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# Mortgage Arrears

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## INTRODUCTION AND SUMMARY

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The vast majority of Danish families with mortgage debt service their debt on time. The number of families falling behind on their mortgage payments has remained at a low level since the mid-1990s. Even the strong downturn in the Danish economy during the financial crisis resulted in only a minor rise in the level of mortgage arrears for Danish families.

However, the question is whether the arrears rate can be expected to remain at the current low level in future. Danish families have far more debt relative to income than families in other countries. This has caused some concern among observers as to whether the families will be able to service their debt, especially if the Danish economy is affected by another serious downturn. If a sufficient number of families turn out to be unable to meet their obligations to the mortgage banks, this could undermine confidence in the mortgage banks' credit standing.

In Part 2 of this Monetary Review we discuss how families in mortgage arrears differ from other families with mortgage debt, cf. Andersen and Duus (2013). Furthermore, we estimate how the probability that a family will fall into mortgage arrears depends on a number of key financial variables for the family concerned. This overview article provides a non-technical summary of the most important findings and conclusions of the analyses.

Our results show that, as expected, there is a clear relationship between a family's finances and the probability that the family will fall into mortgage arrears. The smaller the family's disposable amount, the greater its income loss in recent years, the larger a share of income after tax it uses to service the debt, the smaller its holdings of liquid assets and home equity, and the smaller its pension wealth – the higher the probability of the family falling into arrears will be. The effects are limited in size, however, and for most families, even considerable financial hardship would lead to only a small increase in the arrears probability. This reflects that mortgage arrears are very rare, even among families whose finances are under pressure.

At the aggregate level, these results indicate that even severe setbacks in the Danish economy cannot be expected to lead to a surge in the number of families in mortgage arrears. The vast majority of Danish families service their mortgage debt on time – even when their finances become tighter. Nor are there any indications that the high level of arrears seen in the early 1990s will return, even in the event of a very severe recession in the Danish economy. Consequently, in our assessment, this poses no serious threat to the credibility of the mortgage credit system.

There is no doubt, however, that an economic downturn of the magnitude considered in our stress scenarios would give rise to substantial loan impairment charges in the overall financial sector. The results merely indicate that the loan impairment charges will not be seen primarily in the mortgage credit sector. This is because the mortgage loan is often the last item of debt that a family with a tight budget defaults on. Before that, the family may have defaulted on other loans, including from banks. One of the reasons may be that for borrowers the consequences of default are greater for mortgage loans than for bank loans. Banks are less inclined to require a property to be sold through enforced sale, since only the last-ranking part of the property value is pledged to the bank, cf. the Danish Financial Supervisory Authority (2011). So there is no doubt that the banks will have to post considerable loan impairment charges in the stress scenarios analysed. That underlines the importance of Danish banks being sufficiently well-capitalised.

## **CONSEQUENCES OF MORTGAGE ARREARS**

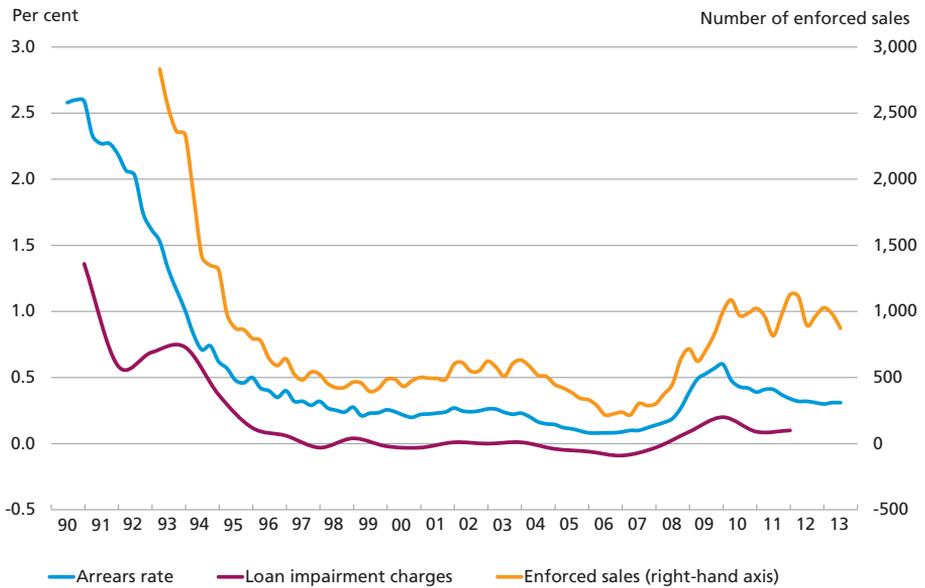
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Mortgage arrears may have considerable consequences for the borrower and the mortgage bank alike. When a family gets behind on its mortgage payments, this may lead to the home being sold through enforced sale. If the proceeds from the sale are insufficient to cover the mortgage bank's claim, the mortgage bank will incur a loss. In principle, the mortgage banks should therefore write down the value of the loan once the borrower falls into arrears.

