

Mortgage Lending Boom-Bust and Regulation Response in Transition Countries – Results Of A Six Country Study

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This article is based a study performed for the EBRD during the first half of 2012 covering Hungary, Poland, Croatia, Serbia, Romania and Turkey. It is an expanded version of its executive summary. The study ('EBRD study') was commissioned to identify sources of mortgage portfolio risk and related broader systemic risk in the CEE region as the well as explore the reasons for the low use of mortgage covered bonds to manage risks.¹ The author in addition builds on 20 years of experience in transition country housing and mortgage market and regulation analysis.

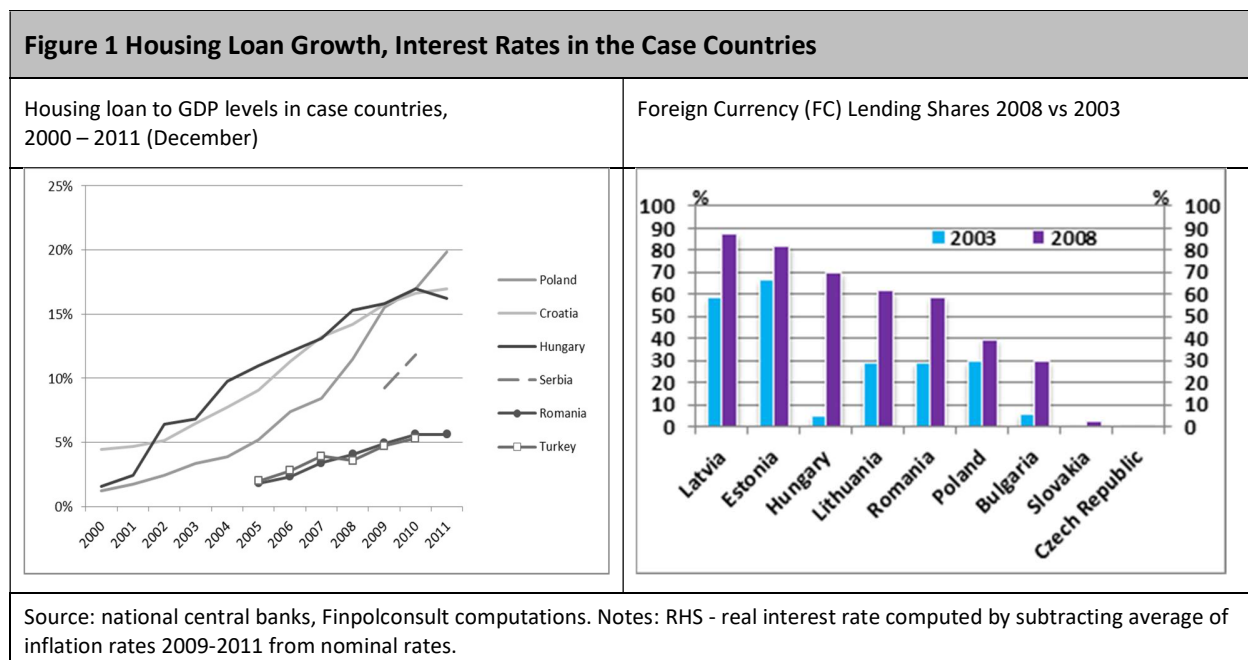
The First Mortgage Market Crisis In Transition: Risky Products, Lax Underwriting

After some inertia during the early 1990s, transition countries swiftly built up market-based housing finance systems until ca. 2010. Developing housing finance had been an important public policy goal in order to revive construction activity, which had collapsed in the 1990s from their high pre-transition levels. Despite the significant stock built in socialist times, additional construction was needed to catch up with housing consumption levels in Western economies, to replace obsolete stock, to upgrade and modernize the remaining stock and to respond to migration into new job centres.

¹ Dübel (2012b). Download:

http://finpolconsult.de/mediapool/16/169624/data/Housing_Finance/CEE/CEE_Mortgage_Regulation_EBRD_Oct_12.pdf

Yet, only in the isolated case, rental housing construction was revived, in small volumes, e.g. in Poland in 1994 with the 'TBS' rent-to-own schemes. Without such a corporate/communal lending portfolio, housing finance in the region developed almost exclusively as 'retail' lending to households essentially by private and frequently foreign banks. A secondary goal of its introduction exacerbating its retail character was to liquefy capital locked in the existing housing stock. Much of the publicly owned apartment sector had been privatized around 1990 to tenants for free and lending against this collateral was implicitly, and at times even explicitly, seen as an income substitute.²



Following a period of strong growth, since ca 2010 the retail version of housing finance in the region has entered a stagnation and partly recession phase. From a broader stability perspective, compared to Western severe crisis cases there is rather little reason for concern: housing debt-to-GDP levels in the region are still moderate (15-20% of GDP, as compared to e.g. in the US around 80%). These values per se pose no systemic risk to CEE financial systems. Despite stagnating or declining house prices, portfolio performance has in most countries been reason-

² For a review of the rental housing sector in transition, see Dübel, Brzeski and Hamilton (2006).

able – with default rates between 2% and 4%³, as is to be expected in an emerging market context where lending has focused on initially higher-income borrowers.

Yet, there are important characteristics of mortgage lending in the region that have already contributed to seriously impaired portfolio performance, even to the beginnings of system crisis in some countries, and more generally pose questions regarding the sustainability of the lending growth of the 2000s in the region:

- First, lending with a few exceptions, e.g. the Czech Republic and Slovakia (see RHS of Figure 1), has been primarily in foreign currency (FC). Using foreign currencies as the basis for lending is not sheer speculation; in the region it serves valid purposes:
First, FC lending addresses the so-called Tilt effect of fast real amortizations of housing loans in the presence of high *nominal* interest rates due to a high inflation component.⁴ Secondly, it taps more liquid foreign capital markets and thus borrowers benefit from lower *real* interest rates (see Figure 8 in the annex for data).
Yet, FC lending also gives foreign banks a convenient entry vehicle to compete against local banks with limited access to FC funding. This has led to deterioration of consumer protection standards. Also, the other side of the coin of the deeper liquidity and lower rates in FC lending is the risk of funding overhang, which translates into potentially excessive credit growth: a comparison of Poland (moderate FC share rising only from 2006 onwards) and Hungary (high FC share since 2004) in Figure 1 and Figure 9 below suggests significant differences in growth dynamics of a predominantly foreign currency vs. a predominantly local currency-dominated housing loan portfolio.
- Secondly, despite the emerging character of CEE markets and lending focus on higher-income borrowers, the growth in the region was already partly driven by questionable

³ At the time of writing of the EBRD study in early 2012.

⁴ In the presence of moderate or high inflation, the loan-to-value ratio of a housing financing drops faster from the initial level chosen at underwriting than in the presence of low inflation. Households have to shoulder an excessive real debt burden, as the loan must be amortized fast in real terms. This is a problem specific to long-term lending. It leads to remarkable coexistence of long-term loans in foreign (e.g. housing) and short-term loans (e.g. auto loans, credit cards or overdrafts) in local currency in the region. See also Figure 3 below for visualization.

product innovation. In particular, home equity lending and lending for rental investments by consumers that took decades to develop in Western Europe grew rapidly in the CEE region, and also subsequently saw the highest default rates (see upper LHS of Figure 2 for Hungary data). This fast forward product innovation can be seen as a side effect of excess liquidity and the associated weakening in bank governance. Innovation has a strong feature of FC dominated markets with Hungary (home equity) and Latvia (rental investment) being the extreme cases; it can also be traced in local currency (LC) markets with strong liquidity growth and competition levels, esp. the Czech Republic.⁵

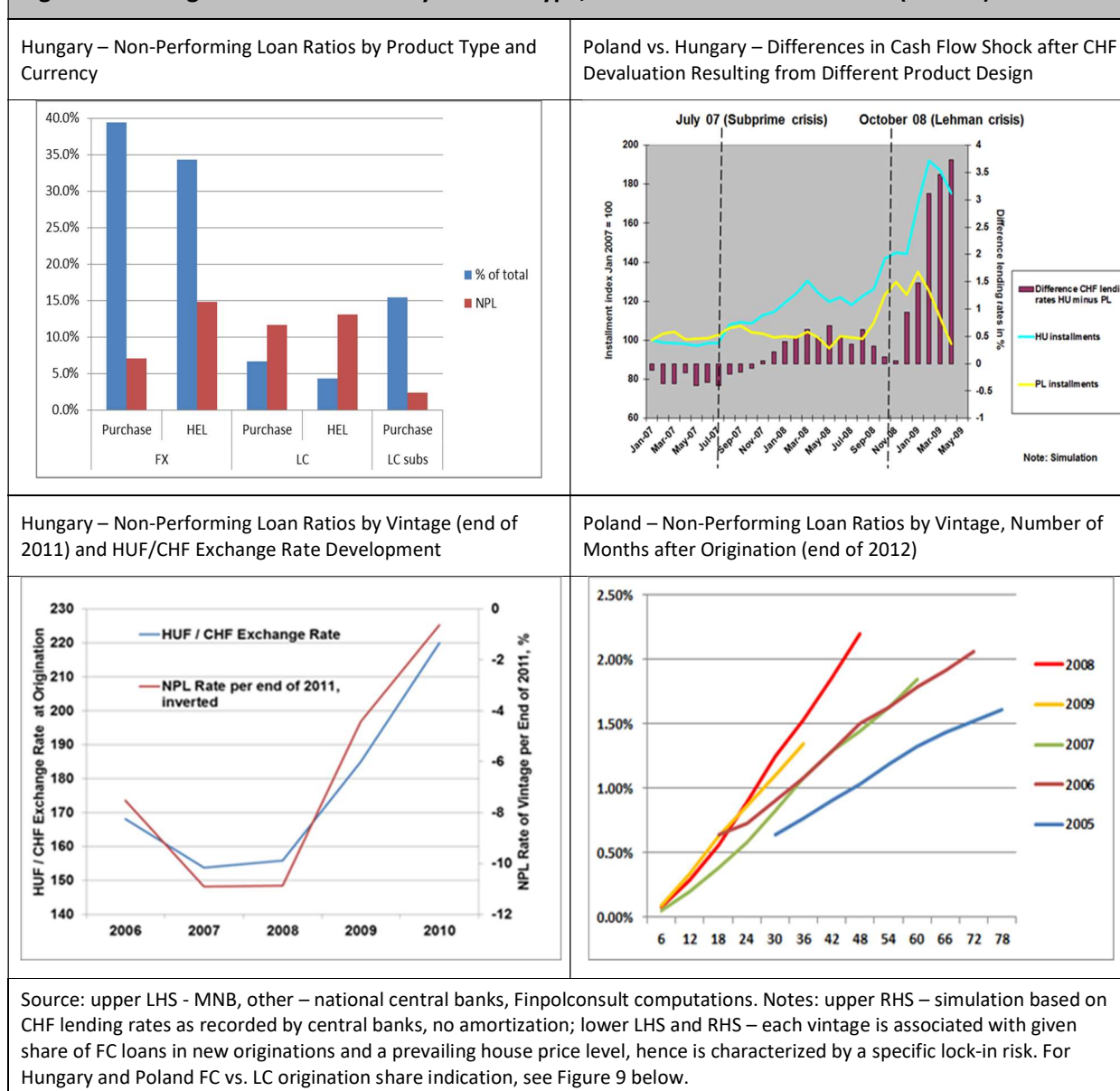
Given earlier and parallel events in the United States and Western European countries, the cumulating sector risks and beginning risk realizations around 2010 caught the attention of foreign financiers: these affected the funding ability of both domestic and foreign banks in foreign currency, and it reduced the willingness of foreign bank owners to deploy sufficient capital for additional growth to the region, or recapitalizations.

