Interaction between monetary and macroprudential policies in practice – a Hungarian example

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Abstract

As the financial crisis showed, price stability in itself cannot ensure macroeconomic stability and financial stability issues cannot be separated from monetary policy considerations. This paper presents the changes in the relationship between monetary policy and financial stability in Hungary following the outbreak of the financial crisis and its consequences. An important source of the Hungarian economy's vulnerability was the mismatching of maturities and foreign currency positions, arising primarily from foreign currency lending. We describe how a liquidity-based macroprudential instrument (the Foreign Exchange Funding Adequacy Ratio or FFAR) has been used to reduce these risks, thereby strengthening domestic financial resilience. We conclude that the improving maturity structure of foreign funds is expected to mitigate risks arising from the drying up of foreign liquidity and the consequent intensification of exchange rate volatility. As regards the relation between the Hungarian monetary and macroprudential policy, it can be stated that this regulation may provide more room for manoeuvre for monetary policy to focus on its primary objective, namely price stability. At the same time it should be borne in mind that upon the occurrence of certain financial stability risks, falling beyond the MNB's macroprudential competence, monetary policy may still need to react to financial conditions and contribute to the achievement of the financial stability.

Keywords: macroprudential policy, monetary policy, financial stability, policy coordination, foreign currency lending, foreign exchange liquidity mismatch

JEL classification: E58, E61, G28, F34

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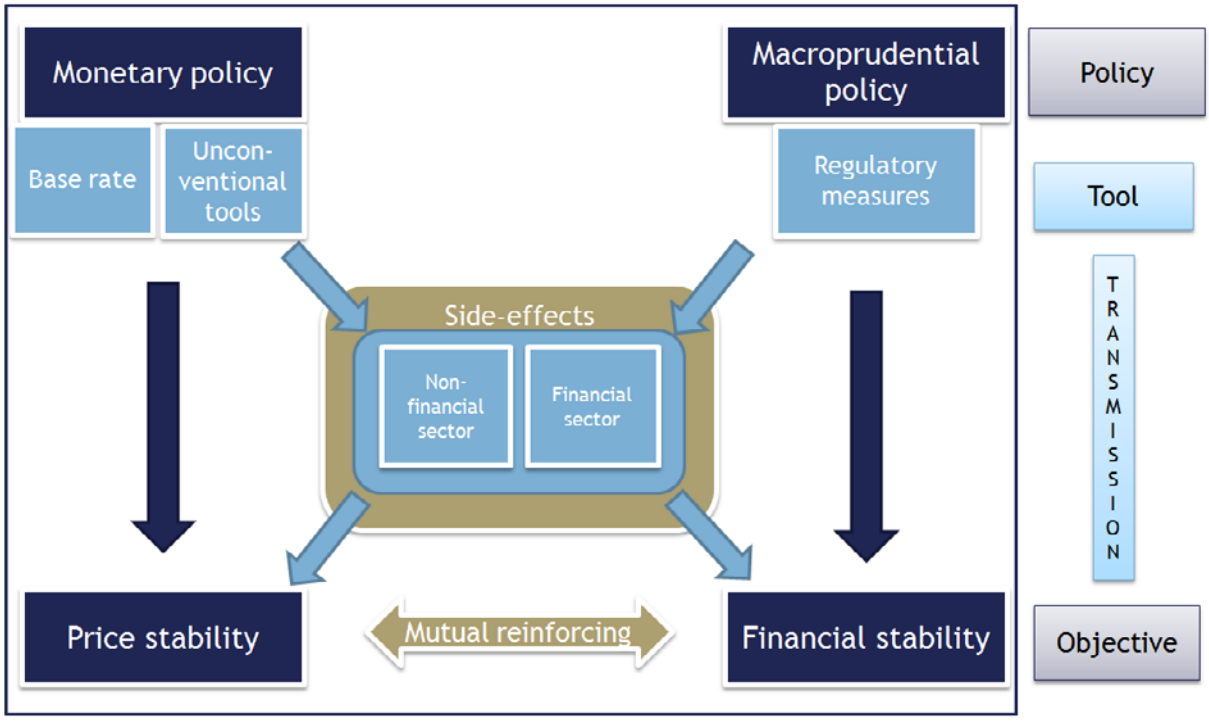
1. Introduction: Link between monetary and macroprudential policies – the new policy framework

Pre-crisis, the primary objective for Hungary's monetary policy was price stability. This strategy was supported both by the academic consensus and the policymakers, which created a relatively stable macroeconomic environment during the period of Great Moderation, and appeared to be the most capable of stabilising the economy and the financial system. However, the financial crisis highlighted the fact that the price stability alone cannot ensure macroeconomic stability, given that financial imbalances built up under a low inflationary and stable economic environment. Although the relationship between monetary policy and financial stability is still debated (see eg the classification by Smets (2013)), in the light of the experiences of the crisis the opinion that monetary policy and financial stability issues cannot be separated is now increasingly widespread (Billi-Vredin (2014)), as is the view that financial stability must be taken into account as an additional goal during the creation of macroeconomic stability. (IMF (2013a)). In this spirit, an increasing number of policymakers and economists emphasise that financial stability is an important part of monetary policy.[2] On the other hand, the management of financial stability problems is the primary responsibility of macroprudential policy rather than of monetary policy.

Objectives and interactions of monetary policy and macroprudential policy

Graph 1



Source: based on Lautenschläger (2014).

[2] Dudley (2013), Yellen (2014).

Parallel with the development of the macroprudential framework there is an increased focus on the link between macroprudential and monetary policies. According to the post-crisis consensus, price stability has remained the primary objective of monetary policy, while financial stability continues to be the primary objective of macroprudential policy. On the other hand, unintended impacts on the goal of the other policy do arise in the course of formulating both policies (see Graph 1); these interactions may improve or reduce the efficiency of the individual policies in the course of achieving their objectives, which necessitates coordination between the two policy areas (IMF (2013a)). In accordance with this, Shakir and Tong (2014) also emphasise that the interaction of these transmission channels is rather complex; still, the various policies must take account of the primary goals and probable effects of the other policy.

The purpose of this paper is to examine the relationship between monetary and financial stability in the light of experience with a special Hungarian macroprudential tool, the Foreign Exchange Funding Adequacy Ratio (FFAR). Section 2 of the paper outlines how the interrelation between monetary policy and financial stability has changed in Hungary since the outbreak of the financial crisis. Section 3 describes the interactions and transmission channels through which the individual policies may impact the goals of the other policy; in this connection, it also discusses the cases when monetary policy may need to consider financial stability issues. In this light, Section 4 describes the background for the FFAR's introduction, the adjustment triggered by the regulation and its economic policy consequences. The last section summarises the experience gained so far, also commenting on how the FFAR's revision can influences the room for manoeuvre of monetary policy.

