

# Safeguarding investment in Danish mortgage bonds

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## ABSTRACT

*This paper considers some safeguard measures protecting the investment in mortgage bonds against credit risk.<sup>1</sup> The outset of the discussion is the 200-year old Danish system of mortgage credit where investor protection primarily has been achieved by ensuring the quality of the mortgage credit institutions' balance sheets. The safeguard measures used focus on the relative and absolute size of the capital base of the mortgage credit institutions and the minimisation of interest rate and credit risk borne by the institutions. Important features in this respect are the so-called 'balance principle', eliminating interest rate risk from lending operations and maximum loan-to-value rules. These measures combined with a monopoly on the name 'mortgage bond' constitute the backbone of the system.*

## INTRODUCTION

The main aim of this paper is to give a brief introduction to some basic measures safeguarding the stability of a mortgage credit system, where the loanable funds are raised by issuing mortgage bonds.

The main emphasis will be put on the description of measures safeguarding the investment in mortgage bonds against credit risk. The system is, therefore, predominantly viewed from the perspective of a potential mortgage bond investor.

It is important to note that this investor perspective is not as narrow as one would tend to think. In a system where the cost of mortgage loans is directly linked to the pricing of mortgage bonds in the market the borrowing cost is reduced if the investor estimates the mortgage bonds to be safe 'gilt-edged' investments. Safeguarding the investor is, therefore, one of the prerequisites for affordable housing in a bond-funded mortgage credit system.

As the basis for the drawing up of the basic safeguard measures presented in this paper is the Danish system of property financing, the paper starts with a description of the main features of the Danish mortgage market. Thereafter, the safeguard measures provided for in the mortgage credit act are introduced. The paper ends with a few concluding remarks.

## THE DANISH MORTGAGE MARKET

The history of the Danish mortgage credit system dates back to the big fire in Copenhagen in 1795 which resulted in the near destruction of the city. The fire created an extraordinary demand for capital which

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could not easily be satisfied, as the insurance company which insured most of the houses was rendered insolvent by the fire. The fire resulted in the creation of a system for investment in real property with an intermediary link between those economic agents with a capital surplus and those with a capital deficit. The private mortgage credit institutions (MCIs) constitute this link. The first mortgage credit act was approved in 1850, and MCIs have since then provided the major part of mortgage credit in Denmark.

The fundamentals of the old system can be traced in today's Danish mortgage credit market. The MCIs are specialised institutions separated from the other commercial banks by a special mortgage credit act.<sup>2</sup> The business range of an MCI is limited by the mortgage credit act to the granting of loans against mortgage on real property.<sup>3</sup> They do not, however, have a monopoly of this market, as other financial institutions are free to grant loans secured by mortgages. However, the MCIs are by law given the exclusive right to fund mortgage loans by issuing mortgage bonds.

As the individual loans granted by MCIs are restricted in size by the mortgage credit act to a maximum loan-to-value ratio (LTV), the market is in practice divided into two parts. A primary mortgage market where loans primarily are secured by first mortgages and funded in the bond market by the MCIs, and a market for 'top-up' loans granted by commercial banks and secured by second mortgages or not at all. The MCIs are excluded from the top-up market because of the LTV rules and the above-mentioned provision in the mortgage credit act limiting the business range. The top-up mortgage market is dominated by the commercial banks.

In brief, the Danish primary mortgage market can be described as a wholesale market dominated by a number of specialised MCIs funding loans against mortgage

on real property on the basis of bond issuing.

In the following sections will be given a description of the size and structure of the mortgage market and the basic mode of operation of the mortgage credit institutions. Throughout the paper the main emphasis will be on the market for residential mortgages.

### **Size and structure of the Danish mortgage market**

The outstanding stock of loans by MCIs was 854bn DKK at the end of the second quarter 1997.<sup>4</sup> This corresponds to approximately US\$ 125bn.<sup>5</sup> Lending to owner-occupied dwellings accounted for just over half of the total lending. In terms of GDP the outstanding loans amounted to approximately 90 per cent.

The market concentration is relatively high with a total of only nine MCIs. Three of them are specialised in non-residential lending, ie lending to agriculture, trade and industry or non-profit housing, leaving six institutions to cover the bulk market.

