

# Regionally-differentiated debt cap rules: a Hungarian perspective

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## Abstract

Budapest, the capital of Hungary, has experienced a two-year growth rate of 50% in housing prices (Q2 2014 – Q2 2016). This increase has been significantly higher than in the rest of Hungary, but calculations show that houses are not yet overvalued in any region of the country. Still, the characteristics of the housing market in the Budapest metropolitan area make this region the primary candidate for a possible regional housing bubble in the future. International experience has shown that housing bubbles accompanied by lending booms pose a serious risk to financial stability. Therefore, the Magyar Nemzeti Bank has started to evaluate the potential macroprudential interventions that could be applied in a regionally-differentiated manner.

Our analysis allowed us to identify capital requirements and concurrently implemented payment-to-income (PTI) and loan-to-value (LTV) limits (referred to as debt cap rules) as the most promising avenues for intervention. According to our evaluation, debt cap rules outperform capital requirements in several dimensions. Several challenges need to be addressed before actual macroprudential policy intervention can be considered. We highlight a number of calibration issues and review potential spillover effects. We conclude that the regional tightening of the already introduced PTI and LTV limits could support financial stability objectives but their interaction with other policy areas, including fiscal, social and employment policy, would warrant careful consideration and very tight coordination.

Keywords: financial stability, housing market, lending boom, macroprudential policy, regional housing bubble, loan-to-value ratio, debt-service-to-income ratio, policy interactions

JEL classification: E58, G28, R23, R31, R38

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## Housing bubbles and macroprudential policy

### Housing bubbles and household leverage

The term “housing bubble” refers to a sustained and often explosive overvaluation of houses. Such serious mispricing can severely distort real economic allocation, which frequently culminates in financial instability or even economic crises. Reinhart and Rogoff (2009) show that major recent banking crises in advanced economies tend to be associated with housing busts.

Three special features of the housing market make it peculiarly exposed to damaging bubbles. First, temporary deviations from long-run equilibria are more likely in the housing market because of decentralised trading with imperfect information, high transaction costs, and slow supply responses due to construction lags and limited land availability. Temporary overvaluations attract speculative investors, who then exaggerate and prolong them.

Second, residential real estate purchases typically involve borrowing, which readily gives rise to credit-fuelled housing bubbles. Lending against collateral with increasing value may trigger a financial accelerator mechanism where excessive lending and excessive house prices reinforce each other. Rapidly growing house prices also imply declining household savings, overinvestment in houses and inefficient construction of new homes. When the housing bubble eventually bursts, highly indebted households often face repayment difficulties and must curb their consumption, with the result that the financial and construction sectors incur heavy losses. Altogether, a general recession starts to unfold.

Third, real estate constitutes a large part of household wealth; residential mortgages account for a sizeable portion of bank assets; and the construction sector makes a major contribution to GDP. These factors magnify the aforementioned adverse effects of housing and credit cycles. The home ownership rate in Hungary is especially high (it reached 86.3% in 2016).

As Mishkin (2008) observes, modern economies tend to be affected largely by two types of housing bubble, the purely equity funded “irrational exuberance” type and the “credit boom” type. Credit-financed housing bubbles pose the highest risk to financial stability compared with other forms of asset bubbles. Various studies (eg Crowe et al (2013); Claessens et al (2009); and Jordà et al (2015)) have found that housing bubbles accompanied by credit booms tend to be followed by deeper recessions and slower recoveries. The basic reason is that when unleveraged bubbles burst, they are not characterised by the subsequent deleveraging feedback loops and hence pose a lesser threat to financial stability.

A strong surge in house prices is usually accompanied by an excessive credit growth and increasing indebtedness. Crowe et al (2013) examined a sample of 40 countries, of which only seven had experienced a real estate bubble without excessive credit growth, with two ending up facing a relatively mild crisis. Since equity financed booms are not funded by credit, they can be better targeted with fiscal policy interventions and structural reforms focusing on the supply side of the housing market.

Although credit booms may lead to devastating financial busts, the relevance of sustainable credit growth as an indispensable contributor to economic activity is well known. Some empirical estimates directly examining this macrofinancial relationship

lend support to it. For example, Garcia-Escribano and Han (2015) showed that, in emerging market economies (EMEs), consumer and housing credit growth in the composition of private sector credit had a significant positive effect on the contribution of private consumption to real GDP growth.<sup>2</sup> Rondorf (2012) estimated a similar positive effect of credit growth induced by changes in loan supply on output growth in his cross-country panel regression for euro area countries. Indirectly, the empirical literature discussing the bank lending and balance sheet channels of monetary transmission contribute to these findings. For instance, Cappiello et al (2010) examined the bank lending channel in the euro area and found a positive relationship between credit and GDP. Ciccarelli et al (2015) estimated mortgage demand and supply effects, and found that changes in demand significantly affect GDP growth. In countries where post-crisis deleveraging did not put downward pressure on household loan demand, sustained household consumption expenditure and housing investment acted to stabilise economic growth. Côté (2011) gave a similar recount of the Canadian experience.

The various policy measures that can be employed to combat the risks associated with house price bubbles can be summed up as shown in Table 1.

Measure	Potential impact	Effects on	
		Unleveraged booms	Leveraged booms
<b>Fiscal tools:</b>			
Abolishing the tax deductibility of mortgage interest	Decreases benefits of highly leveraged purchases, mitigating credit demand	X	✓
Transaction taxes (buyer/seller stamp duties)	Discourages the resale of properties and speculative investments	✓	✓
Recurrent property taxes	Reduces speculative housing demand and benefits of home ownership	✓	✓
Taxes on imputed rents and capital gains	Reduces indirect benefits of home ownership and housing demand	✓	✓
<b>Macroprudential tools:</b>			
Capital requirements	Increases resilience of banks and leads to higher funding costs that curb excessive lending	X	✓
Dynamic provisions		X	✓
Limits on LTV or PTI ratios	Prevents the excessive indebtedness of borrowers at the contract level	X	✓
Note : The green cells with checkmarks indicate that the measure is expected to be effective, while the yellow cells with the crosses mark that a measure is expected to have little effect during a certain type of house price boom.			
Sources: Crowe et al (2013); IMF (2016b).			

Several countries have used the above taxation tools to mitigate house price movements with encouraging results. Sweden and Ireland have abolished or tightened the usage of mortgage interest rate deductibility. In addition, various

<sup>2</sup> However, recent studies highlight that the contribution of household lending to GDP growth in the long term depends on the driving forces and sustainability of such credit growth (see Mian et al (2015) and references therein).

transaction taxes, such as seller and buyer stamp duties, have been used in different jurisdictions in certain Asian countries. China, Singapore and Hong Kong SAR have introduced seller stamp duties for real estate that is resold within a specific time period, and buyer stamp duties (excluding China) for certain purchases, such as speculative investors or non-residents. Such measures successfully dampened house price growth in these countries (IMF (2016b)).

When it comes to credit-financed housing bubbles, macroprudential authorities should address these proactively, as they pose serious risks to financial stability. Constraining excessive lending may not always prevent the overvaluation of houses, but it can be effective in mitigating the economic losses that housing bubbles can potentially cause. Therefore, a precautionary macroprudential authority should pay close attention to signs of excessive house prices, even if empirical results are not conclusive about the precise direction of causality between credit and house prices (Table 2).

