COLLATERALIZATION AND FINANCIAL STABILITY

Vilma Dingová, Václav Hausenblas and Zlatuše Komárková

From a general perspective, collateralisation of exposures is a key tool for mitigating the idiosyncratic risks of financial institutions. If, however, the use of collateral in the financial system exceeds a certain threshold it can pose a risk to financial stability. Collateral use is procyclical. Heavy collateral use creates a network of direct and indirect linkages in the financial system, making it more vulnerable to contagion. It also fosters general growth in asset encumbrance in borrowers' balance sheets. This article looks at collateral use, asset encumbrance and related sources of systemic risk and maps out this phenomenon in the Czech financial system.

1. INTRODUCTION

The recent financial crisis exposed the vulnerability of short-term unsecured markets to runs among financial institutions. The subsequent breakdown of these markets contributed significantly to the deterioration in liquidity and credit conditions across the financial system. The related increase in overall risk aversion resulted in financial institutions shifting their activities from unsecured to secured markets. This shift was also encouraged by the newly introduced regulatory framework for the financial system, which provides financial institutions with incentives to use secured funding in preference to unsecured funding in order to foster greater resilience to risks.

Collateralisation is a key tool for mitigating idiosyncratic risks at institution level. However, overdependence of the system on secured funding can have major implications for financial stability. These implications are linked primarily with the sources of systemic risk arising from that dependence in both the time and cross-sectional dimensions.

The main source of the time component of systemic risk is procyclical behaviour by financial institutions. This behaviour is evident from the extent of collateral use over the cycle and is linked with how collateral policy is set. In the upward phase of the financial cycle, institutions accept a broad pool of assets as collateral under relaxed conditions, whereas in the downward phase they tighten their collateral policy. The direct or indirect linkages between financial institutions stemming from collateral and especially from collateral reuse create a network of channels in the system through which negative shocks can spread quickly from one institution to another (contagion). This network risk is, in turn, the primary source of the cross-sectional component of systemic risk. Heavy dependence of the system on secured funding can also generate a risk of excessive asset encumbrance in financial institutions' balance sheets, which limits the markets' ability to price the risk of unsecured debt. Issuance of covered bonds also causes asset encumbrance. This type of funding does not fall directly under collateralisation. However, covered bonds are secured by assets in the issuer's balance sheet, and from the asset encumbrance perspective this type of funding can create similar risks in the financial system as collateral. These risks imply a need to monitor collateral use not only in individual institutions, but also in the system as a whole.

Although the risks arising from collateral pertain primarily to countries whose financial institutions are highly dependent on market funding,[1] some of them cannot be ignored in the case of the Czech Republic either. There are two main reasons for this. First, Czech financial markets have a relatively limited number of asset types defined as high quality and liquid for regulatory purposes. Second, the Czech financial sector displays some signs of procyclical behaviour (Frait and Komárková, 2013). It is thus vital for the Czech supervisory authority to monitor the potential systemic risks associated with collateral use.

This article examines the systemic risk associated primarily with collateral use and marginally with asset encumbrance. The aim of the article is to assess this risk and discuss the regulatory framework designed to mitigate it, including the use of suitable prudential tools. The article starts by focusing on collateral use and on factors that influence the level of collateral and asset encumbrance in the financial system in general. The following section describes sources of systemic risk arising from collateral. Data from regular reporting by entities supervised by the CNB is used to map out collateral use in the Czech financial system. The extent of collateral use, the types of collateral used and the durations of secured transactions are described and networks of institutions that use collateral are identified. The final

1 Throughout this article, market funding refers to funds raised on the money and/or capital market.

section offers a list of potential prudential policy instruments that could be used to mitigate the said risks.

2. THE IMPORTANCE OF COLLATERAL AND THE EXTENT TO WHICH IT IS USED

Financial institutions use collateral to mitigate counterparty risk and reduce overall market uncertainty. On one side stands the lender – the collateral recipient. Collateral provides the lender with protection against counterparty default. As the market value of collateral can change over the life of a transaction (market risk associated with pledged/transferred assets), its initial value at the time of the pledge/transfer is subject to a deduction called a "haircut". The decision to classify an asset as eligible collateral and the decision on the size of the haircut are made by the lender. On the other side of the secured transaction stands the borrower – the collateral provider. By providing an asset to secure the loan, the lender reduces the credit component of the risk premium, i.e. his credit costs. This means collateralisation should benefit both parties.

The extent to which collateral is used depends largely on the financial institution's business model, i.e. on the structure of its financial sources and on the composition of its assets. The use of secured markets is driven on the one hand by a need for short-term funding and on the other by information asymmetry and risk aversion. Growth in the use of secured transactions was recorded during the recent financial crisis owing to growth in counterparty risk. In countries with highly developed markets, the amount of repos increased and a major shift in market activity from the unsecured to the secured market was recorded (e.g. ECB, 2013).[2] The crisis saw a change not only in short-term funding, but also in longer-term funding. For example, there was sizeable growth in the issuance of covered bank bonds (bonds covered by credit claims), especially in the euro area (Houben and Slingenberg, 2013). Asset encumbrance therefore generally increased in these countries.