The most publicly featured, even though not the most extreme, risk realization was seen in the Hungarian market where the risk-layering effect of simultaneous interest rate and devaluation shocks in Swiss Franc lending had a severe impact on both household debt service burdens and debt levels. The resulting surge in default rates came through both classical default motives: cash flow (debt service) risk and balance sheet (over-indebtedness/lock-in) risk. The lower LHS of Figure 2 shows the correlation of default rates in Hungary with the initial FC exchange rate level by vintage, a proxy for balance sheet risk given the subsequent dynamics of exchange rates. Also, interest rates in Swiss Franc in Hungary could be unilaterally reviewed by the lender, i.e. was not tied to an interbank index, which increased cash flow risk. Within the sample of

⁵ For a review of the sources of LC liquidity growth in the Czech Republic, see Dübel (2003). In 2004, the 'American mortgage' was introduced, and in 2005, mortgages for the elderly. See Dübel et. al. (2006), chapter on the Czech Republic.

the EBRD study, Swiss Franc lending-related problems in the same constellation arose also in Croatia and Serbia.⁶

Figure 2 Housing Loan Performance by Product Type, Cash Flow vs. Balance Sheet (Lock-In) Motives



⁶ Mortgage portfolios in Eastern European countries were hit by US-Dollar appreciation (Ukraine, Russia), Romania by the appreciation of the Euro.

In Poland, in contrast to the above cases, cash flow risk as a motive of default was mitigated since Swiss Franc loans had been indexed to the interbank rate, which declined after the Swiss National Bank started to reign in the appreciation by lowering her refinancing rates. The upper RHS of Figure 2 shows that the Polish debt service shock following the devaluation, as a result of this 'hedging' of its two individual determinants interest rate and exchange rate, was far lower than the one in Hungary. In Hungary, similar in Croatia and Serbia, the banks used their contractual review options for Swiss Franc lending rates to pass through higher funding cost and rates did go *up*, not down.

Nevertheless, despite relative calm in the cash flow risk dimension, for Poland as the lower RHS of Figure 2 suggests we also find evidence for balance sheet driven defaults in a vintage comparison: those loan underwriting years characterized by the highest Swiss Franc market shares (see Figure 9) and at the same time highest house price levels, 2008 and 2009, were most likely to experience future balance sheet stress as the Franc appreciated and house price growth declined, and thus became characterized by the highest default rates. In contrast, earlier vintages were protected by either a lower FC lending share (2006, 2007), meaning less adverse debt dynamics in local currency, or by having been underwritten at significantly lower house price levels (2005), meaning a higher future house price appreciation and a lower likelihood of future negative equity.

As per EBRD study closing date of mid-2012, sizeable portions of the FC portfolio in the region were already in or close to a negative equity situation, e.g. Hungary (56% of FC loans over 90% loan-to-value (LTV) ratio, Central Bank), Poland (32% of Swiss Franc loans with over 100% LTV, Central Bank; some 300,000 loans according to the Polish Financial Services Authority), Serbia ('close to 100%' for Swiss Franc loans, 10-15% for Euro loans; interviews). In Romania, the Euro appreciation in particular of the first half of 2012 in combination with excessive valuations during the house price boom also gave rise to a large number of loans in negative equity. While the Swiss Franc devaluation risk has been contained through the peg to the Euro of 2011, the general situation has likely further deteriorated as regional currencies have come under additional pressure also vs. the Euro and the US-Dollar. Thus, even where FC interest rates have declined

again, partly resulting from consumer protection intervention to be discussed below, pressure remains high from a balance sheet perspective to restructure the portfolios.

The recognition of the heightened risk levels since ca 2010 brought mortgage portfolio growth in most countries to a halt, even if in some cases portfolio size as a percentage of GDP continued growing through technical devaluation effects. Home equity products and the most problematic foreign currency product tied to the Swiss Franc have significantly lost in relevance, and underwriting standards have been generally raised.

The Struggle Over The FC Lending Legacy Led To Many Inconsistent Primary Market Interventions

The current credit recession or stagnation trend has largely been driven by supply factors. Many lenders experienced funding shortages in the currencies used for mortgage lending: even foreign lenders, such as Austrian banks, withdrew rather quickly from the idiosyncratic Swiss Franc market when hedging became increasingly expensive and domestic regulators stepped up scrutiny. In the meantime, credit protection costs in Euro had increased, too. More importantly, the increasing economic uncertainty in the region and capital needs at home prompted lenders to not fully replace capital written off at the local level and sometimes withdraw from markets altogether.

On the demand side, next to the weakening economic situation in large parts of the region, the local regulatory response has been a key factor. Unfortunately much of it has been inconsistent and some potentially damaging to loan supply in the long-term.

A key reason for this outcome is that when designing primary market regulations, the CEE region is still largely left on its own – either formally for countries that are non-EU-members, or economically, given that EU consumer protection rules adopted so far have been focused on enhancing transparency, rather than on materially reducing risk for consumers. For example,

the EU CARRP Directive⁷ regulating mortgage credit only modestly tightens underwriting standards and has almost no impact on product design. Even the ECB/ESRB guidance on FC loans is not truly restrictive to the design, but rather rations these types of loans to high-income borrowers or those with matching currency income.

With such limited external guidance, it is perhaps not surprising that in three of the six countries reviewed by the EBRD study ex-post interventions into product design were recorded. I.e. governments altered the terms of credit contracts that had already been closed and whose cash flow as a consequence was changed ex-post. This is the case with the interest rate adjustment regulations passed in Romania and Serbia and the Swiss Franc debt restructuring exercise in Hungary. For example, lenders in Serbia were forced by the central bank in 2011 to re-index FC loans with reviewable interest rates to an interbank rate with fixed spreads back to the first payment.

Whether or not these interventions have helped borrowers to avoid default, or have rather randomly distributed benefits among the borrower population or between borrowers and banks, and even between banks, must be subject future evaluation. There are a number of worrisome signs. The Hungarian Home Protection Action Plan of 2011 permitted borrowers to pre-pay Swiss Franc loans at a favourable exchange rate into Forint loans. However, affordability of Forint loans at the time of implementation was so low that only the best customers of the banks by mid-2012 had been able to exercise the option. In Serbia, the above mentioned spread had to be calibrated such that in combination with the historic interbank rate to be applied it resulted in the same first payment as initially agreed under the reviewable rate contract. Since some Swiss Franc lenders worked with initial periods of reduced rates and some fully priced interest from the beginning, this intervention led to very different payments of mortgagors, depending on which bank was their counterparty. Some banks in Serbia had offered ini-

⁷ 'CARRP': Credit Agreements Related to Residential Property

tial discounts to borrowers and now were forced to apply these discounts on the entire life of the loan.

These cases, if anything, highlight the difficulty of brush ex-post intervention into products, as opposed to means-tested portfolio restructuring strategies (i.e. focusing on the individual ability-to-pay). They also highlight the importance of rational ex-ante product design.

Regarding new lending, the new FC loan regulations in the region are today heavily biased towards rationing of eligible borrowers. The mechanisms are tight loan-to-value and income limits as well as income stress tests. Hungary pushes the LTV limit for Euro (!) loans down to 60%, for example, and Poland requires a severe income stress test for FC borrowers in which FC shock and interest rate shock are cumulative (as opposed to the empirical reality of the crisis shown in the upper RHS of Figure 2). There are several fundamental problems with this approach, at least if taken in isolation: tight LTV limits may still not be sufficient to protect borrowers against negative equity risk in a potentially extreme devaluation scenario while – without the higher LTV alternative in LC being sufficiently developed – they severely impair borrowing ability. In Poland, earlier income stress testing regulations attempting to push incomes of FC borrowers significantly higher can be shown to have not worked well in practice during the strong house price appreciation period of 2006 and 2007.⁸ As also U.S. experiences have shown, pressure on banks to arbitrage income or LTV requirements through inflated income statements or appraisals in such phases will be high.