The high market concentration is partly attributable to a *de facto* prohibition by government to entry into the mortgage market of new banks which was in place from 1970 to 1989. Since the adoption of a new, more liberal mortgage credit act in 1989 — in connection with which free access to the market was granted — five more institutions have begun granting loans against mortgage on real property.

The mortgage contracts drawn up to mortgage loans for residential purposes are typically of a very standardised nature. The main part of loans granted by MCIs to finance the acquisition of owner-occupied dwellings are callable annuity loans with a lifetime of 30 years and a fixed nominal interest rate for the entire lifetime of the loan.

The maximum lending limit — LTV — is 80 per cent of the value of the property

for owner-occupied permanent dwellings. The typical first-time house owner produces a down payment of only 5 to 10 per cent of the house value. The remaining 90 to 95 per cent is borrowed. Typically, 80 per cent of the house value is financed through an MCI and the remaining 'top-up' loan through a commercial bank.

The loans are not callable by the MCI as long as the borrower meets their obligations towards the bank.

The cost of funds in the mortgage market is determined by the pricing of the mortgage bonds in the capital market as well as by the size of the up-front fees and running administration fees etc. paid to the MCI. As most loans are callable at par by the borrower, the corresponding bonds are priced by investors as a conventional bond with an embedded call option. Assessing the prepayment risk is, therefore, an important part in the valuation of the different mortgage bonds.<sup>6</sup> A 30-year fixed interest mortgage loan with a proceed of 1m DKK (US\$ 145,000) carries the first year, at the present interest rate level, a payment before tax of approximately 90,000 DKK (US\$ 13,000) including administrative fees. As interest is tax deductible in Denmark the after tax payment in the first year is approximately 50,000 DKK (US\$ 7,500).

### Basic mode of operation

The basic mode of operation in the mortgage market is relatively simple as the following rudimentary description of the system shows.

When a potential borrower wishes to apply for a loan on real property, they approach an MCI either directly or through a commercial bank or an estate agent, and file an application for a loan. The MCI determines the value of the property on the basis of an independent valuation. The maximum loan the bank can offer to the potential borrower is then

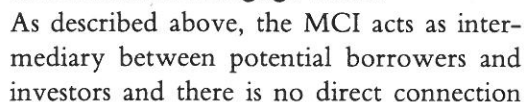
fixed by the LTV ratios laid down in the mortgage credit act. It is important to note that it is a maximum LTV ratio and the MCI is free to offer a smaller loan. Traditionally, the MCIs have focused primarily on the value of the property when granting loans, not the credit-worthiness of the borrower and then only as a secondary lending criterion. When the borrower has accepted the offer, the MCI secures the loan by taking a mortgage on the property. If the borrower defaults on the loan the mortgage ensures that the MCI can enforce a sale of the property in question.

When a loan is granted the MCI funds the loan simultaneously by issuing bonds and selling them at the Copenhagen Stock Exchange. The exact cost of a mortgage loan is not known to the borrower until the bonds are sold to investors at the going market interest rate. Figure 1 illustrates this basic mode of operation.

On the loan side the MCI operates as creditor *vis-à-vis* the borrower. The bank screens applications from potential borrowers, pays out the mortgage proceeds, receives interest, repayments and fees from the borrower and, in case of default, exercises the right of the mortgagee to enforce a sale of the property.

On the funding side the MCI issues bonds to produce the loan proceeds needed to satisfy the demand from the loan side. The bank pays the interest and repayments to the bondholder. As the issuing bank is fully liable for punctual payment of interest and repayment of principal it acts as debtor *vis-à-vis* the bondholder.

Contrary to a US type system where assets are sold out of the issuer's balance sheet via a master trust, the loans remain on the issuer's balance sheet. This is the same principle as in the German 'Pfandbriefe' system. As illustrated in Figure 2, the balance sheet of an MCI thus has a liability side consisting of the issued bonds and own capital and an asset side with



between the individual borrower and the bond investor. It is, therefore, primarily the general risk exposure of the MCI relative to its capital base that is of importance for the investor's assessment of the credit risk attached to mortgage bonds. In other words, the quality of the asset side on the balance sheet is the primary factor that determines the risk premium on the investment in mortgage bonds. The only time a mortgage bond investor is in a position where he or she takes over some of the credit risk attached to the loan operation, is in the case where an MCI is declared bankrupt. In this case the holders of mortgage bonds are safeguarded by a preferential claim on the funds in the MCI ensuring that the claims of the bondholder are met before claims of any other creditor.