Heightened uncertainty about counterparty risk also emerged in the Czech interbank market. The crisis saw a gradual decline in trading volumes on the unsecured market, while activity on the secured market remained stable.[3] However, the financial crisis had a much smaller impact on the Czech money and capital markets than on their counterparts in other countries. This is because the Czech financial system consists mainly of a banking sector which operates in an environment of a structural liquidity surplus and whose main funding sources are client deposits.[4] This means it has less need for market funding (see sections 3 and 4 of this Report). Repos account for as much as 50% of total transactions in the Czech capital and money markets. However, a large proportion of those transactions are executed by public institutions (see Chart 1). To conduct its monetary policy, the Czech National Bank (CNB) mostly uses two-week classic repos in which it accepts surplus liquidity from commercial banks and provides agreed securities as collateral. Such transactions made up around 20% of all repos in 2013. To manage Treasury liquidity, the Czech Ministry of Finance (MFCR) uses short-term classic reverse repos in which CNB bills and T-bills are used as collateral. Transactions executed by the MFCR accounted for 19% of the total on average in 2013. The following text, however, focuses exclusively on other market participants, especially banks. These participants accounted for around 61% of total repo transactions (and banks alone for 52%). The key importance of banks operating in the Czech Republic is also clear from Chart 1. Aside from their mutual links, banks execute the most repos with non-financial corporations, non-residents and mutual funds.

The degree of use of repos by banks influences their demand for collateral assets. The factors affecting this demand can be either cyclical or structural (Fender and Lewrick, 2013). Cyclical factors are linked mainly with changes in investors' preferences and risk appetite and with changes in the net supply of high-quality assets (CGFS, 2013). The stock of eligible collateral assets can be viewed as a liquidity buffer to be used in times of market distress as unsecured funding becomes more costly or even unavailable to risky parties owing to high counterparty risk aversion. As the debt crisis in some euro area countries has shown, the level of sovereign risk in financial institutions' balance sheets also affects access to market funding. Uncertainty about this level can greatly increase domestic financial institutions' funding costs on unsecured markets and sometimes even hinder their access to the secured market.

Structural factors are linked with changes in the regulation of the financial sector, especially liquidity reforms and

2 Throughout this article, the term repo covers both classic repos and reverse repos as well as the lending and borrowing of securities and the sale of securities with simultaneously agreed repurchase and vice versa.

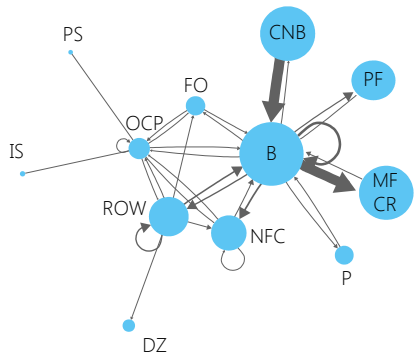
3 ttp://www.cnb.cz/en/financial_markets/money_market/mm_turnover/

4 Client deposits accounted for 59% of total assets and 67% of total external funds in the Czech banking sector at the end of 2013.

CHART 1

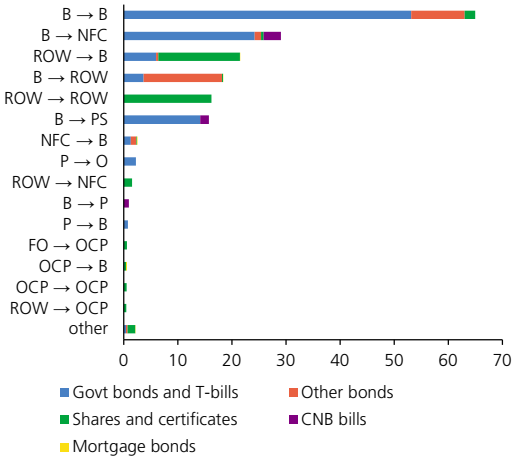
INTERSECTORAL LINKAGES ARISING FROM REPOS

a) Network of linkages
(average in 2013)



B	Banks
OCP	Non-bank investment firms
FO	Natural persons
P	Insurance companies
ROW	Rest of world
MFCR	Czech Finance Ministry
CNB	Czech National Bank
NFC	Non-financial corporations
PS	Pension companies
IS	Investment companies
PF	Mutual funds
DZ	Credit unions

b) Most important linkages by type of security
(end-2013 average, CZK billions, excluding CNB and MFCR transactions)



Source: CNB, authors' calculations
Note: The arrows point in the direction of the transfer of assets used as collateral, while the thickness of the arrows (left-hand chart only) indicates the relative importance of the exposure in the market as a whole. The size of the circles is proportional to the sum of the exposures pertaining to the given sector of the financial system. Other bonds comprise bonds issued by international organisations, local government and the corporate sector.

reforms of derivatives markets. The liquidity coverage ratio (LCR) requires banks to hold a sufficient liquidity buffer of unencumbered high-quality assets to survive a 30-day liquidity stress scenario. Given that in a downward phase of the financial cycle, only highly transparent, highly liquid and easy-to-value assets tend to be regarded as high-quality collateral, this requirement might affect the structure of demand for such assets. Higher collateral demand may also be fostered by stricter regulation of OTC derivatives – both for standardised derivatives subject to an obligation to clear through a central counterparty (CCP) and for bilaterally cleared derivatives subject to no such obligation. Demand might be boosted by a stricter margining regime, in particular one with initial margin requirements.[5] In addition, variation margin will have a small first-order effect on net demand for eligible collateral assets. However, additional demand might be generated by the precautionary motive. In an effort to maintain a certain variation margin level in periods of increased market volatility, banks might frontload on high-quality assets to hedge against potential margin calls.