Most importantly, the rationing approach in essence aims at protecting lenders rather than consumers. The alternative would be a risk taking by lenders on behalf of consumers through ‘detoxifying’ the product set. The essential options here for the FC lending segment are negative amortization limits, i.e. mandatory exchange rate caps, on a higher LTV FC product, an ap-

⁸ Calibration of the stress tests is always a problem, too. The 2012 Polish regulations demand draconically the cumulation of a 30% devaluation shock with a 400bp interest rate increase. In contrast, as we have seen, Polish FC loans are mostly indexed to interbank rates which even tend to drop when the foreign currency appreciates.

proximation of the amortization profile of the FC loan through 'price-level adjusted' mortgages in LC, and a first and second mortgage split with the first mortgage in low LTV foreign currency and the second mortgage in local currency. For the two latter options, see the discussion in the subsequent section. Negative amortization had been limited in U.S. federal legislation for decades at 120% of the initial loan amount; alternative levels or dynamics of ceiling could be worked out in the individual case in transition countries, depending on the local house price and wage inflation context. Regulators have resisted such material protections provided to borrowers ex-ante on the grounds of excessive potential currency risk for banks. Given that borrowers anywhere in the case countries, except for the irrelevant case of Turkey where FC lending remains prohibited, already today can convert their FC loans into local currency at any point in time without fees and thus create considerable currency mismatch risk for lenders, this argument looks implausible.

An important supporting regulation could be amortization rules that address the 'current' LTV risk – i.e. negative equity risk - directly through demanding the investment of parts of the interest rate advantage of FC loans into higher amortization. Under the typical French mortgage product used in Europe, with a level payment and low initial amortization, such a regulator demand will impair initial affordability less than the above measures. Poland is demanding a maximum amortization period for FC loans of 25 years - assuming a (fixed) interest rate of 4% this would imply 2.5% initial amortization, which raises initial instalments close to the local currency levels in Polish Zloty. Generally, the faster the speed of loan amortization that is agreed on the higher could be the initial LTV that can be accepted. Yet, because of the risk of a severe devaluation event, an amortization rule can only support, not replace, a hard negative amortization limit.

In summary, the risks of foreign currency lending in the six-case sample have been addressed by regulations in vastly diverging fashions – from not at all in Croatia (only most recently there has been court action on Swiss Franc loans borrowing from the Serbian solution) via rationing in Hungary (loan-to-value and payment-to-income limits) to an outright ban in Turkey (related to the 2001 macro crisis). A common denominator is perhaps the push against more exotic cur-

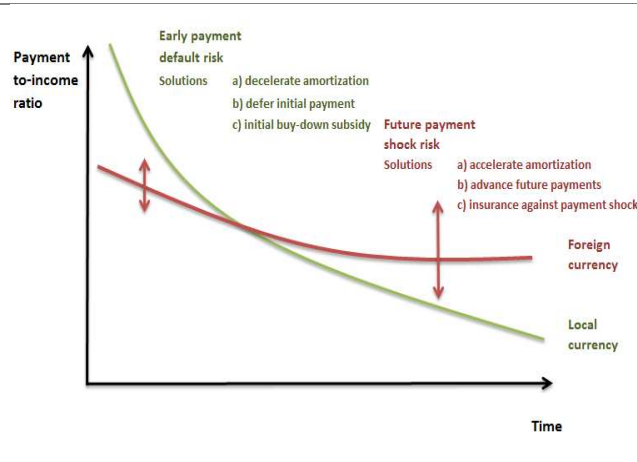
rencies like Japanese Yen and Swiss Franc, which leaves the Euro and the US-Dollar as the dominant foreign currencies in use today. For an overview of the empirical findings – per mid-2012, see Table 1 in the annex.

Local Currency Loan Products Need A Comprehensive Development Strategy

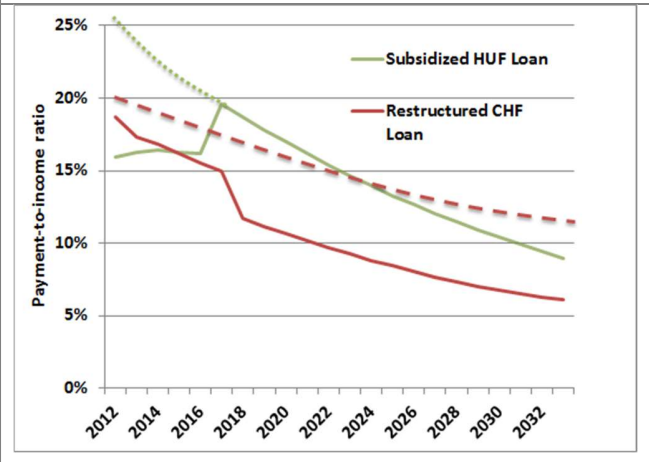
Almost across the board, FC loan product regulations in the case countries have been imposed *before* sufficiently affordable local currency products have been made available (Serbia, Romania, Hungary – in Turkey FC products are banned since 2001). The unintended consequence of a very prompt reaction by regulators could be thus rising early payment default risk. This arises if borrowers are forced to pay far higher initial debt service in local currencies. The LHS of Figure 3 stylizes the payment-to-income profiles of local vs. foreign currency loans over time. As long as nominal interest rates are high, achieving greater initial affordability will demand either an initial burden reduction through subsidies or shifting the initial burden to later phases of debt service through deferring payments or lowering amortization. Let us review these options in the following.

Figure 3 The Tilt Effect Associated with Local Currency Mortgage Loans and Solutions

Tilt Effect, Strategies to Address Default Risk in LC vs. FX Mortgage Lending



Hungary – Comparison of the PTI profile of restructured CHF loans with the newly designed subsidized HUF loan

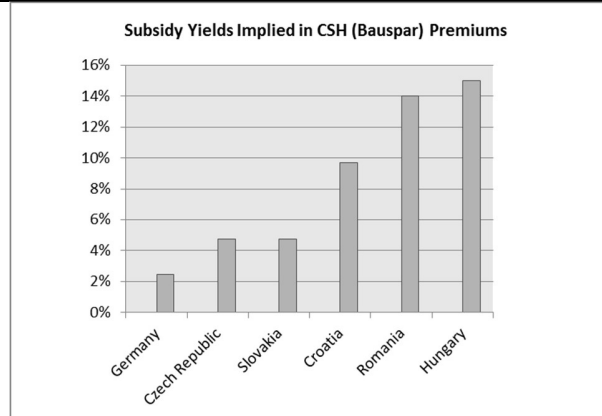


Sources: LHS - author's simulation, RHS – author's representation. Notes: LHS – vertical arrows denote potential dislocation of payment-to-income profile when exchange rate depreciates (upward) or appreciates (downward). RHS - stylized simulation, dotted lines indicate unsubsidized payment-to-income ratio profile.

Experiences in the region with mortgage subsidies are mixed at best. Given partly high past and current subsidy volumes, there could be scope for reorganizing these to support local currency retail lending. For instance, with the government-supported restructuring option offered for Swiss Franc loans originated during 2004-2008 under the Home Mortgage Action Plan, a companion option to the above mentioned conversion option into Forint, Hungary as per 2012 was ready to massively subsidize the second large mortgage portfolio within a decade. The first subsidy program had drastically reduced interest rates on Forint loans during 1999-2003 under the so-called Széchenyi Plan. Forint rates at the time were *for the entire life of the loan* reduced from ca 14% to 5%, in some cases 3%. Spending only a fraction of the subsidies of the past on a Forint loan buy-down programme focusing - only on the first few years of loan life, as portrayed in the RHS of Figure 3 above – could substantially improve subsidy efficiency measured as Forint mortgage demand stimulated relative to fiscal cost. By 2012, a likely insufficient interest buy-down programme for Forint lending had been set up along these lines. In comparison, the

Figure 4 Contract Savings for Housing (CSH) Subsidies

Subsidy yields in Germany and different transition countries per 2011 legislations



Source: national CSH legislation, Consultant computation.
 Note: subsidy yield is defined as excess yield from state premiums under the assumption of the locally applicable minimum holding period.

restructuring solution for Swiss Franc loans shown also in RHS of Figure 3 seems to be wasting future ability-to-pay potential of households.⁹

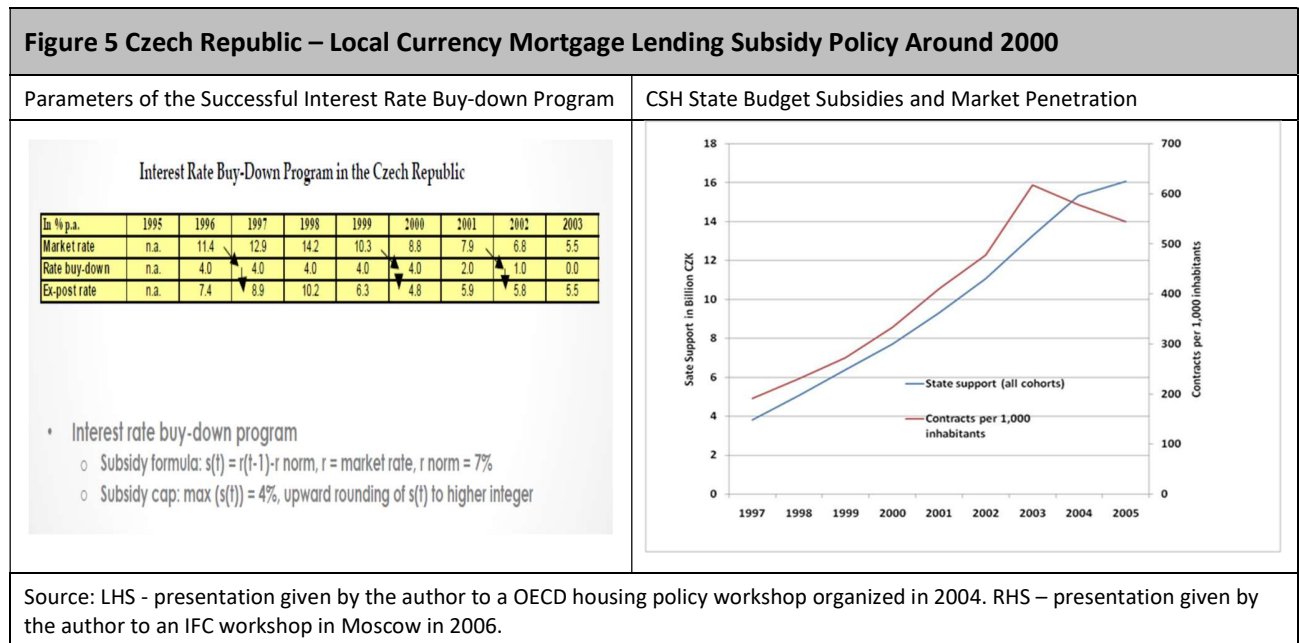
Subsidizing savings through contract savings for housing (CSH, also 'Bausparen') schemes, which generate small second mortgage loans in local currency, is an alternative policy that could fill the capital gap left by tighter LTV regulations on (first mortgage) FC lending. CSH programs have been established in half of the case countries (Romania, Croatia, Hungary). They had no chance to take off during the unrestricted foreign currency lending

boom years. With stricter FC LTV rules in place, the Hungarian CSH system has grown strongly recently. For legal reasons, however, the product still cannot be used as a second mortgage topping up first mortgage FC lending and thus mitigating the LTV rationing problem described before.

