THE BEGINNING AND SPREAD OF THE US SUB-PRIME CRISIS

From the middle of the 1990s, sub-prime mortgage loans exhibited spectacular growth in the USA. Essentially, sub-prime mortgage loans are loans provided to higher-risk borrowers at interest rates which are 200 to 300 basis points higher than the interest rates of loans granted to 'prime' borrowers. A large portion of these debtors either had an unsatisfactory credit history or a history of payment problems. In addition, there is also an Alt-A category, which include otherwise relatively good borrowers, who either lack reliable proof of income or have a high debt-to-income ratio. At the beginning of 2007, according to IMF estimates sub-prime loans represented 15 per cent of the total mortgage loan portfolio in the USA, while Alt-A loans comprised another 5 per cent. According to estimations, the ratio of sub-prime and Alt-A category loans within the securitised mortgage loan portfolio was 14 per cent and 12 per cent, respectively (Chart 1).

The rapid expansion of sub-prime and Alt-A loans peaked between 2004 and 2006. A good indication of this expansion was the simultaneous growth in sub-prime and Alt-A loans, which together represented 40 per cent of the portfolio of new loans in 2006, as opposed to 10 per cent in 2003. During this period, even debtors with a blemished credit history were able to obtain loans as US real estate prices continued to increase. Both borrowers and lenders assumed that housing prices would continue to increase and that the capital gain from home price appreciation would be sufficient to pay back the loans of the home-owners. Due to the fact that, from the end of 2003 growing interest rates made it increasingly difficult for some sub-prime borrowers to obtain financing, lenders gradually started to relax their credit conditions. Thanks to the relaxed credit standards, an increasing number of borrowers were offered loans even though their equity was less than 10 per cent and they did not...
have sufficient proof of income, or enjoyed lending options with negative depreciation, or lower instalments in the initial incentive period. As a result, by 2006 the share of adjustable-rate mortgages (ARMs) ensuring lower initial interest payments typically for up to two years, had reached 50% in the sub-prime category.

The strong demand of investors for high-yield instruments also contributed to the dynamic expansion of sub-prime mortgage loans. Consequently, mortgage-backed securities were issued in growing quantities along with their re-packaged version, structured loan products called CDOs, which transferred the credit risks associated with sub-prime mortgages to investment groups with varying risk appetites. While base interest rates were at an all-time low, institutional investors typically became highly leveraged, i.e. the bank loans used to finance their investments exceeded the amount of their equity (hedge funds) or they issued short-term notes (conduits). Long-term investments were generally financed by rolling over very short-term funds. Due to low interest rate volatility and increasing asset prices, this strategy was beneficial.

The underlying problems in the sub-prime mortgage market and the issue of mispriced risks started to surface in 2006, when housing prices began to depreciate. The drastically decelerating growth of home prices combined with increasing interest rates resulted in payment difficulties. As a result, the ratio of delinquencies on sub-prime loans increased substantially, reaching 17.3 per cent by the last quarter of 2007 (Chart 2). This ratio exceeded the previous (2002) record, and featured a considerably steeper rate of growth than that of older vintages, while the loan portfolio drastically increased. The growing number of delinquencies on sub-prime mortgage loans is expected to peak this year as the re-pricing of these loans, which were originally offered with fixed teaser interest rates, continues. In addition, the growing volume of delinquent loans has started to spread to the Alt-A category loans, and the same trend has been observed even for vehicle loans and credit cards.

As the growth rate of defaults rose, prices of asset-backed securities (ABS) and structured credit products (CDO) associated with mortgage loans declined significantly, and as a result certain institutional investors suffered substantial losses. Investors stopped buying structured credit products to avoid further losses and increased risks, and thus they remained on the balance sheets of the issuing banks. The banks attempted to cover their credit exposures by purchasing credit derivatives (CDS), which set off a sharp increase in the prices of these derivatives (i.e. the cost of hedging). In order to reduce additional potential losses, banks cut back on the financing of leveraged clients. As a result, because of the increasing losses of leveraged entities (mainly conduits), issuance of short-term notes became impossible.

The abrupt contraction in short-term funds forced a number of investment funds to quickly liquidate their leveraged positions. As several funds followed the same investment strategy, they attempted to make similar deals at the same time, including a large part of their individual ABS and CDO portfolios. Since they did not essentially trade these instruments (they held them until they matured), their value was determined on the basis of financial models. Following their forced sales, these products showed up on the market, however, their sales price was extremely low due to the one-sided selling pressure, and investors had to mark down the value of these assets. This led to extreme price changes, and occasionally resulted in markets ‘drying up’. As funding was scarce, the funds tried to open up financing opportunities on markets with no direct link to the mortgage market, spreading the wave of selling to other markets.