Literature evidence on the interaction between housing prices and credit

Table 2

Author (s)	Long-term relationship			Short-term relationship		
	ph → d	ph ← d	ph ↔ d	ph → d	ph ← d	ph ↔ d
Hofmann (2003)	*					*
Hofmann (2004)	*					
Brissimis and Vlassopoulos (2009)	*					*
Gerlach and Peng (2005)	*			*		
Oikarinen (2009a, 2009b)		*			*	
Fitzpatrick and McQuinn (2007)			*		*	
Berlinghieri (2010)			*			*
Gimeno and Martinez-Carrascal (2010)			*			

<sup>1</sup> Asterisks show the empirical findings on the direction of causality between housing prices (ph) and credit (d).

Sources: Table 1 and Table 2 in Anundsen and Jansen (2013).

Possible regulatory interventions for curbing the effects of credit-fuelled bubbles include the following:

- Increasing capital requirements by raising minimum risk weights (RW) or loss given default (LGD) floors would force banks to build a buffer against possible losses occurring in the bust phase. Furthermore, by increasing the cost of credit through higher funding costs, demand might be reduced and lending constrained (Cohen and Scatigna (2016)). Countries that have employed such a measure include Bulgaria, Croatia, Poland and Romania, although only in Poland have they had some effect on minimising post-bust damage (Lim et al (2011)).
- Dynamic provisions, ie loan loss provisions set aside in good times, can be regarded as being very similar in nature to capital requirements, as they help increase the resilience of banks in preparation for bad times. This measure, however, has proven to be less efficient in containing excessive credit growth in the boom phase, as was the case with higher capital requirements. The most prominent example of a jurisdiction introducing dynamic provisioning is Spain in 2000, with only a moderately effective impact (Crowe et al (2013)). The tool had a marginal effect on credit growth in the boom phase, as profit opportunities

proved too high for provisions to restrict banks' lending activity (Fernández de Lis and Garcia-Herrero (2010)). Moreover, due to a low regulatory cap on provisions, such a measure proved insufficient to cover the losses suffered by banks in the latest crisis (Mahapatra (2012)).

- Limits on the loan-to-value (LTV) or debt-service-to-income (DSTI, alternatively payment-to-income or PTI) ratios, or so-called debt cap rules, directly prevent the build-up of vulnerabilities for individual loan contracts, thereby providing protection both for borrowers from overindebtedness and for lenders from elevated losses in case of a crisis. Such tools have been used extensively in Asian jurisdictions, including China, Taiwan, Hong Kong, Japan and Korea, while European examples include, among others, Denmark, Sweden and Norway (McDonald (2015)).

### Household leverage and debt cap rules

Debt cap rules are among the most promising macroprudential tools to effectively curb excessive lending. Two forms of debt cap rules are prevalent (ESRB (2015); Kuttner and Shim (2013); and Cerutti et al (2017)). They limit the maximum loan amount to a proportion of the collateral value (LTV) and limit the instalments that can be made to a proportion of income (DSTI, PTI). PTI caps primarily strive to ensure the solvency of borrowers, while LTV caps reduce lenders' losses on loans that may become non-performing.

Since future values are not observable, these caps refer to incomes and collateral values at the beginning of the loan contract. Therefore, it is expedient to apply debt cap rules in a countercyclical manner. When houses are becoming overvalued or expected future wage growth deteriorates, previously set regulatory limits no longer ensure that the income of new borrowers or collateral values will remain high enough to prevent significant non-performance and bank losses in the future. In these cases, restoring the effectiveness of debt cap rules in preventing excessive lending requires their tightening.

The limited international experience gained so far indicates that a generally favourable effect can be expected from debt cap rules intended to rein in excessive household indebtedness and house price inflation (Table 3). Analyses of debt cap rules also highlight the possible variance in the potential ability of the two distinct types of instrument to affect policy targets (eg debt outflow, house price growth and household debt servicing capacity), which could prove even more diverse across jurisdictions.

## Studies estimating the effects of PTI and LTV regulations worldwide

Table 3

## Cross-country analyses

Variable affected	Author(s) (geographic coverage) [other details on the variable affected]	PTI (& LTI)	LTV
Housing/mortgage credit (growth)	Kuttner and Shim (2013) (57 countries worldwide)	significant and material	non-significant
	McDonald (2015) (17 countries worldwide)	significant	significant
	Akinci and Olmstead-Rumsey (2015) (57 countries worldwide)	significant and material	significant and material
	Jácome and Mitra (2015) (5 countries in East Asia and Eastern Europe)	na	significant
	Morgan et al 2015 (10 countries in Asia)	na	significant
Private sector credit (growth, real)	Lim et al (2011) (49 countries worldwide)	significant	significant
	Geršl and Jašová (2014) (11 countries in Central and Eastern Europe)	significant	
	Cerutti et al (2017) (119 countries worldwide)	significant	significant
House price (growth)	Crowe et al (2013) (21 countries worldwide)	significant	non-significant
	Vandenbussche et al (2015) (16 countries in CEE and Southeastern Europe)	non-significant	non-significant
	Kuttner and Shim (2013) (57 countries worldwide)	non-significant	significant
	McDonald (2015) (17 countries worldwide)	significant	
	Akinci and Olmstead-Rumsey (2015) (57 countries worldwide)	significant and material	significant and material
	Cerutti et al (2017) (119 countries worldwide)	non-significant	non-significant
	Carreras et al (2016) (19 OECD countries)	significant	significant
Individual country analyses			
Delinquency ratio	Baek et al (2013) (Korea)	significant	significant
Housing/mortgage credit	Igan and Kang (2011) (Korea) [non-metropol. household debt growth]	significant	significant
	Kim (2013) (Korea) [quarterly growth]	significant	significant and material
	Lee (2013) (Korea) [real level]	non-significant	non-significant
	Price (2014) (New Zealand) [annual growth, counterfactual est.]	na	significant
	Wong et al (2014) (Hong Kong) [est. supply and demand]	na	significant
	Neagu et al (2015) (Romania) [growth]	significant	
	Kuncl (2016) (Canada) [level, also impact on residential investment]	na	significant

House price	Craig and Hua (2011) (Hong Kong) [quarterly growth]	na	significant and material
	Igan and Kang (2011) (Korea) [growth, metropolitan areas]	non-significant	significant
	Kim (2013) (Korea) [quarterly growth]	significant	significant and material
	Lee (2013) (Korea) [real level]	non-significant	non-significant
	Price (2014) (New Zealand) [annual growth, counterfactual est.]	na	significant
	Kronick (2015) (Canada)	na	non-significant

Note: LTI is the ratio of the total loan amount to household income. Yellow indicates a significant effect found by the related study, white indicates an insignificant finding and orange indicates cases where the estimated effect of the modelled policy interventions was quantitatively outstanding compared with other types of policy instruments (eg capital instruments and fiscal tools). Grey indicates that the related study does not examine a specific instrument. Cells not separated in the middle represent estimates that do not differentiate between PTI and LTV type instruments.

Source: MNB and the referenced papers.

## Debt cap rules in Hungary

The high degree of risk-taking that characterised the Hungarian banking sector up until the later period of the international unfolding of the 2007–2008 Great Financial Crisis (GFC) led to excessive credit growth. The wide-spread extension of loans under overly liberal lending conditions and insufficient collateral resulted in a sharp increase in non-performing loan portfolios after the crisis. Risks were substantially amplified by the high share of foreign currency (FX) loans, which exposed households to substantial level of exchange rate risk. Consequently, the crisis and the ensuing exchange rate depreciation resulted in the recognition by the Hungarian banking sector of losses that were nearly equivalent to its pre-crisis capital stock. The losses incurred, the deteriorating capital position and the increasing risk aversion resulted in a substantial decline in credit supply.

