How to identify a Housing Bubble?

Bulgarian housing market in 2019: Is there a new bubble?

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Corporate & Investment Banking

Agenda

1.1. What is a house price bubble?

❑ The term "bubble" refers to a substantial and sustained mispricing of an asset. Identifying a house price bubble is difficult due to the lack of consensus in the economic profession about what precisely constitutes a housing bubble and what methods (methodology and tools) should be used to establish its presence.

❑ Typical signs confirming the existence of a house price bubble include:

   ❑ Decoupling of house prices from local incomes;

   ❑ House prices rising much faster than rents;

   ❑ Distortions of the real economy, such as excessive supply of credit or capital flows channeled toward the housing market as well as excessive volumes of construction activity.

❑ Presence of a house price bubble (for the purposes of this analysis) shall be considered established if two conditions are met simultaneously. First, if there are too many excessively overpriced properties. And second, if there is some kind of accompanying distortion in the real economy.

1.2. Price sustainability analysis

❑ We first focus on the link between housing prices and household incomes. We call this part of the analysis price sustainability analysis.

❑ By definition Price-to-income ratio is the ratio between the price of a median home to that of the median annual household income in a particular area. As no median data are available average ones are used. Grey economy is taken into account to improve reliability of the estimate. As house price data in specific locations in Sofia are not available, asking prices (provided by a private sector real estate agent company Imot.bg) are used as a proxy.

❑ Interpretation of the obtained PI ratios:

❑ PI ratio equal to 5x will be used as a threshold to distinguish between house prices in line with prevailing local incomes and house prices which are decoupled from local incomes;

❑ Substantial and sustained mispricing of housing (or presence of too many excessively overpriced properties) will be considered the case when housing in a specific location is overpriced more than 30% relative to the price level corresponding to the 5x price income measure.

1.3. Dislocations analysis

❑ To identify a presence of a price bubble we shall also check for distortions/dislocations in the real economy. This is important because historically the emergence of price bubble episodes has often been accompanied by the emergence of dislocations in the real economy. We shall call this part of the analysis dislocations analysis.

❑ We shall check for three specific types of dislocations:

    ❑ Excessive increases in the supply of credit (channeled to real estate and construction activities) to the real economy;

    ❑ Excessive increases in speculative foreign capital inflows channeled toward the booming construction sector and vertically integrated tourism and real estate sectors;

    ❑ Booms in the construction sector, which we shall try to identify by looking at the sector profitability performance, as well as the volumes of investment in construction of new housing.
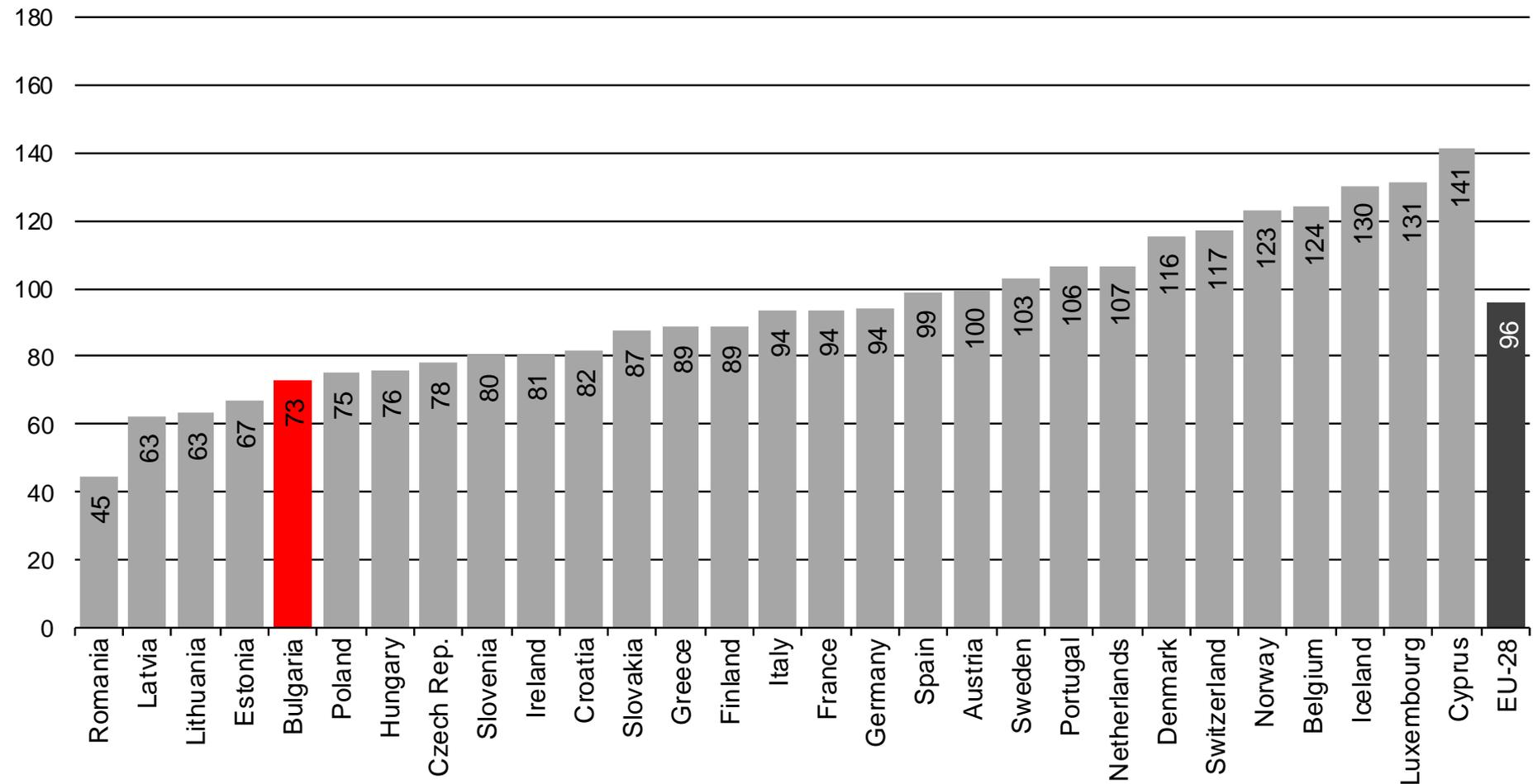
Agenda

2.1.1. Average size of dwelling in Bulgaria is 73 square meters

Average size of dwelling in EU countries, m² (2012)

Source: Eurostat, UniCredit Bulbank Economic Research

2.1.2. Average house price data for the country and for the six largest cities

Housing price per sq.m. in BGN

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total for the country	320	321	326	366	541	738	847	1 091	1 363	1 072	964	905	881	866	870	894	957	1 040	1 108
Ruse	316	284	287	292	471	727	896	1 262	1 652	1 042	893	865	873	882	887	915	939	1 065	1 155
Varna	468	485	488	580	954	1 198	1 316	1 763	2 117	1 816	1 579	1 488	1 430	1 390	1 377	1 386	1 464	1 618	1 727
Burgas	402	380	400	443	771	1 127	1 227	1 442	1 723	1 473	1 196	1 170	1 147	1 118	1 137	1 247	1 306	1 375	1 435
Plovdiv	341	362	342	377	627	863	940	1 143	1 521	1 149	1 036	972	935	927	952	1 000	1 077	1 181	1 312
Stara Zagora	278	282	319	331	662	776	915	1 145	1 415	1 026	899	888	885	870	893	940	1 029	1 121	1 182
Sofia (capital)	579	601	674	811	1 017	1 222	1 342	1 813	2 330	1 738	1 569	1 468	1 453	1 440	1 481	1 579	1 753	1 944	2 091

Housing price for average size of dwellings (73 sq.m. apartment) in BGN

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total for the country	23 325	23 399	23 831	26 739	39 457	53 874	61 795	79 661	99 534	78 272	70 362	66 094	64 341	63 194	63 492	65 263	69 843	75 896	80 897
Ruse	23 062	20 720	20 939	21 328	34 383	53 071	65 386	92 126	120 627	76 062	65 174	63 170	63 732	64 399	64 758	66 813	68 521	77 718	84 325
Varna	34 152	35 387	35 609	42 374	69 657	87 461	96 068	128 672	154 532	132 592	115 269	108 609	104 368	101 494	100 521	101 150	106 854	118 114	126 050
Burgas	29 319	27 758	29 194	32 333	56 254	82 235	89 571	105 272	125 770	107 502	87 333	85 405	83 699	81 641	83 022	91 024	95 335	100 368	104 768
Plovdiv	24 914	26 392	24 932	27 521	45 764	62 992	68 642	83 451	111 039	83 884	75 656	70 945	68 291	67 680	69 475	73 021	78 600	86 248	95 776
Stara Zagora	20 303	20 601	23 287	24 142	48 348	56 619	66 766	83 567	103 319	74 874	65 613	64 834	64 577	63 543	65 188	68 629	75 149	81 815	86 302
Sofia (capital)	42 239	43 852	49 184	59 169	74 248	89 235	97 951	132 361	170 081	126 847	114 523	107 172	106 042	105 105	108 117	115 277	127 983	141 938	152 679

Source: NSI, UniCredit Bulbank Economic Research

2.1.3. Average household gross disposable annual income data

Total household gross annual income, average per household

in BGN	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total for the country	4 360	4 307	5 289	5 584	5 925	6 158	6 657	7 818	8 686	9 122	9 023	9 251	10 244	11 420	11 666	11 883	12 112	12 836	13 450
Ruse	4 071	3 897	4 715	4 898	5 604	6 585	6 894	8 710	8 165	8 566	8 444	9 409	9 587	9 978	10 740	12 730	12 331	11 882	n.a.
Varna	4 526	4 454	5 665	5 912	6 151	6 384	7 492	8 354	10 182	10 351	9 941	10 120	10 066	11 393	11 439	12 443	11 818	11 668	n.a.
Burgas	3 807	3 915	4 839	5 532	5 953	6 550	7 905	8 272	8 946	9 137	8 321	8 359	8 983	10 050	10 130	10 438	11 256	11 746	n.a.
Plovdiv	4 062	4 031	4 738	5 314	5 326	5 545	6 719	7 519	8 047	8 596	9 279	8 492	8 814	10 128	10 055	9 725	10 613	12 463	n.a.
Stara Zagora	4 632	3 618	5 657	5 777	5 823	6 278	5 938	7 897	8 220	9 545	10 164	10 736	10 993	12 033	11 480	11 674	12 071	12 608	n.a.
Sofia (capital)	4 571	4 332	5 137	5 521	6 366	6 434	7 242	9 099	10 925	11 880	11 372	12 549	14 498	16 973	16 425	16 724	16 283	16 334	n.a.