From the end of June, an increasing number of market players began reporting losses or bankruptcy. Although the turbulence primarily affected US banks and investment funds, some European financial institutions and funds also faced substantial

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6 This document is not intended to discuss the impact of the sub-prime crisis on the economy of the USA.

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8 Source: Mortgage Bankers Association.
losses, and as a result, risk appetite weakened. Due to the combined effect of the selling wave set off by the sub-prime crisis and investors’ desire to minimise their risk exposure, pressures to sell higher-risk instruments and the demand for risk-free and highly liquid instruments skyrocketed.

The sub-prime crisis and money market turbulence affected banks through several channels. In addition to the direct exposure of banks (mortgage loans), their investment portfolio included mortgage-backed securities as well. Legally independent special entities, which were founded by banks to underwrite their leveraged positions (e.g. conduit, SPV or SIV) amplified their exposure. Even though the founding banks generally played a major role in their financing, the related exposure was off-balance sheet, and was not included in the books. Additional risk was posed by the loans which banks extended to the related, opaque operating hedge funds. Due to the multi-layered potential exposure, it was impossible to assess the actual exposure of specific banks. Last August and subsequently in November this uncertainty led to a crisis in confidence among banks, as well as the drying up of commercial securities markets used by banks to raise funds, and this in turn was followed by the drying up of dollar and euro inter-bank markets.

After hitting banks and investment funds, the crisis spread to US financial guarantors. Financial guarantors were originally established to insure local government bonds, but over recent years they extended their activities to the insurance of asset-backed securities and structured credit products. Covered by the insurance of financial guarantors with a generally higher credit rating (usually the top rating, AAA), low-rated issuers were able to issue securities with the lower interest rates connected to higher rating categories. However, as the number of defaults increased credit insurers were crippled by ever-growing payment obligations and consequently, they faced the threat of downgrade. In addition, the downgrading of credit insurers instantly deteriorates the rating of all securities insured by them, causing additional losses to the owners of the insured securities.
The security-based exposure of the countries in the euro area to the US mortgage market roughly amounts to a total of EUR 200 billion (Table 1), comprising less than 2 per cent of long-term security investments. It is important to note, however, that only a fraction of the above EUR 200 billion is linked to the sub-prime market. Of the total exposure, EUR 117 billion represents securities issued by mortgage companies sponsored by the federal government, with no sub-prime exposure whatsoever. On the other hand, some of the exposures behind the securities issued by private corporations, which amounts to a total of EUR 83 billion, have no relation to the sub-prime market either. Another important factor to underline is that, based on current information, the parent banks of the largest Hungarian banks typically have marginal direct exposures to the sub-prime market. According to securities statistics, Hungarian banks do not have instruments backed by foreign mortgages, and the total volume of the portfolios in the bank’s custody, particularly the investment fund portfolio, is negligible.

In the near future, the contagion effects of the sub-prime crisis on other markets may have a negative impact primarily on the profitability of investment banks and complex banking groups with a strong investment business. Such effects may be channelled through the declining volume of leveraged buyouts and speculative corporate bond issues, the substantial deterioration in trading profits, and potential credit losses from defaulting hedge funds. In this context, the impact on the foreign banking groups dominating the domestic banking sector will be somewhat mitigated by the fact that the most significant contributor to their business activities and increased profitability of recent years was income from traditional financial intermediary activities (e.g. retail banking), which is largely attributable to their significant expansion in lending in the regions of Central and Eastern Europe.

From a broader perspective, it is important to assess how the solvency situation of large US and European banks may impact the stability of the European parent banks of Hungarian banks. Up to now, the capital adequacy of some US and European banks has deteriorated significantly, which is reflected in decreasing stock prices. Capital was mainly

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raised by sovereign funds. Another risk may be that only a part of expected losses has been reported up to now. The increasing market role of non-transparent financial institutions (hedge funds, private equity funds) and financial innovations (credit risk transfer, CRT, products) deteriorates the transparency of financial markets and impedes risk pricing, and consequently, inhibits the adequate assessment of direct and indirect credit market exposures to the sub-prime crisis and the distribution of losses in the financial sector. Another difficulty is posed by the financial institutions themselves: many of them tend to conceal their losses for business considerations, and thus the actual extent of losses is not revealed until the institution is on the verge of insolvency. As a consequence, European supervisory authorities are exerting pressure on financial players to report their exposures related to the US sub-prime mortgage market as early and as precisely as possible.