2. Development of the MNB's relationship to the macroprudential policy in Hungary

2.1 Monetary policy and financial stability before and after the outbreak of the crisis

Before the crisis, Magyar Nemzeti Bank (MNB) took the same view as the international consensus, according to which monetary policy did not need to react to financial stability risks and could simply concentrate on the management of the problems arising after any bubble burst. ("do not lean, just clean" or "mop up" strategy).Thus, even though the MNB identified signs that certain threats to financial stability (eg foreign currency lending) were accumulating, it had neither the authority nor the tools to prevent the build-up of these imbalances. The financial crisis has considerably modified the domestic monetary policy strategy. Post-crisis, the MNB has faced a dilemma: while the real economy and the inflation outlooks pointed to the direction monetary policy easing, the resultant weakening of the exchange rate would have jeopardised financial stability to an extent that monetary policy would not be able to ignore.[3]

[3] In this extraordinary situation, the central bank had to increase the base rate by 300 basis points at the end of 2008 in order to preserve the stability of the financial intermediary system and to curb capital outflows.

This was attributable, on the one hand, to the fact that pre-crisis years households had accumulated significant foreign currency debts, but the associated financial stability risks became obvious only after the outbreak of the crisis. Then, in the stressed financial environment characterised by liquidity shortage, the further depreciation of the exchange rate, coupled with base rate cut, would have had an unfavourable impact on the households with foreign currency loans and – through the increased risk of default – on the banking sector and financial stability. Meanwhile, high outstanding external debt and public debt, significantly increased the vulnerability of the Hungarian economy.

Following the outbreak of the crisis, these vulnerability risks materialised, with a significant impact on the banking system. The banks showed significant vulnerability on both the assets and the liabilities side, primarily due to the unsecured foreign currency loans extended to the households. On the liabilities side, due to the increased risk aversion of international investors, the required foreign currency liquidity could be acquired from the money market only at a higher cost and on shorter maturities than before. At the same time, the assets side was hit by the weakening of the forint exchange rate, as loan repayment instalments, expressed in forints, increased dramatically, leading to an unexpected surge in credit risk and to the escalation of solvency risks at a systemic level (see Section 4).

2.2 Evolution of the Hungarian macroprudential institutional system

Both the international and the domestic experiences related to the financial crisis showed that more stringent regulation and oversight were required to prevent the build-up of the financial imbalances and to mitigate their consequences.[4] In order to manage the systemic risks properly a number of European countries have revised their oversight structure in the wake of the European Systemic Risk Board's recommendations. A number of different solutions were applied: in countries where the microprudential authority was integrated into the central bank, it was typically the central bank that took responsibility for macroprudential policymaking (eg Belgium, the Czech Republic, Ireland and the United Kingdom). In a number of cases an inter-institutional financial stability committee was set up, with representatives delegated by the supervisory authority, the government and the central bank (eg France, Sweden). In the third version, connections between the individual authorities were strengthened without changing the institutional structure (eg Norway, Switzerland) (Nier at al (2011)). The few existing empirical studies[5] that have analysed the efficiency of the different solutions find the first configuration to be the most suitable and it is also clear that, on the broader international horizon, more countries have opted for this solution.

In accordance with the European processes, Hungary also strengthened its supervisory framework in late 2013. The microprudential supervisory authority (HFSA) was closed and its duties transferred to the MNB, so that the central bank, reinforced with supervisory functions, became the authority responsible for the stability of the financial system as a whole and for the safer operation of individual financial institutions.

[4] On the importance of oversight based on a macroprudential foundation, see eg Weidmann (2011).

[5] Eg Goodhart and Schoenmark (1995), Merrouche and Nier (2010).

Additionally, the Hungarian central bank was vested with macroprudential powers that are far-reaching by international standards. Its new responsibilities included the formulation of macroprudential policy in a framework that is designed to contribute to the resilience of the financial system while supporting economic growth (Fáykiss and Szombati (2014)) The central bank was also vested with a number of new regulatory tools, covering four areas: limiting excessive credit outflows, the mitigation of risks stemming from procyclical banking system behaviour, the management of structural risks and the mitigation of systemic liquidity risks.[6] The integration of the supervisory functions in the central bank also contributes to considering the interaction between monetary policy and macroprudential policy upon decision making[7]. Nevertheless, the MNB's key objective is still to achievemaintain price stability, and financial stability must be supported without jeopardising this objective.[8]

The MNB's new decision-making regime has been also formulated in accordance with these objectives. The Monetary Council remains the primary decision-making body, being responsible first of all for monetary policy by setting the base rate; the other decision-making body is the Financial Stability Council, which is responsible for macro- and microprudential supervisory issues, resolution tools and the reorganisation. On the other hand, the priority of the price stability objective is ensured by the facts that the Financial Stability Council operates within the strategic framework determined by the Monetary Council, and that the two decision-making bodies have a number of members in common.[9]

3. Importance of the coordination between monetary and macroprudential policies

3.1 The primary monetary policy instrument , i.e. the channels of transmission between the base rate and financial stability

The primary monetary policy instrument, ie the base rate, influences financial stability through a number of channels on which research is still under way (IMF (2012)). Below, we outline the most frequently identified channels that are deemed to be the most relevant to Hungary's case.

[6] On the elements of the available tools, see Fáykiss and Szombati (2013). Harmonisation with EU legislation was completed by Act CCXXXVII of 2013, and the details of the tool's introduction are now being elaborated.

[7] It should be noted that the body responsible for the prevailing financial regulation – in the case of Hungary the Ministry of National Economy (NGM) – is also involved in the development of the national macroprudential policy. Coordination with the ministry is supported by inviting a high-ranking NGM official to discussions of macroprudential relevance on the Financial Stability Council's agenda.

[8] The Central Bank Act states that "The primary objective of the MNB is to achieve and maintain price stability. Without prejudice to its primary objective, the MNB shall support the maintenance of the stability of the financial intermediary system and the increase of its resilience, the sustainable contribution thereof to the economic growth, as well as the economic policy of the Government using the instruments at its disposal."

[9] The Monetary Council is a body comprising of a minimum five and a maximum of nine members, while the Financial Stability Council has at least three and a maximum of 10 members. At present the common members of the two bodies are the Governor of the MNB and the three Vice-Presidents.