A more important, albeit indirect, safeguard measure is the monopoly to the name 'realkreditobligation' (mortgage bond). This monopoly gives institutions granting loans under the mortgage credit act the sole right to issue bonds with the name 'realkreditobligation'. The monopoly reduces the investor's investment costs and assures that all the safeguard measures required by the mortgage credit act are in place within the MCI. After having examined once and for all the credit risk involved in the investment in mortgage bonds the investor can be sure that the measures safeguarding the quality of balance sheet, and thereby the investment, are the same regardless of the exact name of the issuer. Investor research on credit quality can further be reduced by relying on the (conservative) credit ratings recently given by Moodys to some of the mortgage bond series (Aa2 to Aa3 depending on the issuing institution). Supervision by the Financial Supervisory Authority further ensures the quality and the actual existence of the safeguard measures within the MCIs.

The safeguard measures securing the quality of the balance sheet of an MCI in

case of adverse business conditions are described in detail in the following sections.

### **Measures safeguarding the capital base of the MCI**

When evaluating the ability of a company to withstand adverse business conditions focus is usually set on the size of the own capital. In the case of credit institutions the capital is usually seen relative to the risk-weighted assets.

The own capital of an MCI can be seen as fulfilling three main functions. Firstly, as the own capital is usually invested in interest bearing debt securities, it contributes to the earnings of the bank. Secondly, the funds are used to provide liquidity in case of defaults on mortgages, enabling the MCI to fulfil its obligations towards the bond investor from the time the borrower ceases to pay to the time where foreclosure procedures are over and the mortgaged property is sold. Thirdly, in case the proceeds from the sale do not cover the capital value of the mortgage, the own funds are used as collateral buffer enabling the bank to amortise the bonds in full, anyway.

From an investor's perspective the primary interest lies in the ability of the own capital of the MCI to fulfil the liquidity and collateral buffer functions. However, it is, of course, also important for the security of the MCI in the long run that the institution is able to generate own funds through, among other things, its investments in debt securities.

The primary safeguard ensuring that the own funds can fulfil the described main functions is the use of risk-based minimum capital requirements. As Denmark is a member of the European Union the capital requirements of the MCIs are based upon EU directives applying to all credit institutions. Thus, in compliance with the directives, the own capital of an MCI must amount to at least 8 per cent of its risk-



**Table 1** Basic safeguard measures

Instrument		Objective
<b>Primary safeguard</b>	<i>Secondary safeguard</i>	
1. General measures safeguarding investment in mortgage bonds		
<b>Preferential claim on assets</b>		Safeguards the bond investor in case of bankruptcy.
<b>Monopoly to the name 'mortgage bonds'</b>		Ensures that bonds bearing the name 'mortgage bonds' are secured by the described safeguard measures.
<b>Supervision</b>		Ensures compliance with the rules stipulated in the mortgage credit act (solvency requirements, lending and valuation rules, control of market risk).
2. Measures safeguarding the capital base of the MCI		
<b>Risk-based capital requirements</b>		Ensures the existence of a minimum of own capital to generate earnings and perform liquidity and collateral buffer functions in case of default by borrowers.
	<i>Absolute capital requirements</i>	Ensures a high minimum capitalisation of MCIs, further strengthening the own funds ability to perform its buffer function.
3. Measures safeguarding the MCI against interest rate risk		
<b>The balance principle</b>		Safeguards the MCI against interest rate and liquidity risk from its lending operations.
	<i>Investment requirements</i>	Enhances the ability of own funds to perform the liquidity and collateral buffer functions.
4. Measures safeguarding the MCI against credit risk		
<b>Loans must be secured by a mortgage on real property</b>		Ensures the existence of collateral reducing credit risk.
	<i>Personal liability</i>	Limits the probability of willing default by the borrower.
	<i>Joint and several liability</i>	Spreads the credit risk from the bank to borrowers in case of major systemic losses.
<b>Strong legal position of the mortgage</b>		Ensures the value of the mortgage.
	<i>Requirement of registration</i>	Limits problems with asymmetrical information regarding the status of the mortgaged property and possible disputes over the existence of a mortgage.
	<i>Central registration of land</i>	The registration secures the unequivocal identification and demarcation of all real property.
	<i>First mortgage</i>	Ensures that the MCIs claims are fulfilled before others in case of foreclosure.
	<i>Fast and cost efficient foreclosure procedures</i>	Limits the value of the borrower of willingly defaulting, minimises the legal expenses and the amount of accumulated unpaid interest.
		Limits credit risk.
<b>Valuation rules</b>		
	<i>Maximum loan to value</i>	Safeguards against adverse price movements on the collateral, creates excess value to cover unpaid interest, lowers the probability of the borrower willingly defaulting and creates a buffer against wrongful valuation.
	<i>Rules for prudent valuation of the property</i>	Safeguards against relaxation of the underwriting standards.