The correlation between arrears on the one hand and enforced sales and loan impairment charges in the mortgage credit sector on the other has been close in the last 20 years, cf. Chart 1. In the early 1990s, when the number of families in arrears was significantly higher than today, the number of enforced sales and mortgage banks' loan impairment charges were also at a much higher level than today. Likewise, the increase in arrears in the wake of the financial crisis in 2008-09 was followed by in-

ARREARS, ENFORCED SALES AND MORTGAGE BANKS' TOTAL LOAN IMPAIRMENT CHARGES

Chart 1



Note: The arrears rate indicates the percentage of the total payments that had not been made three and a half months after the due date. The calculation includes lending by all mortgage banks for owner-occupied dwellings and summer cottages. The calculation of the number of enforced sales only includes single-family houses, owner-occupied flats and summer cottages. Total loan impairment charges comprise lending to retail and corporate customers and are stated as a percentage of total lending and guarantees.

Source: Association of Danish Mortgage Banks, Danish Mortgage Banks' Federation and Statistics Denmark.

creases in both enforced sales and loan impairment charges. But neither variable returned to the high level of the early 1990s. The close correlation between arrears and loan impairment charges implies that the level of arrears is a relevant indicator of the soundness of the mortgage credit sector.

Presumably, there are many reasons why mortgage arrears are much less common today than in the early 1990s. Undoubtedly, macro-economic developments with reduced unemployment and falling real interest rates have played a major role. In addition, certain structural conditions also contributed to the arrears rate being unusually high in the early 1990s. First and foremost, the tax reform in the mid-1980s reduced the taxation value of interest costs. At the same time, credit facilities for owner-occupied homes were restricted to 20-year mixed loans. Subsequent liberalisation of mortgage credit legislation in 1992 and 1993 and the introduction of adjustable-rate and deferred-amortisation loans in 1996 and 2003, respectively, probably contributed to the substantial drop in the arrears rate. In addition, mortgage banks tightened the procedures for customers in financial difficulties in the

early 1990s. This may have contributed to a change in behaviour among some mortgage customers, since the consequences of defaulting on loans were now greater and set in more quickly.

Presumably, the swift and significant consequences of mortgage default are among the main reasons why mortgage arrears are less common in Denmark than in most other countries. Denmark differs from most other countries by having a fast and cost-effective legal procedure for the handling of defaulted mortgage loans, cf. Duygan-Bump and Grant (2009). Moreover, Danish mortgage banks maintain a claim against the borrower if the proceeds from the sale of the home are insufficient to cover the remaining debt. This is a significant difference compared with e.g. large parts of the US housing market, where borrowers are not personally liable for their loans. So if the property value is lower than the remaining debt, some US borrowers may have an incentive to default on their loans and let the lender take over the home, since this means they are no longer liable for the remaining debt. In contrast, Danish borrowers have strong incentives to service their mortgage debt and avoid enforced sale. This contributes to the robustness of the Danish mortgage credit system.