Total household gross annual income by decile groups, average per household

in BGN	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total for the country	4 360	4 307	5 289	5 584	5 925	6 158	6 657	7 818	8 686	9 122	9 023	9 251	10 244	11 420	11 666	11 883	12 112	12 836	13 450
First decile	1 749	1 672	1 930	2 144	2 238	2 410	2 825	3 196	3 606	3 812	3 590	3 395	3 753	4 312	4 819	5 078	5 153	5 514	n.a.
Second decile	2 434	2 432	2 774	2 943	3 040	3 180	3 519	4 134	4 702	5 094	5 251	5 200	5 436	6 098	6 329	6 556	6 403	6 829	n.a.
Third decile	2 687	2 621	3 064	3 294	3 333	3 663	3 970	4 673	5 107	5 558	5 581	5 532	5 934	6 544	7 013	7 082	7 678	7 490	n.a.
Fourth decile	2 966	2 868	3 458	3 756	3 868	4 136	4 550	5 302	5 743	6 316	6 292	6 250	6 916	7 336	8 352	8 128	8 322	8 917	n.a.
Fifth decile	3 303	3 297	3 844	4 288	4 406	4 730	5 252	6 218	6 457	7 183	6 923	7 161	7 744	8 444	8 812	9 329	9 598	10 321	n.a.
Sixth decile	3 810	3 737	4 365	4 708	4 980	5 362	5 883	7 007	7 776	8 102	8 162	8 364	9 160	9 759	10 346	11 287	11 070	11 619	n.a.
Seventh decile	4 394	4 213	5 036	5 441	5 660	6 247	6 745	7 878	9 084	9 530	9 417	9 463	10 419	11 522	11 831	12 431	12 417	13 311	n.a.
Eighth decile	5 073	4 974	6 137	6 526	6 645	7 282	7 787	9 100	10 839	11 000	10 880	11 430	12 446	13 734	14 064	13 987	14 607	15 488	n.a.
Ninth decile	6 086	6 068	7 439	7 996	8 380	8 668	9 185	10 634	12 553	13 054	12 490	13 014	14 881	16 070	16 287	16 857	17 032	17 760	n.a.
Tenth decile	8 959	9 070	11 920	12 070	13 750	13 357	14 547	17 066	18 809	19 090	18 447	19 326	22 129	25 703	23 788	23 036	24 231	25 958	n.a.

Source: NSI, UniCredit Bulbank Economic Research
Total income of households = Total income - Drawn savings – Loans and credits. Total income includes monetary and valued income in kind.

2.1.4. To reflect grey economy, official household income data are adjusted for the estimates obtained from Prof. Dr. Friedrich Schneider's research*
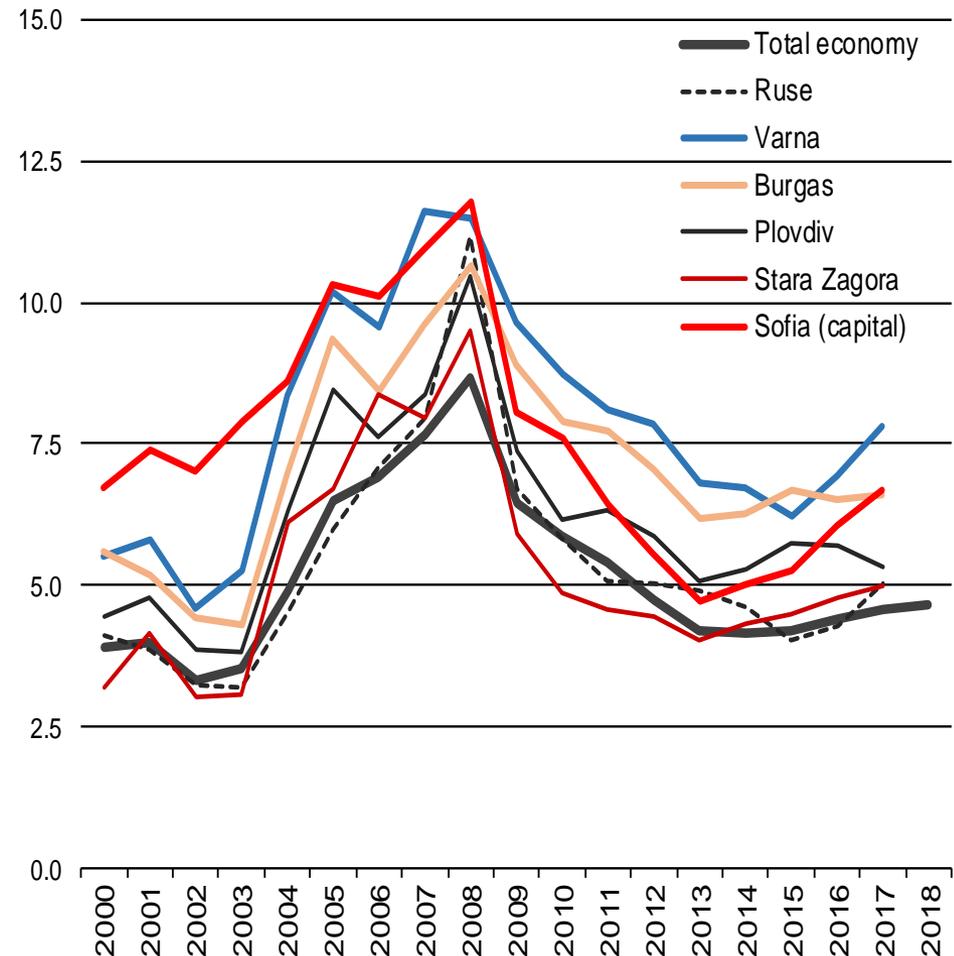
(as % of GDP)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EU (28), simple avg	**22.6**	**22.3**	**21.8**	**21.1**	**20.3**	**19.6**	**20.1**	**19.9**	**19.6**	**19.3**	**18.8**	**18.6**	**18.3**
Austria	10.8	11.0	10.3	9.7	9.4	8.1	8.5	8.2	7.9	7.6	7.5	7.8	8.2
Belgium	21.4	20.7	20.1	19.2	18.3	17.5	17.8	17.4	17.1	16.8	16.4	16.1	16.2
Bulgaria	35.9	35.3	34.4	34.0	32.7	32.1	32.5	32.6	32.3	31.9	31.2	31.0	30.6
Croatia	32.3	32.3	31.5	31.2	30.4	29.6	30.1	29.8	29.5	29.0	28.4	28.0	27.7
Czech Republic	19.5	19.1	18.5	18.1	17.0	16.6	16.9	16.7	16.4	16.0	15.5	15.3	15.1
Denmark	17.4	17.1	16.5	15.4	14.8	13.9	14.3	14.0	13.8	13.4	13.0	12.8	12.0
Estonia	30.7	30.8	30.2	29.6	29.5	29.0	29.6	29.3	28.6	28.2	27.6	27.1	26.2
Finland	17.6	17.2	16.6	15.3	14.5	13.8	14.2	14.0	13.7	13.3	13.0	12.9	12.4
France	14.7	14.3	13.8	12.4	11.8	11.1	11.6	11.3	11.0	10.8	9.9	10.8	12.3
Germany	17.1	16.1	15.4	15.0	14.7	14.2	14.6	13.9	13.2	12.9	12.4	12.2	12.2
Greece	28.2	28.1	27.6	26.2	25.1	24.3	25.0	25.4	24.3	24.0	23.6	23.3	22.4
Hungary	25	24.7	24.5	24.4	23.7	23.0	23.5	23.3	22.8	22.5	22.1	21.6	21.9
Ireland	15.4	15.2	14.8	13.4	12.7	12.2	13.1	13.0	12.8	12.7	12.2	11.8	11.3
Italy	26.1	25.2	24.4	23.2	22.3	21.4	22.0	21.8	21.2	21.6	21.1	20.8	20.6
Latvia	30.4	30.0	29.5	29.0	27.5	26.5	27.1	27.3	26.5	26.1	25.5	24.7	23.6
Lithuania	32	31.7	31.1	30.6	29.7	29.1	29.6	29.7	29.0	28.5	28.0	27.1	25.8
Luxembourg	9.8	9.8	9.9	10.0	9.4	8.5	8.8	8.4	8.2	8.2	8.0	8.1	8.3
Malta	26.7	26.7	26.9	27.2	26.4	25.8	25.9	26.0	25.8	25.3	24.3	24.0	24.3
Netherlands	12.7	12.5	12.0	10.9	10.1	9.6	10.2	10.0	9.8	9.5	9.1	9.2	9.0
Poland	27.7	27.4	27.1	26.8	26.0	25.3	25.9	25.4	25.0	24.4	23.8	23.5	23.3
Portugal	22.2	21.7	21.2	20.1	19.2	18.7	19.5	19.2	19.4	19.4	19.0	18.7	17.6
Romania	33.6	32.5	32.2	31.4	30.2	29.4	29.4	29.8	29.6	29.1	28.4	28.1	28.0
Slovenia	26.7	26.5	26.0	25.8	24.7	24.0	24.6	24.3	24.1	23.6	23.1	23.5	23.3
Cyprus	28.7	28.3	28.1	27.9	26.5	26.0	26.5	26.2	26.0	25.6	25.2	25.7	24.8
Spain	22.2	21.9	21.3	20.2	19.3	18.4	19.5	19.4	19.2	19.2	18.6	18.5	18.2
Slovakia	18.4	18.2	17.6	17.3	16.8	16.0	16.8	16.4	16.0	15.5	15.0	14.6	14.1
Sweden	18.6	18.1	17.5	16.2	15.6	14.9	15.4	15.0	14.7	14.3	13.9	13.6	13.2
United Kingdom	12.2	12.3	12.0	11.1	10.6	10.1	10.9	10.7	10.5	10.1	9.7	9.6	9.4

Source: Prof. Dr. Friedrich Schneider, Department of Economics, Johannes Kepler University (January 20, 2015), UniCredit Bulbank Economic Research
* For the purposes of our calculations we assume that grey economy declines in 2016, 2017and 2018 at a pace equivalent to the one reported in 2015.