weighted assets. However, the minimum capital requirement of an MCI in absolute terms is 150m DKK in Denmark, or approximately four times higher than required by the directives, further strengthening the own funds ability to function as a buffer.

With regard to the MCI's ability to generate own funds through earnings, it is an important feature of the system that the institutions have a discretionary right to raise administration fees (see Figure 1), from not only the new but the full stock of borrowers. In times with heavy losses this enables the MCI to raise earnings thereby securing the own funds. This ability most of all resembles a right to levy taxes.

#### **Measures safeguarding against interest rate risk**

In general, interest rate risk in a (mortgage) bank exists, if the interest rate sensitive assets have a different maturity than the interest rate sensitive liabilities. The assets and liabilities of an MCI can be split in two (Figure 2), firstly, the loans against mortgages and the issued bonds, and secondly, the bank's investment in debt securities etc. and the own capital. Interest rate risk may arise in both cases.

Usually, financial intermediation by banks is characterised by the transformation of short-term deposits into longer-term loans. However, in a mortgage credit system granting loans with a maturity up to 30 years at a fixed nominal interest rate, such an arrangement would lead to excessive interest rate risk. For example, if the bank has short-term funding and grants long-term loans with a fixed nominal interest rate, then rising interest rates makes it impossible to service the funding side with the proceeds from the loan side, see Figure 1.

The so-called 'balance principle' in the mortgage credit act is a safeguard against

this kind of interest rate risk. According to this principle the MCI, when issuing bonds, must assure that every year the total payments received by the MCI from the borrowers and the total payments made by the MCI to the bondholders are equal. The easiest way to obey the balance principle is to issue bonds with precisely the same repayment profile and lifetime as the loan which the bonds finance when granting a loan.<sup>7</sup> The balance principle also ensures that the MCI does not face any liquidity risk from its loan operations.<sup>8</sup>

The existence of the balance principle limits the risk of the MCI's loan operations to credit risk. However, the bank can take on interest rate risk when investing its own funds. The investment portfolio of an MCI is required to consist of at least 60 per cent listed bonds. The MCIs are thus actually required to take on a certain amount of interest rate risk when investing their own funds. The interest rate risk, however, is reduced by a provision in the mortgage act, limiting the maturity of the own funds to a maximum of the same maturity as that of the issued bonds. This rather complex set of rules safeguards the bank in a situation where a borrower defaults on a loan. In this case, the balance principle no longer protects the bank against interest rate risk on the bonds issued to fund the defaulted loan. However, the banks can hedge this risk by investing their own funds in bonds with a corresponding maturity, thus being able to fulfil their obligation to the bondholder with the proceeds from the own funds, no matter how the interest rate develops. In other words, the provision guarantees a certain minimum capacity of the own funds to fulfil the liquidity and collateral buffer functions.

#### **Measures safeguarding against credit risk**

Credit risk is usually defined as the ability or willingness of the borrower to fulfil the

obligations *vis-à-vis* the MCI. Potential credit risk can in general be divided into two overall factors: the risk of the borrower defaulting and the loss position when the default has occurred. In general the first of these is usually minimised by efficient screening of the financial strength and track record of the potential borrower, and the second by efficient screening of the value of the collateral. Borrowers might default either willingly or unwillingly. For example, an *unwilling* default might occur after an unforeseen drop in income making the borrower unable to service the loan (illiquidity). Illiquidity is usually seen as a necessary but not sufficient condition for unwilling default, as the borrower usually will try to realise the property before defaulting. A *willing* default would occur if the market value of the property falls below the value of the mortgage. In the latter case, the mortgage loan is seen as including an option giving the borrower a right to deliver the property to the lender and thus avoiding repayment on the loan. However, the value of the option is limited by 'transaction costs', i.e. lower credit rating in the future, moving expenses and the risk of losing other assets or future income.