## THE RELATIONSHIP BETWEEN ARREARS AND FAMILY FINANCES

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The analyses in Andersen and Duus (2013) are based on detailed data from mortgage banks coupled with register data from Statistics Denmark. The data material from mortgage banks contains information about all outstanding mortgage loans to private individuals, calculated at the end of 2009, 2010 and 2011. For each loan, it is stated e.g. whether the borrower had arrears of more than kr. 1,000 on the June instalment.

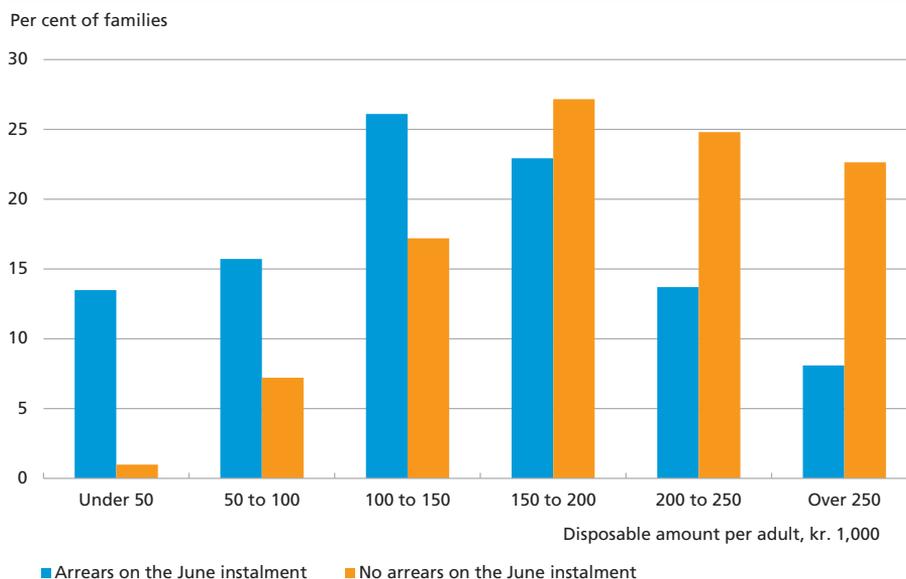
Of the just over 1 million families with mortgage debt at end-2011, approximately 3,350 were at least three and a half months behind on their mortgage payments for June 2011. These families had a lower average disposable amount per adult than the other families with mortgage debt, cf. Chart 2. The disposable amount is calculated as the family's total income after tax, less all interest costs, administration margins and any principal payments on mortgage debt.<sup>1</sup> For 13 per cent of families in arrears on the June instalment, the disposable amount per adult was less than kr. 50,000 in 2011. Among the families paying their mortgages for the June instalment on time, the corresponding figure

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<sup>1</sup> Any maintenance payments and repayment of social benefits are also deducted when calculating the disposable amount. Principal payments on debt other than mortgage debt are not deducted due to lack of data.

**DISTRIBUTION OF DISPOSABLE AMOUNT PER ADULT AMONG FAMILIES WITH MORTGAGE DEBT, 2011**

Chart 2



Note: The disposable amount per adult is calculated as the family's total annual income less tax, interest payments, maintenance payments, repayment of social benefits, administration margins payable to mortgage banks and any principal payments on mortgage debt – divided by the number of adults in the family. Families with members who are self-employed are not included in the chart. The same applies to families with members who are not fully liable to Danish income tax, and families with an annual income after tax of less than kr. 25,000.

Source: Own calculations based on data from mortgage banks and from Statistics Denmark.

