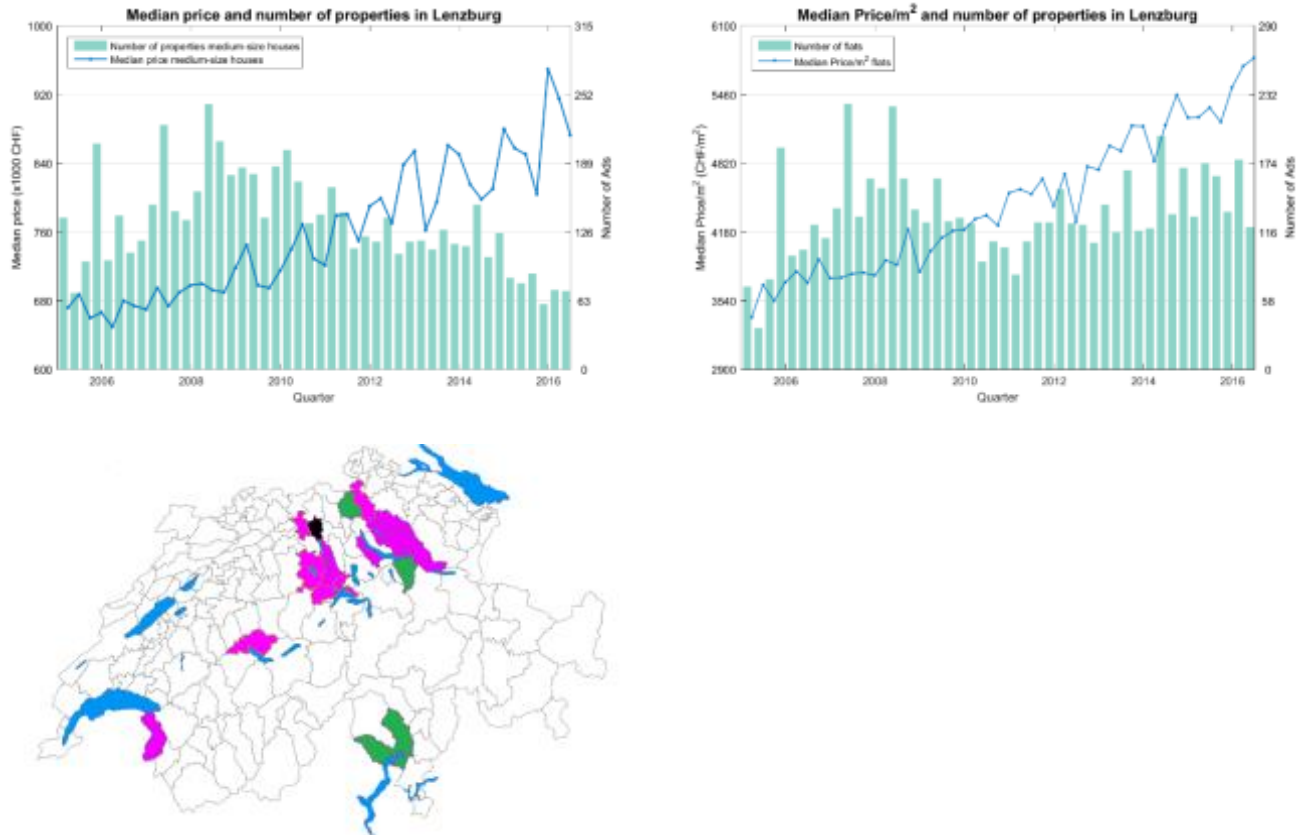


Figure B. 12: District: Lenzburg, Status: To Monitor, Property type: medium size houses (top left), all apartments (top right).