Required limits for LTV and PTI levels

Table 4

		HUF	EUR	Other currency
PTI	Net monthly income lower than HUF 400,000	50%	25%	10%
	Net monthly income equal to or greater than HUF 400,000	60%	30%	15%
LTV	Mortgage loans	80%	50%	35%
	Motor vehicle loans	75%	45%	30%

Note: HUF 400,000 is approximately equal to EUR 1,300.

Sources: MNB.

With a view to preventing the reappearance of excessive lending, the Magyar Nemzeti Bank (MNB) introduced debt cap rules in the household sector in January 2015.<sup>3</sup> For the majority of borrowers under the rules, the amount of new household loans may not exceed 80% of the collateral value (LTV), and the related instalments may not be greater than 50% of a borrower's regular, legal income (PTI) (Table 4).

The debt cap rules were calibrated with several different factors taken into consideration:

- Coverage: the rules cover all loan products and protect both lenders and borrowers. This is to ensure that regulatory arbitrage is minimised.<sup>4</sup>
- Foreign currency risk: a depreciation of the Hungarian forint against the currency in which the loan is denominated could increase significantly the monthly instalments and principal relative to the collateral value. This warrants an additional buffer to cover the added risk.<sup>5</sup>
- Income level: higher income levels lower the probability of default, which allows restrictions to be eased. Given that the increase in consumer expenditure usually lags behind income growth, higher income levels mean that a higher portion of income is available for loan repayments. This warrants higher household indebtedness limits.
- Type of income: only legal, certified income is considered. This incentivises economic agents to move out of the informal economy. Certified, legal income can be regarded as more stable than other earnings, which means that only such income may be considered for the purposes of calculating the PTI ratio. This also encourages borrowers to declare their income to the tax authority.

To prevent excessive growth in household indebtedness and help the adjustment of both lenders and borrowers, the regulatory framework was put in place long before lending could become overheated. The MNB continuously monitors developments over the lending cycle with a view to intervene if necessary. Lenders have integrated the rules into their lending practices, and thus the room for competition in risk-taking has diminished. Given the present situation of the domestic financial cycle, the implementation of the debt cap rules does not have any substantial negative impact on household credit extension. This is supported by the fact that the substantial increase in the volume of new lending has been realized with loan contracts exhibiting PTI ratios that have not clustered excessively around the regulatory limits.

<sup>3</sup> MNB Decree No. 32/2014. (IX. 10.) on the Regulation of the Payment-to-Income Ratio and the Loan-to-Value Ratio.

<sup>4</sup> With the rapid emergence of new intermediaries (eg marketplace and balance sheet lenders) in some countries – especially in the United States and the United Kingdom – reaching out to borrowers through the innovative means of financial technology (FinTech) regulators should consider whether the effectivity of debt cap rules could become undermined by regulatory arbitrage.

<sup>5</sup> The limits differentiated according to currencies were determined by taking exchange rate movements into account, based on value-at-risk estimates.



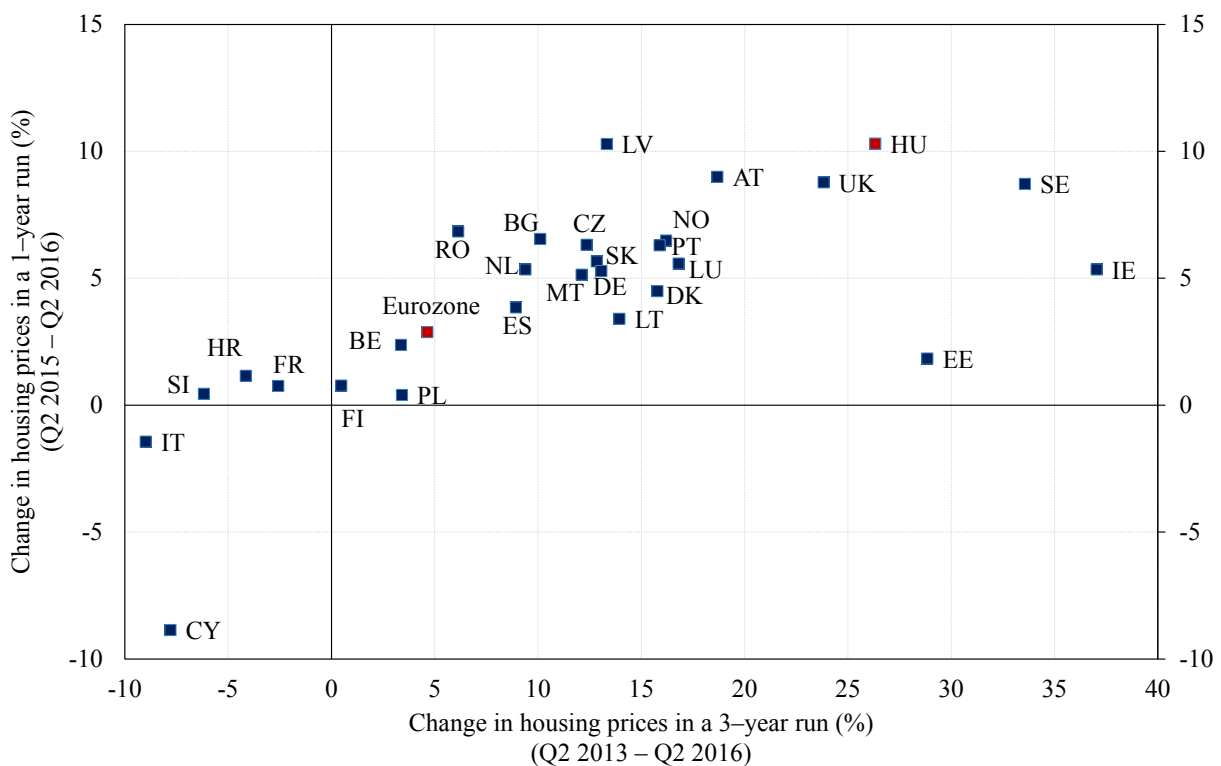
## Regional differences in house prices and lending

House prices have started to pick up across the European Union, but there are significant differences between countries (Graph 1). Markets in several member states have shown rapid price growth, often coupled with high leverage, pointing to medium-term vulnerabilities that can pose a serious risk to financial stability. This has prompted the European Systemic Risk Board (ESRB) to issue warnings regarding the vulnerabilities of housing markets in eight EU countries.<sup>6</sup> Even though price increases in Hungary have not reached a critical level, they surpass not only the EU average, but those of all regional peers as well, which warrants a constant monitoring of the market.

Changes in nominal housing prices in the EU

In per cent

Graph 1



AT= Austria; BG = Bulgaria; BE = Belgium; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; NO = Norway; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovakia; UK = United Kingdom.

Source: Eurostat.

