

■ Swedish households' indebtedness and ability to pay – a household level study*

MARTIN W. JOHANSSON AND MATTIAS PERSSON

Household borrowing has increased considerably in a number of developed countries in the past two decades, both in absolute terms and relative to household income. This has raised concerns about the sustainability of household debt, the household sector's vulnerability and possible implications for the stability of the financial system and banks' loan losses. Given the inherent limitations of analysing aggregate data, such as the mixing of debt holding and non-debt holding households, in its analysis of the household sector's balance sheet the Riksbank has increasingly turned to micro data. Furthermore, this approach allows stress testing of the ability to pay in the household sector. The purpose of this paper is to give a detailed exposé of how the Riksbank uses micro data for analysing the debt-carrying ability of the household sector. What the data tell us, in brief, is that the distribution of household debt in Sweden is highly skewed towards high income earners who also hold a large portion of the household sector's assets. The results also indicate that, despite the considerable increase in household indebtedness in the past decade, Swedish households do not seem particularly vulnerable to rising interest rates or rising unemployment.

Keywords: household indebtedness, income distribution, micro data, stress testing

Introduction

Household borrowing has increased considerably in a number of developed countries over the past two decades, both in absolute terms and

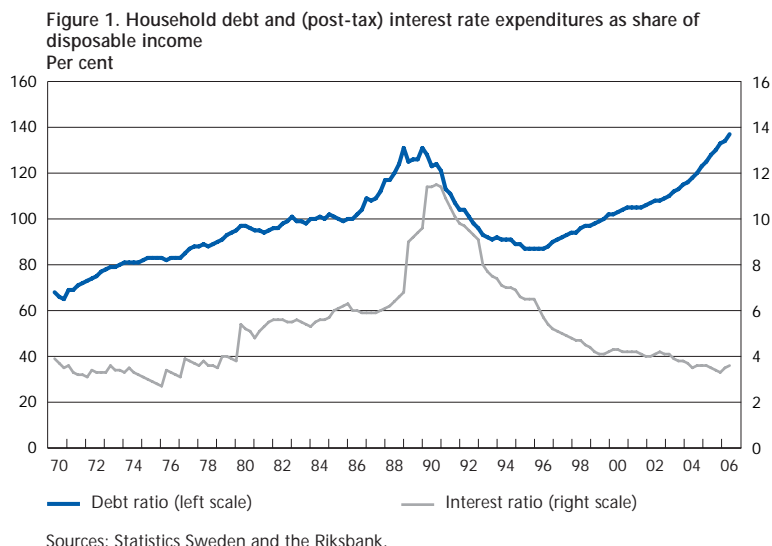
* The views in this paper are solely the responsibility of the authors, and do not necessarily reflect the views of the Executive Board of Sveriges Riksbank.

relative to household income (see Debelle (2004) and CGFS (2006)). The increase can be attributed to a number of factors, and structural differences between countries might help to explain why households in some countries have increased their indebtedness more than those in other countries. Two important factors behind the increased indebtedness in developed countries are probably: financial deregulation in the early 1980s, which reduced the level of credit rationing, and the lower levels of interest rates, in both nominal and real terms. At present, the aggregate household debt ratio (household debt as a share of disposable income) in Sweden stands close to 140 per cent, which is roughly twice the figure for 1970. The Swedish credit markets were deregulated in the mid 1980s and this was followed by a rapid increase in household debt (see Figure 1). Sweden's dismal macroeconomic history in the early 1990s is well known and came about when the onset of a global economic slowdown coincided with both an ultimately untenable defence of the Swedish krona and a major overhaul of the tax code.¹ The ensuing sharp rise in interest expenditures placed an excessive burden on households, who responded by sharply cutting borrowing. In the following years, the debt-to-income ratio fell to levels well below those in the period of credit de-regulation (see Figure 1). The mid 1990s saw a renewed increase in the debt burden of Swedish households and this increase has continued up to the present, with debt ratios returning to the levels from just before the banking crisis in the early 1990s (see Figure 1). However, although the debt ratios are almost the same now as then, the current situation differs in a number of important respects. This is evident in the evolution of the interest ratio (interest expenditures as a share of disposable income). Whereas this share rose during the build-up of household debt in the 1980s, in the past decade it has fallen continuously and is now almost at an historic low (see Figure 1). Nonetheless, the increase in indebtedness has raised concerns about the sustainability of household debt, the vulnerability of the household sector and possible implications for the stability of the financial system and banks' loan losses. The purpose of this article is to study the indebtedness and ability to pay of individual indebted households, in order to see if there is a risk of "over-borrowing" and potential significant loan losses in the banking sector. Furthermore, we study what effect macroeconomic shocks, i.e. higher interest rates and increased levels of unemployment, would have on the indebted households' ability to pay.