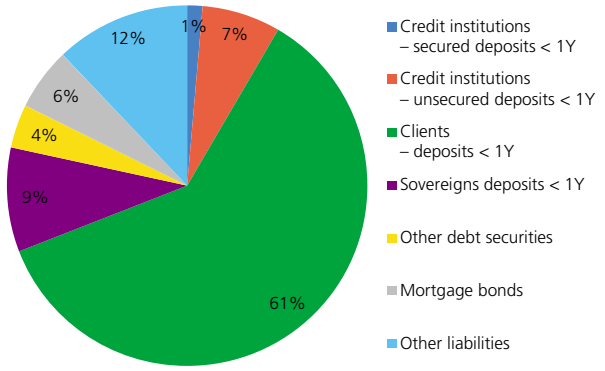
There are many estimates of the growth in global collateral demand stemming from the above regulatory reforms (Heller and Vause, 2012; Singh, 2010; BCBS-IOSCO, 2012, 2013; Lopez et al., 2013; BCBS, 2010, 2012). These estimates differ according to the methodology chosen, the assumptions made and the institutions included in the sample. Although subject to uncertainty, the overall estimate for growth in aggregate collateral demand over the next few years is around USD 4 trillion (CGFS, 2013).

The key question remains how the supply of high-quality assets will react to this additional demand. The supply is to some extent exogenous, as it is affected by the financing needs of sovereigns and non-financial corporations. The exogenous supply has a cyclical component. At times of economic contraction, the supply of high-quality corporate bonds tends to fall, while issuance of government bonds usually rises. If the markets see it as sustainable, government debt can sustain or even increase the supply of high-quality assets at times of market distress. Recent sovereign downgrades, especially in Europe, and the significant decrease in the issuance of securitisation instruments in the USA have prompted concerns about a fall in the supply of high-quality assets. However, there is widespread consensus (Lopez et al., 2013) that aggregate supply is likely to rise and thus offset the current growth in aggregate demand for collateral. For example, IMF (2012) estimates that the advanced economies' sovereign debt will rise by USD 2 trillion by 2016. In addition, Singh (2013) estimates that net issuance of AAA/AA-rated debt by sovereign and corporate issuers will increase the supply by about USD 1 trillion every year.

5 Initial margin is a component of the universal two-way margining regime. Above a certain contract value threshold, both parties are required to exchange cash or other high-quality assets held on a separate counterparty account. By contrast, variation margin is one-way and relevant to the loss-making counterparty.

CHART 2

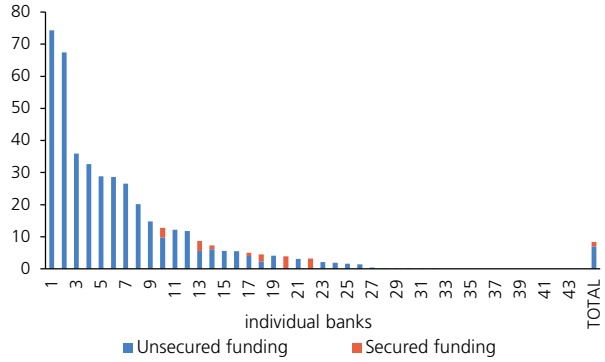
COMPOSITION OF CZECH BANKS' EXTERNAL FUNDS
(%, as of end-2013)



Source: CNB, authors' calculations

CHART 3

SHARES OF FUNDS FROM THE MONEY MARKET IN THE TOTAL EXTERNAL FUNDS OF INDIVIDUAL BANKS
(%, as of end-2013)



Source: CNB, authors' calculations

These estimates point to a sufficient future exogenous aggregate supply of high-quality assets. Nevertheless, some countries may see a temporary mismatch between demand and exogenous supply. This local imbalance might arise due to uneven allocation of collateral assets. The central bank could ameliorate the situation by, for instance, introducing an additional liquidity facility or changing its collateral policy (Debelle, 2011),[6] or the market may itself adjust. An insufficient supply of high-quality collateral will lead to an increase in the market price, which, in turn, will induce a change in the behaviour of market participants. Market/endogenous adjustment occurs through a number of channels (CGFS, 2013): (1) direct creation of collateralisable assets either through the pooling of high-quality loans earmarked for covering bond issues, which is more common in Europe, or by means of asset securitisation, which is more common in the USA, (2) broadening of the pool of eligible collateral assets, (3) collateral reuse (such as reinvestment and rehypothecation), where collateral is repeatedly pledged or transferred with increasing velocity,[7] (4) use of collateral swaps, i.e. the exchange of higher-quality collateral for lower-quality collateral.

Demand for collateral in the Czech banking sector is likely to be flat over the coming years. As mentioned above, a conservative business model based primarily on stable client deposits holds sway in the Czech banking sector (see Chart 2). The ratio of secured funding to total external funds was only around 1% at the end of 2013. There are some differences in the structure of the sources of this type of funding across banks active in the Czech market. In some cases, the share of short-term market funding in total external funds is significantly higher than the 8.4% recorded by the sector as a whole (see Chart 3). However, this mostly concerns branches of foreign banks or banks with low systemic importance. The limited effect of cyclical factors on collateral demand is also indicated by the ratio of client deposits to client loans, which is around 135% on average in the Czech banking sector. A limited effect can also be expected for asset encumbrance. Although covered bonds, in particular mortgage bonds, represent a slightly larger source of funding for the Czech banking sector, they still account for only 6% of external funds (see Chart 2).