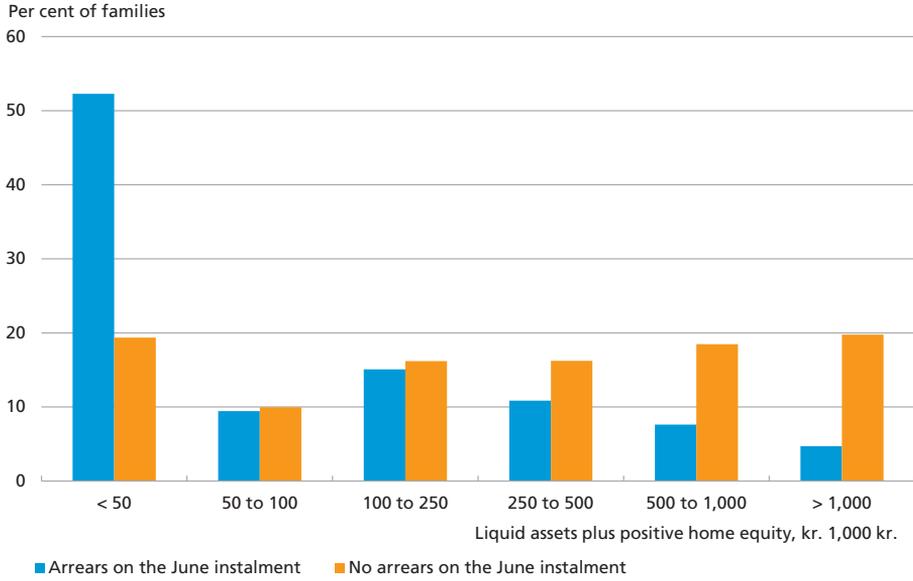
was 2 per cent. Similar differences between the two groups applied in 2009 and 2010.

In terms of wealth, there is also a big difference between the two groups of mortgage customers, cf. Chart 3. Among the families who were behind on their mortgage payments for the June instalment of 2011, more than half had liquid assets of less than kr. 50,000 at the end of the year. This includes any positive home equity in the family's mortgaged property/properties. Among the other families with mortgage debt, this applied to just under 20 per cent.

For the families who were in arrears by 105 days on the June instalment of 2011, the average remaining debt on their mortgage loans more or less equalled that of the other families with mortgage debt. But the size of the remaining debt varied slightly more among the families in arrears. As regards the distribution of the remaining debt on various loan types within the two groups, deferred-amortisation loans prove to be somewhat more widespread among the families in arrears, cf. Chart 4, whereas the share of adjustable-rate loans is more or less the same in the two groups of mortgage customers. A possible explanation of the more widespread use of adjustable-rate loans among families in arrears

**DISTRIBUTION OF LIQUID ASSETS PLUS POSITIVE HOME EQUITY IN MORTGAGED PROPERTIES AMONG FAMILIES WITH MORTGAGE DEBT, 2011**

Chart 3

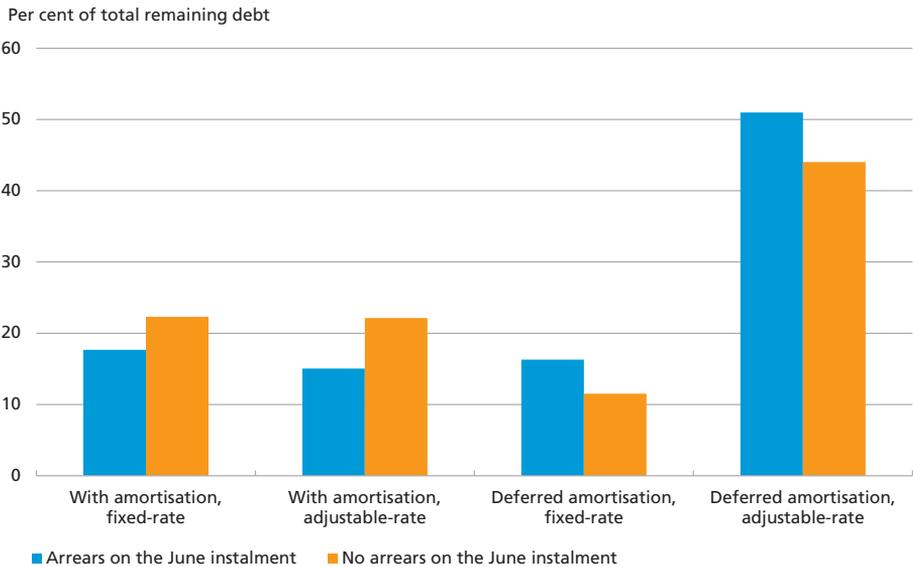


Note: Liquid assets consist of the family's deposits in banks and the market value of bonds, mortgage deeds, stocks and investment certificates in the custody of a bank. Home equity is calculated as the difference between 80 per cent of the property valuation (60 per cent for summer cottages) and the amount of mortgage debt on the property. Families with members who are self-employed are not included in the chart. The same applies to families with members who are not fully liable to Danish income tax, and families with an annual income after tax of less than kr. 25,000.