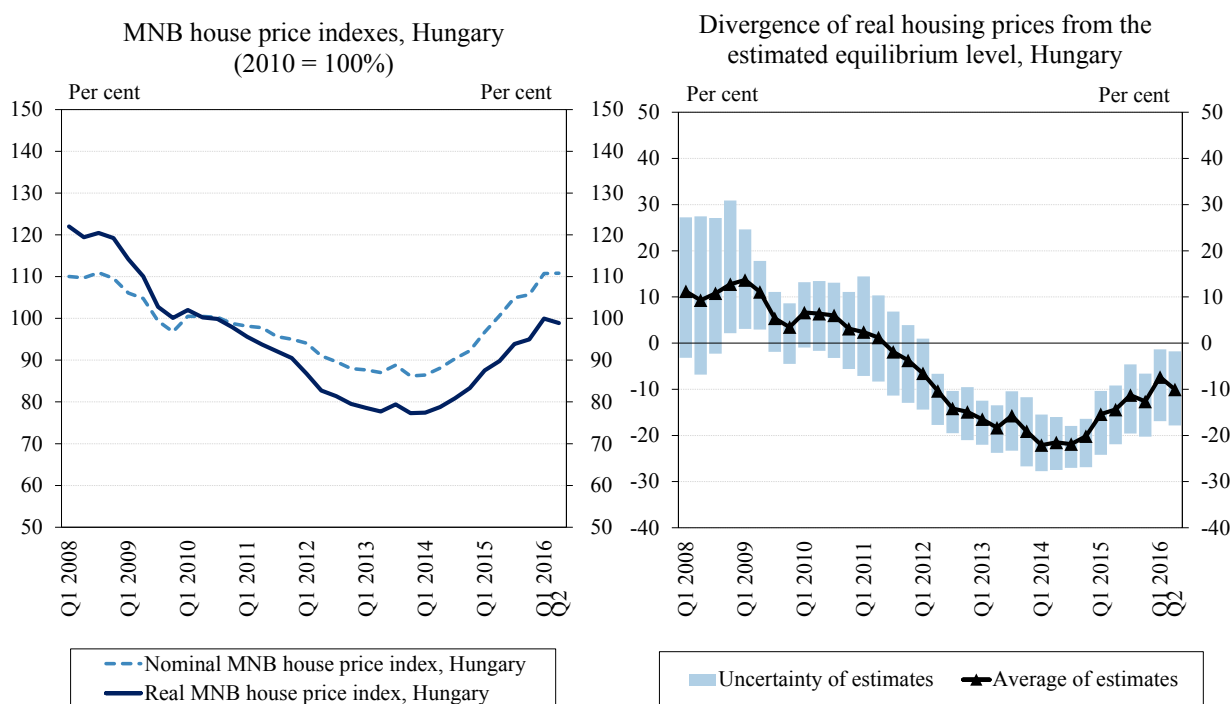
<sup>6</sup> For further information on the warnings and their basis, see ESRB (2016).

These developments deserve additional attention due to the economic importance of the real estate market in Hungary, given that housing wealth accounts for a high share of households' total wealth<sup>7</sup> and that mortgage loans represent a large proportion of households' total debt. House price swings in the country therefore have an accentuated effect on the consumption and savings decisions of households, and on the collateral position of banks.

Following the steady decline in both house prices and market turnover after the start of the GFC, a recovery started at the end of 2013. Since then, prices have shown rapid growth, reaching pre-crisis levels in the second quarter of 2016 (Graph 2). This growth can be mostly attributed to the overall economic expansion in Hungary and slow supply side accommodation in the real estate market.<sup>8</sup> Given the country's strong macroeconomic fundamentals, including unemployment, household income and credit conditions, house prices have not yet surpassed their estimated equilibrium level.

Housing price indexes and the divergence from the estimated equilibrium level

Graph 2



Source: MNB.

However, the increase in house prices exhibits strong regional differences. Regions and especially certain cities situated in the economically more developed north western and central parts of the country have outperformed other regions in terms of house price growth since 2014 (Graph 3), with this growth being mostly driven by cities with county rank. Prices in Budapest stand out especially, with a two-

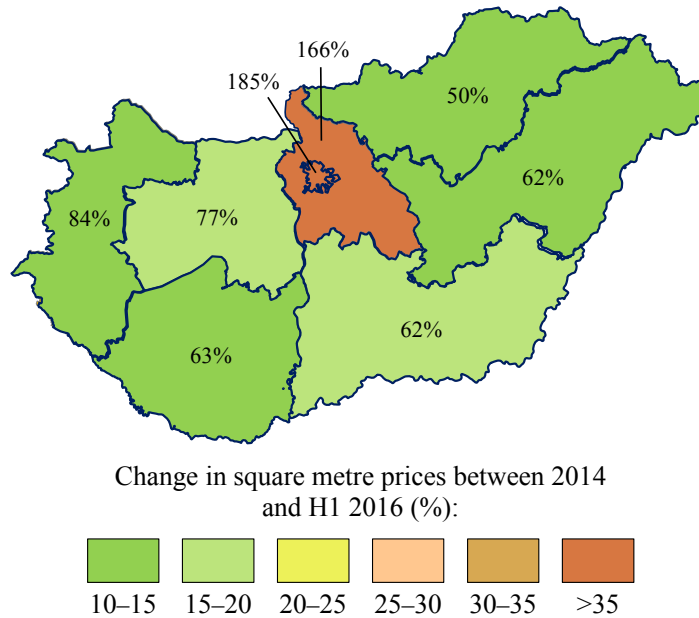
<sup>7</sup> For an international comparison, see Horváth and Körmendi (2009).

<sup>8</sup> For further information on the Hungarian residential real estate market, see the Housing Market Report of the MNB: [www.mnb.hu/en/publications/reports/housing-market-report](http://www.mnb.hu/en/publications/reports/housing-market-report).

year growth rate of 50% (Graph 4). The steep increase is strongly supported by the lack of suitable housing supply and the low interest rate environment which may have increased investment-purpose demand.

Relative square metre prices in 2016 and the change between 2014–16

Graph 3

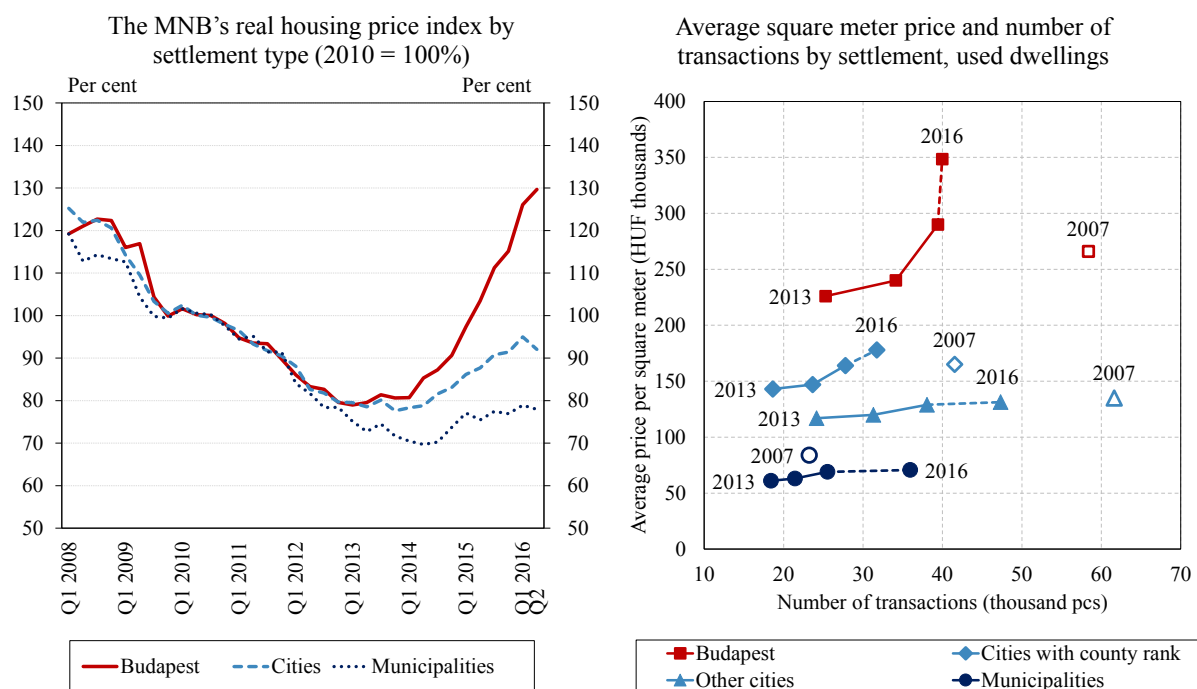


Note: Colours denote the change in square metre prices between 2014 and H1 2016 by region. The numbers indicate regional square metre prices for H1 2016 relative to average country-wide square metre prices in the same period.