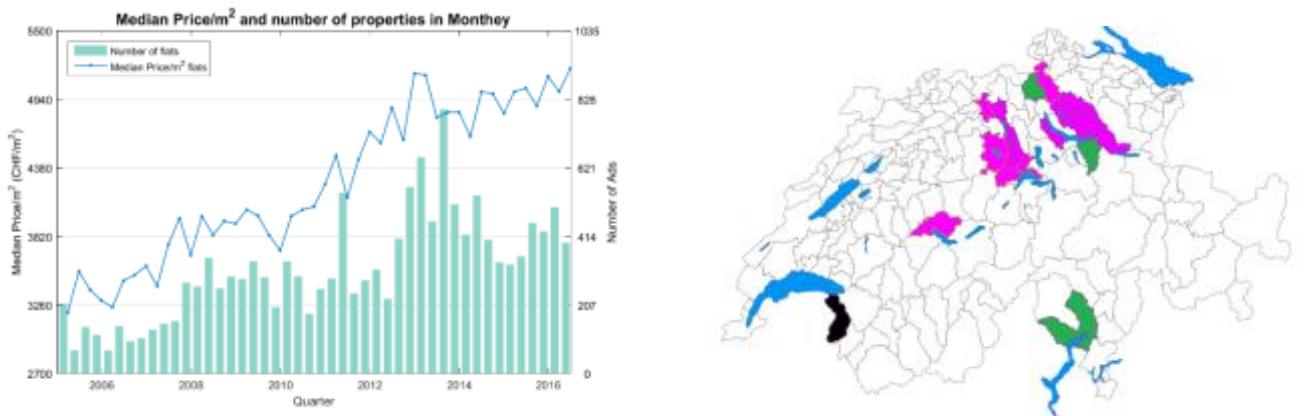


Figure B. 13: District: Monthey, Status: To Monitor, Property type: all apartments.

Appendix C: Development of the Reported Districts in 2013-Q2, 2013-Q4, 2014-Q2, 2014-Q4, 2015-Q2 and 2016-Q2.

District Name	Analysis as of 2013-Q2			Analysis as of 2013-Q4			Analysis as of 2014-Q2			Analysis as of 2014-Q4			Analysis as of 2015-Q2			Analysis as of 2016-Q2		
	Status (Critical Time)	Property Type	Property Size	Status (Critical Time)	Property Type	Property Size	Status	Property Type	Property Size	Status	Property Type	Property Size	Status	Property Type	Property Size	Status	Property Type	Property Size
Aarau	M	H/A	Med/All	M	H/A	Med /All	M	H/A	Med/All	M	H/A	Med/All	W	H/A	Med/All	M	H/A	Med/All
Affoltern	R	A	All	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baden	C 2013 Q3 - 2014 Q3	A	All	M	A	All	R	A	All	-	-	-	-	-	-	-	-	-
Bremgarten	R	A	All	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bülach	C 2013 Q3 - 2014 Q4	A	Med/S	C 2014 Q1 - 2015 Q2	A	All/Med/S	W	A	All/Med/S	W	A	All/S	W	A	All/S	M	A	All
Dielsdorf	C 2013 Q3 - 2014 Q3	A	All	W	A	All/Med	M	A	All/Med	M	A	All/Med	M	A	All	R	A	All
Dietikon	R	A	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hinwil	M	H/A	Med/All	M	H/A	Med/All	M	H/A	Med/All	M	H/A	Med/All	M	H/A	Med/All	M	H/A	Med/All
Hochdorf	-	-	-	W	A	Med/S	W	A	Med/S	M	H/A	Med/All	M	H/A	Med/All	M	H/A	Med/All
Höfe	M	A	Med	M	A	Med	M	A	Med	R	A	All	-	-	-	-	-	-
Horgen	M	A	All	M	A	All	M	A	All	M	A	All	M	A	All	M	A	All
Jura-Nord Vaudois	M	H	Med	R	H	Med	-	-	-	-	-	-	-	-	-	-	-	-
Lausanne	M	A	All	M	A	All	R	A	All	-	-	-	-	-	-	-	-	-
Lenzburg	M	H	Med	M	H	Med	M	H	Med	M	H/A	Med /All	M	H/A	Med /All	M	H/A	Med /All
Locarno	M	A	All	W	A	All/S	W	A	All/S	M	A	All	M	A	All	R	A	All
Luzern	-	-	-	-	-	-	-	-	-	-	-	-	W	A	All	M	A	All
March	M	A	All	M	A	All	M	A	All	M	A	All	M	A	All	R	A	All
Monthey	M	A	All	M	A	All	M	A	All	M	A	All	M	A	All	M	A	All
Münchwilen	M	A/H	Med	M	H/A	Med /All	R	H/A	Med /All	-	-	-	-	-	-	-	-	-
Pfäffikon	W	A	Med	W	A	Med	W	A	Med	M	A	All	M	A	All	M	A	All
See-Gaster	-	-	-	W	A	All/Med	W	A	All/Med	M	A	All	M	A	All	M	A	All
Sursee	-	-	-	-	-	-	-	-	-	-	-	-	W	H/A	Med/All	M	H/A	Med/All
Thun	-	-	-	-	-	-	-	-	-	-	-	-	W	A	All	M	A	All
Uster	W	A	Med/S	M	A	All	M	A	All	M	A	All	M	A	All	M	A	All
Zug	R	A	All	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Status: C: Critical, W: To Watch, M: To Monitor, R: Regime Change

Property Type: A: Apartments, H: Houses

Property Size: Med. Medium Size, S: Small Size