**TURBULENCE ON THE FOREIGN INTERBANK MONEY MARKETS AND ITS IMPACT**

The temporary disorder experienced so far on the European and US money markets did not have a significant effect on the forint money markets. The FX swap market is the most important factor in the forint liquidity of non-resident players, and the forint interbank market, and its turnover did not reflect any changes. International news did not have a major influence on overnight forint yields, and nor were central bank secured loans taken.

All in all, reports of market players are consistent with the scenario described above based on the aggregate market indices. According to some bank dealers, the lack of confidence observed between the parent banks may have appeared on the domestic market as well. However, the reports of other dealers indicate that this opinion is neither shared throughout the banking sector, nor reflected in the actual market deals.

The crisis of confidence which appeared on the non-resident interbank markets should not pose a threat in the future to domestic banks, unless potential problems related to confidence between the parent banks also extend to the subsidiary banks. Only a prolonged confidence crisis would have a notable impact, triggered by further negative news involving some of the major market players. This may manifest itself in decreasing interbank limits and higher premiums for loans of banks that are deemed higher-risk institutions. As a consequence, it is extremely important to continuously monitor the domestic interbank markets and payment systems in order to identify any potential contagion.

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† The total mortgage market exposure consists of two main parts: securities issued by agents sponsored by the federal government (i.e. Fannie Mae or Freddie Mac), and securities issued by private corporations.
from the troubled European markets, a task that the central bank of Hungary is obviously performing on a daily basis.

**LONG-TERM FUNDING RISK OF DOMESTIC BANKS**

A prolonged increase in market liquidity risks may impact domestic banks primarily through the pricing of and access to non-resident interbank and capital market funding. Shrinking liquidity primarily affects domestic banks through the increasing cost of funds. Short-term non-resident interbank interest rates and, to a certain extent, the higher, above pre-crisis values of banks’ CDS premiums indicate that in the event of a prolonged contraction of liquidity, the cost of non-resident funds are expected to increase.

It is important to note, however, that a significant difference may be observed on developed markets regarding the price of non-resident funds. The 3-month TED spread increased, and at this point it exceeds the level recorded in August by some 50 to 60 basis points. This is largely due to the fact that, by means of the successful, temporary expansion of monetary policy instruments, central banks have managed to significantly alleviate the confidence crisis. In the meantime, CDS premiums, used for assessing the price of long-term funds, have shown a further increase (Chart 5). Since July, 2007, CDS premiums have increased by 250 to 260 basis points, which may be explained by two primary factors. On the one hand, credit risks have increased; and on the other hand, there is less confidence in the risk rating of credit derivatives of credit rating agencies.

**Chart 5**

**Costs of short-term and long-term foreign funding**

![Chart 5](image)

*Source: Datastream.*

The banking sector of the euro area promptly responded to a potential divergence of short-term and long-term fund costs, i.e. differences in costs over various time horizons. Concerned about permanently high prices of long-term funds, the banks increased the frequency of short-term security issues, and held back on the issue of long-term securities (Chart 6).

**Chart 6**

**12-month changes in short-term and long-term funds**

![Chart 6](image)

*Sources: ECB, MNB.*

Due to the high proportion of non-resident funding in general, and that of parent bank funding in particular, pressure to shorten the average maturity of funds has become typical in Hungary. By the end of 2007, domestic banks had a worse funding structure (increasing ratio of short-term, non-resident funds) and increased funding costs.

It is important to note, however, that the abundant liquidity which characterised the past few years on a global scale is expected to drop substantially over the long run, which may adversely impact the domestic banking sector through increasing funding costs and shrinking access to non-resident funds. Shrinking access to non-resident funds may inhibit loan originations, and pose increasing funding liquidity risks. Funding liquidity risks may be mitigated by the fact that nearly one-half of the banking sector’s non-resident funding is provided by non-resident parent banks. On the other hand, subsidiary banks may face increased liquidity risks if parent banks reduce the average maturity of the funding they provide to their subsidiaries.