Source: Hungarian Central Statistical Office (HCSO)

Recent house price increases in Budapest do not yet imply the formation of a real estate price bubble. More positive labour market conditions and demographic trends currently warrant higher housing market demand in the capital, which may partially explain the higher-than-average rise in housing prices. Furthermore, the number of construction permits issued in 2016 grew at a faster rate in Budapest than in the rest of the country, which may help somewhat in alleviating price pressures in the near future.

The risks of a foreign investment-driven speculative bubble should also be considered, as foreign investors searching for yield may add to the pressures faced by domestic buyers. Foreign buyers and legal entities can purchase property in Hungary directly. The effect of their purchases can currently be considered moderate, with a share of around 5% of total house market transactions in Budapest. But the rapid increase from the level of 3% in 2014 and the high concentration of foreign investments in certain parts of the city warrants attention. Furthermore, the effect of foreign investment may also be amplified by purchases of foreign-owned Hungarian firms, which are harder to track.

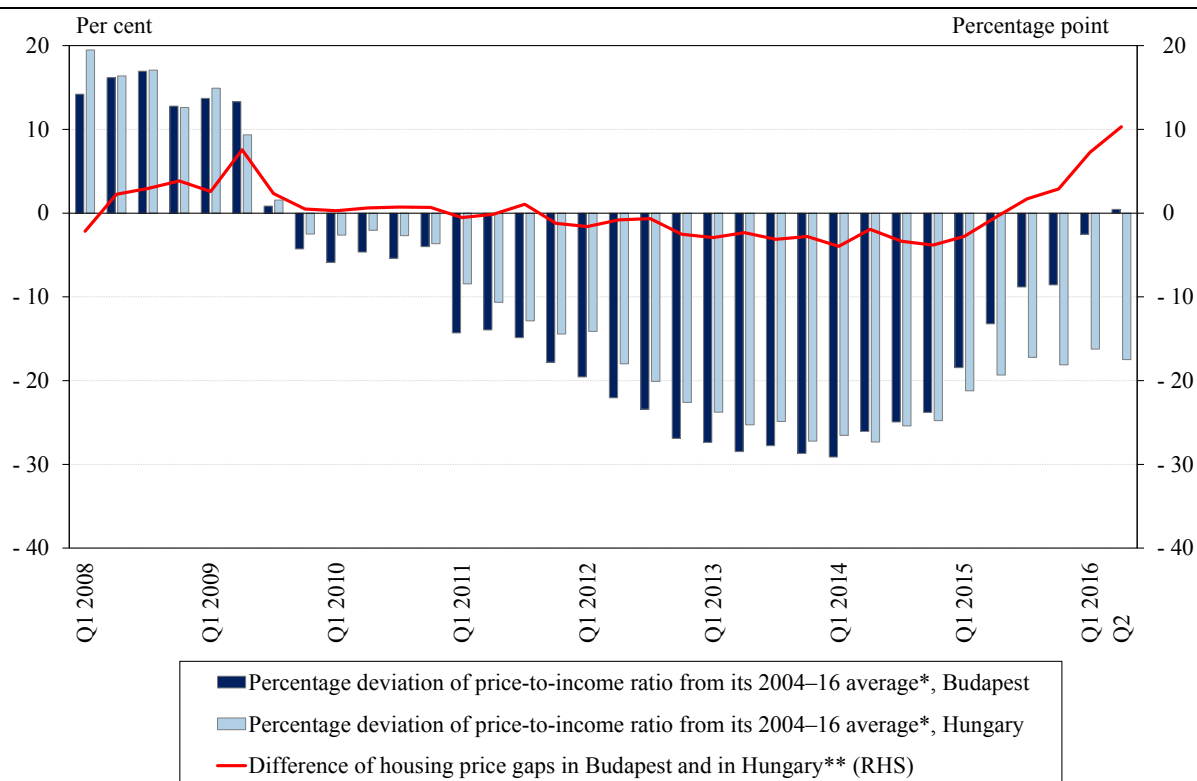


Note: Right panel data in 2016 are estimated based on observations from the first two quarters.

Source: HCSO, MNB.

Indicators relating to the possible overvaluation of house prices in the capital also point to increasing valuations but no overheating yet (Graph 5). House prices have increased at a faster pace than household income in Budapest during the last two years (Q2 2014 – Q2 2016), resulting in a convergence of the price to income ratio to its long-term trend. Housing prices in the city have also started to deviate positively from their long-term trend to a higher extent than the rest of the country. However, based on the current level of these indicators and the fundamental macroeconomic conditions in Budapest, it can be concluded that house prices in the capital do not exhibit a major overvaluation at this point.

Household indebtedness also shows marked regional differences (Graph 6). Lending growth is more elevated in major cities in general but Budapest stands out somewhat. The higher proportion of highly indebted borrowers, higher average loan amounts and the incipient but still indefinite increase in the average maturity of housing loans support the conclusion that the housing loan market in the capital is not yet overheated, but deserves enhanced regulatory attention, especially since the rapid growth in housing prices may further elevate the level of household leverage in the future.