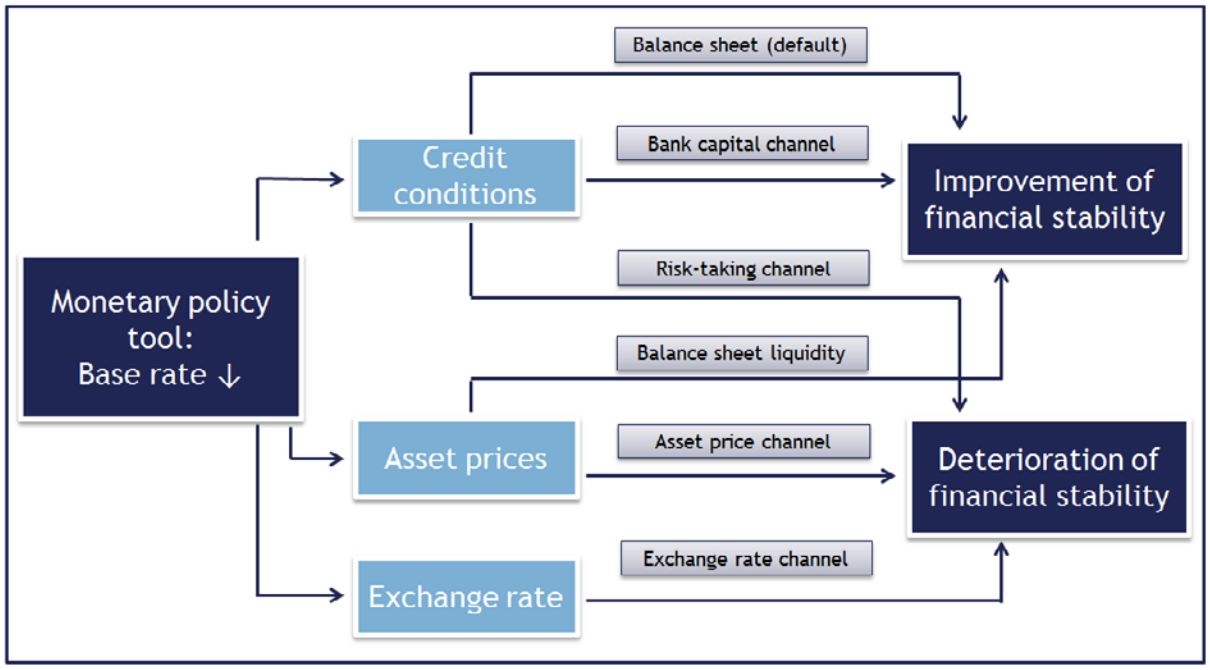
- **Balance sheet or default channel.**[10] Monetary policy influences lending conditions by decreasing the base rate, reducing the interest burden of debtors with variable interest rate loans, thereby reducing the probability of default and improving their willingness to repay the loan, ie it has a positive impact on financial stability. (Allen and Gale (2000); Illing (2007); Goodhart et al (2009)).
- **Bank capital channel.**[11] In this channel, a reduced interest rate increases the spread between the deposit and the loan interest rates, as the change in the base rate typically has a greater influence on the interest rates applied to (shorter-term) deposits than on that of (longer-term) loans.[12] As a result, the spread increases, the yield curve steepens, thereby improving bank profitability and reducing financial stability risks (BoE (2013)).
- **Risk-taking channel.** Lower interest rates encourage banks to expand their balance sheets and debts, as well as to ease credit conditions for borrowers (Borio and Zhu (2008)). Additionally, the low interest rate environment may change investor risk perceptions, so that they are encouraged to take on more risk in the search for higher yields. Hence, monetary easing may increase financial stability risks through the risk-taking channel.
- **Balance sheet liquidity channel.** Lower interest rates increase – through the asset price channel of monetary policy – the value of securities acceptable as collateral, which eases access to liquidity for banks and improves external financing opportunities. As a result, the increased lending capacity, profitability and resilience of banks have a positive impact on financial stability (BoE (2013)).
- **Asset price channel.** Higher asset prices, due to low interest rates through the financial accelerator impact – may encourage economic agents to increase their indebtedness, which may lead a continued rise in asset prices, thereby intensifying the financial cycle, which may eventually lead to a bubble. (Bernanke and Gertler (1989)). In this channel, monetary easing may increase financial stability risks.
- **Exchange rate channel.** In a small open economy, the monetary policy stance has an impact on the exchange rate and capital flows. In this case, a rate increase may cause the exchange rate to strengthen and increase capital inflows, leading to a credit expansion, and possibly to increased foreign currency lending. All these factors may generate an overheated economy and increase financial stability risks. Reducing interest rates, on the other hand, could cause depreciation of the exchange rate to fall, posing financial stability risks in the case of significant FX exposure in the economy.

[10] BoE (2013) defines this channel, or similar mechanisms, as the demand channel.

[11] IMF (2013a) refers to this channel as the risk-shifting channel.

[12] On the other hand, it should be also noted that when the base rate is close to the zero lower bound, deposit rates cannot be reduced any further. Thus, the spread increase resulting from the interest rate cut may stop or even shrink (endowment effect).

Interactions between monetary policy and the financial stability Graph 2



Source: MNB.

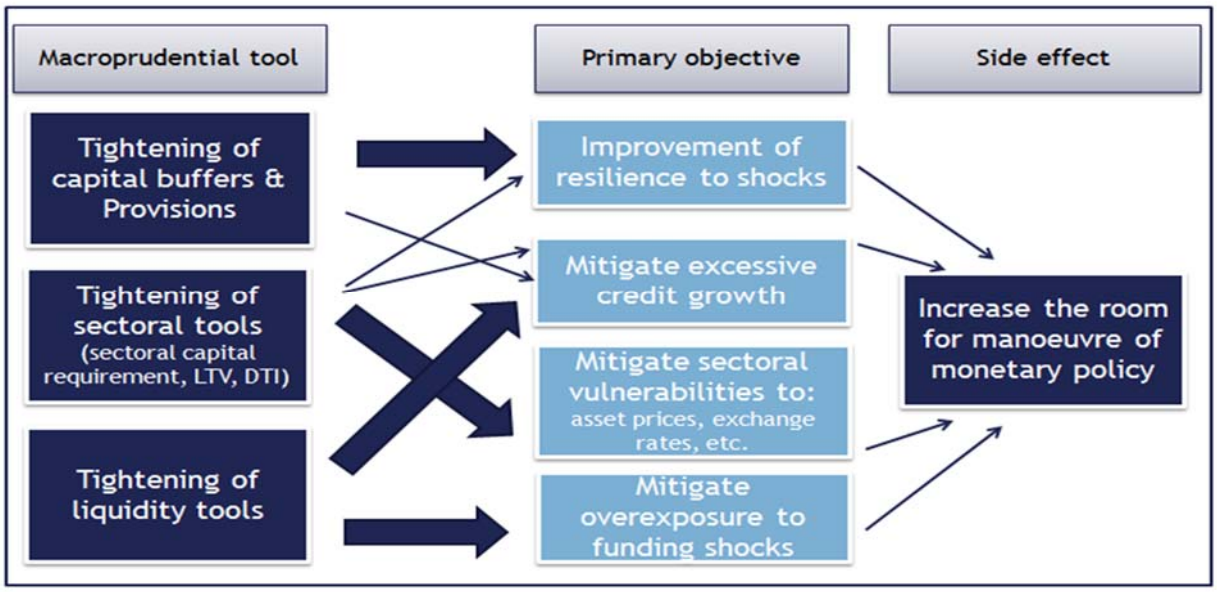
It is clear from the above that a reduction in the base rate improves financial stability through certain channels, while other channels may impact it negatively (see Graph 2). The strength of the individual channels depends on a number of factors such as the state of the financial cycle, the financial structure or the openness of the economy.

3.2 Channels of transmission between macroprudential tools and price stability

In this section, we describe the primary financial stability objective of the most important Hungarian macroprudential instruments, and the way they may indirectly affect the inflationary and real economic processes, such as room for manoeuvre in monetary policy. In this connection, Graph 3 presents the financial stability risks mitigated by the tightening of certain tools, and the way they may thereby create additional room for manoeuvre in monetary policy.