**RISK OF A CREDIT CRUNCH**

In extreme cases, the sub-prime crisis related losses and increasing funding costs of banks may lead to a credit crunch. A credit crunch occurs when the willingness of banks to take risks sharply declines to such an extent that they drastically reduce their lending business, and despite increasing prices they are not willing to expand their loan portfolio, i.e. the...
credit supply curve becomes vertical. This setback in the availability of loans can lead to an economic recession. The sub-prime crisis may primarily result in a credit crunch in countries where sophisticated financial markets are in place, and capital markets play a major role in the financial structure. With an eye to the underdeveloped local bond markets, lack of loan securitisations, and the dominance of bank loans, this channel has low relevance in Hungary. A more likely channel for potential credit crunch contagion could be the increasing risk avoidance and stricter lending terms of parent banks, which may result in reduced credit limits for subsidiaries.

Influenced by the sub-prime crisis, banks on developed markets have introduced drastically tighter lending terms regarding non-price related factors (Chart 7). The most significant restrictions have affected the mortgage market in the USA.

**Chart 7**

Changes in credit standards according to Senior Loan Officer Surveys by the Fed and the ECB

Restricted lending may spread to the domestic banking sector if the subsidiaries of non-resident parent banks reduce their credit limits. Thus far we have not experienced this; on the contrary, commercial banks have introduced even more relaxed terms for housing loans after the austerity measures from last year, and this more lenient practice is expected to continue in the first half of 2008. Apart from the USA, Poland and Lithuania have similar statistics in the region. In both countries of the region, lending terms were tightened for housing loans, and did not change notably in respect of consumer loans. In neighbouring countries banks justified the more stringent terms for housing loans by the deteriorating capital adequacy, which followed the accelerated growth in the volume of the loan portfolio.

Apart from non-price factors, it is also important to observe factors affecting prices. The banking sector may react to the increased cost of funds by reducing margins on the one hand, and by raising interest payments for (existing and new) clients on the other. The primary consequence of higher interest payments for existing clients may be a deterioration of the portfolio quality, and the increased instalments may reduce the disposable portion of available income. Transferring costs to new customers may have an adverse effect on credit demand and consequently, on consumption. Currently, the transfer of costs to new customers is not a typical practice.

**Chart 8**

Changes in credit standards in Hungary

**Chart 9**

Increase of freshly announced lending rates above the 3-month risk free interest rates in 2007

Sources: Fed, ECB.

Sources: National central banks.
either in the region as a whole, nor in the euro area. The only exception so far are the Baltic countries, where lending rates on both the corporate and household markets increased considerably, exceeding the 3-month reference interest rates (Chart 9).

The increased cost of foreign funds and shrinking (FX) liquidity may influence individual countries differently. The impact may depend on a number of factors, including the liquidity situation of parent banks, the tightness of the position of subsidiary banks based on their loan-to-deposit ratio, the profitability prospects of the banking sector in the specific host country, and changes in the macroeconomic environment. These last few factors may be significant because they strongly influence liquidity allocation within banking groups. It is unfavourable that the loan-to-deposit ratio of the Hungarian banking sector is high compared to international standards (Chart 10), the profitability of the banking sector is on the decline, and macroeconomic activity is low.

CHART 10
Loan-to-deposit ratio in international comparison (2007)

![Loan-to-deposit ratio chart]

Having said that, a number of factors work against the development of a similar crisis. Although the proportion of loans with an LTV ratio over 70 per cent is dramatically increasing within mortgage loans, the average LTV of the loan portfolio is 50 per cent. In addition, in contrast to the practices seen in the US sub-prime segment, black-listed debtors are unable to obtain loans from banks in Hungary (if they do obtain loans through financial companies financed by some banks, they are relatively small in number and low in value). In addition, there is no sign of a real estate bubble. Finally, even though the debt service coverage ratio is slightly higher than the EU average, the proportion of the mortgage loan portfolio relative to the GDP is 10 per cent and considered low, and this, again, works against the development of a similar crisis.

GLOSSARY

ALT-A: With regard to risk the ALT-A category is located between the prime and sub-prime market on the US mortgage market. The candidates for ALT-A lending are considered relatively good borrowers, but either lack reliable proof of income or their debt-to-income ratio tends to be high.

Asset-backed securities (ABS): Securities backed by portfolios of homogeneous debt groups (mortgage or motor vehicle loans, credit cards, student loans, etc.). These securities are issued by institutions established exclusively for this purpose (SPV). One of the most important types of ABS is MBS, a security with an underlying mortgage loan collateral (mortgage-backed security). Changes in the prices of the ABS market are indicated by the ABX index, a synthetic, asset-backed credit derivative index.