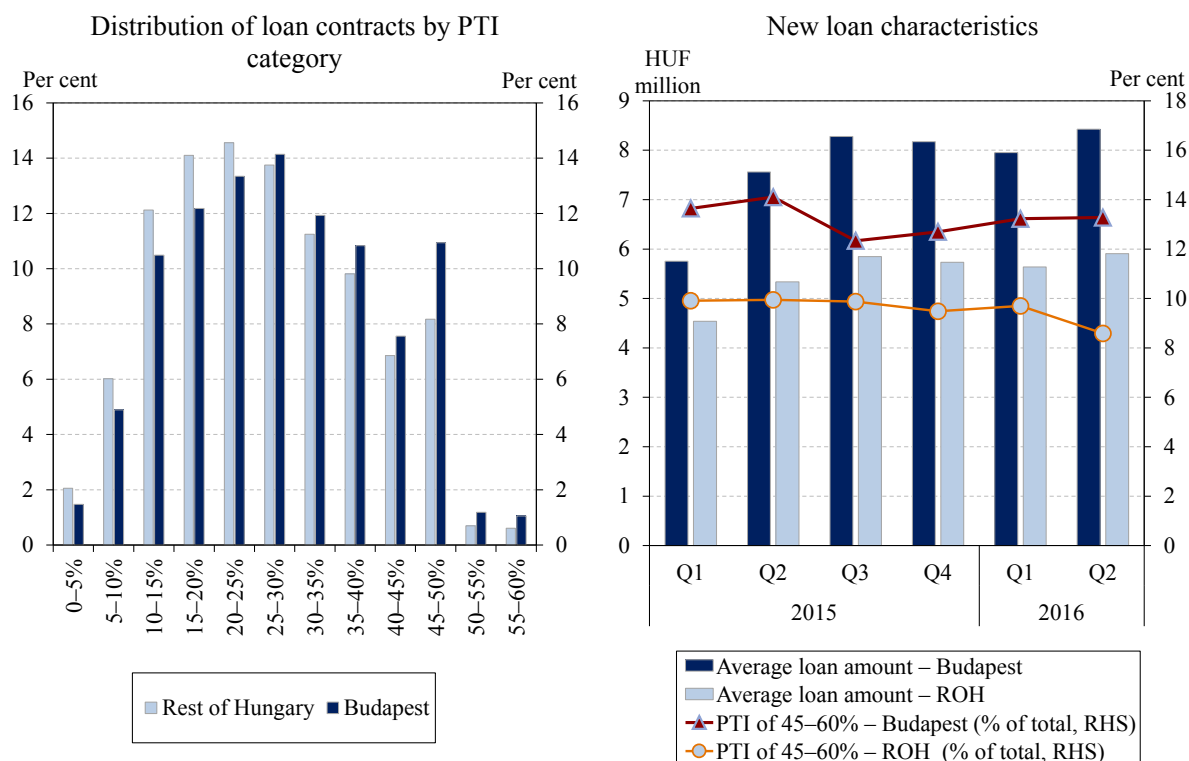


\* Based on the nominal MNB house price index (2010 = 100%) and average net wage. \*\* Calculated by filtering real MNB housing price indexes (2010 = 100%) from 2001 with a non-recursive HP-filter with lambda 1600.

Sources: HCSO, MNB.

Despite the currently supportive economic fundamentals in the capital, both the outstandingly high level of housing prices and the rapid rise in these levels over the past two years (Q2 2014 – Q2 2016) point to the need for constant regulatory vigilance. An environment of prolonged low interest rates combined with optimistic economic expectations may, in the future, result in excessive house price growth, increasing the probability of household overindebtedness and a severe price correction. In addition to closely monitoring house price and credit market developments, an overview of possible policy steps that could be taken to react in a timely manner to control such a fast expansion is warranted.

The emergence of significant regional differences in house price growth is a well known phenomenon. Recently, housing markets in major cities of several countries show significantly higher increases than other regions in these countries, including China, Germany, Korea, New Zealand and the United Kingdom (IMF 2016a). Growth differences in these countries range from moderate levels, such as the 12% average yearly growth rate for the past three years in London compared with 7.5% in the rest of the United Kingdom, to extreme levels, such as the 28% annual growth of Beijing residential property prices for the period 2004–2015 compared with 7% in other cities in China (ESRB (2016); Wu et al (2015)).



Note: Distribution between Q1 2015 and Q2 2016, by contract number.

Sources: MNB.

## Justification for regionally-differentiated macroprudential interventions

The introduction of a regionally-differentiated macroprudential tool is advisable only when several basic conditions apply.

### Marked regional vulnerability

Housing markets are usually segmented geographically. Moreover, market developments can diverge significantly between them even permanently. In some regions, the housing market is more sophisticated and liquid because rental housing is more extensive, the housing stock is larger and transactions are more frequent. There may be significant regional differences in the amount of surplus housing capacity and in constraints on expanding the current housing stock, such as administrative restrictions or land availability. These imply different price responses to similar housing demand shocks. As some areas are specialised in particular economic activities, they and their housing markets are exposed to idiosyncratic economic shocks, and even general economic shocks can impact them specifically. Trends in internal mobility also exert different local demand and supply effects.

According to these criteria, in Hungary the natural candidate for regional housing overvaluation is the Budapest metropolitan area, possibly supplemented by some major cities in other areas. Its housing market can be considered as a single and relatively large and sophisticated one. There are significant economic differences between the metropolitan area of the capital and the rest of the country. Budapest has special rules for construction, land availability is relatively restricted and its metropolitan area has been the main destination of internal mobility for the last three decades.

## Enforcement

At least theoretically, several capital requirements and debt cap rules may be applied in a regionally-targeted manner. Rules may be based on the geographical location of the collateral or the permanent residence of loan applicants. Regionally-differentiated tools, however, give rise to incentives to circumvent them in special ways. One important example is applying for a mortgage loan to purchase a house in a more tightly regulated region, using a house in a more loosely regulated region as collateral. In this respect, regionally-targeted tools are more easily enforceable when they are connected to the geographical location of the collateral rather than the permanent residence of the loan applicants. The exact calibration of the chosen macroprudential intervention should minimise regulatory arbitrage.

## Efficiency

Regional macroprudential tools may only achieve a regional shift in credit-fuelled local housing overvaluation. If the potential development of house price bubbles is expected to be slow, then the macroprudential authority can apply a step-by-step geographical extension of tightening. Otherwise, only country-wide interventions have an efficient impact on excessive lending. In Hungary, significant regional economic differences make it unlikely that a potential housing bubble in the Budapest metropolitan area would be shifted to other parts of the country as a response to regionally-targeted macroprudential intervention. The low level of geographical mobility observed in Hungary reinforces this conclusion.

## Spillover effects

Properly calibrated regional macroprudential interventions have the added benefit that they may also alleviate the adverse effects of regional housing bubbles and not just of those of overindebtedness. A regional housing bubble is a serious mispricing which can constrain efficient house purchases. Consequently, households in the region are hindered from obtaining a proper living at a reasonable price. Living in a smaller, worse quality and more distant flat (from the workplaces of household members) implies several additional costs: discomfort, additional commuting expenses, more expensive health costs, delayed family formation etc. Regionally-differentiated macroprudential tools mitigate these adverse effects under two conditions. On the one hand, they should be successful not only in restraining excessive lending but also in reducing housing overvaluation. On the other hand, they should be targeted precisely enough to let potential borrowers with lower risk obtain the necessary loans.

A housing bubble in the Budapest metropolitan area may also significantly distort the optimal geographical reallocation of labour. This is a serious concern in Hungary, since the capital's metropolitan area is the most economically developed region, and geographical mobility in the country can be inefficiently low (even in normal times due to the inflexible labour market and the underdeveloped rental market). Regionally-targeted macroprudential interventions can have an additional social benefit in supporting geographical mobility to the extent that they facilitate access to a proper living space in a region with excessive housing prices.

Regional housing bubbles distort the allocation of capital as well. Excessive investment in the housing market and construction crowds out efficient investment projects in other sectors. Excessive housing prices worsen the competitiveness of firms in regions with overvalued houses. Regionally-targeted macroprudential interventions can mitigate these adverse effects only if they can also dampen excessive housing prices.

A potential housing bubble in the Budapest metropolitan area might increase inequality in several dimensions. Excessive house prices in the capital intensify regional differences between house owners. Property owners in areas affected by the bubble gain but tenants lose and could even be forced into worse living spaces. Older generations also tend to gain at the expense of younger ones, since home ownership is higher among them. Richer households can invest more easily in overvalued houses, because of their higher savings and generally better access to financial intermediation. Poorer households rely more heavily on geographical mobility, which tends to be hindered by a potential housing bubble in the capital's metropolitan area. Although assessing the welfare effects of rising inequalities is subject to value judgement, properly applied regional macroprudential interventions could mitigate these effects to the extent that they decrease housing overvaluation.