The situation in recent years has raised questions not only about what the sharp expansion in credit could entail for the vulnerability of the household and banking sectors, but also how the domestic macroeco-

¹ For an excellent account of the Swedish banking crisis in the early 1990s, see Englund (1999).

conomic environment could be affected if this development were to cease. However, this article focuses on the direct stability aspects of the debt situation and leaves any effects on the general macro economy open. The analysis has been performed on wealth and income data from Statistics Sweden for Swedish households in 2004, the most recent data available.



In Section 2, we present the data used in the analysis. This is followed in Section 3 by a bird’s-eye view of the distribution of income, assets, liabilities and ability to pay within the Swedish household sector. In Section 4, we stress the household sector’s balance sheet, with regard to changes in rates of interest and unemployment. We also estimate households’ present vulnerability, their indebtedness and ability to pay, given the recent changes in interest rates, disposable income and indebtedness at the aggregate level. In Section 5, we summarise and conclude.

The data set

As mentioned in the introduction, the increase in indebtedness has raised concerns about potential effects on the stability of the financial system, if interest rates or unemployment were to rise. These are vital questions, but trying to answer them using aggregate data from the financial and national accounts will prove difficult, if not impossible. Aggregate data on income do not distinguish between indebted and non-indebted households, where the latter are irrelevant for analysing potential loan losses. Moreover, aggregate data tell us nothing about the distribution of debt, interest expenditures and income. Hence it is possible that pockets of vul-

nerability are masked by financially sound segments of the household sector. Given these limitations, the Riksbank has increasingly turned to micro data, more specifically to the HEK survey, for analysing the household sector's balance sheet. The HEK survey, which is compiled by Statistics Sweden (SCB), is a detailed annual survey of the household sector with data on income, debt and wealth. The survey is based on administrative register information collected from government bodies responsible for income transfers and taxation. Furthermore, approximately half of the participating households are selected for interviews. Each household in the survey is assigned a population weight that corresponds to the number of households in the population which that household represents. This makes it possible to aggregate the micro data for comparisons with data from either the national or the financial accounts. The survey has also been used for more academic purposes; see for example Andersson (2001), Bergmark and Palme (2003), Klevmarken (2003) and Flood et al. (2004).

The number of households in the survey varies, depending on how a household is defined. A household can be defined either as two adults living together (or one adult living alone), with children below the age of 18, or, basically, as all the individuals living under one roof. Using the first definition of a household, the number of participating households is about 20,000. With the second definition, the number is about 17,000. Hence, obviously, the latter definition is more inclusive in its definition of a household. For example, a grown-up child living with his, or her, parents, would count as a separate household using the first definition, but would be included in the parents' household using the second definition.

It is not immediately clear which definition should be used. An example will hopefully clarify the choice at hand. In general, there is a return-to-scale effect of individuals living together with regard to living costs. Thus, for example, a 20-year-old male living with his parents may look financially constrained until one takes into account that his parents are paying for at least some of his running costs. This would suggest that the more inclusive household definition should be used, as it more accurately depicts the conditions "on the ground". However, while his parents may help out with his daily running costs, it does not follow that they would bail him out if he took on debt and were unable to fulfil his debt obligations. Hence, since the focal point of the exercise is loan losses, the Riksbank works with the first, less inclusive definition. In our example, this would mean that our 20-year-old male is counted as a separate household even though he is living with his parents. However, one should not overstate the consequence of which household definition is used. Most of the households look the same, regardless of which definition is used. This

is particularly true of households in the higher income echelons, where, as we shall see, most of the debt in the household sector is concentrated.

While the survey gives a detailed insight into the economy of the household sector, it suffers from publication lags. Statistics Sweden calculates a preliminary version of the survey, which does not include any data on household wealth, about 15 months after the end of a year. The final version of the survey is released a few months later and contains data on households' wealth, besides an adjustment of the sample from the preliminary survey to better match the population. The final version of the survey is released quite soon after the preliminary version, so the preliminary one is used only when the Riksbank's Financial Stability Report is published in the window between their publication.

Another obvious limitation is that the survey only covers assets, liabilities and income that are reported to the authorities. In practice, this means that the survey underestimates households' disposable income, due to wages from the informal sector. It is also likely that the size of assets is underestimated, due to offshore investments that are not properly reported to the tax authorities. On the other hand, there is no incentive to underreport debts, partly because the interest expenditures are tax-deductible, but also because a reported lower net wealth means a lower (or zero) wealth tax. Moreover, real assets are basically defined as real estate, ignoring assets such as jewellery, mink furs, and cars.