Demand for collateralisable assets in the Czech Republic might thus be affected more by the above-mentioned structural factors. Here again, however, a generally marginal impact is expected, at least in the short run. The Czech banking sector holds as much as 29% of its assets as claims on the CNB and in AA-rated domestic government debt securities. Assuming that Czech sovereign debt remains high in quality, the Czech banking sector thus already has quite a large buffer of high-quality liquid assets. The large majority of Czech banks will therefore not need to increase their demand for high-quality assets in order to satisfy the requirements of the new regulatory framework.

However, the supply of high-quality assets denominated in the domestic currency in the Czech financial market is underdiversified. CNB bills and government debt securities account for a large share, and the supply of them is rising as

6 This situation applies to Australia and South Africa, for example. The central banks of both these countries are currently introducing new liquidity facilities (for their parameters, see Table 1 in Bech and Keister, 2014).

7 A typical example of collateral reuse is a combination of securities lending and repos where the assets lent are then pledged or transferred for the purposes of obtaining an advantageous loan.

sovereign debt grows. In the coming three years, the MFCR plans to issue around CZK 120 billion in government securities in net terms each year (MFCR, 2013). The supply is also made up of a very small number of corporate bonds and equities, net issuance of which is rising over time (see section 3.1). The supply of assets generated by the Czech banking sector is also trending upwards. In particular, growth in mortgage bonds has been observed in recent years. The amount of mortgage bonds in circulation has more than doubled since 2005 and currently stands at around CZK 251 billion. However, the proportion of corporate issues is still very low by comparison with government securities.

All this implies that an imbalance could temporarily arise between the demand for, and exogenous supply of, high-quality assets in the Czech financial market in two cases in particular – if the Czech government were to start cutting the total debt sharply, or, conversely, if it were to start increasing it sharply. In the first case, the market would see a gradual decline in high-quality assets due to a fall in the supply of government debt securities. The second case would also entail a gradual fall in high-quality assets in the market, as sovereign credit risk rises as sovereign debt grows. The supply of government debt securities would rise, but market perceptions of their quality and liquidity would probably change. Faster growth in external demand for Czech government debt, which under certain conditions could crowd out domestic demand, might also create some room for an imbalance to develop between the supply of, and demand for, high-quality Czech assets. Given that most of the debt is issued in the domestic currency, however, this is unlikely to happen at least in the medium term (see section 3.1).

3. COLLATERAL AND SYSTEMIC RISK

As mentioned above, collateralisation is an important tool for mitigating the idiosyncratic risks of financial institutions. Under certain conditions, however, it can also be a source of systemic risk in both the time and cross-sectional dimensions (FSB, 2012).

The cross-sectional dimension of systemic risk might manifest itself in overdependence of the system on secured funding. The benefits of interconnectedness in the form of idiosyncratic risk-sharing between financial institutions could come at the cost of the emergence of other risks, such as contagion risk. Any risk, even if "relatively" collateralised, remains in the financial system and, through collateralisation, merely migrates between financial institutions. In simple terms, each separate financial institution in the system may be relatively secured, but the system as a whole may become vulnerable to contagion risk. This risk may further increase if the re-pledging chain gets longer (see Singh and Aitken, 2009). In this way, indirect linkages are created in the system. Excessively long re-pledging chains can lead to a situation where the true volume and value of collateral in the system is substantially lower than the volume and value of contractually agreed collateral.

The time dimension is linked with aggregate risk, the main source of which is procyclicality. In the collateral context, procyclicality manifests itself mainly in the types of assets included in the pool of eligible collateral, in the valuation of the underlying assets making up the collateral, in the level of collateral reuse, in haircuts and in the duration of secured transactions. These risks are linked not only with the quality, quantity and type of collateral, but also with the leverage and balance-sheet composition of collateral users. It generally holds that a large quantity of lower-quality eligible collateral assets in an already overleveraged system fosters sudden and sharp changes in the behaviour of collateral users.

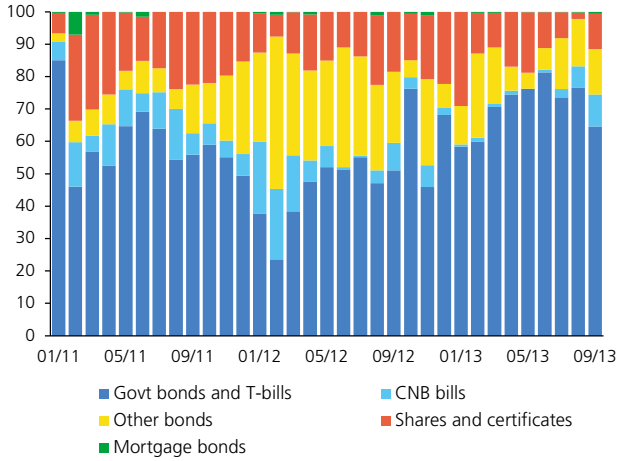
The definition of collateral quality derives on the one hand from the regulatory capital and liquidity requirements (EBA, 2013) and on the other from the demands and preferences of market participants. Pretty much any asset – from a simple financial instrument such as a government bond or cash through to a more sophisticated one such as a covered bond (e.g. a mortgage bond) or a structured product (e.g. an ABS or MBS) – can be used as collateral.[8] A safe and thus high-quality asset has the following characteristics: low credit, foreign exchange and market risk, high market liquidity, limited inflation and idiosyncratic risk, ease of valuation, listing on a securities exchange, and eligibility in the central bank's collateral policy (BCBS, 2013).