In the unfavourable case when regional macroprudential interventions cannot impede effectively the overvaluation of houses, such interventions may even aggravate difficulties in obtaining a proper living space and in internal mobility, since households face not only excessive housing prices but also tighter credit constraints. Even so, renting would be constrained less severely, because housing bubbles are not always accompanied by a proportionate increase in rents. This may exert a positive vitalising effect on the currently underdeveloped rental market in Hungary. Also, unexpected additional housing demand may arise in some settlements located at the border of the region with tighter macroprudential rules. This then generates additional demand for public infrastructure in traffic, education and healthcare.

Ultimately, regionally-targeted macroprudential policy interacts with numerous other policies. Fiscal policy aspects arise vis-à-vis public investments in regions where potential demand is at least partially supposed to be redirected. Social policy is primarily affected through its role in supporting people in obtaining proper living spaces and for decreasing unintended inequalities. Employment policy can have the objective of creating a more flexible labour market, for example, by incentivising atypical forms of employment such as part-time jobs and teleworking – which are not prevalent in Hungary – and by conducting more efficient retraining programmes. A strengthened legal infrastructure for the housing rental market would reduce the informal economy and extend the currently underdeveloped and partly informal rental market. Access to public services should be equal across regions, which also means that investment in public infrastructure should be well coordinated with private investment in new houses. All of these potential interactions highlight the



dilemma that any policymaker would face in implementing regional macroprudential intervention. It also highlights the necessity of closely cooperating with the other parties responsible for the relevant policy areas.

## Regionally-differentiated debt cap rules

### Selecting the most fitting macroprudential intervention to address regional differences

If credit market developments reach a critical level and the criteria for regional interventions are satisfied, several dimensions for the selection of the specific regulatory intervention should be considered. Based on the international experiences with different sectoral tools elaborated upon in Section 1 and the criteria above, the possible sectoral macroprudential interventions to target regionally overheated mortgage lending markets can be summed up as in Table 5.

Based on this comparison, debt cap rules may provide the most fitting regulatory response. Capital-based instruments can be regarded as less effective in tackling the risks associated with the boom phase of the lending cycle due to their less targeted nature. Moreover, they also offer no direct protection against household indebtedness. Debt caps, on the other hand, have proven to be effective in tackling risks of excessive lending and household overindebtedness by directly imposing restrictions at the contract level. Internationally, debt caps have also served as differentiated tools for targeting specific geographical areas (see Box 1). Even though the regulatory intent may be circumvented to some extent (eg by extending loan maturities), most issues can be resolved through the careful and comprehensive calibration of the measure. The regulatory framework has already been put in place by the MNB, which enables effective, timely and targeted reactions to overheated regional lending.

## Macroprudential interventions that could combat excessive lending regionally<sup>1</sup>

Table 5

	Increasing RW and LGD floors / direct capital requirements / dynamic provisioning	Debt cap rules
Effectiveness	<ul style="list-style-type: none"> <li>+ Higher levels of capital increase banks' resilience.</li> <li>+ Increasing funding costs makes excessive lending less attractive for banks.</li> <li>– Higher capital requirements do not restrain households from becoming overindebted, which may have broader economic and social consequences.</li> <li>– Banks may react through decreasing voluntary buffers.</li> </ul>	<ul style="list-style-type: none"> <li>+ Debt caps restrict the conclusion of overly risky loan contracts, protecting both lenders and borrowers.</li> </ul>
Efficiency	<ul style="list-style-type: none"> <li>+ Frontloading is usually less of an issue, as the measure could be applied to all real estate exposures, not only new lending.</li> <li>– There is an incentive but no direct prevention against excessive lending.</li> <li>– There is limited room for differentiating requirements according to the riskiness of real estate exposures.</li> <li>– Lending might be relocated to less heavily regulated entities or to foreign entities within the same banking group.</li> </ul>	<ul style="list-style-type: none"> <li>+ Debt cap rules set restrictions directly at the contract level.</li> <li>+ The necessary framework has already been introduced by the MNB and its rules have been integrated into lending practices. This should allow for smoother accommodation to differentiated rules.</li> <li>± Frontloading might occur in anticipation of regional tightening but this effect can be diminished through appropriate timing and communication.</li> <li>± Regulatory limits may be circumvented (eg LTV caps by the increased use of unsecured loans or PTI caps by longer loan maturities). The risks of such impediments can be mitigated by applying a comprehensive set of measures (LTV and PTI caps, limits on loan maturity) and by constantly monitoring market developments.</li> </ul>
Proportionality	<ul style="list-style-type: none"> <li>– Banks with high outstanding loan in the affected region would face higher requirements, regardless of their contribution to new lending.</li> <li>– Lending opportunities may be too attractive for increased capital requirements to have any significant impact on credit availability.</li> </ul>	<ul style="list-style-type: none"> <li>+ As individual loan contracts are targeted, the measure affects banks in proportion to their contribution to the build-up of systemic risks.</li> </ul>

Note: "+" denotes strengths of the given measure, "–" denotes weaknesses, and "±" denotes weaknesses that can be counterbalanced by additional regulatory steps if necessary.

<sup>1</sup> Evaluating the impact of policy measures according to the concepts of efficiency, effectiveness and proportionality is an approach deeply embedded in the global and other international, eg EU level regulatory and supervisory legislation and practice. For instance, these are included in the BCBS (2012) Core Principles for Effective Banking Supervision and at level 1 legal rules in Capital Requirements Regulation (EU) No. 575/2013, see eg Recital (22) and (46) among several other occurrences. Effectiveness and efficiency are focal points of evaluation in eg IMF–FSB–BIS (2016) and the European Systemic Risk Broad 2013/1 Recommendation. Proportionality in the implementation of the Basel standards are investigated in BIS–FSI Insights (2017) and the application proportionality was explored conceptually and by case studies in the Report of the EBA (2015).

Sources: MNB based on Crowe et al (2013), ESRB (2014).

## International experience with regionally-differentiated debt caps

A couple of countries have implemented a geographically-targeted LTV or PTI regulations:

- New Zealand: to tackle the issue of rapid house price growth, especially in Auckland, LTV limits were introduced in 2013, with no direct banning of high LTV loans but with a limit on the proportion of such loans in new lending. In response to growing house market risks in Auckland, LTV limits were tightened on a regional basis in 2015, with tighter rules being applied to Auckland mortgages. Even though house prices and lending showed a temporary fall at the end of 2015, house prices and mortgage credit continued on an elevated growth path at the national level, which forced the central bank to introduce tighter LTV limits overall in September 2016 (Reserve Bank of New Zealand (2016)).
- Korea: after experiencing the adverse effects of two major housing cycles, Korea has been conducting an active macroprudential approach since 2002. Following the first housing crisis, the Korean authorities introduced LTV limits in 2002, which were complemented by DSTI restrictions in 2005. As house price movements are determined by geographically heterogeneous demand and supply factors, the LTV and DSTI restrictions have been implemented on a regional basis, determining higher restrictions in the speculative parts of southern Seoul. Since their implementation, the restrictions have been tightened several times, significantly mitigating excessive credit and house price movements (Crowe et al (2013); and Igan and Kang (2011)).