Purpose of macroprudential tools and their impact on the room for monetary policy manoeuvre

Graph 3



Source: Based on IMF, (2013c).

The primary objective when **tightening capital buffers** is to increase the resilience of the banking system. In practice, the tightening of the capital buffer in run-up periods may reduce lending and economic activity via the tightening of lending conditions. However, experience shows that this impact is limited. On the other hand, the effect may be more significant in less favourable periods, when the previously accumulated capital buffers help to maintain the credit supply at its former level – or at least mitigate its decline. Accordingly, when tighter lending conditions have a negative impact on the economic activity during a downturn, sufficient capital buffers may support the effectiveness of an expansionary monetary policy and help policymakers to avoid hitting the ZLB. (IMF (2012),

The purpose of **tools for preventing excessive credit** build-ups (eg loan-to-value (LTV), debt-to-income (DTI), payment-to-income limits (PTI)) is to moderate the financial accelerator effect during the recovery, as well as the probability of overheated lending dynamics and property prices, and excessive household indebtedness. By reducing aggregate demand, these tools also have implications for monetary policy. Thus, while the LTV and DTI regulations reduce the impact of the financial accelerator during the recovery, they also allow monetary policy to be loosened. Additionally, the application of the LTV and DTI regulations after the outbreak of a financial crisis reduces lending and real economy losses by mitigating the impact of the financial shocks on domestic investments and consumer spending. On the other hand, the relatively moderate downturn reduces the need to loosen monetary policy unduly and thus makes it less likely that the zero lower bound will be reached (IMF (2012),

Liquidity ratio requirements become relevant, because banks – particularly in small open economies – finance their loans typically from short-term funds, often

denominated in foreign currency, which generates maturity and currency mismatches in bank balance sheets.[13] Thus, liquidity ratio requirements can be applied to mitigate risks related to excessive dependence on short-term funding. Such restrictions can reduce not only the maturity and currency mismatches, but also credit growth in general (IMF 2013d)). This tool may affect monetary policy through several factors, particularly by reducing the exchange rate volatility generated by a financial shock. This may reduce the relevance of the financial stability considerations and increase the focus on price stability for monetary policy of a small, open economy. (IMF (2012)).

3.3 Changed relation of monetary and macroprudential policies

As noted in Subsection 3.1, when focusing on its primary objective, ie on price stability, monetary policy may have both a positive and a negative impact on financial stability. If the negative side effects prove to be stronger, the resulting financial instability can endanger the entire economy, including price stability. In this case, properly selected macroprudential tools, applied ex ante, may be able to mitigate these risks, which may give additional room for manoeuvre for monetary policy (IMF (2013a)).

Looking at this from the other side, the active macroprudential policy mitigates the financial stability risks, and a number of analyses pointed out that the macroprudential tools may be efficient in the identification and management of certain sectoral or even systemic risks. Thus, a properly designed macroprudential framework and toolset may make it possible – in addition to fulfilling its primary objective, ie the maintenance of financial stability –for monetary policy to focus on its primary objective, ie price stability (IMF (2012)). At the same time, risks that cannot be managed by macroprudential tools may also arise, or there could be cases when macroprudential tools prove to be ineffective in stopping the build-up of an imbalance. If so,[14] monetary policy may also need to take into account the prevailing financial conditions.

Additionally, the financial crisis also drew the attention to the fact that, in addition to the business cycle, financial cycles should also be taken into account when integrating macroeconomic stability goals into the formulation of monetary policy. Whether monetary and macroprudential policy help or hinder each other in efforts to achieve price stability or financial stability objectives depends on the interrelationship between the business and financial cycles.[15] The analysis of the

[13] As a result of this some countries (eg Korea, New Zealand) applied macroprudential measures to mitigate these risks, and the Basel Committee on Banking Supervision also introduced similar tools (eg the NFSR).

[14] There are certain factors that may limit the effectiveness of macroprudential policy. One of these is when it is difficult to identify the financial imbalances, and hence to ascertain what type of tools should be developed, or to make a decision on whether it is time for tightening or easing. A further challenge, for the calibration of such tools, is that we have limited knowledge of their quantitative impact, which could lead – at least initially – to policy errors (IMF (2013b)). So-called regulatory arbitrage represents a further risk, according to which the stricter a regulation is, the stronger the incentive will be to find alternative solutions (eg via the shadow banking system) (Borio (2014a)). In addition political economy constraints may work against the application of appropriate macroprudential tools.

[15] Although there is still no consensus on the definition of financial cycle, it is agreed that it has a number of features that monetary policy cannot afford to ignore (see BIS (2014, Chapter IV)).

simultaneous development of the two cycles is important, because it was proved that an economic policy that ignores the financial cycles has a price: namely the build-up of financial imbalances, the debt overhang of the enterprises and the households or the overleveraged financial system may lead to the substantial deterioration of the macroeconomic and financial conditions. The phenomenon of an "unfinished recession" highlights the fact that a monetary policy which fails to take into account the medium-term financial cycle, and thus supports the further leveraging of the economy in boom times, may avoid a recession in the short run, but it runs the risk of generating an even deeper recession after the bubble bursts (Drehmann et al (2012)).

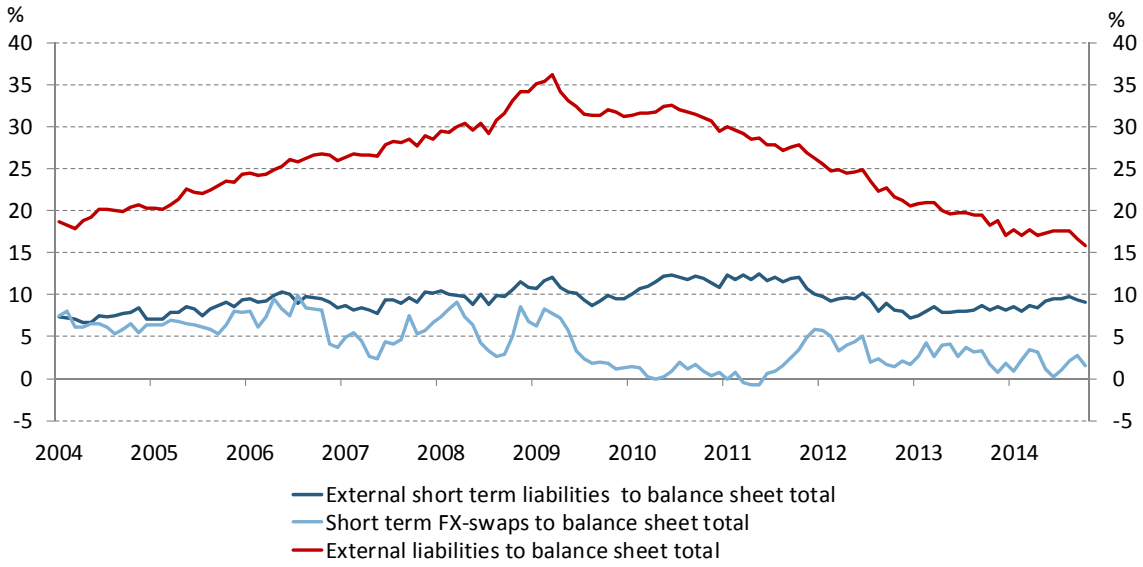
Taken together, it can be stated that the two policies in most cases support or supplement each other, and that there is only a relatively small probability that situations may arise where the objectives of the two policies expressly conflict with each other. Even in the case of coordinated and effective interventions, it may happen that monetary policy needs to react to the financial conditions and play a part in achieving the financial stability ("Last line of defence" theory; IMF (2013b); Carney (2014); Yellen (2014).