The credit risk of the Danish MCIs is minimised by the demand that all loans must be secured by a mortgage on real property. And, as mentioned earlier, the MCIs in Denmark, therefore, only to a limited extent focus on the financial strength of the potential borrower when granting loans. The lack of borrower screening, however, emphasises the importance of efficient screening of the value of the collateral. If the borrower defaults, the MCI has a right to force a sale of the property, thereby getting the means to cover the value of the mortgage plus accumulated unpaid interest and expenses. If the sale of the property does not produce a sufficient amount of money to cover the mortgage debt in full, the borrower is per-

sonally liable for the remaining unpaid debt. The fact that the borrower in case of default not only loses the property but also runs the risk of losing other financial assets or future income in itself limits the probability of willing default.

In some cases MCIs have granted loans on condition that borrowers funding their loans in the same mortgage series, in addition to their liability for the payment of their own debt, should be jointly and severally liable for the payments of the total debt within the group. If the MCI experiences losses of such a magnitude that it no longer fulfils the minimum capital requirements, it can demand extraordinary payments from those borrowers who are jointly and severally liable. This type of 'collective liability' spreads the credit risk from the MCI to the borrowers in those cases where the MCI experiences major losses. The joint and several liability has not been applied in Denmark in modern times.<sup>9</sup>

A central prerequisite for the efficient use of mortgages is the strong legal position of the mortgage. This position is primarily created through the requirement of registration of the mortgage in a registration system, the existence of a priority rank, and an efficient and fast foreclosure procedure.

The requirement of registration solves the problem of establishing whether the property has been used as collateral for another loan. It also solves in advance any disputes over the existence of a mortgage, as the registration is the constitutive act which completes the mortgaging. It is a prerequisite of this kind of registration system for mortgages that all land in Denmark is registered and can be unequivocally identified and demarcated through a title number. The title number system is administered by a department under the Ministry of Housing and Building.

If a property is sold by compulsory sale



the claims from lenders with a registered right are separated from the mass and are then paid (if possible) in order of priority, ie the first mortgage gets paid in full before any second mortgages. Mortgage loans are primarily secured by a first mortgage. This priority rank is stipulated both in the provisions of the deed and usually respected in standard terms for other registered documents of right.

In the case of default by the borrower it is important that the foreclosure procedure is fast and cost efficient. This, firstly, ensures that the part of the value of the borrower's option of willingly defaulting that stems from a 'rentfree' period of possession after payments have ceased, is as small as possible. Secondly, it assures that the value of the mortgage is not diminished by legal expenses. Thirdly, that the accumulated non-paid interest is minimised.

Another measure safeguarding the MCI against credit risk is the valuation rules laid down in the mortgage credit act. The maximum LTV rule constitutes the primary safeguard measure in this area. However, it cannot be seen disconnected from the rules governing the actual valuation of the property.

In Denmark, the maximum LTV for owner occupied dwellings is 80 per cent of the value of the property at the time of borrowing. The 'haircut' of 20 percentage points of the value serves three purposes. First, it provides a safeguard against adverse price movement from the time of borrowing to the time of a forced sale of the property. Second, the haircut creates 'excess value' to cover not only the principal of the loan but also any unpaid interest and expenses related to the foreclosure procedure. Third, the haircut lowers the probability of a borrower willingly defaulting. This effect arises because the price movements needed to make the value of the property fall below the value of the mortgage rises with the size of the haircut.<sup>10</sup>

Fourth, the haircut creates a hidden reserve to take account of any mistakes made in the valuation of the property. However, explicit rules for the prudent valuation of property should minimise the risk of the latter.

The primary valuation rule stipulates that valuation has to be made on a cash basis reflecting the market value of the property. However, the value assessed cannot exceed the price a skilled purchaser 'with a knowledge of the local market and price conditions would pay for the property'. This rule safeguards against a relaxation of the underwriting standards in the MCI. It also serves to protect against a situation where more or less fictive traders are made with the sole aim of increasing the size of the loan. Finally, when making the valuation the MCI shall take into consideration special market and structural conditions so that valuation made during a boom in the housing market reflects the risk of possible future adverse price movement.