Debt, income, wealth and the ability to pay in the Swedish household sector

To analyse the distribution of debt, income, wealth and ability to pay, the household sector is divided into five equally large categories, according to their level of disposable income. The ultimate purpose of the analysis is to find pockets of vulnerability, which, under stress, may translate into loan losses in the banking sector. Households that do not hold any debt, and hence are unable to cause any loan losses, are excluded from the analysis, unless otherwise stated. Thus we study only the indebted households within each income category.² Descriptive statistics for the five income categories can be found in Table 1. There it will be seen that high disposable income, high indebtedness and large assets tend to go hand in hand. Note that since we only study indebted households, the number of included households varies between the income categories. In the lowest category, only 18 per cent of the households hold debt and have positive

² Besides excluding non-debt holding households, we exclude households with a negative disposable income. A household can, for example, have a negative disposable income if it earns zero (or close to zero) income on labour and/or capital while at the same time paying property or wealth tax.

disposable income. This share rises across the income categories; in the highest, 93 per cent of the households hold debt. It is also instructive to compare the debt and interest ratios in Table 1 with those calculated from aggregate data (see Figure 1). While the aggregate debt ratio in 2004 hovers just above 120 per cent, the highest income category has a debt ratio above 190 per cent. The household sector also seems to have sufficient collateral to back the liabilities, as can be seen from the “assets-to-liabilities” row in Table 1. All income categories have, on average, assets worth more than twice the value of their liabilities.³

A more thorough investigation of the data set shows that the differences can also be quite large within the individual income categories. The most heterogeneous group is category 1. Characterising this group is difficult because it consists of individuals with very different life situations. The statistics show that a major part of these households do not have employment, income, assets or liabilities. Moreover, as can be seen from Table 1, the mean disposable income in this category is quite low and many households would find it hard to make ends meet on such incomes. Hence, there is reason to be sceptical about the quality of the data in the lowest income category.

TABLE 1. INCOME, ASSETS AND LIABILITIES OF INDEBTED HOUSEHOLDS IN 2004

Mean values in thousands of SEK unless otherwise specified

Income category	1	2	3	4	5
Disposable income	78	133	192	288	467
Financial wealth	53	68	105	240	516
Real wealth	317	324	491	911	1843
Debt	177	155	255	450	901
Debt ratio (per cent)	185	117	133	156	193
Interest ratio (per cent)	3.9	3.4	4.2	4.9	5.7
Assets-to-liabilities (per cent)	283	290	265	273	278
Included households (per cent)	18	44	61	82	93

Note 1: 1 SEK corresponds to 0.11 euro, or USD 0.13.

Note 2: The definition of household debts excludes study loans.

Note 3: The debt (interest) ratio is defined as household debt (interest expenditures) divided by household disposable income.

Note 4: The last row in Table 1 shows the share of households for each income category that are included in the analysis (i.e. are indebted and have a disposable income larger than zero).

Sources: Statistics Sweden and the Riksbank.

³ Total assets include households' financial assets including insurance saving, and the market value of owner-occupied and tenant-owned dwellings and secondary dwellings. Other items are rental property, agricultural property and other property, including building sites. Assets also include a small miscellaneous item, "other assets".