Source: Own calculations based on data from mortgage banks and from Statistics Denmark.

**MORTGAGE CUSTOMERS' REMAINING DEBT BROKEN DOWN BY LOAN TYPE, 2011**

Chart 4



Source: Own calculations based on data from mortgage banks and from Statistics Denmark.

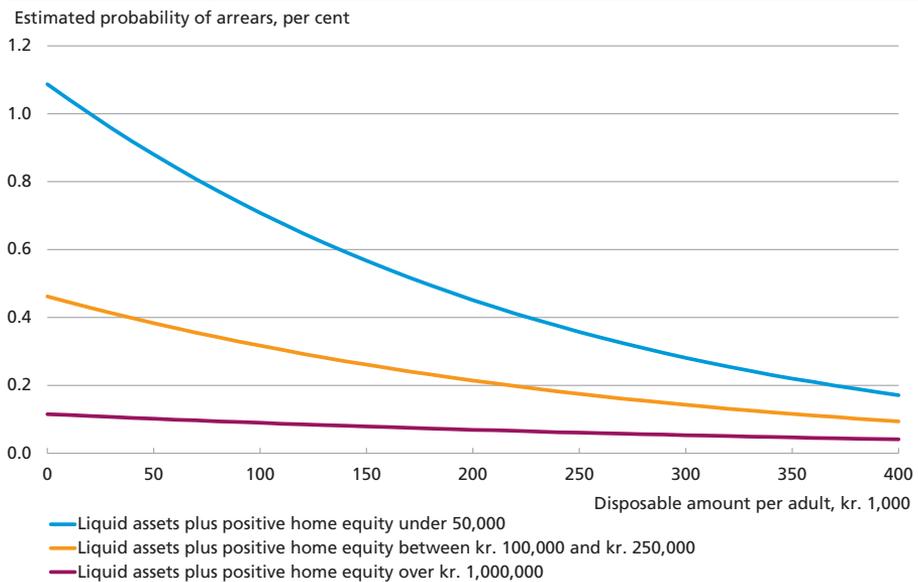
that some of these families use deferred-amortisation loans as a means to counter temporary financial difficulties. Obviously, this is only possible if they did not already fully exploit the deferred-amortisation option before the problems occurred.

In Andersen and Duus (2013) we estimate an econometric model describing how the probability of a family falling into mortgage arrears depends on its financial situation. At the same time, a number of other conditions are taken into account, including the size of the family, the age of its eldest member, the geographical region of residence, and whether the family was affected by social events such as illness or divorce.

As expected, the estimations show a clear statistical relationship between the level of mortgage arrears and the family's finances. The greater the family's income loss in recent years, the larger a share of income after tax it uses to service its debt, and the smaller its pension wealth – the higher the probability of the family falling into arrears will be. Moreover, the smaller the family's disposable amount per adult and the smaller its holdings of liquid assets plus positive home equity – the higher the arrears probability will be, cf. Chart 5. The two latter vari-

RELATIONSHIP BETWEEN ANNUAL DISPOSABLE AMOUNT, LIQUID ASSETS PLUS POSITIVE HOME EQUITY AND PROBABILITY OF ARREARS IN THE FOLLOWING YEAR

Chart 5



Note: The chart shows the average estimated probability of arrears for various combinations of disposable amounts and holdings of liquid assets plus positive home equity in mortgaged homes. For each combination of disposable amounts and assets, an estimated probability of arrears is calculated for each individual family, given the family's other characteristics. The probability is calculated under the assumption that the family has had the disposable amount in question (or less) for minimum three years. After the probability of arrears has been calculated, the average for all families is calculated.

Source: Own calculations based on data from mortgage banks and from Statistics Denmark.

ables also interact: The size of the disposable amount has a greater impact on the probability of arrears if the family's liquid assets are small than if they are large. This is because liquid assets and positive home equity can often serve as a financial buffer. Families holding large liquid assets are consequently better able to handle having a modest disposable amount.