2.1.5. The calculated PI ratios suggest that housing has been very hard to afford (when applying our 5x income threshold) during the real estate boom (2005 – 2008)

Price to Income ratio for Bulgaria and six major cities for average size of dwellings (73 sq.m. apartment)

	Total economy	Ruse	Varna	Burgas	Plovdiv	Stara Zagora	Sofia (capital)
2000	**3.9**	4.1	5.5	5.6	4.5	3.2	6.7
2001	**4.0**	3.9	5.8	5.2	4.8	4.2	7.4
2002	**3.3**	3.3	4.6	4.4	3.9	3.0	7.0
2003	**3.5**	3.2	5.3	4.3	3.8	3.1	7.9
2004	**4.9**	4.5	8.4	7.0	6.4	6.1	8.6
2005	**6.5**	6.0	10.2	9.3	8.5	6.7	10.3
2006	**6.9**	7.1	9.6	8.5	7.6	8.4	10.1
2007	**7.7**	8.0	11.6	9.6	8.4	8.0	11.0
2008	**8.7**	11.2	11.5	10.6	10.4	9.5	11.8
2009	**6.5**	6.7	9.7	8.9	7.4	5.9	8.1
2010	**5.9**	5.8	8.7	7.9	6.1	4.9	7.6
2011	**5.4**	5.1	8.1	7.7	6.3	4.6	6.5
2012	**4.8**	5.0	7.9	7.1	5.9	4.5	5.5
2013	**4.2**	4.9	6.8	6.2	5.1	4.0	4.7
2014	**4.2**	4.6	6.7	6.3	5.3	4.3	5.0
2015	**4.2**	4.0	6.2	6.7	5.7	4.5	5.3
2016	**4.4**	4.3	6.9	6.5	5.7	4.8	6.0
2017	**4.6**	5.0	7.8	6.6	5.3	5.0	6.7
2018	**4.7**	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Source: Prof. Dr. Friedrich Schneider, Department of Economics, Johannes Kepler University (January 20, 2015), NSI, UniCredit Bulbank Economic Research
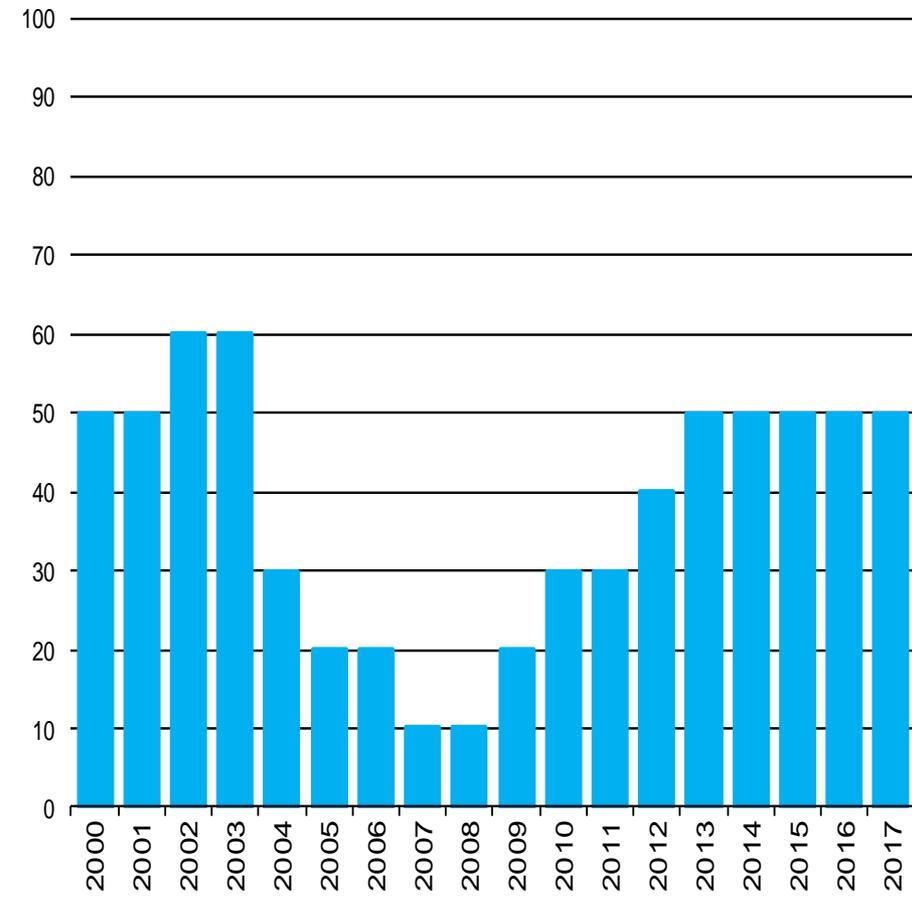
2.1.6. Households with incomes from the highest five decile groups were able to afford an average apartment in 2017. In the peak of the housing boom only 10% highest income population in Bulgaria was able to afford a 73 sq.m. apartment

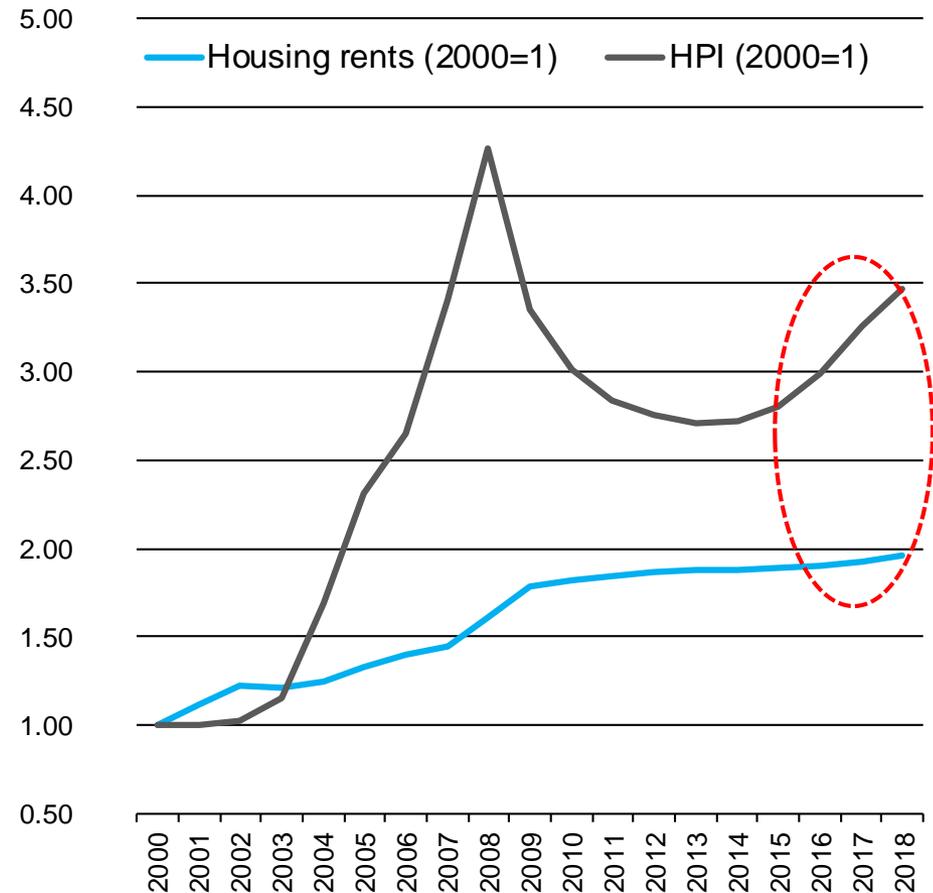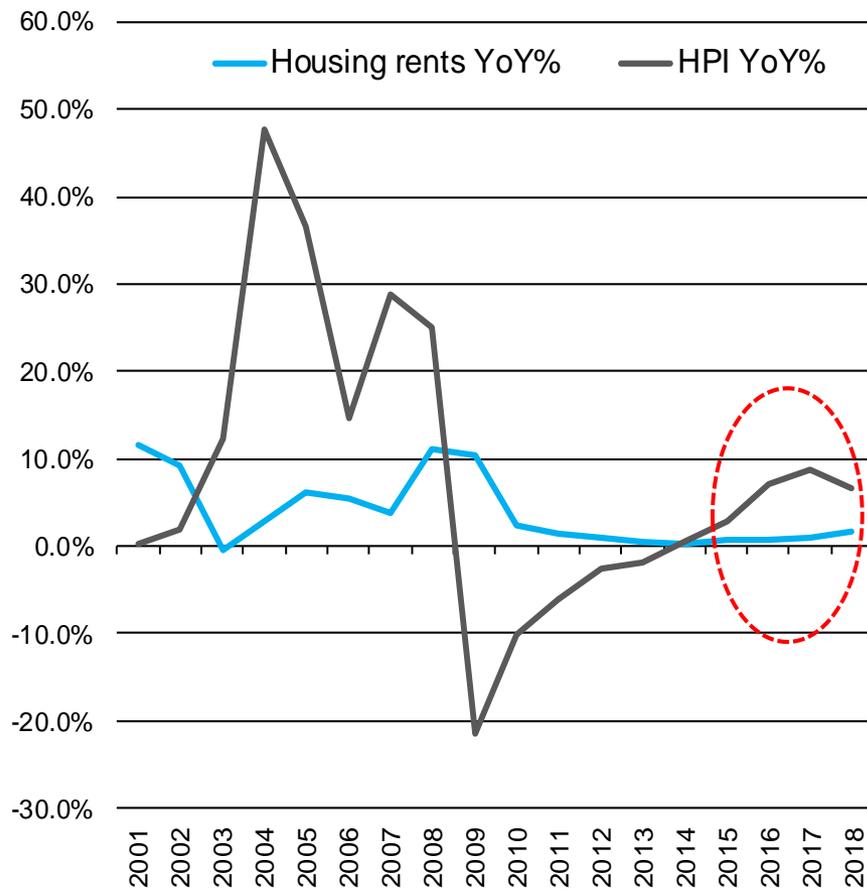**Price to Income ratio by decile groups for apartment with 73 sq.m. size**

	Total economy	First decile	Second decile	Third decile	Fourth decile	Fifth decile	Sixth decile	Seventh decile	Eighth decile	Ninth decile	Tenth decile
2000	**3.9**	9.7	7.0	6.3	5.7	5.1	4.5	3.9	3.3	2.8	1.9
2001	**4.0**	10.2	7.0	6.5	6.0	5.2	4.6	4.1	3.4	2.8	1.9
2002	**3.3**	9.1	6.3	5.7	5.1	4.5	4.0	3.5	2.8	2.3	1.5
2003	**3.5**	9.2	6.7	6.0	5.2	4.6	4.2	3.6	3.0	2.5	1.6
2004	**4.9**	13.0	9.6	8.7	7.5	6.6	5.9	5.2	4.4	3.5	2.1
2005	**6.5**	16.6	12.6	10.9	9.7	8.5	7.5	6.4	5.5	4.6	3.0
2006	**6.9**	16.3	13.1	11.6	10.1	8.8	7.8	6.8	5.9	5.0	3.2
2007	**7.7**	18.8	14.5	12.8	11.3	9.7	8.6	7.6	6.6	5.6	3.5
2008	**8.7**	20.9	16.0	14.8	13.1	11.7	9.7	8.3	7.0	6.0	4.0
2009	**6.5**	15.5	11.6	10.6	9.4	8.2	7.3	6.2	5.4	4.5	3.1
2010	**5.9**	14.8	10.1	9.5	8.4	7.7	6.5	5.6	4.9	4.2	2.9
2011	**5.4**	14.7	9.6	9.0	8.0	7.0	6.0	5.3	4.4	3.8	2.6
2012	**4.8**	13.0	9.0	8.2	7.1	6.3	5.3	4.7	3.9	3.3	2.2
2013	**4.2**	11.2	7.9	7.4	6.6	5.7	4.9	4.2	3.5	3.0	1.9
2014	**4.2**	10.1	7.7	6.9	5.8	5.5	4.7	4.1	3.4	3.0	2.0
2015	**4.2**	9.8	7.6	7.1	6.1	5.4	4.4	4.0	3.6	3.0	2.2
2016	**4.4**	10.4	8.4	7.0	6.4	5.6	4.8	4.3	3.7	3.2	2.2
2017	**4.6**	10.6	8.6	7.8	6.6	5.7	5.0	4.4	3.8	3.3	2.3

Share of households with housing affordability ratings below 5.0

Source: Prof. Dr. Friedrich Schneider, Department of Economics, Johannes Kepler University (January 20, 2015), NSI, UniCredit Bulbank Economic Research

2.1.7. House prices today are rising faster than rents, which is another factor signaling potentially unsustainable house price development

Housing prices and Housing rents*, YoY% (left figure), 2000=1 (right figure)

* Housing rents index is extracted from CPI basket and re-estimated in 2000=1 basis
Source: NSI, UniCredit Bulbank Economic Research

2.1.8. Main takeaway messages from price sustainability analysis

❑ The obtained PI ratios suggest that the average house remained hard to afford for a large swath of the population during the most recent real estate boom (2005 -2008). On the positive side, the results obtained between 2012 – 2018 were below the 5x income threshold. Though slowly, housing affordability is deteriorating in the last five years, after bottoming out in 2013.