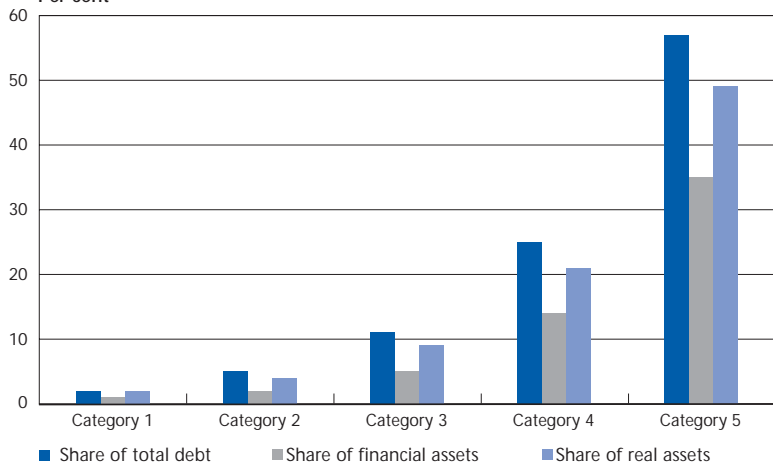
DISTRIBUTION OF ASSETS AND LIABILITIES

In total, assets constitute about 276 per cent of the value of total liabilities, but the distribution is highly skewed towards the top income earners (see Figure 2). The bars in Figure 2 should be interpreted as follows: Indebted households in the highest income category (i.e. the indebted households among the 20 percent households with the highest disposable income) hold 57 per cent of the household sector's total debt (dark blue bar). However, the same households also hold 35 per cent and 49 per cent of the financial and real assets, respectively (grey and pale blue bars). The reader should be aware, that while the debt shares for all income categories sum to 100 per cent, the shares of financial and real assets in Figure 2 do not, because some of the assets are held by households that are not indebted. In total, the indebted households hold 86 percent of the real assets, compared to only 57 per cent of the financial assets. The fact that indebted households hold a larger portion of the real compared to the financial wealth is hardly surprising in that the major share of the household debt has been used to accumulate real assets (i.e. houses and owner-occupied flats). Furthermore, comparisons with earlier years show that the distribution of assets and liabilities across the income categories is stable over time.

HOUSEHOLDS' ABILITY TO PAY

An indebted household can service its debts in two ways, from either disposable income or capital gains from selling off assets. In the longer run,

Figure 2. Indebted households' share of assets and liabilities held in 2004 by income category
Per cent



Sources: Statistics Sweden and the Riksbank.

most households would find it hard to service their debts from capital gains, so this way is presumably used as a last resort to avoid default. Unlike real assets, financial assets are relatively easy to realise, and can therefore serve as a short-term buffer against unexpected, temporary, drops in disposable income. Nonetheless, under normal circumstances, households service debts from disposable income, so a study of households' ability to pay also requires some idea of how large a proportion of the income is dedicated to interest expenditures and how much income is left when debts have been serviced. As was shown in Table 1, households with high income, in general, have both a higher interest ratio and a higher debt ratio.

In order to get an idea of households' vulnerability to changes in income or expenditure, the economic margin of household j , M_j , is calculated:

$$M_j = Y_j - iD_j - RC_j$$

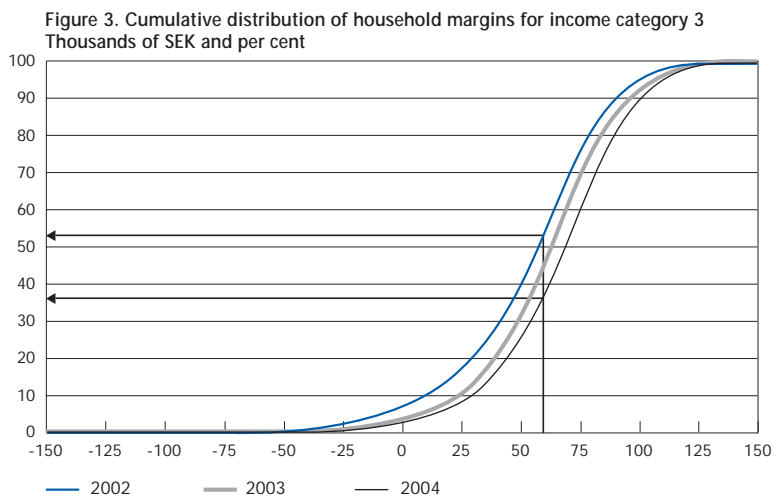
where Y_j is the household's disposable income, iD_j is the interest expenditure and RC_j are other running costs. The margins thus measure how much income each household has left after it has serviced its debts and paid the necessary living costs. A margin of less than zero means that the household would find it hard to make ends meet and might therefore default on its debts. In our analysis, we assume that the probability of a household j defaulting on its debts (p_j^D), is one if the margin is less than zero and that if the margin is larger than (or equal to) zero the household will not default.

Living costs, RC_j , consist of two components. One is what roughly can be described as day-to-day expenses, such as clothes and food. Statistics Sweden calculates the minimum each household needs to cover such costs, taking into account the household's size and composition. The other component is non-interest housing costs, such as electricity and rent. Unfortunately, the HEK survey provides no information on these costs. However, Statistics Sweden publishes another (much smaller) expenditure survey (the HUT survey), which does contain information on such costs for each income decile. To estimate these non-interest housing costs for each household in the HEK survey, we map these expenditures from the HUT survey to the HEK survey, i.e. the top ten percent earners in HEK all get the same costs as the mean of the top ten percent earners in the expenditure survey. Nonetheless, the running costs are probably somewhat underestimated, with regard to both their mean and variance. For example, we have no information on the cost of child care. Moreover, individuals who work need to transport themselves to and from work

twice a day. This can either be very cheap (walking) or expensive (car). The analysis of the ability to pay is also somewhat simplified because, in reality, a household can find it harder to realise its assets (especially real assets) or adapt to lower running costs.