In Croatia and Romania these legal issues are present, too, and moreover strict FC LTV rules are either absent or easy to circumvent. In Croatia, first mortgage lenders interviewed by the author tend to see CSH as subsidized competition and refuse to co-operate on a potential integration. Romania offers through the Prima Casa program still 95% FC lending, under certain conditions, which can be easily arbitrated. This reduces the co-financing potential of the existing CSH savings program. A more generic problem with CSH has been widely differing, and partly excessive, subsidy policies (see Figure 4) resulting from ad-hoc lobbyism. In Romania, also the co-

⁹ The Forint buy-down is also necessary to support the any conversion program at preferential exchange rates in order to avoid mistargeting.

existence of subsidized CSH and similarly subsidized mortgage insurance appears to be inconsistent.¹⁰



Historically, supporting subsidies for CSH have also been used as a complement to a loan buy-down program. The model for buy-down programs in the region is the one implemented in the Czech Republic in the 1990s (see the LHS of Figure 5 for historic program parameters). Its success can only be fully understood when considering the high levels of CSH subsidies provided in the 1990s and early 2000s that stimulated a veritable boom in term deposits. This in turn induced very low mortgage rates in the Czech Koruna market,¹¹ and in the event the Czech Republic was able to avoid FC lending altogether. Whether a subsidy policy on this scale – see the RHS of Figure 5 - should be repeated anywhere else is questionable: statistically, by 2000 every

¹⁰ Romania and Serbia run high-LTV mortgage insurance and public loan systems, which in principle can replace contract savings. Yet, these programs support solely FC lending. In addition, insurance programs carry the risk of adding to borrower leverage and create a large contingent fiscal liability. They should probably be refocused on LC lending, where permissible LTV limits are higher, and so is early payment default risk.

¹¹ See Duebel (2003). The key mechanics is the requirement to invest CSH deposits that are not invested in CSH loans into housing-related assets. This provision stimulated the development of the Czech covered bond market, which in turn ensured that by the mid-2000s the country had one of the lowest funding cost levels for mortgage lending in Europe.

second inhabitant in the country owned a CSH contract, and when deposit rates collapsed to 1% by the mid-2000s, CSH deposit rates remained at double digit levels and fiscal cost ballooned. However, the conclusion may be drawn that moderately stimulating the term deposit market via CSH in combination with a buy-down program can be an effective strategy in stimulating LC mortgage lending. It is in this context finally worth noting that Poland had discussed Zloty loan buy-down programs for years, which either due to fiscal concern or market interest rates declining below the target rate were never implemented.

Considering the regulatory strategies adopted in the six-country sample, permitting shifting payments on LC products to the future seems already to be an option in most of them. Underwriting regulations are far laxer now on LC lending than on FC lending, with payment-to-income ratios permitted often up to 50% (see Table 2 in the annex). In this context, interest-only phases or introductory rate arrangements in local currency could be abused to further stimulate debt take-up. This could mean additional credit risk via future payment shock - in local currency - if products remain unregulated, which is the case in most of the reviewed countries (see Table 2 in the annex).

It might be worthwhile therefore at least for those countries with - as a rule of thumb - inflation rates in excess of 5% and nominal interest rates in excess of 10% for extended time periods to consider 'inflation-proof' local currency loan products. The price-level adjusted mortgage (PLAM) product negatively amortizes by increasing the outstanding of the loan with the inflation rate while determining debt service through the application of the real interest rate over the inflated outstanding. Latin American countries like Chile or Colombia with moderate inflation levels and little prospect of joining a regional currency union have used the PLAM instrument for decades as the preferable alternative to FC lending. The difference between both instruments, put simply, is that the PLAM narrows the negative amortization driver down to the official inflation rate. FC lending in contrast means negative amortization risk resulting from drivers behind exchange rate movements beyond inflation, including inter alia the impact of cyclical capital flows and speculative attacks. PLAM lending is under most empirical scenarios less risky than FC lending and could hence permit higher LTVs upon underwriting. In order to

illustrate the Hungarian case, the annex provides for a simulation example with the historical exchange rate and inflation data for loans originated in 2007. Still, as experiences in some markets have shown – a prominent example is the Icelandic portfolio originated before the financial crisis – PLAM contracts carry potentially significant mismatch risk between inflation and wages and/or house prices and thus should be sufficiently conservatively regulated.

The regulatory design initiatives for local currency products in the region currently do not include such an option, even though Hungary and Poland have historic experiences with variants of PLAMs practiced in the 1990s. Local currency product design in the region is – as in the case of their FC product counterparts - essentially limited to adjustable-rate loan products. Given the typically large interest rate volatility in the local currency this means that this product class is subject to even higher re-pricing risk on interest rate conditions than foreign currency loans, which could severely hit borrowers. While a verbal preference among regulators for fixed-rate lending is heard as a routine statement, there is hardly any evidence of lending in local currency beyond fixing periods of one year. An exception is the Czech Republic where the typical fixing period is five years.

Clearly, nominal fixed-rate lending over a horizon material for interest rate risk protection requires material support for lenders, from sufficiently available long-term refinancing to suitable consumer protection regulation. The latter is a particular reason for concern: almost all countries feature strong interventions severely capping (Romania) or removing (Croatia, Serbia) prepayment indemnities which renders fixed-rate lending through the implicit requirement to price the prepayment option expensive, and thus in comparison with adjustable-rate lending in local currency creates interest rate differentials that may leave borrowers little choice. The political reason for the curbs of prepayment indemnity is clearly high nominal interest rate levels; in the Czech Republic, in contrast, full yield maintenance indemnities are permitted as interest rates are significantly lower, thus lowering the opportunity costs for households from not prepaying. Yet, still at elevated rate levels somewhere between 5 and 10% in the remainder of the region, permitting indemnities should be feasible to allow fixing periods in the range of 1-3 years, which should allow banks in return to issue fixed-rate deposits or bonds for refinancing.

Regulators could reduce some of the remaining cost differential to adjustable-rate loans through lower capital requirements for such loans with mid-term fixing periods, given the absence of re-pricing risk during the fixing period.

After the negative experiences with unilateral upward interest rate reviews by lenders discussed before, adjustable-rate products by regulation in the case countries now as a default have to be tied to interbank rates. Lender cost-of-funds indices as the alternative are frequently rejected by regulators as easy to manipulate (Serbia, Romania, Hungary at the time of writing of the EBRD study was still undecided). Yet, interbank indices in local currency are known to face serious credibility issues. The most serious is that there is usually no interbank loan demand by banks which typically are over-liquid in local currency. Thus local currency interbank indices are vulnerable to manipulation as the quotes collected are essentially reflecting only ask prices of banks without underlying loan transactions.

A particularly problematic regulatory demand is in addition to require fixing the spreads over the underlying indices for the entire life of the loan (Serbia, Romania). This type of profit regulation may severely raise lender solvency risk when refinancing costs for him increase above the interbank index. There are stark lessons from Euro crisis experiences in Ireland or Spain in that regard. In these countries the refinancing of portfolios of interbank index-based products with low fixed spreads today depends on the European Central Bank. The alternative - within the adjustable-rate lending product framework and assuming fixed-rate loans are not feasible - would be to permit re-adjustment of spreads in certain time intervals, e.g. every 3 years. Finally, an option still is to use an easily verifiable proxy for industry funding cost as a basis for the reference index, e.g. deposit rates.

The Supporting Infrastructure For Mortgage Lending Remains Insufficient

Beyond mortgage regulation and subsidies, almost 25 years into the transition the fiscal, design and implementation capacities of housing policy remain limited in the region. This means that lower credit households – in particular the young that move into cities with very limited supply of rental units - are pushed towards the retail mortgage market. The continued lack of capacity

is amply demonstrated by the backlog in both private and public/non-profit rental housing production and maintenance of the existing stock (Romania, Serbia, Hungary, Turkey). Additional rental housing production, or at least stock repair and modernization of rental units, which would require reform of rent control laws, could cater to the needs of young and mobile households.

Poland is the only country in the sample that has partly succeeded in rebuilding a non-profit rental housing sector (TBS system), although the country has not up-scaled it yet from direct national budget funding. Croatia harbours plans for a revitalization of pre-transition rental housing programs. There are plans in Romania to comprehensively rehabilitate pre-transition flats which could support the rental market.

Challenged by rising default rates, the foreclosure and consumer insolvency regimes are currently tested for the first time in the region, and across the board need improvement (Hungary, Serbia, Croatia, Poland). As in Western Europe (e.g. Ireland), the risk of distortive foreclosure moratoria decreed by the state in the region is high. It is highest where both the default case-load is elevated and rules that permit the discharge of residual debt after a foreclosure are absent or highly restrictive. Hungary in this context has limited permissible foreclosures to a low quarterly number.