The example above illustrates that the impact on the probability of arrears of changes in the key financial variables varies considerably among the families in the analysis. But for the *average* family, the probability of arrears does not change very much when the financial situation changes. For example, reducing the annual disposable amount by kr. 10,000 per adult in the family will increase the probability of arrears by only 0.01 percentage point for an average family. This means that only one out of 10,000 families would fall into mortgage arrears if their disposable amount per adult was kr. 10,000 lower. Similar results are found for the other key financial variables. The modest effects reflect that the share of families in arrears on their mortgage debt is very small, even among those groups of families whose finances can be said to be tight.

## **EXPECTED DEVELOPMENT OF ARREARS IN STRESS SCENARIOS FOR THE DANISH ECONOMY**

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The estimated model can be used to assess how the number of families in arrears can be expected to develop in different scenarios for the Danish economy. In the article in Part 2, we use historical cases as a source of inspiration to set up two scenarios in which the Danish economy is assumed to be affected by a very serious downturn. We then calculate the expected consequences for the number of families in arrears. The assumptions and calculated consequences in each scenario are summarised in Table 1. Both scenarios assume a sudden rise in unemployment, while real house and stock prices plummet. In addition, scenario 1 assumes a strong increase in the level of interest rates, while interest rates remain unchanged in scenario 2.

The marked macroeconomic changes have only a modest impact on the average probability of arrears among families with mortgage debt. Translated into the number of families in arrears on their mortgage debt, the result is an expected increase of approximately 2,800 families in scenario 1 and approximately 1,200 in scenario 2. Compared with the actual number of families in mortgage arrears, the increases are of a considerable magnitude. But it should be noted that, as previously mentioned, the actual number of families in mortgage arrears is very low. In

EXPECTED EFFECTS IN SCENARIOS	Table 1	
	Scenario 1	Scenario 2
<i>Macroeconomic assumptions</i>		
Change in interest rates, percentage points .....	5.7	0.0
Change in gross unemployment, percentage points .....	4.0	4.5
Change in house prices, per cent .....	-14.0	-16.5
Change in stock prices, per cent .....	-46.0	-46.0
<i>Estimated consequences</i>		
Average change in probability of arrears for all families with mortgage debt, percentage points .....	0.29	0.13
Expected increase in the number of families in arrears by 105 days on the June instalment .....	2,816	1,236
Expected increase in total mortgage debt for families in arrears by 105 days on the June instalment, kr. billion .....	5.28	1.83

Note: A more detailed description of the estimation methods can be found in Andersen and Duus (2013).

Source: Own calculations based on data from mortgage banks and from Statistics Denmark.

absolute terms, the effects are very modest. Thus, a sharp increase in the incidence of mortgage arrears is not likely, even if the Danish economy is affected by a very serious downturn.

However, it is important to make it clear that the analyses solely review the consequences for mortgage arrears. Our results do not say anything about the expected consequences for families' defaulting on their loans from e.g. banks. It is likely that an economic downturn of the magnitude considered in our stress scenarios will lead to a great many families finding it difficult to service their debt, which will give rise to substantial loan impairment charges in the overall financial sector. The analyses in Andersen and Duus (2013) indicate that the financial difficulties and the resulting loan impairment charges would be very limited in the mortgage credit sector. On the other hand, this seems to indicate that the banks' loan impairment charges will be considerable. By combining the macroeconomic assumptions in our scenario 1 with estimation results from Abildgren and Damgaard (2012), it is possible to calculate an expected immediate increase in banks' loan impairment charges on lending to private households of approximately 1 per cent of total lending. The corresponding figure for scenario 2 is 1.2 per cent. These estimates support the view that the consequences of a serious macroeconomic downturn will be considerably greater for banks than for mortgage banks.

## LITERATURE

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Abildgren, Kim and Jannick Damgaard (2012), Models for banks' loan impairment charges in stress tests of the financial system, Danmarks Nationalbank, *Monetary Review*, 1st Quarter, Part 2.

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