A convenient way to illustrate the distribution of the households' ability to pay is to calculate the cumulative distribution of the margins for each income category, which looks like an S-shaped curve (see Figure 3). This gives an indication of how many households in each income category are below margin and how close the other households are to the margin. In Figure 3 we plot the cumulative distribution of the households' margins for income category 3 for the years 2002, 2003 and 2004.⁴ Figure 3 should be interpreted as follows: in 2002, about 53 per cent of the households in income category 3 had an annual margin of not more than 60 000 SEK. In 2004, this share had decreased to 37 per cent. Thus, the households in income category 3 have significantly strengthened their financial position between 2002 and 2004. By moving the vertical line (the one at 60 000 SEK in Figure 3) to the left and right, one quickly gets an idea of how sensitive the households in each income category are to changing income or increasing costs.

However, as the ultimate purpose of the study is to monitor potential loan losses in the banking sector, it does not suffice just to calculate the proportion of households below the margin, without taking into account their share of the household sector's total debt and the value of the assets that can be used to cover losses incurred by default. Hence, we calculate



Sources: Statistics Sweden and the Riksbank.

⁴ The households' margins for 2002 and 2003 are calculated from earlier versions of the HEK survey.

two measures: “Exposure at Default” (EAD), which measures the share of total household debt held by households with a margin less than zero, and “Loss Given Default” (LGD), which measures the share of debt held by households with a margin less than zero that is not covered by the households’ financial or real assets. More specifically, LGD is calculated as follows: if a household defaults on its debts (i.e. the household’s margin is less than zero), the creditors stand to lose a negative value of the household’s net wealth, NW_j . For example, if a household defaults on its debts and has assets and liabilities worth 8 000 SEK and 10 000 SEK, respectively, the creditor will suffer a credit loss equal to $-(8\,000 - 10\,000)$ SEK = 2 000 SEK. If net wealth is greater than (or equal to zero) the default will not incur any loan loss to the creditors because the debts are fully covered by the assets. In the example above, if the defaulting household had assets worth 12 000 SEK, the creditor would not suffer any loan losses, as the value of the assets covers the liabilities by a margin of 2 000 SEK. To calculate the projected loan loss generated by each household, we multiply p_j^D (which is either 1 or 0) by L_j (which is the negative value of net wealth, assuming that this is negative). The loan losses can then be summed, either within income categories or across the entire population. The LGDs are then defined as aggregate projected loan losses divided by the outstanding stock of household debt.

Formally:

$$p_j^D = \begin{cases} 1 & \text{if } M_j < 0 \\ 0 & \text{otherwise} \end{cases}$$

$$L_j = \begin{cases} -NW_j & \text{if } NW_j < 0 \\ 0 & \text{otherwise} \end{cases}$$

$$LGD = \frac{\sum_j (p_j^D \times L_j)}{\text{total household debt}}$$

TABLE 2. VULNERABLE HOUSEHOLDS, EAD AND LGD

Per cent

Income category	Share of households below margin in each income category	EAD (as share of total debts)	LGD (as share of total debts)
Income category 1	64.2	1.8	0.49
Income category 2	6.4	1.2	0.14
Income category 3	2.8	1.4	0.09
Income category 4	0.5	0.6	0.04
Income category 5	0.1	0.7	0.11
All income categories	6.3	5.6	0.9

Sources: Statistics Sweden and the Riksbank.

It is worthwhile stressing that our LGDs are not necessarily identical to those calculated by the banks. Our measure should be viewed as a risk metric that we are able to construct, given the data available to us, not as an attempt replicate the LGDs in the banks' loan books.

In Table 2 we calculate some statistics on the proportion of households with negative margins, EADs, and LGDs within each income category. Table 2 should be interpreted as follows: the second column lists the proportion of indebted households that are below the margin per income category; these households are also called "vulnerable" households. The next column shows the vulnerable households' share of total household debt. The last column shows the debts, held by vulnerable households in each category, that are not covered by assets, as a share of total household debt. For example, in income category 2, 6.4 per cent of all indebted households have a margin of less than zero. These 6.4 per cent, in turn, hold 1.2 per cent of all household debt. If these households were to default on their debts, their assets would be claimed by the creditors. The debt held by the defaulting households that would not be covered by the assets amounts to 0.14 per cent of the total debts held by the household sector. Repeating the exercise for all the indebted households leads to the conclusion that 6.3 per cent of all the indebted households in the survey have negative margins and thus, at least technically, run a risk of cancelling their debt servicing. Together, these households hold 5.6 per cent of total household debt. If they were to default on their debts, the creditors would suffer losses corresponding to 0.9 per cent of total household debts. This figure is substantially higher than actual loan losses as reported by the banks. Although some of the lending to households is channelled through other creditors, whose loan losses are presumably higher than those of banks and mortgage institutions, one cannot disregard the fact that projected loan losses of 0.9 per cent seem to be on the high side. In practice, it means that, according to the survey, households would default more frequently on their debts than they actually do.⁵ Another point to note is that more than half of the loan losses stem from the lowest income category, even though this category holds only 2 per cent of total household debt (see Figure 2). This supports the suspicion aired earlier, that households, especially in the first income category, have incomes and assets that are not recorded in the survey.