Discharge rules would require the borrower to service that debt only for a number of years, after which relief is granted. This would strike a balance between preserving a penalty for defaulting and avoiding the eternal debt tower of large volumes of residual debt, which is particularly relevant for young households. Drastic reductions of discharge periods have been implemented in Western Europe (e.g. Ireland, from 12 years to 3 years). Reducing them to very low levels could increase the probability of default, while keeping long discharge periods in place could keep the risk of political intervention high.

Finally, the data situation supporting lender underwriting decisions remains deficient, specifically regarding the availability of house price data (no national standardized index concepts in the case countries, except Turkey) and existence of rental market surveys (all cases). Rental

survey data are direly needed in order to begin departing from the open market valuation method that is currently dominating underwriting. This method, which essentially just records inflation, is increasing the risk of excessive credit growth (all cases). This risk could potentially be reduced - at least for lending in the apartment sector - if lenders were to use the income method, which ties valuations to the alternative of renting the property out. Flagrant misappraisals have also been recorded in new construction due to inflated profits of developers (e.g. Romania). This could be corrected by using the reconstruction value as the relevant benchmark in the new construction case.

More Mortgage Securities Issuance Is Needed For Both Greater Risk Transfer And Mitigation

More than twenty years into the transition process progresses in both market development and regulatory environment of mortgage securities remain incomplete. The delay promises continued high interest rate and liquidity risk for mortgage lenders, in both foreign and local currency dimensions. The situation also makes continued reliance of the primary markets on risky lending products more likely.

To develop the issuing incentives of banks, regulators in the region will need to use the appropriate metrics for risk calibration. They should, as a first step, shelve the idea of bringing the Loan-to-Deposit Ratio (LDR) permanently down to 100%, which implies purely deposit-funded mortgage finance systems.

To be clear, imposing a conservative LDR can be part of an effective short-term strategy to radically cut back on excessive domestic credit. But in order to avoid structural damage, the strategy should focus on the source and maturity of funding, in particular short-term foreign capital inflow, not the instrument. Figure 10 in the annex looks at four countries that experienced housing booms on the back of considerable foreign capital imports. It shows that mortgage securities had an impact on capital supply generation (Spain, U.S.), but their presence was not a necessary condition since surges in interbank funding (Hungary) or unsecured bank bonds (Ireland) have led to the same results. In other words, the goal should be to bring down excess for-

eign liquidity transmitted through any channel, and here in particular those with the highest liquidity risk (e.g. short-term bonds or deposits, interbank or intra-group funding).

A 100% LDR goal will finally be entirely undesirable when there is risk for eliminating the space for long-term bank bonds targeted at developing the *domestic* capital market:

- First, regulators cannot simply assume that deposits will be more stable than bond funding. That this is not necessarily the case is amply demonstrated in the CEE region by capital flight and bank run experiences, e.g. 2011 in Hungary. In particular covered bonds tend to have a dedicated domestic investor base that is unlikely to run (i.e. reject roll-overs).
- Secondly, regulators must reduce the risk of long-term mortgage assets being funded by short-term deposits, which is increased by applying the LDR concept. While regional central banks classify a substantial portion of deposits as term or 'time' (see upper LHS of Figure 6 below), truly long-term deposits with maturity of 1 year and more are extremely rare in the region.¹² We discussed above the exception of CSH contracts with maturity of between 2 and 5 years; where laws exist, these can fill some, but not all, of the void.
- Thirdly, a strong reliance on the LDR keeps promoting the use of adjustable-rate mortgages that match the re-pricing profile of deposits, i.e. induce lenders to move on the mortgage yield curve from the long to the short end. This short-term interest rate risk minimization policy for banks does not only deprive borrowers from interest rate risk protection. It also creates greater pass-through of monetary policy signals, thus tends to intensify credit boom-bust and maximize long-term credit risk for banks.

An appropriate set of regulations trying to promote mortgage funding stability would start from a modified version of the Net Stable Funding Ratio (NSFR). Among the six countries reviewed only Hungary applies the NSFR concept to the foreign currency portfolio, where the key liquidi-

¹² 1 year is the cutting point for the Basel III net stable funding ratio (NSFR). In order to enhance eligibility of deposits for the NSFR, roll-over assumptions for deposits have recently been generously expanded. This concession by regulators to the banking industry can easily impair the usefulness of the metric, especially in a transition country context.

ty risk for lenders lies ('foreign funding adequacy ratio', FFAR). The NSFR, which under Basel III rules is limited to one year and focusing on the overall liquidity situation of the bank, must also be complemented by long-term matching tests to appropriately monitor the liquidity and interest rate risks of long-term mortgage portfolios. Matching tests can be static, such as duration gap analysis, or dynamic, e.g. stressed asset and liability cash flow on a net present value basis. The result of such testing will be additional stimulus for lenders to issue either bonds or long-term deposits to improve matching. They are the standard in covered bond regulations in the region (Hungary, Poland, Romania, Turkey), and could be easily extrapolated to the overall mortgage portfolio level.

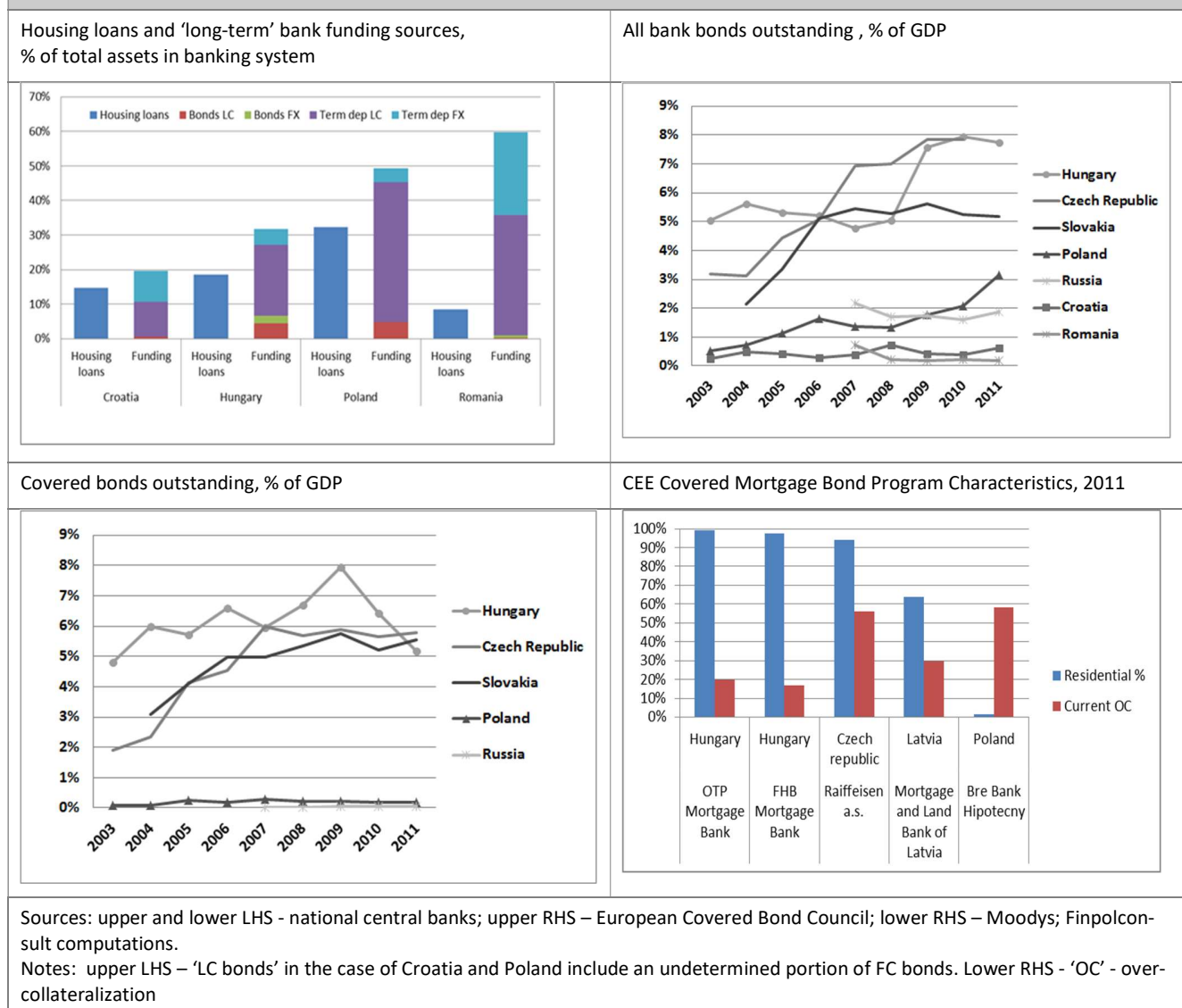
A particular problem also for mortgage funding is legislation severely capping or outlawing prepayment indemnities. This primary market regulation issues discussed before will result in high variation of durations of fixed-rate mortgages depending on the interest rate scenario and borrower behaviour. Particularly problematic for lender solvency is so-called negative maturity transformation risk, i.e. the risk that funding maturities are longer than asset maturities, when the latter are shortened through prepayments. The potential losses arising in a declining interest rate scenario where lenders service debt interest expense is not covered by asset interest revenue could easily compromise the validity of proposing matched long-term deposit or bond funding.

Lenders generally ought to assess duration risks properly and in particular do appropriate loan portfolio duration modelling. If truly interested in developing fixed-rate mortgages, regulators should then consider reintroducing indemnities – see discussion above, even though small indemnities may also be an issue when protecting index tracker spread¹³. Where protecting asset cash flow is impossible they should draw the consequence and try to enforce appropriate optionality in mortgage funding instruments. Examples are pass-through bonds, in which investors bear the prepayment risk, or callable or soft bullet bond instruments, which provide the lender

¹³ An example would be Spain which permits a 0.5% prepayment indemnity on Euribor loans.

with additional duration risk management options. It should be warned though that the investor base for such instruments, in particular in local currency, is very thin, and thus attempts to stabilize asset cash flow will be preferable. The fundamental alternative is staying with the high-risk short-term adjustable rate product set. In this case, issuing bonds could at least mitigate some of the liquidity risk of the product.