❑ PI ratios for the six largest cities are more nuanced. They suggest that houses were hard to afford (rarely were below the 5x income threshold) in Sofia and on the seaside. However, houses were more affordable in the rest of the country (generally speaking in the second-tier cities), where the PI ratio has been below the 5x income threshold on average for prolonged periods of time.

❑ PI ratios calculated by income decile groups reconfirm that house affordability sharply deteriorated a decade ago, to the point when in 2007 and 2008 only 10% of total households were able to afford a 73 sq.m. apartment.

❑ House prices today are rising faster than rents, which is another factor signaling potentially unsustainable house price development.

Agenda

1. Measurement approach

2. Price sustainability analysis

   1. Total economy and major cities results using NSI data

   2. Sofia's results using Imot.bg data

3. Dislocations analysis

4. Conclusions

2.2.1. What Imot.bg dataset represents and how we use it?

❑ NSI compiles only one single time series for house prices evolution that tracks average performance in the capital city Sofia. But this is not enough for our purposes, since Sofia has a very diverse and very large housing market.

❑ To overcome lack of reliable information from official sources, we use information from a private sector real estate agent. Imot.bg is an internet based tool with information about asking prices for housing real estate property offered for sale.

❑ This source has its own limitations and can be tricky to use:

  ❑ Above all, asking prices differ from prices at which sales contracts are made. What's more, in periods of increased market turbulence these differences can increase significantly;

  ❑ The prices of most newly built houses are without VAT included, resulting in undervaluation;

  ❑ The stock of housing offered for sale might be very different from the total housing stock available at any specific moment in time and in any specific geographical location.

2.2.2. We stick to the housing affordability rating system used so far, where 5x income is used as a threshold to distinguishes between house prices in line with the prevailing local incomes and prices decoupled from the local incomes

Housing affordability rating	
Ratings	**Number of years avgerage household need to save it's total income to purchase 73 sq. m. apartment**
Affordable	(3.0 & under)
Moderately unaffordable	(3.1 - 4.0)
Seriously unaffordable	(4.1 - 5.0)
Severely unaffordable - Level 1	(5.1 - 6.0)
Severely unaffordable - Level 2	(6.1 - 7.0)
Severely unaffordable - Level 3	(7.1 - 8.0)
Severely unaffordable - Level 4	(8.1 - 9.0)
Severely unaffordable - Level 5	(9.1 - 10.0)
Severely unaffordable - Level 6	(10.1 - 11.0)
Severely unaffordable - Level 7	(11.1 - 12.0)
Severely unaffordable - Level 8	(12.1 - 13.0)
Severely unaffordable - Level 9	(13.1 - 14.0)
Severely unaffordable - Level 10	(14.1 - 15.0)
Severely unaffordable - Level 11	(15.1 - 16.0)
Severely unaffordable - Level 12	(16.1 - 17.0)
Severely unaffordable - Level 13	(17.1 - 18.0)
Severely unaffordable - Level 14	(18.1 - 19.0)
Severely unaffordable - Level 15	(19.1 - 20.0)
Severely unaffordable - Level 16	(20.1 & over)

2.2.3. The PI results using 3Q2008 data reconfirm the existence of a housing bubble

Housing affordability rating by location in Sofia (peak 3Q 2008)
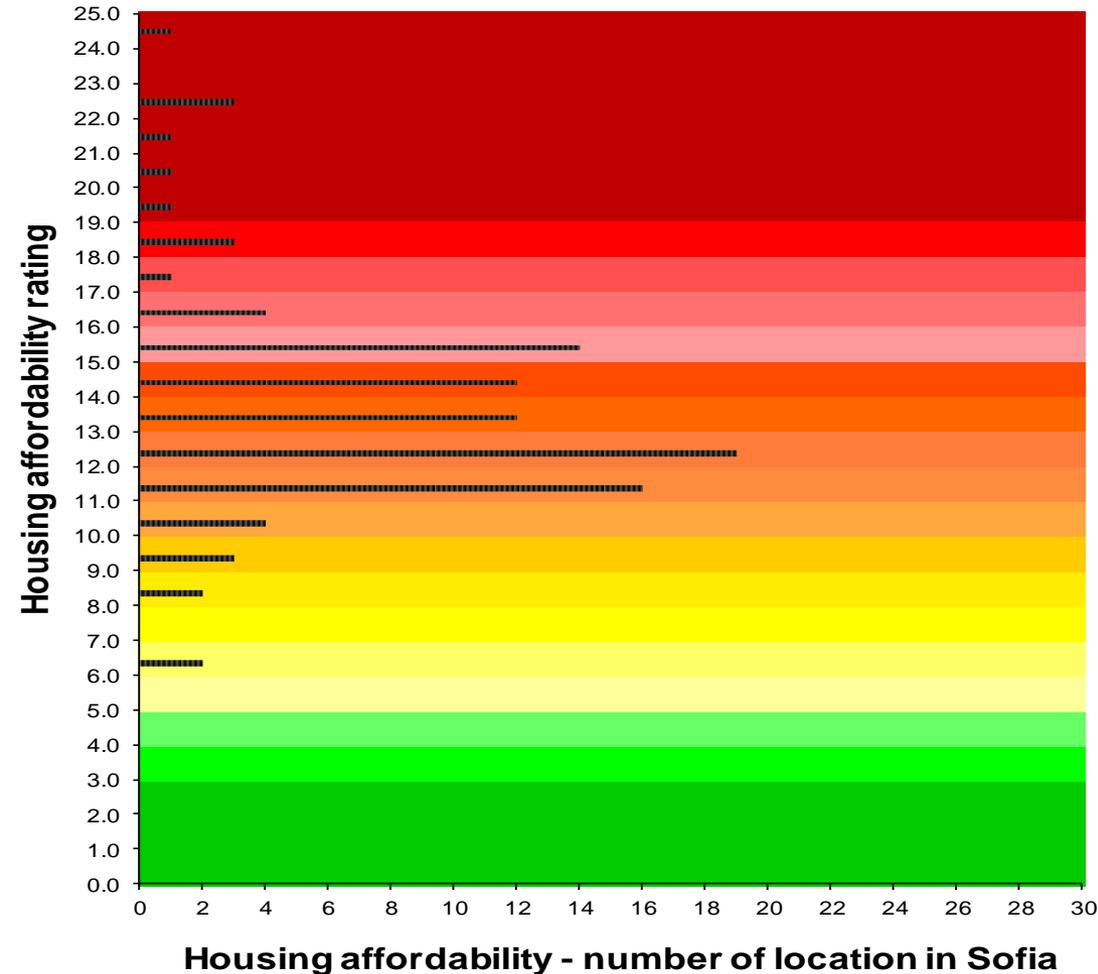
**Housing affordability - number of location in Sofia**

- ❑ Overpriced locations dominated the picture in 3Q2008, when 97 out of 99 total locations in Sofia (or 98%) were overpriced by more than 30%.

- ❑ In 3Q2008 the detachment between house prices and prevailing income levels reached excessive proportions, which highlighted unsustainability of the house prices reached at the peak of the boom.

- ❑ The price of an average apartment in Sofia was 13.6x the average annual household income.

- ❑ In the most desired locations the average household needed to save all its gross (before tax) income for more than 20Ys to buy a 73 sq.m. apartment.

- ❑ The proportions of the bubble were eye watering: there was not a single location (out of 99 total) with Pi ratio below 6x. This demonstrates that house prices reached levels way above what incomes have suggested.

Source: NSI, Imot.bg, UniCredit Bulbank Economic Research

2.2.4. Housing affordability has improved in 1Q2019, when compared with 3Q2008. However, large part of prices in Sofia are not in line with the prevailing income levels. The latter indicates presence of a risk for a downward correction in housing prices

**Housing affordability rating by location in Sofia (1Q 2019)**
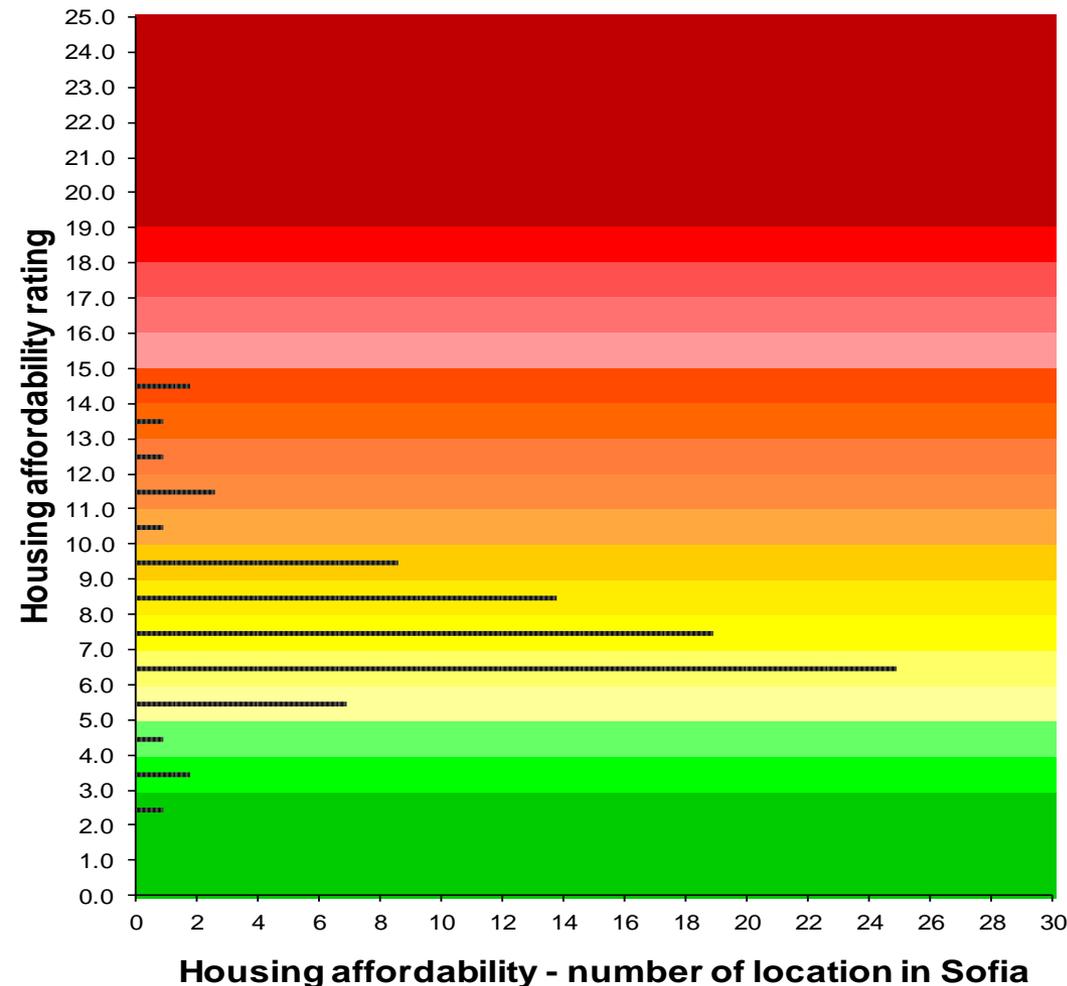
- ❑ The price of an average apartment in Sofia was 7.7x the average annual household income in 1Q2019 (vs 13.6x in 3Q2008).