⁵ At the height of the banking crisis in Sweden, the banks suffered losses on their loans to households that were equivalent to 0.7 per cent of outstanding household debt.

Stress testing the household sector

In the event of a marked deterioration in the ability to pay, due for example to higher interest rates or increased unemployment, some households could encounter difficulties in servicing their debt, and banks' credit risks would mount. While the cumulative distribution of the margins, presented in the previous section, is useful for visualising the margins, it is not really useful for stress testing, unless we translate hypothetical macro-economic outcomes into shifts in the share of vulnerable households, EAD and LGD. This section presents partial arithmetic examples that show how the ability to pay and the risk of loan losses are affected by a rise in the interest rate and unemployment. The ability to pay is tested with the assumption that the interest rate is raised by 1–3 percentage points and that unemployment likewise increases by 1–3 percentage points. The effects that are studied are the change in the proportion of vulnerable households, the impact on banks' exposure to this group (i.e. the EAD) and the projected LGDs. How the proportion of vulnerable households changes, after the deterioration in their finances, indicates their sensitivity. The fraction of the households' total loans that can be attributed to these vulnerable households can be seen as a measure of the increased credit risk in lending, and the LGD as a measure of how severe the loan losses would be if the vulnerable households indeed defaulted. It should be pointed out that these partial calculations do not take account of stylized business cycle effects. Normally, interest rates rise in conjunction with more robust economic activity. Such conditions are also accompanied by stronger household income, but this has not been included in these calculations, in which income is held constant.

EFFECTS OF RISING INTEREST RATES

The sensitivity of households to changes in the interest rate depends on the fixed-rate terms of their loans. A change in rates affects households with variable-rate loans immediately, while for fixed-rate loans the effect is not felt until the loans are renegotiated. In the following calculations, the short-term effects are studied first, given the fixed-rate terms that Swedish households have on their loans.⁶ This is followed by an analysis of the long-term effects that arise when the change in the interest rate affects the entire debt stock. All the loans are assumed at that stage to have been renegotiated at the new, higher rate.

The second column in Table 3 shows the effect of a zero rise in the

⁶ About 60 per cent of the loans in the stock of household debt are at fixed rates.

interest rate, which of course simply reproduces the results from Table 2. A rise of 1 percentage point in the general level of interest rates would result in an increase in households' average interest ratio from 5.1 to 5.4 per cent in the short term. In the long run, when all loans have been renegotiated at the new, higher, level of interest, the interest ratio rises to 5.9 per cent. The proportion of households below the margin is largely unchanged (from 6.3 per cent to 6.4 per cent in the short run and 6.6 per cent in the long run). The LGDs (i.e the debts of the vulnerable households that are not covered by assets) are also essentially unaffected. Thus, the credit risk in household lending is almost insensitive to a 1 percentage point increase in the interest rate. At the other extreme, if the interest rate rises instead by 3 percentage points, the average interest ratio would increase to 6.1 per cent in the short run, and 7.6 per cent in the long run. But the sharper rise in interest rates does not greatly affect the proportion of households below the margin (6.7 per cent and 7.3 per cent, in the short and long run, respectively). The EAD increases somewhat more (to 7.2 per cent and 9.2 per cent, in the short and long run, respectively) and the LGD increases to 1.1 per cent in the short run and 1.4 per cent in the long run.

TABLE 3. EFFECTS OF RISING INTEREST RATES

Per cent				
Rate increase (percentage points)	0	1	2	3
Households below margin in each income category	6.3	6.4 (6.6)	6.6 (7.1)	6.7 (7.3)
EAD	5.6	5.8 (6.8)	6.5 (8.2)	7.2 (9.2)
LGD	0.9	0.9 (1.1)	1.0 (1.3)	1.1 (1.4)
Interest ratio	5.1	5.4 (5.9)	5.7 (6.7)	6.1 (7.6)

Note: The estimates outside the parentheses denote the immediate effect of an interest rate hike, where the effect is confined to loans with adjustable interest rates. The estimates inside the parentheses denote the long-term effect when the entire debt stock has been renegotiated at the higher interest rate.