Collateralised debt obligations (CDO): Special securities backed by bonds, loans or other assets as collateral. Investors purchasing the CDO assume the risk of the loan or bond portfolio concerned. The CDO is issued by an entity established solely for this purpose (special purpose vehicle, SPV), which acquires the securities used as collateral. Based on the different risk levels and maturities the issuer of the CDO chops the credit and/or bond portfolio into pieces (tranches). There are three risk categories reflected by three tranches: senior tranches (AAA rating), mezzanine tranches (from AA to BB ratings), and equity tranches (unrated). If the
securities are backed by loans or bonds only, they are called collateralised loan obligations or CLO, and collateralised bond obligations or CBO, respectively.

**Credit crunch:** A period of recession in a debt-based monetary system, when decelerating growth in debt creates a liquidity shortage in the economy. It is often caused by lax, inadequate lending policies, which generate losses for the lending institutions and for investors trading in debt-type instruments. Obtaining credit may become difficult or more expensive for these institutions, which further increases their accumulated losses.

**Credit default swap, CDS:** A derivative instrument to transfer credit risk, where the buyer of the credit protection pays a swap spread to the seller of the protection, who, in turn, will guarantee the payment of the borrower’s debt.

**Credit Risk Transfer Markets, CRT markets:** A market for those products, which are used for transferring the default or bankruptcy risk of a client to another party. Credit risks may be passed on through the physical transfer of instruments (securitisation), or through a synthetic transfer (credit derivatives). By means of securitisation the credit risk attached to a specific instrument portfolio is transferred to the investor through tradable securities (e.g. ABS). Risk transfer is performed in at least two different investment grade tranches. Credit derivatives are bilateral financial contracts (e.g. CDS), which are used for separating the credit risk of financial products from other risks, and for transferring the risk to another party without transferring the actual ownership of the underlying instrument.

**FX swap:** A short-term lending rate derivative traded on the interbank market. It consists of a spot and a forward FX deal made simultaneously in exactly the same foreign currency amount. The position taken by the forward transaction is the opposite of that of the spot transaction. Excess liquidity in one foreign currency is swapped to another currency, where liquidity can be made better use of. The forward interest rate is fixed at the time of the deal, while the floating rate is the O/N rate, which is realised on the spot deal on a daily basis.

**Hedge funds:** As opposed to traditional investment funds these funds are private, closed, speculative-purpose investment funds, which require a high initial minimum investment amount. For this reason, the entities investing in hedge funds are usually sophisticated, large institutional investors, private pension funds, investment companies or extremely wealthy private individuals. Due to their closed nature they are exempt from several capital market regulations and reporting responsibilities. Their position taking is not restricted by any regulation, and they are characterised by high leveraging, short positions, and the free use of derivatives.

**High-yield bond/Junk bond:** A short name for non-investment grade corporate bonds, which, in return of their higher than average risk, pay higher yields than the traditional corporate bonds.

**Leveraged buyout, LBO:** A form of corporate financing where the acquisition of a company’s majority ownership is financed through debts (loans or bonds). Frequently, the assets of the company being acquired are used as collateral under the responsibility of the company performing the buyout. Since in leveraged buyouts the debt-equity ratio is usually 90 per cent, respectively, if bonds are used for a part of the financing the issued papers are usually speculative bonds (junk bonds).

**LTV:** Loan to Value = loan amount / collateral value.

**Prime lending:** Selling credit products to clients with excellent credit rating and/or clean credit history.

**Private equity fund:** Funds invested in companies and/or complete business sectors with the purpose of obtaining influential ownership. The influential ownership obtained this way allows the owners to restructure the capital, management and organisational structure of the target company.

**Special Purpose Vehicle, SPV:** A legal entity established by the securitisation issuer specifically for the purpose of managing the transaction, which is independent of the securitisation issuer both in respect of bankruptcy and tax law. During the securitisation process, the financial service provider pools and packages some of its assets under the SPV, which then uses the assets as collateral to issue bonds or other securities.

**Structured Investment Vehicle, SIV:** Funds established for the purposes of credit arbitrage, taking advantage of the difference between short and mid-term lending rates and the yields of structured financing products. Their typical investments include ABS securities and certain bonds issued by financial corporations.

**Sub-prime lending:** These clients typically have below average credit ratings because, being unable to prove regular and timely loan payments, their credit history is compromised (in the USA such clients are typically low income or elderly individuals, or new immigrants).