- ❑ Only in 4 (out of 97) locations were prices below the 5x threshold in 1Q2019.

- ❑ There were 8 locations which were priced on the margin (i.e. with PI ratio between 5 and 6). This means that (when including those below 5x) one in every eight locations in Sofia were affordable and therefore reasonably priced in 1Q2019.

- ❑ 59 locations exhibited PI ratios between 6 and 8 times average annual income.

- ❑ Prices at the most preferred locations (those in the south part of the city and in the most expensive downtown areas) were severely unaffordable (though to a lesser degree than in 3Q2008) for households with incomes close to the average.
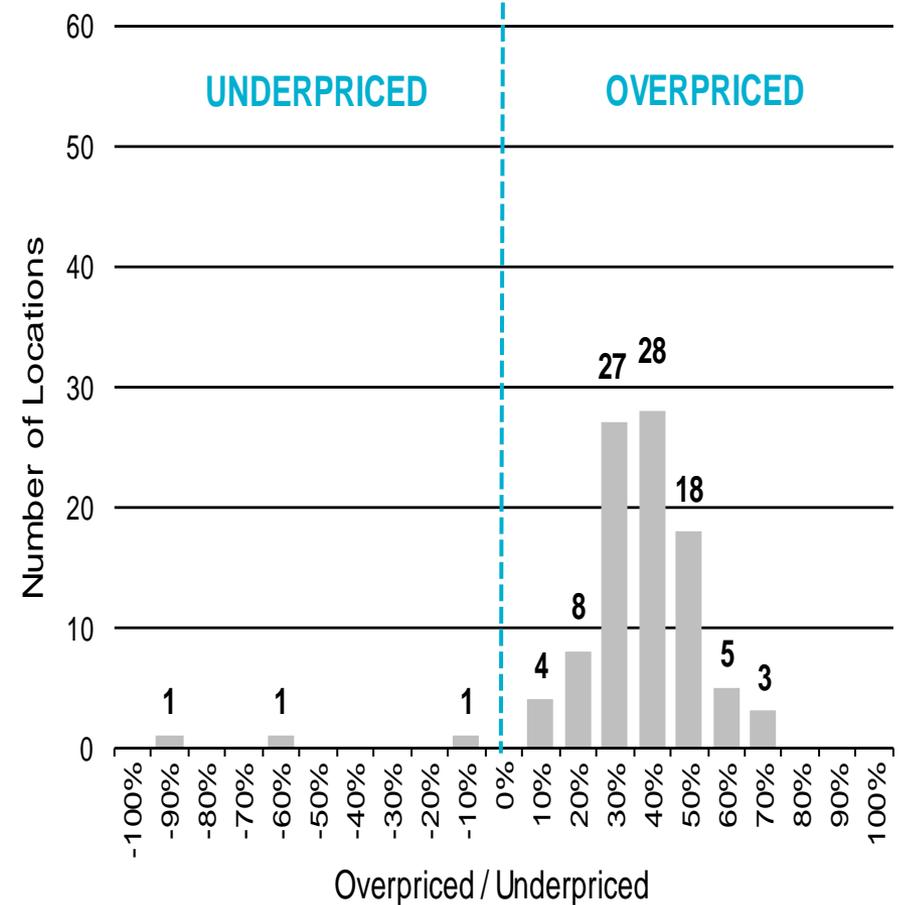
Source: NSI, Imot.bg, UniCredit Bulbank Economic Research

2.2.5. Overpriced locations dominated the picture in 3Q2008, when 97 out of 99 total locations in Sofia (or 98%) were overpriced by more than 30%*. The share of overpriced locations is still relevant (54 out of 97 or 56%) in 1Q2019

Number of underpriced / overpriced locations in Sofia (3Q 2008)
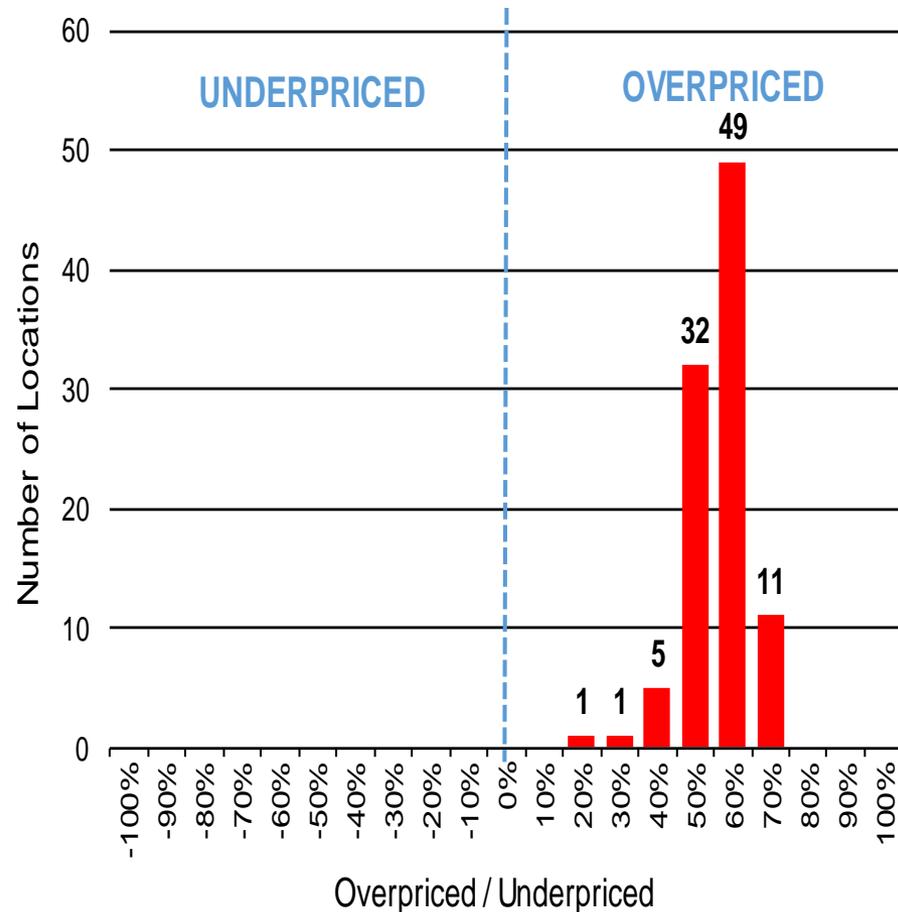
Number of underpriced / overpriced locations in Sofia (1Q 2019)

Source: NSI, Imot.bg, UniCredit Bulbank Economic Research
* Substantial and sustained mispricing of housing (or presence of too many excessively overpriced properties) will be considered the case when housing in a specific location is overpriced by more than 30% relative to the price level corresponding to the 5x price income measure - please see slide 4 Interpretation of the obtained PI ratios section.

2.2.6. Main takeaway messages from price sustainability analysis in Sofia

❑ Overpriced locations dominated the picture in 3Q2008, when 97 out of 99 total locations in Sofia (or 98%) were overpriced by more than 30%.

❑ In 1Q2019, the share of overpriced locations in Sofia is still relevant (54 out of 97 locations, or 56% of total are overpriced, using our 30% threshold). This means that in roughly half of the locations in Sofia housing prices reached proportions not supported by the prevailing income levels.

❑ There is a risk for housing prices to go down. If, for whatever reason, the drop in house prices coincide in time with that of the lending rates resetting (normalization), the risks for financial stability can rise significantly.

❑ It is important to highlight that the presence of risk for a downward correction in housing prices doesn't necessarily mean that this risk will materialize. In the best case scenario, the balance between housing prices and incomes can be restored if prices stop to increase, while incomes gradually catch up.

❑ There are measurement imperfections (related to the quality of data and the measurement approach) which distort the picture, which is why the conclusions above should be taken only very cautiously.

Agenda

1. Measurement approach

2. Price sustainability analysis

    1. Total economy and major cities results using NSI data

    2. Sofia's results using Imot.bg data
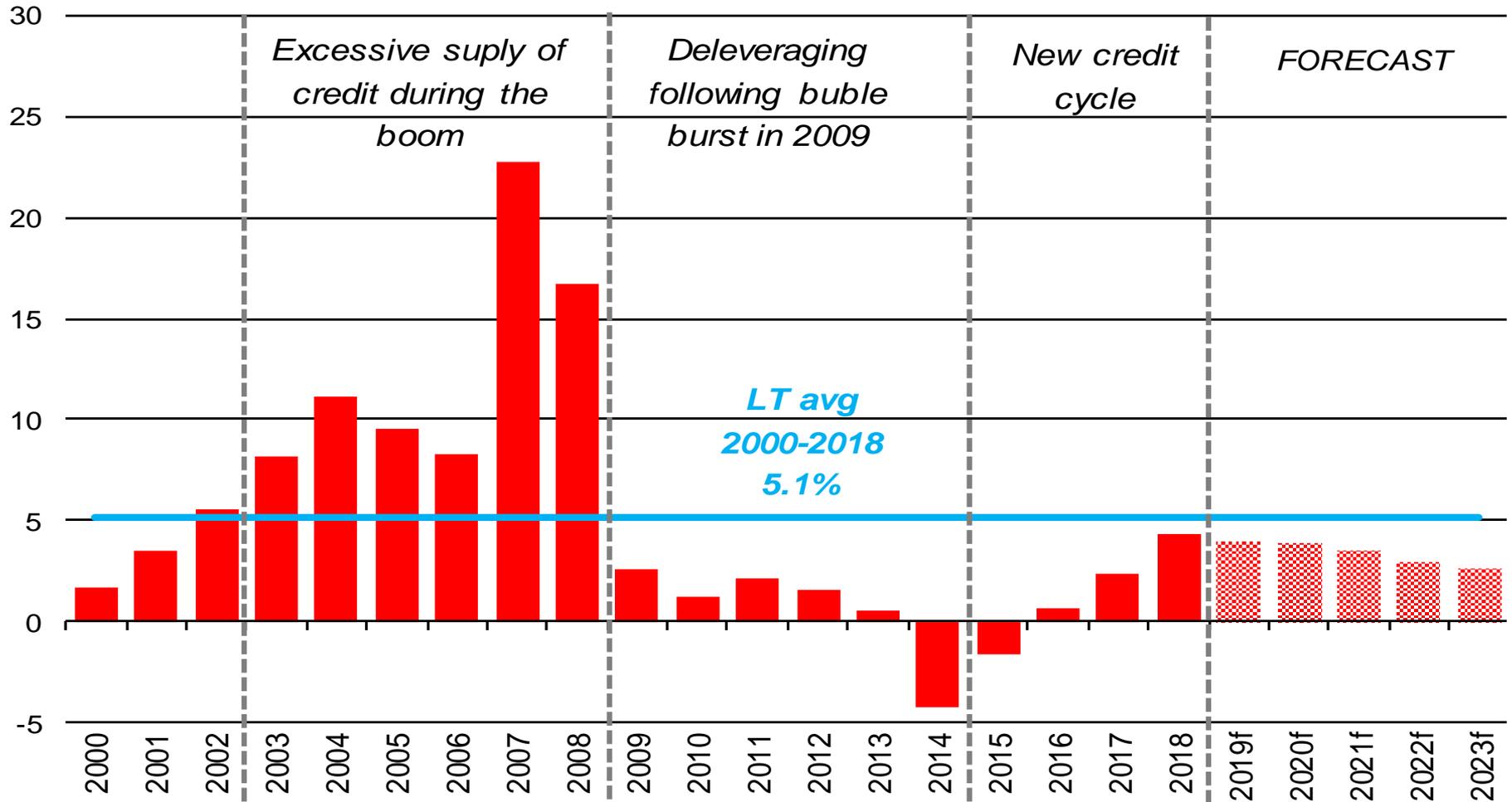
3. **Dislocations analysis**

4. Conclusions

3.1. We check for three types of dislocations (distortions) in the real economy, which historically have often been associated with house price bubbles