Sources: Statistics Sweden and the Riksbank.

The important question is, of course, whether the projected LGD following an interest rate hike of 3 percentage points is a cause for concern. The answer is probably no. First of all, during the banking crisis in the early 1990s, the losses on loans to households amounted to 0.7 per cent of total household borrowing and, unlike losses on commercial property, never posed any serious problems for the banking sector. Secondly, while our projected LGD amounts to 1.1 and 1.4 per cent (in the short and long run), it grossly overstates actual LGD (see the previous section). Hence, if the interest rate were to rise by 3 percentage points, the actual LGD would be far lower than our projected LGD. Hence, it is not likely that a three percentage point increase in the interest rate would entail any significant problems for the banks in the form of loan losses.

EFFECTS OF RISING UNEMPLOYMENT

In the event of unemployment, an individual suffers a loss of income equivalent to the difference between the earlier wage and the unemployment benefit. Could an increase in unemployment affect the banks' loan losses in a way that would give cause for concern? We employ a Monte Carlo approach and simulate the effects of unemployment among the employed individuals, where all a household's individuals with employment run the risk of becoming unemployed. Given a simulated increase in the level of unemployment and using the current rules for unemployment benefits, disposable income and all other statistics are recalculated. The simulations are repeated 1 000 times for each level of aggregate unemployment. In these calculations, all gainfully employed persons have been assigned an equally large probability of becoming unemployed. In reality, those running the highest risk of becoming unemployed in an economic downturn are those who recently joined the labour market (i.e. youths, immigrants and previously unemployed). As these individuals in general have not accumulated any substantial amounts of debt, the implied effect on the banks' loan losses from an increase in unemployment is likely to be overestimated.

TABLE 4. EFFECTS OF RISING UNEMPLOYMENT

Per cent				
Increase in unemployment (p.p.)	0	1	2	3
Households below margin in each income category	6.3	6.5	6.6	6.7
EAD	5.6	5.8	6.1	6.3
LGD	0.9	0.9	0.9	0.9
Interest ratio	5.1	5.1	5.1	5.2

Note: The estimates are the medians of the Monte Carlo replicates.

Sources: Statistics Sweden and the Riksbank.

The results from the simulation can be seen from Table 4, which is constructed in an identical manner to Table 3. Following an increase in the unemployment rate by three percentage points, the proportion of vulnerable households rises from 6.3 to 6.7 per cent, while the EAD at the same time increases from 5.6 to 6.3 per cent. More importantly, however, is that the LGD is essentially unchanged, even in the face of a 3 percentage point rise in unemployment. That the interest ratio is not affected is partly because the interest rate is held constant in the calculations and partly because the decline in disposable income caused by the rise in unemployment is too small to have an impact on the ratio. The important lesson from comparing Tables 3 and 4 is that the effects on the households' ability to pay are far less in the event of an increase in unemployment than in

the case of a rise in the interest rate. One explanation for this is the composition of the households' debt and income. Household debt is by and large concentrated to the highest income category. These households often consist of two employed adults, and hence the household has dual incomes. Thus, even if one individual in the household becomes unemployed, the other's income, together with the unemployment benefit, is usually enough to cover living costs and interest expenditures.

FALLING ASSET PRICES AND LGDS

Even if a household defaults on its loans, the creditors will still be able to recover a clear majority of debts from the household's assets, as indicated in Tables 3 and 4. However, the estimates in those tables are based on the prevailing value of the real and financial assets (which conceptually translates into the existing residential property prices and share prices). In a situation of macroeconomic stress, the value of both real and financial assets is likely to fall, so that an asset-to-liability ratio which may have seemed prudent in good times might no longer be adequate. It is clearly possible to calculate a very large number of combinations of a fall in wealth, rising unemployment and interest rate hikes, but presenting the results without resorting to burdensome tables would be very hard. From previous sections it was clear that, for loan losses, a rise in the interest rate poses a greater threat to banks than a rise in unemployment. Thus, it seems reasonable to investigate how the LGD is affected by the combination of a sharp rise in the interest rate and a fall in the level of wealth.

TABLE 5. LGD AND FALLING ASSET PRICES COMBINED WITH A 3 PER CENT INCREASE IN THE INTEREST RATE

Per cent				
Remaining financial wealth →	100 %	90 %	80 %	70 %
Remaining real wealth ↓				
100 %	1.1 (1.4)	1.1 (1.5)	1.1 (1.5)	1.1 (1.5)
90 %	1.2 (1.6)	1.2 (1.6)	1.2 (1.6)	1.2 (1.6)
80 %	1.3 (1.7)	1.3 (1.7)	1.3 (1.8)	1.3 (1.8)
70 %	1.4 (1.9)	1.5 (2.0)	1.5 (2.0)	1.5 (2.0)

Note: The estimates outside the parentheses denote an interest rate hike's immediate effect, which is confined to loans with an adjustable interest rate. The estimates inside the parentheses denote the long-term effect when the entire debt stock has been renegotiated at the higher interest rate.