4. A specific national tool: the foreign exchange funding adequacy ratio

4.1 Factors underlying the implementation of the FFAR regulation

By 2007, significant liquidity risks had built up in the Hungarian banking system. One of the more acute problems was the growing maturity mismatch in bank balance sheets. Long-term assets were dominant, with those of one- to five-year maturity and of over five-year maturity accounting for 25% and 30%, respectively. The ratio of short-term loans (maturity up to one year) had fallen by about 15 percentage points compared with 2002. At the same time, the Hungarian banking system was increasingly dependent on external liabilities (see Graph 4) – the ratio of external liabilities within the balance sheet increased to some 30–35% on the eve of the crisis, from 20% in 2004. Of this, a major part, ie about 30–40%, was short-term. Adding to a dangerously large external financing requirement, the high degree of maturity mismatching resulted in a significant vulnerability.

External debt of the Hungarian banking system (2004–14) Graph 4



Source: MNB

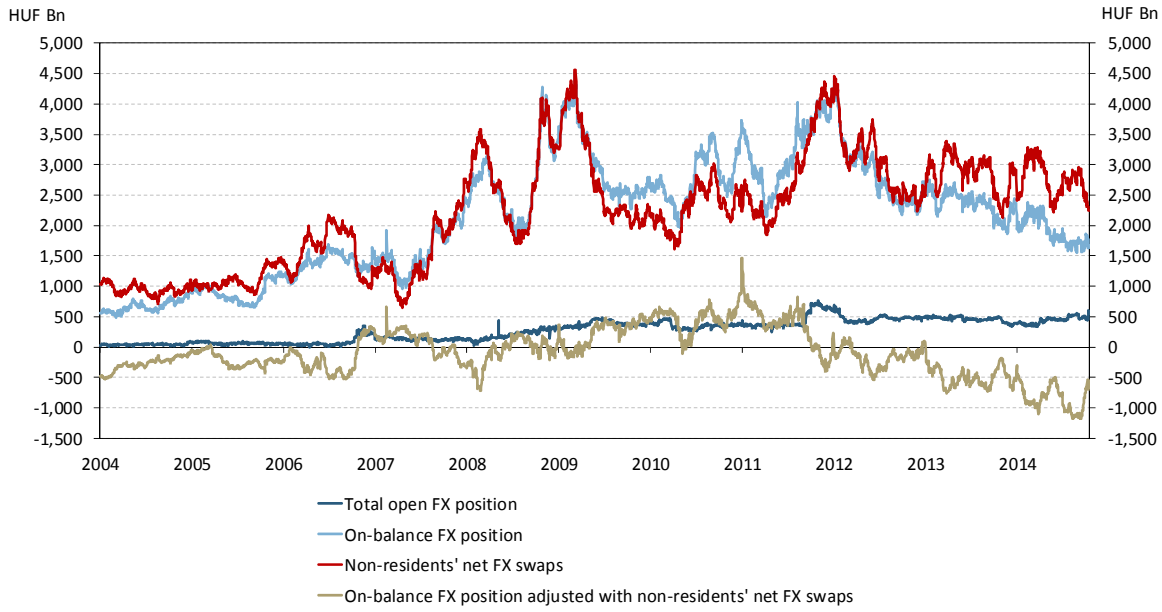
The maturity mismatch within the banks' foreign currency position also contributed considerably to this vulnerability. By the end of 2008, soaring foreign currency lending lifted the ratio of household foreign currency loans within outstanding borrowing to almost 80%.[16] The banks – despite the increasing role of short-term external resources – financed the larger part of their foreign currency lending from forint funds, using foreign exchange swap transactions to close the resulting foreign currency positions on their balance sheets (see Graph 5). Domestic credit institutions therefore became increasingly dependent on the foreign exchange swap market[17] (Mák and Páles (2010)). Banks were exposed to a number of liquidity risk factors (eg margin call impact, rollover risk due to the shortening of the maturity), given that the average residual maturity of the gross outstanding swap contracts between 2005 and 2007 amounted to a mere six months.[18]

[16] The foreign exchange liberalisation entered into force in Hungary in 2001.

[17] The development of the scheme was supported by several factors, eg the banks could manage open positions by using their forint liquidity and due to the increasing borrowing requirement of the Hungarian government, the demand side of the FX swap market was expanded.

[18] For more details, see Páles, Kuti and Csávás (2011)).

Open foreign currency position of the Hungarian banking system (2004–14) Graph 5



Source: MNB.

These external liabilities have represented an outstanding systemic risk in the Hungarian banking system for years. MNB issued several warnings[19] to the effect that the continuous and significant foreign currency fund and rollover requirements on the foreign currency loan portfolio, coupled with excessive maturity mismatch and the related liquidity risks, could become drastically more difficult to satisfy with any withdrawal of funding from the parent banks or the international money markets. However, prior to October 2013, the central bank had no mandate to intervene. Indeed, state intervention against the potential risks inherent in Hungarian financing practices did not appear on the agenda until liquidity abruptly dried up after the onset of the crisis.

In 2010–11, as the European sovereign debt crisis set in, investors' risk appetite once again declined, and Western European parent banks were forced to cut back on funding for their eastern European subsidiaries. The withdrawal of funds from the Hungarian banking system was more intense than in the region as a whole. However, foreign currency-denominated assets could not be cut back as quickly as the funding, and thus the banking system continued to rely heavily on external liabilities. The prevailing maturity and liquidity risks can be gauged from the fact that since the long-term funds became expensive compared to the short-term funds, the ratio of the liabilities with residual maturity of less than 12 months to total foreign liabilities rose to almost 56% by the end of 2010, from 49% at the start of the year (MNB (2010); MNB (2011)).

The impact of the European crisis was also felt in the foreign exchange swap market, where interest margins started to rise from mid-2010 as increasing funding

[19] See eg Balás and Móré (2007).

costs forced banks to switch to shorter-maturity swaps.[20] Within the total portfolio, the ratio of foreign exchange swaps maturing within one year fluctuated at around 50–60% in 2010–11 at the banking system level. Meanwhile, the average residual maturity of the accumulated outstanding swap contracts has tended to converge with the average maturity of the direct foreign currency liabilities, although, at 1.5 to 2 years, it has typically remained shorter than that of the direct liabilities. The value of the net foreign exchange swap portfolio started to rise once again from mid-2010 and continued to do so up to January 2012 (MNB (2010); MNB (2011)). Such a high swap exposure in the Hungarian banking system has not been typical since the stress period that followed the bankruptcy of Lehman, and looking ahead the further growth thereof could be expected.