❑ We start with credit booms. Often housing bubbles have been accompanied and to a significant degree also caused by excessive increases in the supply of credit to the real economy. Such episodes are called twin booms (housing boom which coincides in time with a credit boom). These are particularly dangerous as they can inflict significant harm to the economy, including sending it in a deep and prolonged recession. IMF studies showed that historically twin booms have been accompanied by either a financial crisis or poor economic performance in 90% of the cases.

❑ Second, we test for excessive increases in speculative foreign capital inflows channeled toward the real estate and construction sectors, as these have been sometimes among the relevant drivers of unsustainable house price developments.

❑ Finally, we check for unsustainable booms in construction. To test for this particular type of dislocation we focus on profitability performance of the construction sector. We also use data for investments (measured by gross fixed capital formation) in dwellings construction to assess volumes and sustainability of construction activity.

3.2. Rapid prices growth in the new housing cycle is not accompanied with an excessive increase in supply of credit to the real economy

Yearly change in outstanding loans as % of GDP

Chart labels:
- *Excessive suply of credit during the boom*
- *Deleveraging following buble burst in 2009*
- *New credit cycle*
- *FORECAST*
- *LT avg 2000-2018 5.1%*

X-axis years: 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019f, 2020f, 2021f, 2022f, 2023f

Source: NSI, BNB, UniCredit Bulbank Economic Research

3.3. Apart from rapid growth in real estate prices and credit supply to the real economy, there are several more trends which can send an alert signal

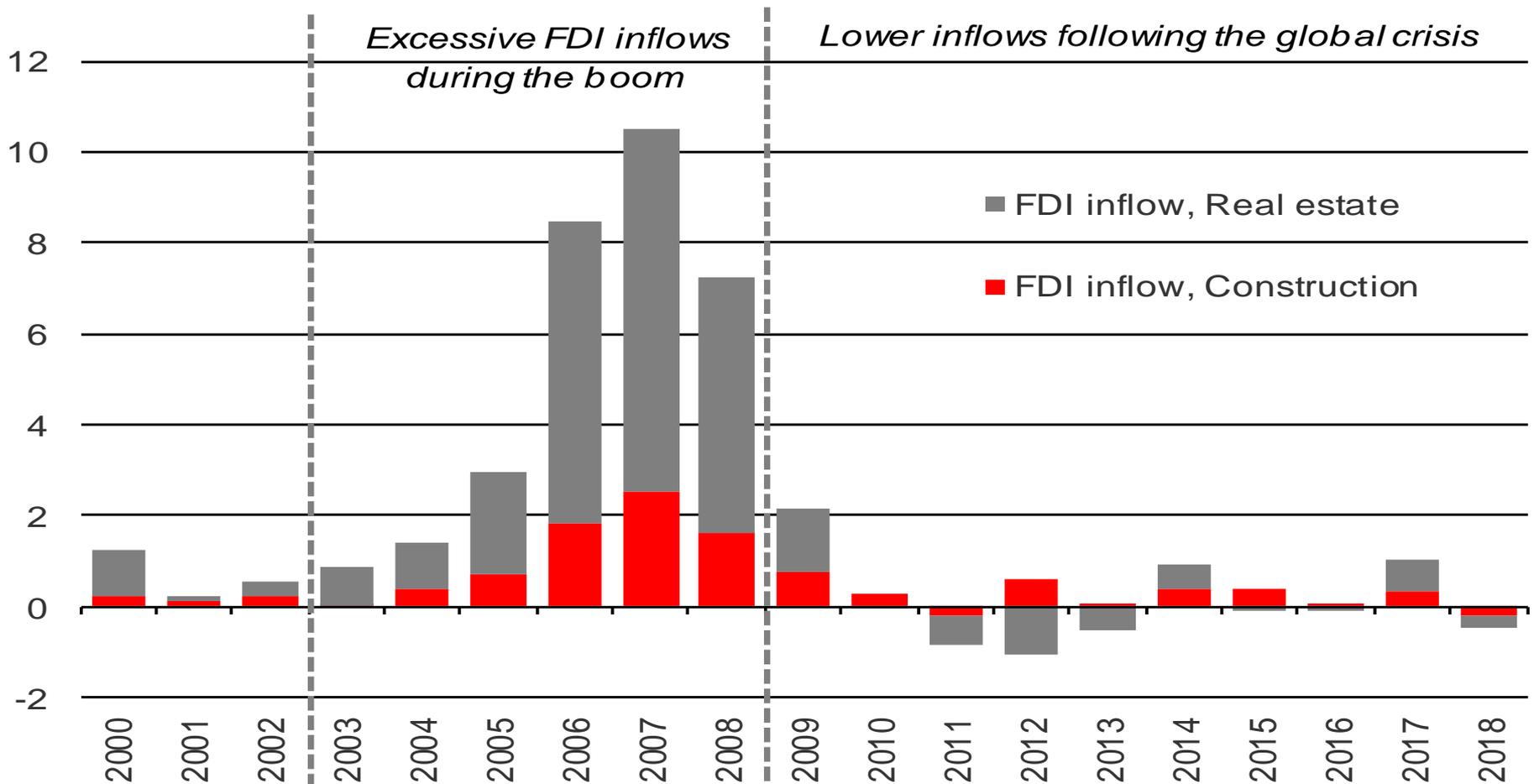| TRENDS ALERT SIGNALS WE NEED TO WATCH	BULGARIAN MARKET REVIEW
Rapid growth in high-LTV loans with long maturities	Unfortunately, such type of data are not publically available in Bulgaria. So far in the current cycle, we haven't come across press information suggesting that high-LTV loans with long maturities are rapidly rising.
Rapid growth in lending to commercial real estate and presence of corporate borrowers with multiple real estate related exposures	This is another trend suggesting that risk taking reaches elevated proportions. It is particularly worrisome, when companies, which traditionally come from other sectors of the economy, focus on real estate transactions as a profit driver with increasing relevance. In Bulgaria, there is some increase in lending volumes to construction more recently, which comes after a prolonged period of deleveraging, but in our view, it is only natural to see this, as large part of new construction is traditionally financed with bank borrowing. Loan sector breakdown data (released by the BNB on a quarterly basis) also doesn't suggest an increase of lending exposures to real estate and tourism, but we should mind that these data are often of poor quality.
Rapid growth in mortgage loans and the number of households with multiple mortgages	Such behavior can potentially signal rise in speculative activities and attempts for circumvention of LTV or DSTI limitations. This is another trend we need to watch. Its true that mortgage loans are rising in Bulgaria, but starting from a very low level, and only after a prolonged period of very subdued growth in the past.
Raising NPLs in real estate related sectors (such as Wholesale and retail trade, Construction, Real Estate and Tourism)	This trend (alert signal) can also indicate risk taking which reaches elevated levels. When happens this is usually in a very advance phase of the bubble forming. In Bulgaria, there are no NPLs data by sector of the economy. Moreover, ahead of the forthcoming stress test and assets quality review scheduled for 1H2019, bank sales of NPLs portfolios are more pronounced, which further blurs the picture.

3.4. Not all FDIs are equal. When taking excessive proportions FDI channeled into acquisition of already existing real estate can inflate bubbles

❑ As the capital account is liberalized capital is allocated across the world to its most efficient uses. This usually takes the form of long-term debt or equity FDI originating from developed economies that goes to finance productive investments in emerging markets. Productive investments generate return which is used to repay debt and reward equity investors. In doing so, productive investments contribute to the growth and jobs creation in the recipient economy.

❑ In the real world some FDI flows take exactly this form. But reality is more complex than that. Some FDI have had little to do with financing sustainable increases in capacity of the economy to produce more goods and services. Instead, they have financed consumption rather than investments or have been channeled to the acquisition of already existing assets, which haven't added much to the increase in productive capacity of the recipient economies.

❑ In some cases, FDI financing consumption have taken excessive proportions fueling a rapid increase in household indebtedness. In a similar way, when FDI channeled into acquisition of already existing assets have exceeded a certain threshold they have contributed to the inflating of bubbles in the prices of different asset categories, including most notably real estate prices.

3.5. FDI importance as a source to finance real estate took excessive proportions from 2004 to 2008, but dropped to more risk-free levels afterwards

FDI inflow in Construction and Real estate sectors as % of GDP

Excessive FDI inflows during the boom

Lower inflows following the global crisis

- FDI inflow, Real estate
- FDI inflow, Construction

Source: NSI, BNB, UniCredit Bulbank Economic Research
Note: We need to be careful with 2018 as data are preliminary and can go through large revisions.

3.6. Excessive increase in construction profits could be a signal for dislocation in the real economy? Recall what went wrong in 2004 – 08

❑ When real estate prices increase, profitability in the construction and other real estate related sectors increases too. The problems come when investors from all type of caliber and background, start shifting production resources (capital and labor) from other sectors of the economy toward rapidly growing real estate and construction sectors.

❑ Eventually, the balance of the economy starts changing and domestic demand oriented sectors gradually displace (crowd out) export oriented ones. To make matters worse, the price of labor also starts to increase at a pace which can become unsustainable, because large profits in construction and real estate boom related sectors allow businesses to increase wages in these sectors rapidly, which, in turn spills over into the rest of the economy and pushes wages growth even stronger.

❑ If the latter continues long enough, CA balance starts deteriorating, because rapid consumption increases eventually start to undermine the cost competitiveness of exports. External vulnerability increases and the economy becomes ripe for a downward adjustment, which as Bulgaria's own experience demonstrated back in 2009 can be very painful when it comes.