Simple financial instruments are usually associated only with the market risk of the collateral (e.g. the market liquidity and volatility of a government bond) and the credit risk of the issuer. In the case of more sophisticated instruments such as covered bonds, one also needs to include the existence of hidden, often chained risks such as the credit risk of the owners of the assets underlying the

8 Structured products are securities whose redemption depends on underlying assets and related cash flows. They are differentiated according to the type of underlying asset: asset backed securities (ABS), mortgage backed securities (MBS), etc.

CHART 4

DECOMPOSITION OF REPOS BY COLLATERAL TYPE
(shares in monthly amounts in %)



Source: CNB, authors' calculations
Note: Other bonds comprise bonds issued by international organisations, local government and the corporate sector.

pledged/transferred collateral (the original issuer of the mortgage bond and the owner of the mortgage loan) and the market and liquidity risk of both the instrument itself and the original underlying asset (e.g. the mortgage bond and the pledged property).[9] In spite of these risks, sophisticated collateralisation instruments are popular among investors. One reason for this is their apparent safety, consisting in overcollateralisation. In overcollateralised transactions, the value of the covering assets often far exceeds the value of the instrument they cover. The instrument can thus gain a higher rating than its own issuer.

Czech government debt securities and CNB bills are the most frequently used forms of collateral in the Czech market. Transactions using this type of collateral usually have a duration of one or two weeks. Equities and corporate bonds are of less significance (see Chart 4). This category is dominated by the equities of Czech issuers, while those of Austrian and UK issuers account for a smaller and steadily diminishing share. Despite the higher market risk attaching to this type of collateral, equity-collateralised transactions often have a duration of longer than two weeks, and a large proportion of them mature in one month or more. The majority of equity-collateralised repos are executed between non-Czech entities and also – due to the greater affordability of equities – between non-professional customers such as municipalities, private individuals and small non-financial corporations. By contrast, professional participants, such as banks, insurance companies and pension funds, tend to use government debt securities as collateral, mainly because these financial institutions are also the main creditors of Czech government debt. Covered bonds in the form of mortgage bonds are rarely used as collateral in the Czech financial market, even though the overcollateralisation averages 360% for these securities.

The financial sector displays procyclicality in assessing asset quality. In an upward phase of the cycle, lenders tend to be more optimistic about counterparty risk and the soundness of issuers of eligible collateral assets. Lower-quality assets are thus also used in secured transactions, and haircuts are often reduced. The lower haircuts increase the leverage available to borrowers and so additional purchases of collateral assets can be financed (CGFS, 2010). Demand for eligible assets rises, credit spreads and price volatility decrease, and the volume and price of the assets used increases, causing the total collateral value to go up as well. Lenders thus enjoy an increase in disposable funds and the availability of credit expands further. These easy market conditions steadily give rise to a virtuous circle of relatively secured short-term funding, and systemic risks quietly accumulate.

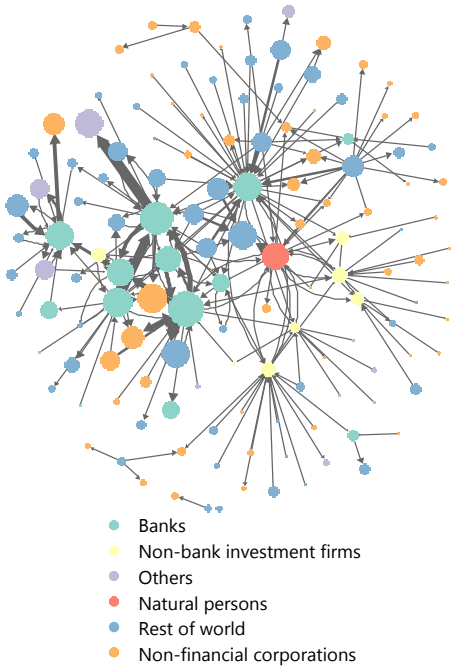
When the financial cycle turns around and risk aversion falls, lenders review their credit conditions. The greater market uncertainty and overestimation of counterparty risk leads them to tighten their collateral policies by narrowing the pool of eligible collateral, tightening the conditions for collateral reuse and setting more conservative haircuts, especially for lower-quality collateral. The number of creditworthy counterparties goes down and the amount of loans provided also decreases.

A rising haircut accompanied by a shrinking pool of eligible collateral can get a borrower quite quickly into liquidity problems. If its business model is based primarily on secured market funding and its collateral buffer is made up mainly of lower-quality assets, it can be very difficult for it to find a new source of funds. On top of that, the liquidity problems of the borrower can easily turn into liquidity problems of the lender. If the borrower defaults, the lender will enter the market to sell the collateral in an attempt to get back the money it lent. If the stock of collateral for sale in the market is relatively large, and especially if it is concentrated mostly in lower-quality assets and the market for those assets is

9 One also has to take into account the different legal forms of individual instruments, as different transactions can have the same economic effect, but different legislation means different legal certainty.