### Calibration issues to be addressed in designing regionally-differentiated debt caps

To ensure that regionally-differentiated debt caps promote the achievement of the predefined regulatory goals effectively and efficiently, several calibration issues should be considered.

#### Instrumental calibration

Regarding instrumental calibration, the following dilemmas should be considered:

- Tightening of limits: limits on both instruments could be set more tightly regionally to effectively tackle possible risks. Along with LTV limits that directly relate to the possibly severe price correction that follow the bursting of a bubble, PTI limits also have an impact on house prices by limiting credit availability.
- Scope of tightening: lower regional limits could be applied in a targeted manner to limit spillover. First, the basis for tightening should be the geographical location of the collateral property, not the place of residence of the borrower, so as not to open up possible loopholes. Furthermore, whereas LTV limits apply to each secured loan contract, PTI limits are based on borrowers' ability to repay all their credit obligations. Instead of lowering the PTI limit for debtors borrowing against collateral in the overheated region, a certain limit could be applied only to instalments from loans secured by real estate located in the overheated region without lowering the aggregate PTI limit for these borrowers. This would ensure that no additional constraints are put on loans that do not carry the added risk related to overheated regional housing markets.
- Addressing lengthening maturities: tighter PTI limits could incentivise banks and borrowers to lower PTI values through lower instalments resulting from

lengthening loan maturities. If this occurs in the region affected, it may be advisable to set limits on loan maturities.

- Addressing interest rate risks: risks of borrowers defaulting in overheated regions could be further mitigated by pairing tighter debt caps with an interest rate stress test that banks would conduct before granting new loans in the region. This would incentivise banks to lend with longer interest fixation periods, mitigating interest rate risks that might worsen the situation.

## Geographical calibration

As mentioned before, the natural candidate for a possible regional housing overvaluation in Hungary is the Budapest metropolitan area. The exact region where the tightened debt cap rules should be applied, however, should be defined according to the next three criteria.

- Excessive growth: the designated region should include the area where signs of credit-fuelled house overvaluation or even housing bubbles arise, and areas where the bubble may quickly develop as a response to regulatory intervention in the region actually affected.
- Monitoring regional differences: the exact localisation of narrowing LTV and PTI limits is subject to a detailed and sensitive monitoring system that is capable of closely tracking regional diversities in housing overvaluation. While the recently created MNB housing price index can be easily adapted to geographic regions, regional monitoring must develop further. The extensive granular database the MNB possesses on household lending can be a useful tool in this respect.
- Side effects: unintended negative side effects and regulatory arbitrage should also be minimised. Debt cap rules always face a trade-off between hindering excessive indebtedness and constraining efficient financial intermediation. Defining the region too broadly would result in too high a level of false restriction of loan contracts without a high risk of non-performance.

## Addressing possible side effects

Besides adequately setting the scope for intervention, the possible unintended consequences of tighter debt cap regulations might warrant consideration of certain exemptions. Tightening measures can have unintended economic consequences regarding borrowing and availability of housing to certain, less risky groups of borrower. This might require the inclusion of some preferential treatment when debt caps are tightened regionally.

Preferential treatment may be granted in a general or specific manner. Proportionate caps, ie allowances for a certain portion of new lending to be exempted from the limits, provide room to manoeuvre for lenders without interfering with the mix of mortgage products. Examples of such caps can be found in several countries, including Norway, the United Kingdom, Ireland, Estonia and Lithuania. However, lenders may have other considerations that would contradict regulatory objectives when deciding what mortgages to exempt from the lower limits. Differentiated treatment can be applied to specific kinds of borrower or property. This allows for a more targeted approach, but it adds the risk of overly restricting market players'

decisions regarding the types of mortgage extended. Country examples include Cyprus, Denmark, Finland, Ireland, Estonia and Romania.

Some of the specific issues to review before tightening debt caps regionally include the following:

- Differentiating by quality: newly built houses and other buildings with certain characteristics (eg high energy efficiency) might exhibit lower price corrections due to higher demand even in economic downswings. This may justify looser treatment under regionally tighter debt cap regulations. Such an exemption might also be helpful if the limited supply of housing is a fundamental factor in a regional house price bubble.
- Differentiating by price: properties with excessively high prices that are not supported by high quality could be treated more strictly, as they may carry a significantly higher risk than houses with lower prices. This might warrant the use of LTV limits differentiated by collateral value, with the price limit set high enough to minimise unwarranted effects on lower-income households (who target houses of lower value and are not involved in the rapid inflation of house prices). However, possible fundamental factors that may underpin the higher price of certain properties should also be considered.
- Differentiating by borrower groups: socially vulnerable debtors, especially first-time buyers in a given region, might be restricted from purchasing a property due to stricter limits, as they do not possess a high amount of equity or income. First-time buyers who are usually young can reasonably be expected to have higher incomes in the future and lower probabilities of default, which would underpin preferential treatment. Preferential treatment for certain groups would also mean a more targeted approach towards any speculative behaviour on the part of borrowers using debt to purchase properties with intent on profiting from rising prices. EU countries differentiating limits for first-time buyers include Cyprus, Ireland and Finland.
- Borrowers in the buy-to-let mortgage market may warrant stricter standards, as their borrowing may worsen house price swings and endanger financial stability. In a downturn, they may be quick to sell their investments, thereby exacerbating the scale of the fall in prices. This may justify stricter debt caps or other underwriting standards in the buy-to-let market, as is the case in the United Kingdom.

## Conclusion

Housing prices in Hungary have risen dynamically by European comparison over the last two years (Q2 2014 – Q2 2016), reaching their pre-crisis levels in nominal terms. This growth exhibited significant regional differences, as shown by a two-year increase of 50% in Budapest. Based on MNB estimates, actual house prices are not considered to be overvalued either in Hungary or, more specifically, in Budapest. Although housing price inflation has been accompanied by significant credit expansion with stronger dynamics in the capital, for the moment the volume of new housing loans is not considered to be excessive.

The Budapest metropolitan area is the most developed region in Hungary; it has a large and sophisticated housing market but relatively inelastic housing supply. This

means that current market developments may eventually lead to a regional, credit-fuelled housing bubble. Since this could bring about systemic financial instability, the MNB monitors the situation closely for signs of excessive house prices and lending in Budapest (and other regions).

The macroprudential regulatory response to a regional housing bubble that is accompanied by excessive lending could be more effective by regional differentiation if certain conditions are met. The primary potential regional tool is an appropriate combination of debt cap rules. International experience shows that such rules can efficiently constrain both excessive country-wide and regional lending. The MNB already introduced debt cap rules in the household sector in January 2015. The exact calibration of a regionally-targeted tool would benefit from the experience gained since then. Although curbing excessive lending may not be entirely effective in preventing housing overvaluation, some international evidence shows that regionally-differentiated debt cap rules could considerably contribute to the mitigation of the adverse effects of regional housing bubbles on both financial instability and on some other aspects of socio-economic exclusion, such as constrained access to adequate living space, hindered internal mobility and enlarged inequalities. However such intervention would go beyond normatively calibrated debt cap rules, with the potential to interfere with other policy objectives that are outside the scope of macroprudential policy, such as facilitating regional development. Nevertheless, if central banks as macroprudential authorities decided to embark on this road, the need to handle these spillover effects would call for a coordinated implementation of regionally-targeted macroprudential policy with various other public policies – eg fiscal, social and employment policies. This could open a Pandora’s box for institutional setups and macroprudential mandates.

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