3.7. Construction posted the second highest profitability during the boom (2008 and 2009). After bottoming out in 2010, profitability started to recover underpinned by EU funds. Fall in EU funds after the end of the previous planning period pushed profitability down in 2016

Return on Equity Capital (ROE), after tax, in %

Source: NSI, UniCredit Bulbank Economic Research
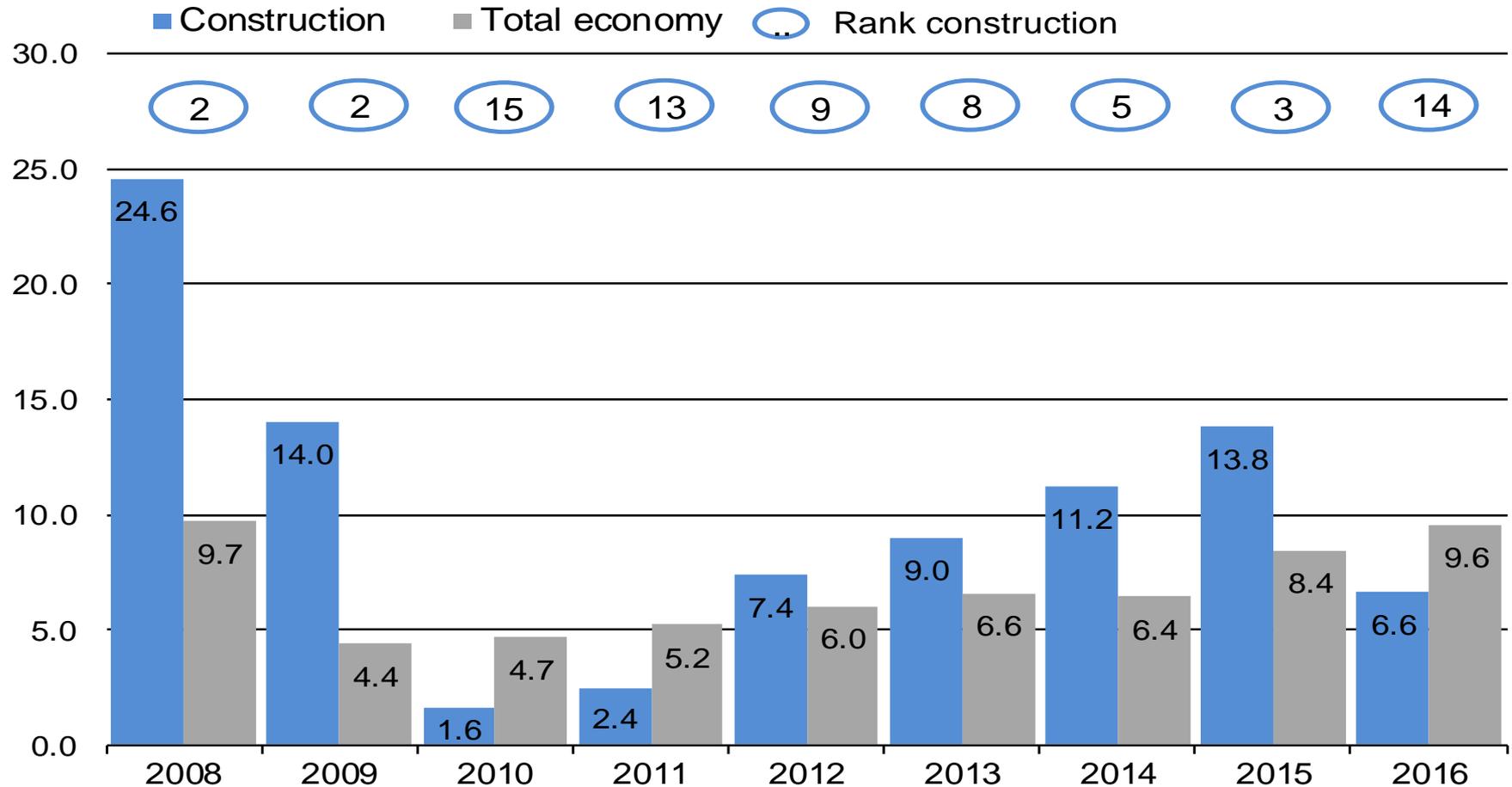
3.8. International comparisons also reconfirm Bulgaria's boom-and-bust story. 2016 posted large and healthy rise in GFCF, thus marking the start of the new cycle

GFCF in construction of dwellings, as % of GDP (%)

Source: Eurostat, UniCredit Bulbank Economic Research
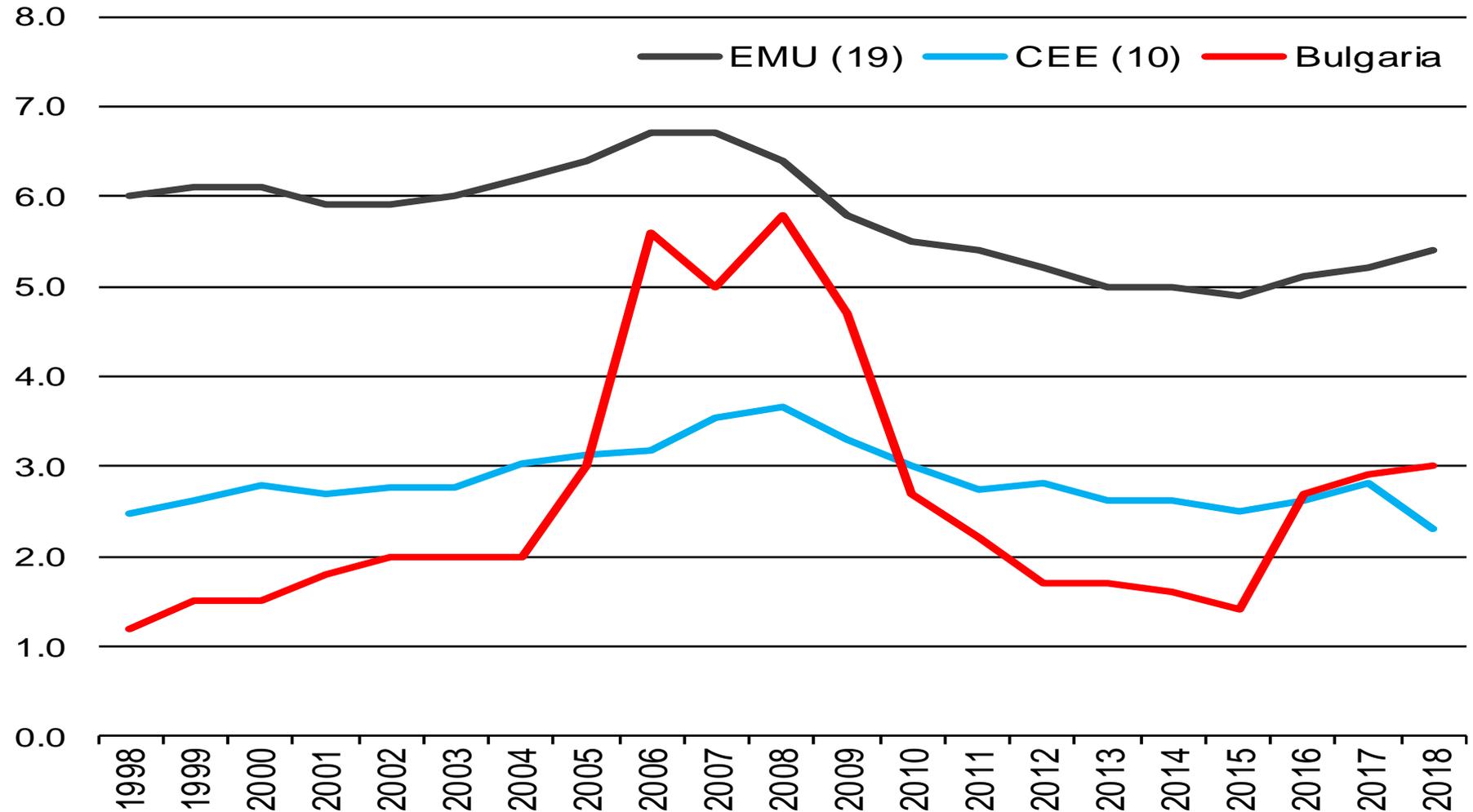
3.9. Bulgaria's GFCF in dwellings has been the third lowest in EU in the past 20Ys. This reflects two things: 1) the low income levels and; 2) the harm which the boom-and-bust pattern of development has inflicted on construction volumes

Investment (GFCF) in construction of dwellings as % of GDP

	Yearly averages (%)				Ranking (out of 27)			
	1995-2003	2004-2009	2010-2018	1995-2018	1995-2003	2004-2009	2010-2018	1995-2018
Cyprus	7.4	10.9	5.5	**7.6**	5	1	5	**1**
Spain	7.8	10.8	5.1	**7.5**	2	2	6	**2**
Greece	8.4	9.0	2.1	**6.2**	1	4	26	**3**
Ireland	7.5	10.4	1.9	**6.1**	3	3	27	**4**
Germany	6.7	5.1	5.8	**6.0**	6	13	4	**5**
France	5.3	6.4	6.1	**5.9**	9	5	1	**6**
Finland	5.2	6.1	6.1	**5.8**	11	7	2	**7**
Belgium	5.3	6.0	5.9	**5.7**	10	8	3	**8**
Portugal	7.5	5.3	2.9	**5.2**	4	12	17	**9**
Netherlands	5.6	6.0	3.9	**5.0**	8	9	11	**10**
Italy	4.9	5.6	4.7	**5.0**	13	11	7	**11**
Austria	5.6	4.4	4.3	**4.8**	7	16	9	**12**
Malta	5.1	6.2	3.5	**4.8**	12	6	15	**13**
Denmark	4.3	5.7	4.2	**4.6**	14	10	10	**14**
Estonia	2.7	4.8	3.7	**3.6**	21	14	13	**15**
Hungary	4.2	4.3	2.4	**3.5**	15	18	22	**16**
Czech Republic	3.1	3.7	3.7	**3.5**	18	21	12	**17**
Sweden	2.2	3.8	4.4	**3.4**	23	20	8	**18**
United Kingdom	3.0	3.7	3.5	**3.3**	19	22	14	**19**
Luxembourg	3.1	3.5	3.3	**3.3**	17	24	16	**20**
Slovenia	3.5	3.9	2.4	**3.2**	16	19	22	**21**
Poland	2.6	3.5	2.7	**2.9**	22	23	19	**22**
Slovakia	2.9	2.7	2.5	**2.7**	20	26	20	**23**
Latvia	2.0	4.4	2.1	**2.7**	24	15	25	**24**
Bulgaria	1.4	4.4	2.2	**2.4**	26	17	24	**25**
Lithuania	1.7	2.8	2.4	**2.2**	25	25	21	**26**
Romania	1.1	2.3	2.8	**2.0**	27	27	18	**27**
EU (28)	**5.3**	**5.7**	**4.8**	**5.2**	-	-	-	-
EMU (19)	**6.0**	**6.4**	**5.2**	**5.8**	-	-	-	-

❑ Bulgaria's investment in dwellings are slightly below CEE average, but smaller than in higher income EU countries. To a large degree this reflects the fact that people's willingness to spend on housing rises faster than incomes. Research made for the UK market has found that if income increases by 10% spending on housing space rises by 20%*.

❑ While Bulgaria went through a well pronounced boom-and-bust cycle of dwellings investment, in other countries the process was more sustainable, either because these countries have been luckier or because housing prices were better managed by the regulators. This is important because it affects quality. The problem is that during booms the share of money (including credit) that goes into bad investment (bad projects) increases.