Figure 6 Funding Structures of Housing Loans, Bank Bond and Covered Bond Market Development Status



The upper RHS of Figure 6 provides an overview over the status of covered bond markets in the region. In Hungary, the Czech Republic and Slovakia the markets have taken off; in Poland and

Russia they remain very small. Market growth came to a halt in Hungary due to the FC lending boom, which mainly used interbank credit and swaps as well as intragroup funding vehicles. During the crisis then issuers tried to compensate for the collapse of the interbank market. Both Hungary and Poland share the same type of regulation, demanding special banks as issuers, with very different results: the reason for this outcome are two public special banks (FHB, OTP) which together with subsidies stabilize (and almost nationalize) the Hungarian market. Poland compensates for the inactive covered bond market with an active unsecured bank bond market (see lower LHS of Figure 6). The Czech and Slovak covered bond markets were partly driven through the recycling of subsidized CSH term deposits, and have now reached a saturation point. Czech covered bonds feature a significantly higher share of commercial real estate than Hungarian, where the cover pool is almost entirely residential real estate.

Within the sample, Croatia and Serbia are discouraging foreign currency bank bond issuance through implicit taxation via reserve requirements. Protecting a small economy from excessive capital inflow is a valid goal in itself; however, developing long-term funding sources for a foreign currency portfolio, given the issues with local currency lending, deserves priority. This would speak in favour of focusing taxation on short-term foreign capital inflow in its various forms.

In that regard, the interbank and intragroup financing situation in foreign currency in a region facing economic stress and deleveraging remains volatile. Potentially, these rather unstable sources of funding could be replaced by covered bonds or mortgage-backed securities (MBS). This motive played a role for instance when Italian banks aggressively issued mortgage bonds in Slovakia and Hungary in 2009 in order to repatriate intragroup financing, or when Hungarian issuers at the same time started issuing Swiss Franc covered bonds. Potential issuers are closely watching the strength of the interbank arrangements to determine issuance needs, or the need to develop or reform their covered bond law to lay the foundations (at the time of the EBRD study in mid-2012, there were positive signals from interviews in Croatia, Romania regarding interest in covered bonds, as opposed to more mixed views in Hungary). That said, by and large

the more important financing constraint reported by potential issuers for the EBRD study in mid-2012 was capital allocation, given the accelerated Basel III capital requirement schedule.

Insufficient liquidity of covered bonds is an important cost driving factor compared to interbank funding. The pooling of residential and commercial mortgages is the standard in the region (except Hungary), which compromises risk transparency. Pooling of local and foreign currency mortgages in the cover is desired by many potential issuers (e.g. Romania), but materially complicated by tightening requirements for swap counterparties. The efforts to establish centralized issuers, still dominating smaller Western European markets (Switzerland, Denmark), that mitigate the liquidity issues have been unsuccessful so far in Poland while the future of the Hungarian arrangement with competing issuers looks uncertain. Options for cross-border collateral pooling, e.g. via the home balance sheet in covered bonds issued from e.g. Austria or Italy, remain unused due to constraints in home country legislation. Improving the economics of special banks, e.g. through enabling loan sales from universal banks to mortgage banks, remains the policy priority in Poland.

Governments in the region have difficulty in addressing the fiscal risk implied by the typical preference given to covered bond investors under national insolvency regimes. European bank resolution and deposit insurance regimes, both existing and proposed, so far do not address issues raised by national covered bond legislation. Fear of a conflict and heavy-handed government intervention has been the historic reason for the demand for special banks as covered bond issuers in Poland and Hungary. Such risk is present still today regarding universal banks as issuers: the introduction of the Good Bank concept for bank resolution (Romania) that also underlies the European bank resolution reforms conflicts with high levels of overcollateralization supporting covered bonds by rating agency demand. The U.S. Federal Deposit Insurance Corporation on several occasions ran into difficulty in resolving banks because of conflicts over overcollateralization. This renders the imposition of issuance limits to covered bonds when issued by universal banks more likely, which in turn could severely discourage specialized mortgage lending business models. A comprehensive legislative approach would need to address the con-

sistency of the broader bank resolution or insolvency framework as well as try to limit overcollateralization or improve its management in the process.

Covered bond laws in the region also historically have adopted a conservative credit risk management profile (low LTV, no foreign collaterals), which should be retained in new legislations in the region. Options for interest rate and liquidity risk management should be enhanced (soft bullet, pass-through issuance), and in this context parallel issuance options with backing by both static and dynamic pools should be considered. The latter is present in the Danish mortgage bond system, which combines the pass-through features of MBS with the dual credit enhancement standard of the covered bond (bank balance sheet/signature and mortgage cover).

MBS markets in the region remain undeveloped, with at the time of the EBRD study laws shelved (Croatia, Serbia), in need of revision (Romania), or inactive (Turkey). A 'gold standard' mimicking covered bond asset quality requirement could help. The most realistic option for market development would be taking the existing mortgage insurance programs (Romania, Serbia) and building an MBS bond insurance programme on that basis. The model for this is the U.S. low-income mortgage market segment funded by MBS. It benefits from dual insurance – loan insurance by the Federal Housing Association and bond insurance by the public insurer Ginnie Mae. Such depth of government insurance intervention should be reserved to the low-income market, however.

The Domestic Long-term Investor Base For Mortgage Securities Should Be Strengthened

Despite the need to enhance funding stability and reduce the dependency on foreign funding, the domestic mortgage securities investor base in the region is at risk of stagnating or even shrinking.

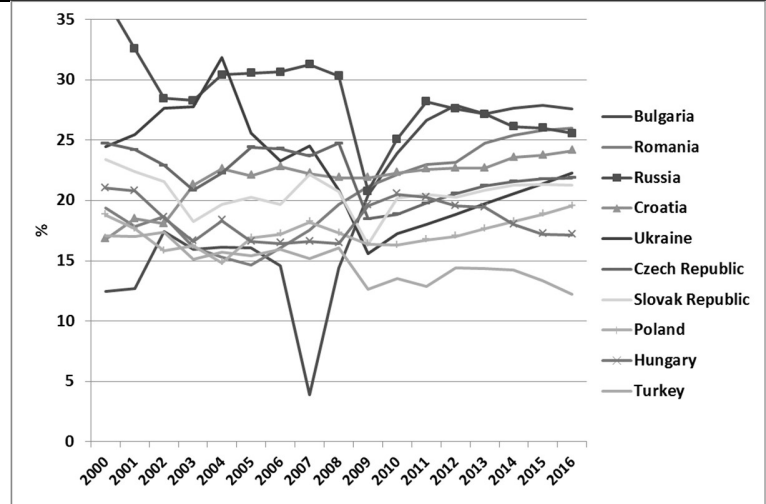
Local investor demand for local currency duration via mortgage securities in principle is high (e.g. Serbia), given the often unattractive risk-return profile of alternatives government bonds, bank bonds or deposits. Except for Turkey, household saving ratios are encouragingly high, supported by the introduction of defined contribution pension funds. Yet, forcing these to invest in

government debt or unwinding them has reduced the volumes for mortgage securities in sample countries (Hungary, Croatia). This matches a historical pattern of countries with large government debt, where mortgage securities investments were disfavoured by regulations. This explains for instance the low relevance of covered bonds in Italy.

More disturbingly, portfolio performance benchmarks enforced on institutional investors actively discriminate against diversification into corporate risk as well as duration risk. That institutions are put into the position to manage duration risk is essential for producing a meaningful division of labour with banks. This is particularly the case when consumer protection rules create considerable prepayment risk, and thus institutions should absorb the duration risk.

Foreign investor demand for long-term covered bonds should be welcome, within the constraints imposed by the need to retain a healthy current account position. It meets certain barriers. European institutions are constrained by home country regulations (investment grade limitation, cross-border limits outside the EU). Yield and in particular macro strategy investor demand, e.g. from private equity funds, is constrained by low liquidity, which impairs exit options. Banks as purchasers rely strongly on the ability to repo covered bonds. This is essentially limited to the Eurozone member Slovakia, which also saw strong issuance activity in 2011. A regional dialogue should be sought to address the regulatory barriers for European investors, possibly under the Vienna II initiative of the EBRD, and to reduce information and analysis cost associated with small issuers from small markets.

Figure 7 National Savings Ratios, 2000 – 2010 and Forecast



Source: IMF, World Economic Outlook September 2011

Conclusion

After more than a decade of boom and first signs of market crisis, CEE countries should comprehensively reassess their mortgage finance systems. The regulatory and policy discussion should be sequenced: first primary, then – on the basis of sustainable asset cash flows - secondary market development.

The interventions of regulators seen in the area of primary market regulation together with the lack of fiscal support to alter the risk environment fundamentally require adjustments in the funding and risk management strategy of banks. Many already have come into difficulty and withdrawn. This is true for all reviewed country cases, and in particular Croatia, Serbia, Hungary and to a lesser extent Romania.

Particularly problematic for lenders ex-post interventions into mortgage product design and pricing mechanics, which have been popular in the Swiss Franc loan portfolio. Such interventions, however, are the results of insufficient attention being given to design and pricing ex-ante. Regulators rather than performing this task prefer rationing via steep demands on borrower incomes and equity, which appears unsustainable. In the isolated events of design interventions, these also tend to go overboard: if regulation demands a lifelong fixing of the spread of a mortgage loan over an interbank index – as is the case in Romania and Serbia – mortgage lenders risk entering into a solvency-threatening situation.