Sources: Statistics Sweden and the Riksbank.

Table 5 shows the combined effect of a 3 percentage point rise in the level of interest and an erosion of real and financial wealth. Judging from Table 5, the LGDs are much more sensitive to changes in real wealth than to changes in financial wealth. This is hardly surprising, given that real

wealth corresponds to nearly 80 percent of total household wealth. It has been asked whether the combination of a sharp interest rate increase and a fall in residential property prices could put the banking sector under strain. The answer to this question, according to Table 5, is no. Suppose that the interest rates were to rise by 3 percentage points. All else equal, that would lead at most to a fall in house prices of 20 per cent, according to econometric estimates by the Riksbank, see Financial Stability Report 2005:2. A 20 per cent fall in house prices (which roughly would translate into a 20 per cent drop in real wealth) combined with a 3 per cent interest rate hike would, according to Table 5, shift the LGDs from their present ratio of 0.9 per cent to 1.3 per cent in the short run and 1.7 per cent in the long run. Hence, in the long run, loan losses from household borrowing would barely double. Given that present actual loan losses (as reported by banks) are close to zero, it would be hard to argue that such a shift would put the banking sector under severe strain.

HOUSEHOLDS' ABILITY TO PAY IN 2005

So what is the current situation for individual households' ability to pay? Since 2004, households have continued to borrow at a high rate, and the value of real and financial assets has risen. To what extent has this influenced the proportion of vulnerable households, the EADs and the LGDs of the population? To estimate this, we use aggregate data from the national and financial accounts to, in effect, try to forecast what the HEK survey will look like in 2005. This, of course, ignores the "micro aspects" of the data set, but abstracting from those and focusing on aggregate credit losses, the forecasts can still be of interest. In this case, we use aggregate data on interest payments, debt, disposable income, residential property prices, stock indices and inflation and map the evolution of these variables between 2004 and 2005 for each household in the survey, i.e. each and every household gets an equal increase (in percentage terms) in disposable income, debt, wealth, cost-of-living etc.

These calculations are shown in Table 6. As expected, the household sector as a whole has continued to strengthen its financial position during 2005. The proportion of vulnerable households has dropped to 5.7 per cent, the EAD has dropped to 5.2 per cent and the LGD has edged down 0.1 percentage point. Thus, if anything, the credit risk in lending to households has continued to fall since the end of 2004.

TABLE 6. VULNERABLE HOUSEHOLDS, EAD AND LGD, ALL INCOME CATEGORIES

Per cent

	Share of households below margin	EAD (as share of total debts)	LGD (as share of total debts)
2004	6.3	5.6	0.9
2005 (forecast)	5.7	5.2	0.8

Sources: Statistics Sweden and the Riksbank.

Summary and concluding remarks

Household borrowing has increased considerably in recent years in Sweden and this has raised questions about what it entails for the vulnerability of households and the banking sector. In this paper we have studied households' assets, liabilities and ability to pay, using Swedish micro data from 2004. One important conclusion is that a majority of the loans are held by households with high incomes as well as a major share of real and financial assets. In fact, the 20 per cent top earners account for 57 per cent of the debts and 44 per cent of the household sector's total assets. Only 0.1 per cent of these households were deemed to be vulnerable in the sense that they would not have margins to cope with adverse changes to their balance sheets. The most vulnerable households, those that have no margins for unexpected expenses, are largely debt-free. We also stress tested households' balance sheets, subjecting them to both mild and sharp increases in the interest rate and the level of unemployment. The lesson from these stress tests is that the household sector is much more sensitive to increases in the interest rate compared to changes in the level of unemployment. However, not even a sharp increase in the interest rate (such as an instant increase of 3 percentage points), combined with large falls in the value of the household sector's real assets, was deemed to be sufficient to generate loan losses in the banking sector that are large enough to pose a threat to the stability of the financial system. The high indebtedness could, however, give rise to problems for individual households. Although household indebtedness at present is unlikely to inflict significant loan losses on the banking industry, it is clear that the situation that has prevailed in recent last years, with debt growing at twice the rate of nominal income, is unsustainable in the longer run. This point has also been made in the Riksbank's Financial Stability Report (2006:1).

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