Source: Eurostat, UniCredit Bulbank Economic Research
* As 14th Annual Demographia International Housing Affordability Survey points out "This is one of the main drivers of increasing real house prices over time, as incomes rise in the face of constraints on the space for houses imposed by restrictions on urban growth." The same survey found that "higher land prices are the principal contributor to the rapidly increasing home prices in unaffordable markets, as well as increased speculative activity. These land prices include the cost increasing influence of land supplyrestrictions (such as urban growth boundaries), excessive infrastructure fees and other overly strict land-use regulations".

Investments (GFCF) in dwelling construction in EU28: Detailed picture

GFCF in dwellings construction as % of GDP

(%)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EU (28)	5.4	5.3	5.2	5.2	5.3	5.3	5.1	5.2	5.4	5.6	5.7	6.0	6.0	5.7	5.2	5.0	4.9	4.7	4.5	4.6	4.5	4.7	4.9	5.0
EMU (19)	6.2	6.1	6.0	6.0	6.0	6.1	5.9	5.9	6.0	6.2	6.4	6.8	6.7	6.4	5.8	5.5	5.4	5.2	5.0	5.0	4.9	5.1	5.2	5.4
CEE (11) weighted avg	2.2	2.3	2.4	2.5	2.6	2.8	2.7	2.8	2.8	3.0	3.1	3.2	3.5	3.7	3.3	3.0	2.7	2.8	2.6	2.6	2.5	2.6	2.8	2.3
Belgium	5.9	5.4	5.7	5.3	5.3	5.2	5.0	4.7	4.9	5.2	5.8	6.2	6.3	6.5	6.1	6.1	5.8	5.9	5.7	5.9	5.8	5.9	5.8	5.9
Bulgaria	1.4	0.4	0.8	1.2	1.5	1.5	1.8	2.0	2.0	2.0	3.0	5.6	5.0	5.8	4.7	2.7	2.2	1.7	1.7	1.6	1.4	2.7	2.9	3.0
Czech Republic	2.4	2.8	3.0	3.3	3.3	3.5	3.2	3.1	3.2	3.2	3.4	3.5	4.1	4.0	3.8	4.0	3.7	3.7	3.2	3.4	3.6	3.7	3.9	4.3
Denmark	3.8	3.9	4.2	4.2	4.3	4.7	4.2	4.3	4.9	5.3	6.0	6.8	6.5	5.4	4.2	3.7	4.3	4.1	3.7	3.9	4.0	4.3	4.7	4.9
Germany	7.6	7.4	7.3	7.1	7.0	6.6	6.1	5.6	5.5	5.2	5.0	5.2	5.1	5.0	5.1	5.2	5.6	5.8	5.8	5.9	5.7	5.9	6.1	6.3
Estonia	3.0	3.1	3.2	2.7	2.5	2.0	2.1	2.5	3.2	3.8	4.9	6.7	6.1	4.3	3.1	2.7	2.7	2.9	3.4	3.9	4.1	4.5	4.3	4.4
Ireland	5.1	5.9	6.6	7.1	7.8	8.1	8.3	8.5	10.2	11.7	13.0	13.5	11.1	8.2	4.7	3.0	2.0	1.4	1.6	1.7	1.4	1.7	2.0	2.5
Greece	8.3	8.4	7.3	8.8	8.9	9.0	7.9	8.1	9.0	10.0	8.8	10.0	10.8	8.1	6.5	5.0	4.6	3.1	2.2	1.0	0.7	0.6	0.6	0.7
Spain	6.0	6.3	6.2	6.6	7.2	8.8	9.1	9.6	10.3	10.9	11.5	12.1	11.7	10.4	8.1	6.9	5.7	4.9	4.1	4.5	4.4	4.8	5.2	5.6
France	5.4	5.2	5.2	5.2	5.4	5.3	5.3	5.4	5.6	5.8	6.1	6.5	6.7	6.8	6.3	6.3	6.4	6.2	6.1	6.0	5.9	6.0	6.2	6.2
Croatia	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Italy	5.2	4.9	4.8	4.7	4.7	4.8	4.7	4.9	5.0	5.2	5.5	5.7	5.8	5.8	5.6	5.6	5.3	5.0	4.8	4.5	4.4	4.3	4.3	4.4
Cyprus	8.0	8.6	7.9	7.1	6.9	6.7	6.4	6.8	8.0	8.9	10.3	11.9	12.3	12.1	9.8	8.1	6.2	4.9	4.1	4.1	4.2	4.9	6.2	7.1
Latvia	2.3	2.9	1.7	2.0	2.1	2.1	1.9	1.7	1.6	2.4	3.1	5.2	7.2	6.1	2.4	1.6	1.9	2.2	2.2	2.5	2.5	2.1	1.9	2.2
Lithuania	2.3	2.1	1.7	1.5	1.7	1.8	1.6	1.3	1.4	2.3	2.2	2.5	2.8	3.4	3.3	2.1	2.0	1.9	2.2	2.5	2.8	3.0	2.7	2.7
Luxembourg	3.8	3.4	3.4	3.5	3.1	2.9	2.6	2.6	2.8	2.9	2.8	3.1	4.0	4.4	3.5	2.9	3.0	3.2	3.6	3.8	3.1	3.3	3.2	3.5
Hungary	4.0	4.7	4.5	3.4	3.2	3.5	4.4	4.8	4.9	5.2	4.5	3.7	4.0	4.1	4.1	3.1	2.2	2.0	1.8	1.9	2.2	2.4	2.8	3.0
Malta	5.6	5.8	5.2	4.7	4.1	4.0	5.0	5.3	6.6	6.8	6.3	7.0	7.4	5.6	4.3	3.4	3.4	3.0	2.6	2.4	2.8	3.5	4.7	5.3
Netherlands	5.3	5.5	5.6	5.5	5.6	5.6	5.8	5.6	5.5	5.7	5.9	6.2	6.2	6.2	5.6	4.7	4.2	3.5	3.0	3.1	3.5	4.1	4.4	4.8
Austria	6.5	6.5	6.3	6.0	5.7	5.3	4.9	4.6	4.4	4.4	4.4	4.3	4.3	4.4	4.3	4.3	4.4	4.3	4.3	4.3	4.3	4.3	4.4	4.4
Poland	2.2	2.1	2.4	2.6	2.8	3.0	2.7	2.7	2.6	3.2	3.3	3.4	3.7	3.8	3.4	3.2	3.0	3.2	3.0	3.0	2.5	2.4	2.2	2.2
Portugal	7.3	7.1	7.5	7.8	8.0	8.2	7.8	7.4	6.2	6.0	6.0	5.6	5.2	4.7	4.1	3.6	3.3	2.9	2.5	2.5	2.4	2.6	2.8	3.1
Romania	0.9	1.0	0.9	0.8	0.6	1.0	1.1	1.5	1.7	1.6	2.0	1.8	2.4	3.1	2.8	2.9	2.7	3.1	2.4	2.4	2.4	2.6	4.2	:
Slovenia	3.4	3.6	4.0	4.1	4.0	3.6	3.3	3.0	2.8	3.1	3.6	3.9	4.2	4.6	3.8	3.1	2.8	2.5	2.4	2.2	2.1	2.1	2.1	2.1
Slovakia	1.2	1.4	1.8	2.9	3.8	4.4	3.6	3.5	3.3	2.9	3.0	2.4	2.5	2.5	3.0	2.6	2.4	2.3	2.7	2.3	2.3	2.8	2.7	2.7
Finland	4.5	4.4	4.9	5.3	5.7	6.1	5.3	5.1	5.5	6.0	6.4	6.6	6.5	5.9	5.2	6.1	6.3	6.3	6.0	5.5	5.6	6.1	6.4	6.8
Sweden	1.8	1.9	1.7	1.9	2.0	2.3	2.6	2.9	3.0	3.3	3.6	4.1	4.3	3.9	3.3	3.6	3.9	3.4	3.5	4.0	4.6	5.1	5.7	5.5
United Kingdom	2.6	2.6	2.8	2.8	2.9	3.0	3.0	3.3	3.6	3.8	3.9	3.8	3.8	3.6	3.0	3.1	3.1	3.0	3.2	3.5	3.6	3.8	4.0	4.1

Source: Eurostat, UniCredit Bulbank Economic Research

Agenda

1. Measurement approach

2. Price sustainability analysis

   1. Total economy and major cities results using NSI data

   2. Sofia's results using Imot.bg data

3. Dislocations analysis

4. **Conclusions**

5.1. The big picture looks mixed

Comparison between housing market dynamics in 2004-2008 and 2017-2018

	2004 - 2008	2017 - 2018
PRICE SUSTAINABILITY ANALYSIS - RESULTS		
Unsustainable house price dynamics	yes	yes
DISLOCATIONS ANALYSIS - RESULTS		
Credit boom	yes	no
Excessive increase in FDI to real estate & construction	yes	no
Unsustainable construction boom	yes	no

- ❑ The evidence from our analysis seems inconclusive.
    - ❑ On the positive side, our dislocation analysis showed that there are no dislocations in the real economy: 1) opposite to 10Ys ago there is no credit boom today; 2) in the same vein, there are no speculative capital flows channeled toward the real estate market (including vertically integrated construction and tourism sectors) today; 3) there is no construction boom either (judging from both profit performance of the sector and the volume of investments in housing construction), opposite to what we had a decade ago.
    - ❑ On the negative side, we found that similarly to a decade ago housing prices have decoupled from income levels in three major cities (Sofia, Burgas and Varna) in the country (using the 5x threshold). Also, house prices today are rising faster than rents, which is another factor signaling potentially unsustainable house price development.
- ❑ Almost in four out of total of five locations in Sofia housing prices were overvalued in 2Q2018, analysis showed.
- ❑ However, it is reassuring that the proportions in which prices exceed incomes in 2Q2018 (in Sofia, Varna and Burgas) are much less worrisome than those 10Ys ago.

5.2. The risks require careful monitoring and adequate policy response

❑ There is a risk for prices to go down. If, for whatever reason, the drop in house prices coincide with the rise in the real interest rates on loans, the risks for financial stability will increase.

❑ The presence of risk for a downward correction in housing prices doesn't necessarily mean that this risk will materialize. The balance between housing prices and incomes can be restored if prices cease to increase, while incomes gradually catch up.

❑ To boost quality of investment decisions, Bulgaria needs to improve sustainability of the construction dynamics. This will require more efficient management of housing prices evolution.

❑ The Bulgarian housing market looks in a less advanced phase of its new upswing cycle when compared with many other economies. This means that when the time draws near for the local policy makers to intervene in order to prevent an unsustainable house price development, there will be significant experience already built in other economies, which can be used to come up with the best possible policy responses.

❑ Nevertheless, Bulgarian policy makers are facing a very complex task. Not only because identifying a housing bubble is difficult but also because the housing market is very heterogeneous. This means that policy makers will need to deal with unsustainable price increases in some particular market segments and geographical locations on the territory of the country (such as in the capital city Sofia or sea side locations, for example), while, at the same time, in the rest of the market, prices will continue to follow a more or less healthy trajectory.

❑ The latter will require very careful choice of corrective measures and much better policy coordination, to ensure that the available policy tools are being used to their best effect.

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