When trying to push borrowers out of foreign currency products, regulators and fiscal policy makers should sit down and design a comprehensive support strategy for the local currency alternative. Markets with no chance of access to the Euro and moderate to high inflation levels should aim at introducing inflation-proof local currency instruments. The others may want to consider supporting standard local currency products through buy-downs or contract savings for housing programs.

Both primary market regulation and fiscal support are still mainly a national task, to which a dialogue among regulators and between regulators and international organizations such as the

EBRD could contribute international best practice review. The European mortgage directive CARRP will provide only limited additional guidance over the already existing EU laws, which have largely been implemented and have little effect on product design and underwriting. Specific suggested areas for further policy dialogue on the basis of the EBRD study would be:

- Primary market regulation: consumer protection law (product regulation, underwriting/affordability tests), mortgage foreclosure/restructuring and consumer insolvency law development.
- Mortgage product fiscal support options, with a preference for reducing the initial burden of local currency products and if necessary designing inflation proof products. For foreign currency products, the development of material protection mechanisms (e.g. negative amortization caps) should be a priority. Current subsidies should be fiscally rationalized (capping of contingent liabilities), refocused on local currency products and targeted to reduce risk (e.g. by supporting borrower equity generation).
- Primary market infrastructure, with a focus on house price and rent index creation as well as the improvement of collateral valuation standards for lending.

Secondary market regulations should follow in a subsequent stage. The possible exceptions here are Poland, where primary market regulations are more advanced and the covered bond market is not taking off, and the on-going covered bond reform discussion in Romania. For EU members, including Western Europeans, covered bond laws should be reviewed to make them consistent with the emerging EU bank resolution and deposit insurance framework.

Going forward, in order to address the serious shortage of rental housing, broader efforts in building housing policy capacity at both national and local levels are needed. To this end, public investment and borrowing capacity in the region should be strengthened, e.g. in co-operation with international development banks. Policymakers both in the region and their supporter at the EU and international level should understand that a sufficiently diversified and healthy housing sector is a central pillar for both financial sector stability and economic prosperity.

Annex

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2. Synopsis of Primary Market Regulations Issues

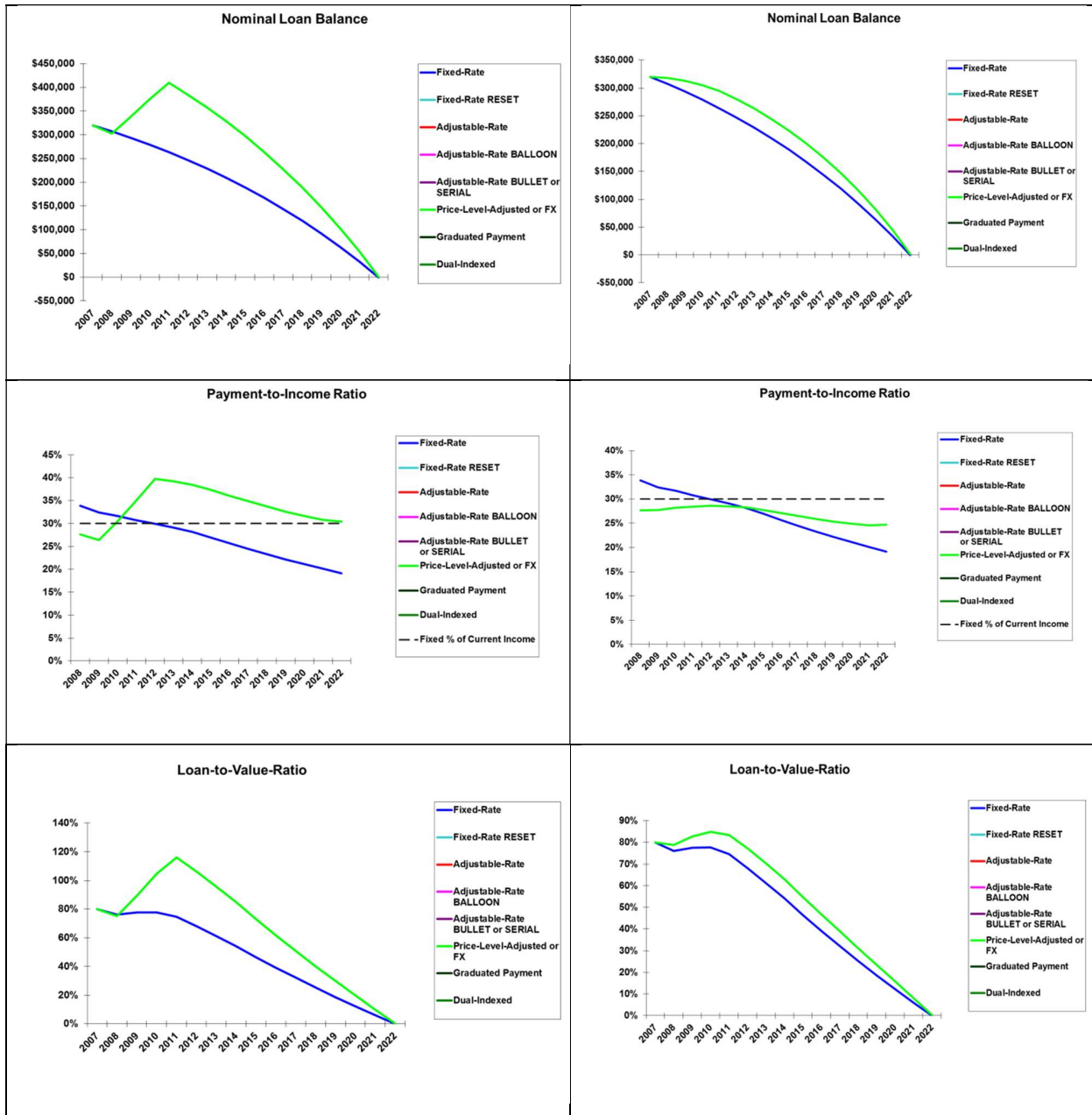
Table 1 Issues in Mortgage Consumer Protection found in Case Countries						
	Croatia	Hungary	Poland	Romania	Serbia	Turkey
Source of Law (last change)	CP law (Jan 11)	CP and BR law (April 12)	BR law (2009 bis), no CP law	CP law (Nov 2011)	CP law (Dec 2011)	Housing finance law (2007)
Transparency	Mandatory APRC.	HFSA Code of Conduct. Mandatory APRC.	APRC recommended but not regulated.	Mandatory APRC.	n.a.	Single page information, mandatory APRC.
Loan-to-value ratio	No official limit (bank practice 90%).	FX LTV 60% LC LTV 80%	No official limit. FX recommended limit of 80%.	FX LTV 75% LC LTV 85%.	FX LTV 80% LC LTV n.a.	LC LTV 75%
Valuation standards	Open market.	Open market.	Open market. Appraisal intervals depend on LTV.	Open market.	Open market.	Open market.
Payment-to-income ratio, income definition	No limit.	30%-50% LC 23%-38% FX, depending on net income.	50% (42% for FX), 65% if income level > national average, net income	35% (all loans 40%), without FX differ, net income	No LC limit. FX 50% for EUR loans	50% max, LC loans only
Payment shock, introductory rates	None	n.a.	n.a.	Introductory rates are prohibited	Discouraged by ex-post fixing of spread to initial level.	N.a.
Payment shock, balloon risk*	None	FX-LC preferential conversion option & FX debt ceiling	Max 25 year amortization assumption.	None	None	FX lending prohibited, no rules on LC negative amortization.
Payment shock, rates	None	Caps on interest rate increases	None	None	Retroactive indexation, spread fixed to initial level.	Interest rate cap mandatory.
Reference index	Not mandatory, reviewable-rate lending market practice.	Mandatory (interbank, gov bond).	Not mandatory, interbank rate is market practice.	Mandatory (interbank).	Mandatory (interbank).	
Spread fixing	None.	3 years and longer over index	None.	Life of loan over index	Life of loan over index	
Early repayment	Universal right, indemnities banned.	Universal right, yield maintenance indemnity	Universal right. Indemnity subject to negotiation.	Universal right, Indemnities limited to 1%.	Universal right, Indemnities banned.	Universal right, Indemnities limited to 2%.

		max 3 yrs.				
Income stress	None	Min income for FX is 15 times minimum wage, or income in FX.	Cumulative FX (30%) and interest rate (400 bp) shock	Cumulative FX shock and interest rate shock	None	None
Restructuring & foreclosure, consumer insolvency	No insolvency regime (plans for 2012) .	FX conversion. Quarterly foreclosure quota. No insolvency regime (Central bank proposal).	Severe eviction delay discouraging foreclosure. 2009 consumer insolvency law.	Moratorium lifted in late 11, foreclosure encouraged. 2006 consumer insolvency law.	N.a.	Extrajudicial foreclosure.
Sources: author's interviews conducted between December 2011 and February 2012. Notes:*negative or zero amortization in local currency (FX is a negative amortization product, if the local currency devalues). Abbreviations: APRC – Annual Percentage Rate of Charge (effective interest) CP – Consumer Protection, CI – Credit Institution, FX – Foreign Currency, LC – Local Currency, LTV – Loan-to-value ratio, PTI – Debt to income ratio.						

Table 2 Supporting Regulations and Subsidies for Local Currency Mortgage Lending							
		Croatia	Hungary	Poland	Romania	Serbia	Turkey
2011 LC % (housing)		0%	Ca 80%	62%	Lower than 20%	0%	100%
Main impediments for LC lending		Property market and banking system euroized. High real rates.	Property market euroized. High real rates. High inflation level (Tilt).	Property market euroized.	Property market euroized. High real rates. High inflation level.	Property market and banking system euroized. High inflation level (Tilt).	Not applicable.
Regulatory support	LC offer mandatory	No	No	No	No	Yes	Only LC lending permitted
	LTV & PTI differentiation	No LTV or PTI diff.	LTV 80% (vs. 60% EUR). PTI 30-50% (by income, vs. 23-38% for EUR); min income for FX.	No LTV limits. Higher PTI (50%). Severe FX stress test.	LTV 85% (vs. 75% EUR). Public 95% LTV LC pgm. Severe FX stress test.	No LC LTV limit. Public 95% LTV for LC. (FX 80%). Higher PTI (by 20% points).	Not applicable.