Despite the experience of the crisis, domestic banks failed to adjust their maturity mismatches to the extent that systemic risk considerations would have suggested. One possible reason was that the credit institutions hoped for a bailout by the central bank in its lender of last resort role. From the outbreak of the crisis, the MNB sought to fend off disruptions to the swap market, with its enormous importance for the Hungarian banking system, and to supply credit institutions with foreign currency. The resulting increase in its foreign exchange reserve holding requirement generated severe costs for the central bank. In effect, the MNB's foreign exchange swap instruments,[21] which had been in place since the end of 2008, represented a financial safety net for the Hungarian banks could avail themselves of upon the exhaustion of the market opportunities or extreme rise in prices. But this foreign currency supply activity had to be designed in a way that did not jeopardise the central bank's foreign exchange reserve requirements. In the light of the foregoing the recurring systemic risk signals indicated that a preventive financial stability instrument was urgently needed.

4.2 Overview of the FFAR regulation

Although with its measures MNB was able to manage the liquidity risks arising from the currency and maturity mismatch to some extent. The condition of the Hungarian banking system after the second phase of the crisis necessitated a targeted intervention. On the MNB's initiative, the government intervened at a macroprudential level in 2011, since at that time the MNB did not yet have the required authority. By Government Decree 366/2011, restrictions were placed on the maturity matching of credit institutions' foreign currency positions. The Foreign Exchange Funding Ratio (FFAR) introduced by the decree entered into force in July

[20] The shortening was triggered, on the one hand, by the deteriorating national profitability. In addition to the permanently higher premium of the long-term swap financing compared to that of the short one, the higher premiums of the direct longer-term liabilities after the crisis also contributed to the process. Additionally, the shortening of maturities could be also attributed to the fact that the foreign parent banks of the domestic subsidiaries, playing a key role in the Hungarian banking system, substituted the withdrawal of the direct liabilities by mediating swap financing to their subsidiaries with maturities shorter than the average of the period.

[21] According to international experience, the relationship between the central bank's swap lines and its foreign exchange reserves is strong, ie in the case of the emerging countries, swap lines act only as a limited substitute for the proper amount of reserves (see Auer and Kraenzlin (2009), Obstfeld et al (2009), Aizenman et al (2010), Landau (2013)). ECB, as the partner of MNB, makes a considerable contribution with its support provided for the generation of the required funds; the borrowing facility in the form of repo operations provided euro liquidity up to a limit of EUR 5 billion.

2012. The basic concept of the FFAR is similar to that of the Net Stable Funding Ratio or NSFR proposed by the BCBS, although in detail it is a considerably different regulatory instrument with a structure set up for the specific purpose of mitigating institutional and systemic liquidity risks. The FFAR is calculated as the quotient of the weighted sum of the stable foreign currency liabilities and the weighted sum of the banks' long-term foreign currency-denominated assets. The regulation specifies that the ratio calculated for each individual credit institution must equal or exceed 0.65 at all times. Through FFAR the regulator has set the mitigation of the individual and systemic liquidity risks and the decrease of the national economy's vulnerability as primary objectives.[22]

The method of calculation is as follows:

$$FFAR = \frac{\text{Available amount of stable foreign currency liabilities} + \text{stock of long term net FX swap position}}{\text{Required amount of stable foreign currency funding}}$$

4.3 Result of the FFAR regulation

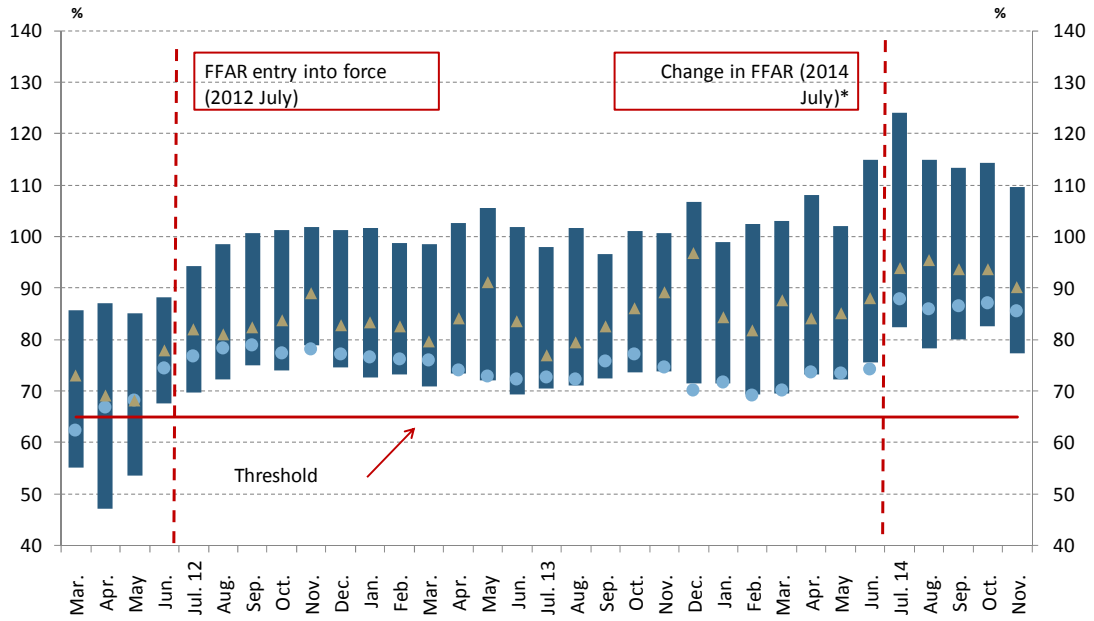
The extreme swap market price fluctuations experienced during 2010–11 have not reoccurred with a similar intensity. Nevertheless, the FFAR regulation has played an important role in the design of the financing maturity structure as the high volumes of foreign currency loan portfolios are slowly phased out.

By July 2012, when the FFAR regulation came into effect, almost all the banks had implemented the required adjustments, resulting in a 10 percentage point improvement in their adequacy within two months (see Graph 6). During this initial adjustment period, the banks took action primarily on the liabilities side. The regulation managed to stabilise the average maturity of the foreign currency liabilities at a higher level, as well as to increase the average maturity of the foreign outstanding swap contracts. The outflow rate of foreign liabilities also decreased by 2013 (but it still remained above the regional average). On the other hand, the withdrawal of funds still slightly exceeded the downsizing rate of the foreign currency assets in 2013, while part of the foreign currency liquidity shortage was funded through a slight increase in foreign exchange swap holdings.

[22] At this time the FFAR could be deemed unique in the international scene; however, based on the Hungarian experience, Iceland also started to develop a similar instrument in 2014.