CHART 5

NETWORK OF AVERAGE LINKAGES BETWEEN REPO TRANSACTION PARTICIPANTS IN THE CZECH REPUBLIC
(based on the average stock of gross exposures in 2013)



Source: CNB, authors' calculations
Note: Each arrow points in the direction of the transfer of securities in the relationship. The size of the points is proportional to the sum of the values of all transactions executed by the participant. The natural persons sector was consolidated.

already under selling pressure, further sales can put the already squeezed prices of the assets under more pressure. If the asset up for sale has been issued in large volumes and is widespread in the balance sheets of borrowers and lenders, a liquidity spiral may develop (Brunnermeier and Pedersen, 2009).

Falling asset prices impact on financial institutions that hold those assets in their trading portfolios and/or as potential collateral. Fire sales of an asset can cause the entire market to freeze due to an inability to price the asset. If, moreover, failure to repay or direct default by the borrower is correlated with the business and financial cycle (materialisation of systemic risk in the deleveraging phase – see Figure 5 on page 14 of Frait and Komárková, 2012), any sectoral concentration in lending will gain in significance, as will the number of lenders hit by similar problems.

Our analysis reveals that the Czech secured market is highly concentrated and centralised. As Chart 5 shows, most of its participants enter into repo transactions with one and the same counterparty, and most often with one of a small number of banks or non-bank investment firms. Most participants always adopt the same position of collateral recipient or collateral provider. In 2013, the five largest participants – most of them banks – accounted for around 50% of all repos. These participants therefore play a major role in this market.

The increasing use of secured funding is lifting the level of encumbered assets in financial institutions' balance sheets, giving rise to new questions about the riskiness of this trend. Issuance of covered bonds also causes asset encumbrance, as some collateralisation of exposures occurs with this type of financing as well. Although the collateralised exposures are similar in terms of purpose, they tend to have different contractual forms with often different legal consequences, especially in the event of breach of contract or insolvency. If a borrower goes bankrupt, secured claims have higher priority than those of many other creditors, including the state and small depositors. As only the highest-quality assets tend to be used as collateral, the average quality of the remaining unencumbered assets falls. Information on the true level of encumbered assets is not fully available to the market or is highly distorted. This can render the markets incapable of pricing the risk of unsecured debt adequately.

The literature describes two methods for measuring asset encumbrance ratios (CGFS, 2013), one based on the proportion of secured borrowing in total liabilities (liabilities-side approach) and the other on the proportion of pledged/transferred balance-sheet assets (assets-side approach). Neither method, however, provides entirely adequate information on the encumbrance level. For example, there is not enough information available on overcollateralisation and on initial margins for derivatives transactions. Keeping these caveats in mind, a working group established by the Committee on the Global Financial System (CGFS) estimated the median encumbrance ratio using the liabilities-side approach. Its estimate for 60 large European banks came to 22.5% of assets. Some banks had ratios of less than 10%, while others had ratios of greater than 50%.

The CNB has made its own estimate of asset encumbrance for the Czech banking sector. The calculation takes account of encumbrance due to both collateral use and issuance of covered (mortgage) bonds. At the end of 2013, the ratio of encumbered assets in the total balance sheet of the Czech banking sector was 13.4% when one uses the value of pledged assets serving as the mortgage bond cover pool as the numerator (assets-side approach) and 8% when one uses the value of mortgage bond liabilities as the numerator (liabilities-side approach). In both cases these figures are

trending upwards. By international standards, however, Czech banks have a low asset encumbrance ratio according to these indicators.

4. REGULATION OF BANKS TO MITIGATE COLLATERAL RISKS

The materialisation of the above systemic risks during the recent financial crisis prompted the G20 and the Financial Stability Board (FSB) to pledge to boost the financial system's resilience to sources of risks such as procyclicality and contagion. The debate on potential prudential instruments and their detailed parameters is still going on at international level, but a number of instruments have already been implemented. Some instruments require international agreement on their introduction (for instance the obligation to execute certain transactions via a central counterparty) or at least some coordination within the EU (capital and liquidity requirements), while for others national authorities have full responsibility (for example restrictions on collateral reuse). We should add that the potential measures to limit systemic collateral risks should be complementary and configured so as to reflect both dimensions of financial stability.

The primary purpose of collateral is to mitigate counterparty risk. This is reflected in the setting of capital requirements. Securitised exposures satisfying the eligibility conditions for collateral assets reduce the capital requirement for credit risk.[10] In this regard, BCBS (2010) additionally recommends strengthening the coverage of counterparty risk for off-balance-sheet items by tightening the conditions for computing the value of such exposures using internal models. This is because capital requirements do not in any way reflect collateral reuse despite the fact that the latter de facto reduces the value of collateral. With regard to collateral reuse, Basel III only recommends considering liquidity risk in the event of a need for additional collateral or a call to return collateral. Supervisory authorities should thus monitor the significance of collateral reuse in individual institutions and react via Pillar 2 where necessary.

Banks are also protected from potential losses due to borrower default by the inclusion of collateral exposures in the regulation of excessive exposures, which also applies to off-balance-sheet items. In simple terms, this means that the sum of large exposures subject to the limit includes not only unsecured exposures and commitments to the counterparty, but also the collateral issued by that counterparty and accepted by the bank.

Regulation of the leverage ratio, i.e. the ratio of equity capital to total risk-weighted assets, can be used as a complementary instrument to the capital concept. The use of external funds in the banking sector to fund exposures is closely linked with collateralisation. The leverage ratio limits excessive growth in balance-sheet and off-balance-sheet totals, thereby also limiting procyclicality in the setting and extent of use of collateral. This instrument is already in effect in various forms in the USA and Canada and was also introduced in Switzerland in 2013 under Pillar 2.