	Deferral of interest or amortization for LC product	Possible.	IO explicitly prohibited, but negative amortization is not.	Discouraged by underwriting regulations	Introductory rates discouraged. IO possible. Negative amortization seen as restructuring.		Not applicable.
Subsidies	Downpayment savings subsidies supporting LC product	Bauspar** (15% premium, down from 25%; 5 years).	Bauspar ** (30% premium, min 4 years)	Savings for housing programme under discussion.	Bauspar** (25% premium, up from 15%, min 5 years).	None.	None.
	Interest rate subsidies for LC product	None	New HUF interest rate buy down**	None (earlier plans abolished).	Public programme interest limits.	Zero interest rate loan***	None
	Public insurance & loans supporting LC product	None	None	None	Public programme not focused on LC.	Public programme not focused on LC.	None
Likelihood of strong increase in LC lending market share		Zero, public support unlikely.	Low, unless LC product redesigned.	Moderate to high, with greater public support.	Moderate, with greater public support.	Zero, unless LC product redesigned.	Not applicable.

Sources: author's interviews conducted between December 2011 and February 2012. Notes: Targeting: *means-tested (income), **price of unit and/or volume of financing (self-targeting), *** categorized (e.g. young families); all other measures are untargeted. § applies also to FX lending. Abbreviations: CP – Consumer Protection, CI – Credit Institution, FX – Foreign Currency, LC – Local Currency, LTV – Loan-to-value ratio, PTI – Debt to income ratio, IO – Interest-only.

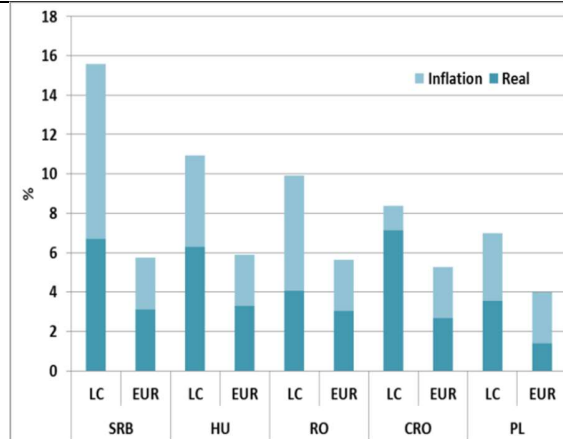


Source: Author's simulation provided for the Wharton School/University of Pennsylvania International Housing Finance Course, June 2012

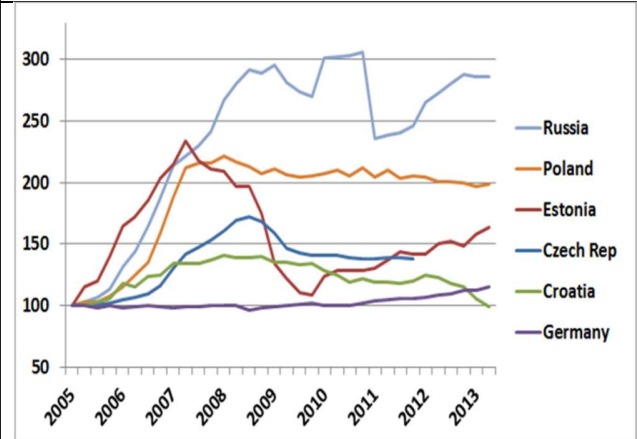
4. Additional Data

Figure 8 Housing Loan Pricing Conditions, House Price Developments

New lending for housing, interest rates LC and EUR, Dec 2011



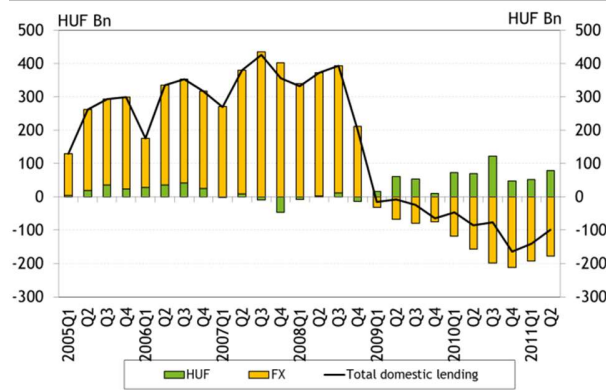
House Prices (existing or all flats), Q I 2005 = 100



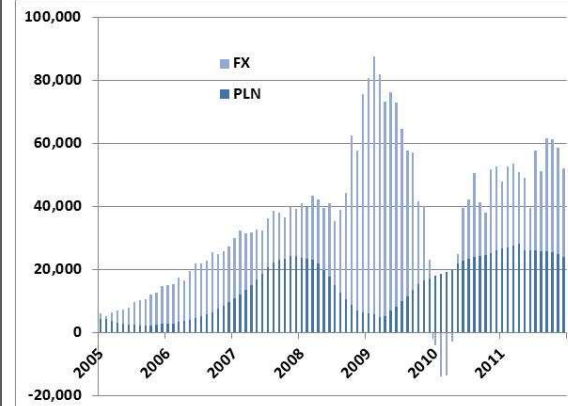
Source: national central banks, BIS, Finpolconsult computations. Notes: LHS - real interest rate computed by subtracting average of inflation rates 2009-2011 from nominal rates.

Figure 9 Changes in Outstanding Loans to Households by Currency

Hungary (billion HUF, quarter on quarter)



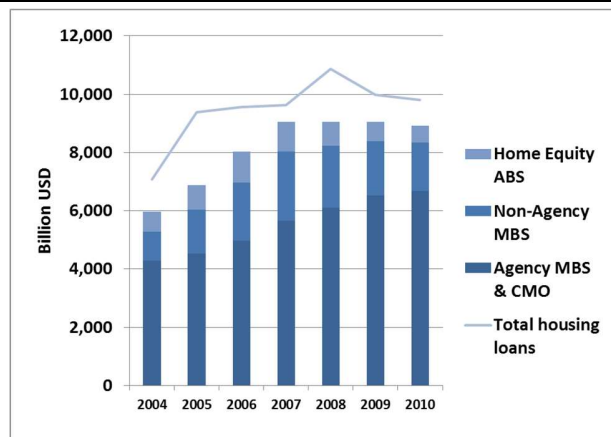
Poland (thousand PLN, month on month)



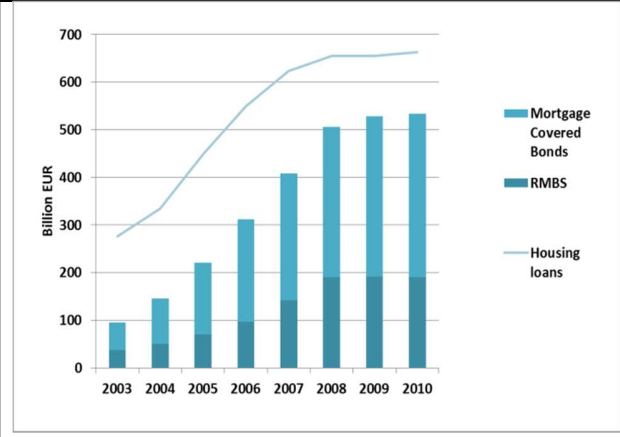
Source: national central banks, Finpolconsult computations. Notes: direct data on new lending currency composition not available.

Figure 10 Role of Mortgage Securities in Economies experiencing Housing Loan Booms

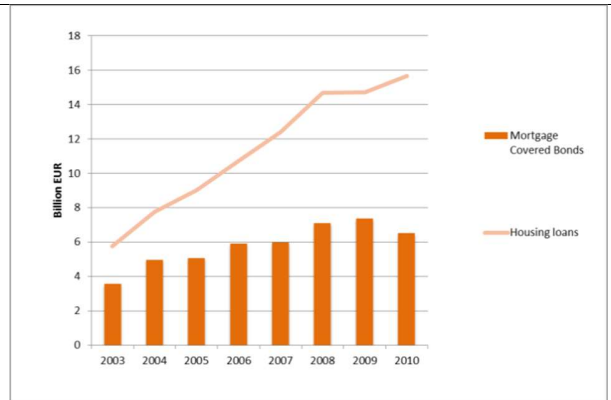
U.S. Mortgage-related Securities Outstanding, 2004 - 2011



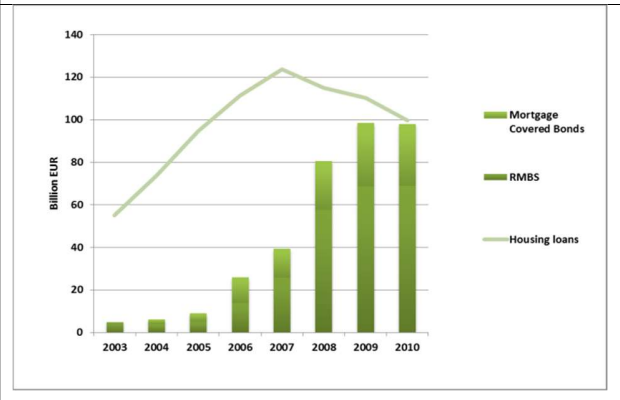
Spain Mortgage-related Securities and Housing Loan Outstanding, 2003 - 2010



Hungary Mortgage-related Securities and Housing Loan Outstanding, 2003 - 2010



Ireland Mortgage-related Securities and Housing Loan Outstanding, 2003 - 2010



Source: SIFMA, European Covered Bond Council, CEPS, author's computations. First published in Dübel (2012a).

Notes: the assessment is highly approximative as disaggregated funding analysis of the national housing loan portfolio is generally unavailable.