FFAR of the banking system since its implementation

Graph 6



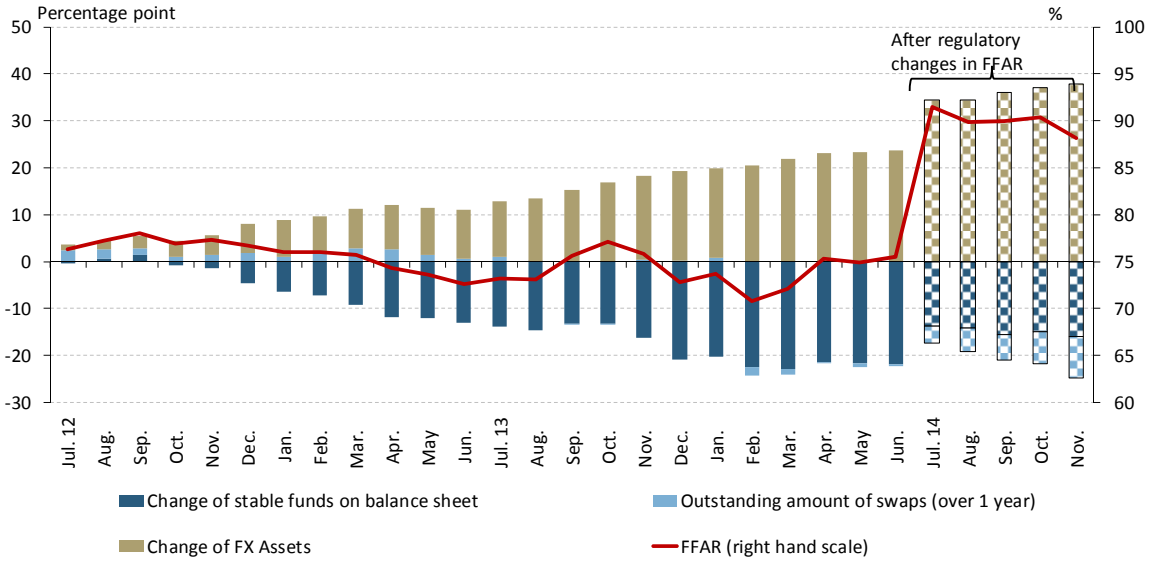
Note: the columns indicate interquartile values (among the banks and branches), the blue dot shows the average of the large banks FFAR, while the yellow diamond shows the median of the FFAR of all participants in the banking system.

* : See the details of the changes of the regulation below, at the end of the section.

Source: MNB.

The two most important components of the individual bank's adjustment patterns included the foreign currency deposits and liabilities with residual maturity of at least one year or longer, fully considered within the large banks' available stable foreign currency liabilities and the net foreign currency swap contracts against forint with residual maturity of over one year. On the assets side, the regulation did not have the effect of restricting corporate foreign currency lending activity at the banking system level. But, between 2010 and 2015, new lending did not significantly increase the household foreign currency loan portfolio owing to various other regulatory limits.

The banking system's foreign exchange funding adequacy ratio Graph 7



Note: The exchange rate- adjusted cumulative monthly difference of the item groups'' values were illustrated at each point of time as a percentage of the value of the stable funds available in June 2012 (for various items of stable funds and swaps at latter specified dates) and of the stock of FX assets requiring stable funding in June 2012 (for FX assets at latter specified dates).

Source: MNB

The FFAR rule proved to be successful in terms of stopping the deterioration of the maturity mismatch, although it could not stop the shortening maturity trend of external liabilities. This is also confirmed by, in addition to the withdrawal of funds resulting from the balance sheet adjustment processes of the foreign groups (while the parent banks take an increasing role in the cheaper mediation of the foreign currency liquidity), the other procedures described above. As a result of the FFAR, therefore, maturity mismatches have materially decreased at the level of several individual banks falling under the regulation, but the regulation was not able to sustain an ongoing improvement in the banking system as a whole after the initial compliance with the restriction on foreign currency position maturity mismatching. As the introduction of the FFAR thus only partially addressed the funding structure and market risk problems, the central bank decided to revise the indicator's content with the aim of instigating an active restructuring of the maturity structure.

In July 2014, the MNB therefore issued a decree calling for a half-yearly 5 percentage point increase in the FFAR.[23] As a first step, the expected minimum level was raised to 75%, with half-yearly increases of 5 percentage points thereafter until the FFAR reaches 100% in 2017. At the same time, the indicator's calculation

[23] From 2013, the MNB was authorised to determine rules related to the foreign currency position and maturity match in order to reduce systemic liquidity risks. The revised rule was issued as the MNB's Decree No 14/2014. (V 19) on the regulation of the credit institutions' foreign currency position maturity match, and on the amendment of the MNB Decree No 43/2013 (XII.29) on the obligations of money and credit market institutions to report data to the central bank.

method was changed in several material points and, as a result of this change, the banking system level value of the indicator significantly improved, from around to 75% to almost 90%. In addition, the FFAR was extended to cover foreign bank branches as well, since they held almost their total external liability portfolio as short-term debt (about one-third of the banking system's total short-term liabilities). This, once again, may help to reduce the level of foreign currency reserves held and help promote a balanced market free from regulatory arbitrage. The new calculation method for the FFAR regulation comes even closer to the NSFR.

4.4 The connection between the FFAR regulation and domestic monetary policy

The primary aim of the FFAR was to reduce an important source of the Hungarian economy's vulnerability, namely that long-term foreign currency mortgage loans were typically funded by short-term foreign swaps, and this aim should be borne in mind when discussing the relationship between the FFAR and interest rate policy. The negative impact of this general market situation could be felt to a lesser extent in periods that were free from stresses; however right after the outbreak of the crisis and also in the second phase thereof, in the wake of the renewed money market tensions from 2011 onwards, it could not be ignored when making monetary policy decisions. The primary objective of the government decree on the foreign exchange funding adequacy ratio, effective since July 2012, was to manage this systemic risk directly.

Since the start of the crisis, Hungarian monetary policy has been subject to some macroeconomic factors that have simultaneously pointed at both easing and tightening. A turning point in domestic monetary policy came in July 2012: when the strengthening of the international willingness to take risks (e.g. those that may be attributable to the loose monetary policy of the developed-country central banks), coupled with an increasing number of country-specific factors (eg a favourable inflation outlook, improving financing capacity, a fall in the government deficit) made it possible to start and then continue the easing cycle. Although the implementation of the MNB's two-year easing cycle was facilitated primarily by these favourable factors, the FFAR regulation may have also increased the room for manoeuvre of monetary policy by relieving the banking system's vulnerability to a possible exchange rate shock. Thus the role of the financial stability risks, which could manifest themselves primarily through the exchange rate channel, could decrease in the formulation of monetary policy. This may have also contributed to the fact that the price stability objective could be enforced more strongly than before in the management of monetary policy. An additional potential external impact of the introduction of the foreign exchange funding adequacy ratio, and particularly the tightening thereof in 2014, is that with the phase out of the banking system's short-term external debt from the balance sheets it could contribute to the gradual reduction of the central bank reserve requirements and thereby to that of the reserve costs.