New liquidity rules – the net stable funding ratio (NSFR) and the liquidity coverage ratio (LCR) – may also have an impact on the use of external funds in the banking sector. The NSFR, a structural instrument, addresses liquidity risk management in the longer term. It provides incentives for banks to reduce the use of short-term and unstable funding sources in order to make them more resilient in situations of reduced access to market funding. The LCR should have a similar impact on the banking sector. Moreover, it motivates the banking sector to hold high-quality liquid unpledged assets so as increase its resilience to bank runs and fire sales and ultimately at least postpone any liquidity spiral. Both instruments are laid down in CRD IV and CRR. The LCR will be phased in between 1 January 2015 and 1 January 2019, while the NSFR is scheduled to take effect on 1 January 2018.

Regulation on both the borrower side and the lender side can be used to mitigate collateral credit risk through the use of high-quality assets as collateral. The legislative rules applying to the issuance of debt securities affect the quality of assets provided as collateral. For more sophisticated instruments such as secured debt securities and structured products, rules are usually set for the underlying assets, including an upper limit on the coverage ratio. This limit is effective mainly in optimistic periods, when concerns about the soundness of asset issuers are falling, but it in no way

10 The conditions of eligibility of collateral assets require collateral to be sufficiently liquid, its value over time to be sufficiently stable and the degree of correlation between the value of the collateral and the credit quality of the obligor to be not too high (Article 194 of the Capital Requirements Regulation (CRR), i.e. Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms).

reduces the effect of overcollateralisation.[11] The latter should be accounted for in the prudential assessment of asset quality by lenders both in the setting of collateral policy itself (eligible assets, margins, haircuts) and in the prudential management of that policy (determination of exposure values). In this context, the need to reduce dependence on external credit ratings has been emphasised (FSB, 2007), as "sudden" rating changes trigger waves of market adjustment. High dependence can thus cause global reshuffles of financial institutions' portfolios. In the case of collateralisation, which usually includes chained exposures, these sudden market changes can mean rapid contagion not only within the financial sector, but also to the real sector. Banks that use internal ratings to determine regulatory capital can, when managing collateral policy, apply their internal methods for estimating the basic parameters (PD, LGD, EAD) based on which borrowers are assigned ratings. However, their use – especially in the case of more sophisticated instruments – significantly limits the requirement regarding the minimum length of the time observations used to estimate LGD and EAD, which must cover a full economic cycle and may not be shorter than seven years.

As mentioned in the previous section, haircut-setting and contractual margining are procyclical. For this reason, it is recommended (CGFS, 2010) that supervisory authorities put in place fixed conversion factors for calculating the value of collateral exposures based on two components. The first component should be conservative and stable over time and should reflect market liquidity and price volatility in the long run. The second component should serve as a macroprudential instrument in the form of a countercyclical add-on.

The new regulatory framework for over-the-counter (OTC) derivatives reacts to the procyclicality in financial institutions' collateral-setting policy and also to the need to make the links between financial institutions more transparent. The new regulation introduces an obligation to clear all standardised OTC derivative contracts through a central counterparty.[12] For OTC derivative contracts not subject to this obligation, the new regulation lays down a higher capital and margin requirement if they are to be cleared bilaterally. In the interests of enhanced transparency, the new regulation introduces an obligation for financial institutions to report their derivatives transactions to a trade repository (non-financial corporations inform ESMA).

Enhanced transparency is also vital for the market owing to the ratio of encumbered assets in the financial system. The sharing of information on this ratio makes it easier for unsecured lenders in particular to price the risks they face. On a general level, one possibility is to use Pillar 3, an element of Basel III aimed primarily at increasing market transparency and enhancing market discipline. Disclosure of encumbered assets also forms part of European legislation (specifically Article 443 of CRR), although these disclosure requirements are only applied on a consolidated basis.

There are many potential measures for strengthening financial institutions and ensuring a sounder financial sector. Many of them are now being implemented following the domino effect seen during the 2007–2009 financial crisis. The consequences of the new regulations and their cumulative effect will only become clear in the years to come.

5. CONCLUSION

Demand for collateral has been rising, especially in economies with developed markets. This rise is due both to cyclical effects, in particular rising global risk aversion and related increased interest in secured funding, and to the structural effects of new regulations. Overuse of collateral in financial transactions can have adverse implications for financial stability, such as (i) a higher likelihood of shortages of high-quality liquid local assets, especially at times of market distress, (ii) greater and closer interconnectedness of financial institutions within the system, and (iii) higher asset encumbrance in financial institutions' balance sheets, which, in turn, exacerbates procyclicality due to haircut-setting, margining and collateral eligibility.

In this article, we set out to assess the relevance of at least some of these risks to the Czech financial sector. Our analysis of data on repo transactions in the money and capital markets revealed that the Czech financial system makes only marginal use of secured funding. The secured market is therefore relatively small, but very concentrated and centralised. Most of its participants enter into secured transactions with one and the same counterparty, and most

11 In the Czech Republic, the Act on Bonds No. 190/2004 Coll. lays down exact rules for claims that can be used to cover the face value and accrued interest on bonds. Specifically in the case of mortgage bond issues, only mortgage claims for which the amount of the loan does not exceed 70% of the price of the pledged property can be used.