The measures safeguarding against credit risk have proved to be very effective in the Danish case. The losses and provisions of Danish mortgage credit institutions amounted to a record low of 580.7m DKK in 1996. Measured in relation to the 854bn DKK of outstanding loans, losses and provisions amounted to a mere 0.07 per cent in 1996, down from 0.14 in 1995.

### Summary

The most important safeguard measures in the Danish mortgage credit system are:

- the 'balance principle' eliminating interest risk in connection with the lending operations
- the requirement that loans are to be based on registered mortgages on real property
- the strong legal position of the mortgage

- the valuation rules, setting maximum limits for the size of the loan relative to the value of the property and ensuring conservative valuation of the property
- the capital requirement of at least 8 per cent of the risk-weighted assets
- a monopoly to the name 'realkreditobligationer' (mortgage bonds)
- the bondholders' preferential claim to the assets of the mortgage bank in case of bankruptcy, and
- a strong supervisory regime.

These safeguard measures have been able to ensure the stability of the mortgage credit system through the 200-year history of mortgage credit in Denmark.

### CONCLUSION

In the above, the Danish system of mortgage financing has been described with the aim of introducing the basic safeguard measures chosen to protect this particular system.

The primary focus has been on the safeguarding of investor interest, and the subsequent minimisation of the credit risk premium connected to mortgage bonds. As has been shown, the safeguards of the Danish system in this respect are primarily aimed at ensuring the quality of the MCIs balance sheet.

Ensuring this aim has resulted in a rather tight regulation of the MCIs' activities. In this connection it is important to note that most regulation has a hidden cost through the loss of economic efficiency. Therefore, regulations in general should be kept to a minimum.

Also the regulation of the banks, here described in the form of basic safeguard measures, cannot be seen isolated from the general economic environment. The structure of the underlying economy, the arrangement of the housing market, the inflation rate, the legal environment, tax regimes, the existence of a domestic and/or

an international investor base and changes in these variables affect the overall stability of the system, no matter how many safeguard measures of a technical nature are introduced to protect the system from adverse business conditions.

### REFERENCES

- (1) An earlier version of this paper was presented at an OECD Workshop on Housing Finance in Central Europe held in Budapest on 24–25 June 1996. The views presented in the paper are those of the author and should not be interpreted as necessarily indicating the position of Danmarks Nationalbank.
- (2) Cf. the Mortgage Credit Act, October 1996 (in Danish only).
- (3) In reality the business range of the MCIs is broader than just the granting of loans against mortgage on real property. They are allowed to perform other activities closely connected to mortgage banking, and conduct insurance and banking activities in the form of subsidiary companies.
- (4) Danmarks Nationalbank, Monetary Review, Third Quarter 1997.
- (5) Average in July 1997: US\$ 100 = 628.04 DKK.
- (6) Cf. eg Jakobsen, S. (1992) 'Prepayment and the Valuation of Danish Mortgage-Backed Bonds', Department of Finance, Aarhus School of Business.
- (7) A limited degree of imbalance is allowed for within the general balance principle and it is, therefore, possible to fund loans with bonds that do not exactly match the loan. However, in most cases the MCIs, at their own initiative, use a strict balance principle where for each loan the payment of interest and instalments within a calendar year is identical to the sum of interest and instalments/drawings for early redemption paid to the bonds issued to fund the loan.
- (8) Liquidity risk arises if eg a 30-year loan is funded with a 5-year bond. The liquidity risk is attached to the situation where the MCI after five years is unable to sell a new bond to cover the loan.

- (9) The joint and several liability is still being used by some of the MCIs. However, this has more to do with the fact that the minimum capital requirements laid down by Danish legislation have been less for institutions granting loans under these terms than the potential dispersal of credit risk.
- (10) In other words the price volatility needed to put the 'option' of delivering the property to the MCI, 'in the money' rises, when the equity stake is high. However,

this argument is only valid if the part of the property not financed by a mortgage loan is financed through borrower equity. In most cases the borrower finances the property through both a primary mortgage loan and a 'top-up' loan with higher instalments than mortgage loans. A low LTV ratio can then, *ceteris paribus*, in fact raise the probability of the borrower unwillingly defaulting, as a high proportion of top-up loans raises the total financing costs.