5. Conclusions

The primary objective of the FFAR regulation was to reduce an important source of the Hungarian economy's vulnerability – namely the maturity and the foreign currency mismatch present in the banking system, related primarily to the former foreign currency lending – and simultaneously to improve the resilience of the

domestic financial system. During the two years that followed its introduction, this macroprudential tool successfully stopped the deterioration of the maturity mismatch. In addition, following the changes made to the regulation in 2014,made by the MNB it may help to further reduce the liquidity risk within the Hungarian banking system.

As regards the relationship between Hungarian monetary and macroprudential policy, the FFAR is expected to provide more room for manoeuvre for monetary policy by increasing the stability of the financial system. When focusing on its primary objective, namely on achieving and maintaining price stability. Additionally, the FFAR should reduce the banking system's vulnerability to exchange rate shocks over time, which should mean that financial stability risks, manifesting themselves primarily through the exchange rate channel, can play a less prominent role in the formulation of monetary policy. Presumably in the future this may contribute to the enforcement of the price stability objective more strongly than before. At the same time it should be borne in mind that upon the occurrence of financial stability risks, falling beyond the MNB's macroprudential powers, monetary policy may still need to react to the financial conditions and participate in the achievement of the financial stability.

An additional feature of the FFAR regulation is that it is based on the concept of the NSFR indicator recommended by the BCBS. In this way, it conforms with international regulatory trends and will facilitate the adjustment of the Hungarian banking system to future EU requirements. Finally, the experience of introducing the FFAR could prove useful for small open economies similar to Hungary's that need to deal with systemic problems arising from foreign currency and maturity mismatching, and the related risks.

References

Aizenman, J, Y Jinjarak and D Park (2010): "International reserves and swap lines: substitutes or complements?", *International Review of Economics and Finance*, vol 20(1), January, pp 5–18.

Allen, F and D Gale (2000): "Bubbles and crises", *The Economic Journal*, vol 110, no 460, pp 236–55.

Auer, R and S Kraenzlin (2011): "Money market tensions and international liquidity provision during the crisis", VoxEu, October, www.voxeu.org/article/effectiveness-central-bank-swap-agreement-crisis-fighting-tool.

Balás, T and C Móré (2007): "Liquidity risk in the Hungarian banking sector", *MNB Occasional Papers*, no 69.

Bank of England (2013): *Financial Stability Report*, June, pp 52–5, Box 3: "Monetary policy and financial stability".

Bernanke, B and M Gertler (1989): "Agency costs, net worth, and business fluctuations", *American Economic Review*, vol 19, no 4.

Billi, R and A Vredin (2014): "Monetary policy and financial stability – a simple story", *Sveriges Riksbank Economic Review*, no 2, pp 7–22.

Bank for International Settlements (2014): *84th Annual Report*, June.

Borio, C and H Zhu (2008): "Capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism?", *BIS Working Paper*, no 268, December.

Borio, C (2012): "The financial cycle and macroeconomics: What have we learnt?", *BIS Working Papers*, no 395.

——— (2014a): "(Too) great expectations for macro-prudential?", *Central Banking Journal*, no 41(2), pp 79–85.

Carney, M (2014): Opening remarks by the Governor, Financial Stability Report Press Conference, 26 June, Bank of England.

Drehmann, M, C Borio and K Tsatsaronis (2012): "Characterising the financial cycle: don't lose sight of medium term!", *BIS Working Papers*, no 380.

Dudley, W (2013): "Why financial stability is a necessary prerequisite for an effective monetary policy", Remarks at the Andrew Crockett Memorial Lecture, Bank for International Settlements, June.

Fáykiss, P and A Szombati (2013): "Macroprudential supervision in non-euro area European countries", *MNB Bulletin*, Special Issue, October.

——— (2014): "Egyértelmű felhatalmazás – erős eszközök: Az MNB makroprudenciális mandátuma", *MNB Article*, 6 October.

Goodhart, C and D Schoenmaker (1995): "Should the functions of monetary policy and banking supervision be separated?", *Oxford Economic Papers*, New Series, vol 47.

Goodhart, C, D Tsomocos and A Vardoulakis (2009): "Foreclosures, monetary policy and financial stability", Conference Proceedings of the 10th International Academic Conference on Economic and Social Development, Moscow.

Illing, G (2007): "Financial stability and monetary policy – a framework", *CESifo Working Paper*, no 1971.

International Monetary Fund (2012): *The interaction of monetary and macroprudential policies*, Background paper.

——— (2013a): *The interaction of monetary and macroprudential policies*, Background paper.

International Monetary Fund (IMF) (2013b): The interaction of monetary and macroprudential policies.

——— (2013c): *Key aspects of macroprudential policy*.

International Monetary Fund (IMF) (2013d): Key aspects of macroprudential policy – Background Paper.

Landau, J-P (2013): "Global liquidity: public and private", Proceedings of the Economic Policy Symposium, Jackson Hole, Federal Reserve Bank of Kansas City, www.fedinprint.org/items/fedkpr/y2013x8.html.

Lautenschläger, S (2014): "The interplay between macro-prudential, micro-prudential and monetary policies at the ECB", Presentation at the conference "Macroprudential policy: implementation and interaction with other policies", jointly organised by Sveriges Riksbank and the IMF in Stockholm, 13 November.

Mák, I and J Páles (2009): "The role of the FX swap market in the Hungarian financial system", *MNB Bulletin*, May, pp 24–34.

Merrouche, O and E Nier (2010): "What caused the global financial crisis? Evidence on the build-up of financial imbalances 1999–2007", *IMF Working Paper*, no 10/265.

Magyar Nemzeti Bank (2010): *Report on Financial Stability*, November 2010.

——— (2011): *Report on Financial Stability*, April 2011.

Nier, E, J Osiński, L Jácome and P Madrid (2011): "Institutional models for macroprudential policy", *IMF Staff Discussion Note*, SDN/11/18.

Obstfeld, M, J Shambaugh and A Taylor (2009): "Financial instability, reserves, and central bank swap lines in the panic of 2008", *American Economic Review*, no 99(2), pp 480–6.

Páles, J, Z Kuti and C Csávás (2011): "The role of currency swaps in the domestic banking system and the functioning of the swap market during the crisis", *MNB Occasional Papers*, no 90.

Smets, F (2013): "Financial stability and monetary policy: how closely interlinked?", *Sveriges Riksbank Economic Review*, no 3, pp 121–60.

Sahay, R (2014): "Managing house price booms: the role of macroprudential policies", Remarks at the IIM-Bangalore and IMF conference on housing markets, financial stability and growth, 11–12 December.

Shakir, T and M Tong (2014): "The interaction of the FPC and the MPC", *Bank of England Quarterly Bulletin*, no 4, pp 396–408.

Weidmann, J (2011): "Managing macroprudential and monetary policy – a challenge for central banks", conference speech, SUERF/Deutsche Bundesbank Conference, Berlin.

Yellen, J (2014): "Monetary policy and financial stability", Remarks at 2014 Michel Camdessus Central Banking Lecture, IMF, Washington DC.