12 Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories, also known as EMIR. This regulation entered into force on 16 August 2012, but most of its obligations take effect in 2013 or 2014.

often with one of a small number of large banks or non-bank investment firms, which thus play a major role in this market.

The risk of a temporary shortage of high-quality local assets in the Czech financial system is low from the medium-term perspective. This is because the Czech financial system already holds a large proportion of its assets in the form of high-quality liquid assets. However, the supply of high-quality assets in the Czech financial market is underdiversified, with government debt securities accounting for a large share. A temporary shortage of high-quality assets could arise only if the supply of such securities was to fall or their quality was to deteriorate. The risk of high asset encumbrance in balance sheets in the Czech Republic is also low by international standards and, given the arguments set out above, is unlikely to rise in the medium term.

The risks described above currently give no cause for concern about the financial stability of the Czech financial system. Given their potential seriousness, however, it is vital to continue monitoring them.

REFERENCES

BCBS (2010): *Results of the Comprehensive Quantitative Impact Study*, Basel Committee on Banking Supervision, December 2010.

BCBS (2012): *Results of the Basel III Monitoring Exercise as of 30 June 2011*, Basel Committee on Banking Supervision, April 2012.

BCBS (2013): *Basel III: The Liquidity Coverage Ratio and Liquidity Risk Monitoring Tools*, Basel Committee on Banking Supervision, January 2013.

BCBS-IOSCO (2012): *Margin Requirements for Non-Centrally-Cleared Derivatives – Consultative Document*, Basel Committee on Banking Supervision and Board of the International Organization of Securities Commissions, July 2012.

BCBS-IOSCO (2013): *Margin Requirements for Non-Centrally-Cleared Derivatives – Second Consultative Document*, Basel Committee on Banking Supervision and Board of the International Organization of Securities Commissions, February 2013.

BECH, M. L., KEISTER, T. (2014): *On the Economics of Committed Liquidity Facilities*, BIS Working Paper 439, January 2014.

BRUNNERMEIER, M. K., PEDERSEN, L. H. (2009): *Market Liquidity and Funding Liquidity*, Review of Financial Studies 22(6), pp. 2201–2238.

CGFS (2010): *The Role of Margin Requirements and Haircuts in Procyclicality*, CGFS Paper 36, Committee on the Global Financial System, March 2010.

CGFS (2013): *Asset Encumbrance, Financial Reform and the Demand for Collateral Assets*, CGFS Paper 49, Committee on the Global Financial System, May 2013.

DEBELLE, G. (2011): *The Committed Liquidity Facility*, speech given by the Assistant Governor of the Reserve Bank of Australia, APRA (Australian Prudential Regulation Authority) Basel III Implementation Workshop 2011, Sydney, November 2011.

EBA (2013): *Report on Appropriate Uniform Definitions of Extremely High Quality Liquid Assets (Extremely HQLA) and High Quality Liquid Assets (HQLA) and on Operational Requirements for Liquid Assets under Article 509(3) and (5) CRR*, European Banking Authority, December 2013.

ECB (2013): *Euro Money Market Survey*, European Central Bank, November 2013.

FENDER, I., LEWRICK, U. (2013): *Mind the Gap? Sources and Implications of Supply Demand Imbalances in Collateral Asset Markets*, BIS Quarterly Review, September 2013.

FRAIT, J., KOMÁRKOVÁ, Z. (2012): *Macroprudential Policy and Its Instruments in a Small EU Economy*, CNB Research and Policy Note 3/2012.

FSB (2010): *Principles for Reducing Reliance on CRA Ratings*, Financial Stability Board , October 2010.

FSB (2012): *Securities Lending and Repos: Market Overview and Financial Stability Issues,* Interim Report of the FSB Workstream on Securities Lending and Repos, Financial Stability Board, April 2012.

GORTON, G. B., METRICK, A. (2009): *Haircuts*, NBER Working Paper 15273.

HELLER, D., VAUSE, N. (2012): *Collateral Requirements for Mandatory Central Clearing of Over-the-Counter Derivatives*, BIS Working Paper 373.

HOUBEN, A., SLINGENBERG, J. W. (2013): *Collateral Scarcity and Asset Encumbrance: Implications for the European Financial System*, Banque de France, Financial Stability Review 17, April 2013.

LOPEZ, J. C., MENDES, R., VIKSTEDT, H. (2013): *The Market for Collateral: The Potential Impact of Financial Regulation*, Bank of Canada Financial Stability Review, June 2013.

IMF (2012): *Safe Assets: Financial System Cornerstone?* Chapter 3 in Global Financial Stability Report: The Quest for Lasting Stability, International Monetary Fund, April 2012.

MFCR (2013): *The Czech Republic Funding and Debt Management Strategy for 2014*, Ministry of Finance of the Czech Republic, December 2013.

SINGH, M. (2010): *Collateral Netting and Systemic Risk in the OTC Derivatives Market*, IMF Working Paper 99.

SINGH, M. (2013): *The Changing Collateral Space*, IMF Working Paper 25.

SINGH, M., AITKEN, J. (2009): *Deleveraging after Lehman – Evidence from Reduced Rehypothecation*, IMF Working Paper 42.

SINGH, M., STELLA, P. (2012): *Money and Collateral*, IMF Working Paper 95.

ZORN, L., GARCIA, A. (2011): *Central Bank Collateral Policy: Insights From Recent Experience*, Bank of Canada Review, Spring 2011.