

Household indebtedness in Sweden and implications for financial stability – the use of household-level data

Mattias Persson¹

Trends in household indebtedness in Europe

Household borrowing has increased considerably in a number of countries over the past two decades, both in absolute terms and relative to household income (see CGFS (2006), BSC (2007), Girouard et al (2007) and Warnock and Warnock (2007)). Two factors that have probably been important in the increase in indebtedness are financial deregulation, which has decreased the level of credit rationing, and lower interest rates, in both nominal and real terms. These two factors, combined with such other factors as an overall benign economic environment and demographic pressures, can probably go a long way towards explaining the rapid growth in household indebtedness in Europe. At present, aggregate household indebtedness in Sweden is slightly over 70% of GDP, nearly double the level in 1970. The upward trend in household indebtedness in Sweden during the last decade parallels that of many other European countries (see Graphs 1 and 2). While the general upward trend is clear, notwithstanding a few exceptions such as Germany, it is also worth noting that there are significant differences in the level of household indebtedness among the surveyed countries. These differences are, of course, due to differences in owner occupancy rates, but differences in national housing finance markets also play an important role.

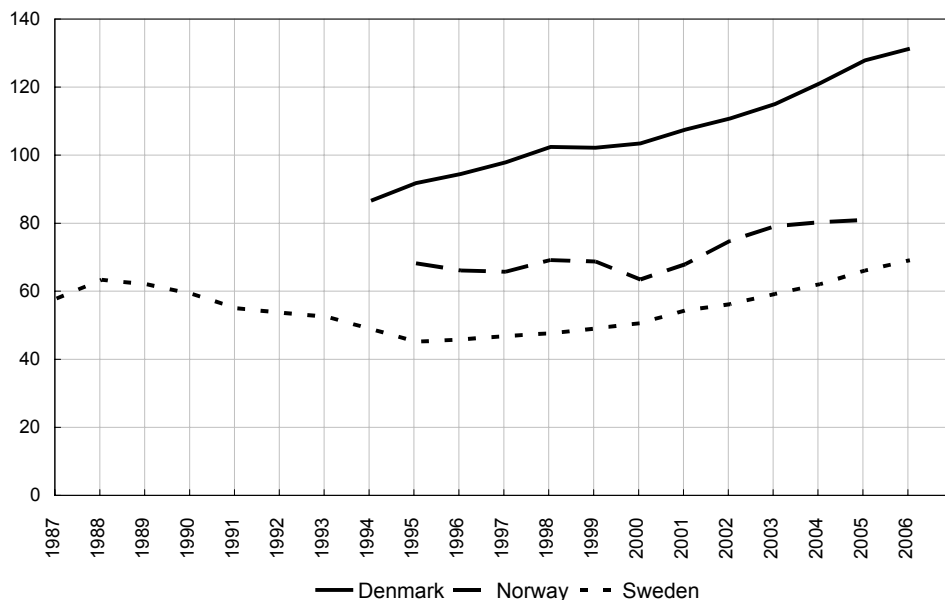
The increases in household indebtedness and house prices have been even more noticeable in many central and eastern European (CEE) economies where lending growth has been well into the double digits for several years (see Graph 3). This rapid growth is due largely to the catch-up process, as these countries have made the transition from command economies to market economies with deregulated financial markets. This development holds great promise for the general population of the CEE countries but has also added a score of new challenges for central bankers and supervisors with respect to financial stability. One challenge is how to separate transitional effects from cyclical effects and determine what a sustainable rate of credit growth would be over the medium term. Another challenge is that the banking system in many of the CEE countries is either owned or controlled by parent banks situated in countries in Western Europe. This means that the authorities must learn to adjust to a situation where cross-border banking has become the rule, rather than the exception.

Overall, the developments in household indebtedness mirror the developments in house prices, as the bulk of the debts taken on by the household sector have been channelled towards the purchase of housing. The surge in house prices during the last decade is more or less a worldwide phenomenon, although house price increases have been more pronounced in some countries than in others (see Graph 4). These differences are likely to have been caused by the same drivers that explain differences in household indebtedness in addition to other factors, such as the prevalence of a speculative “buy-to-let” market or

¹ Sveriges Riksbank, Financial Stability Department. Email: mattias.persson@riksbank.se. The views in this paper are solely the responsibility of the author, and do not necessarily reflect the views of the Executive Board of Sveriges Riksbank.

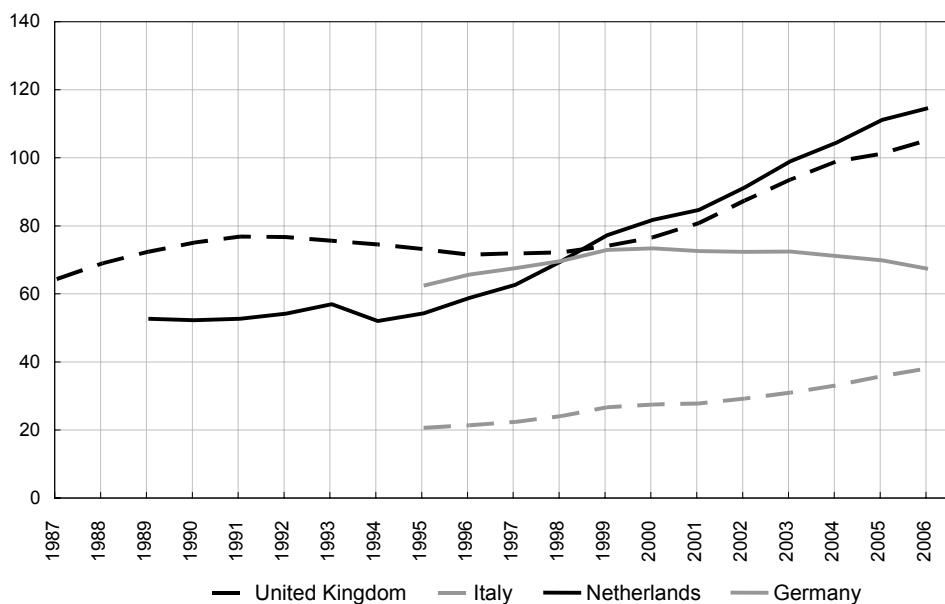
foreign demand for domestic housing. However, there are now clear signs that global house price inflation is moderating. Increases in house prices have slackened recently in several countries and are even falling in others.

Graph 1
Household liabilities as a share of GDP
 In per cent



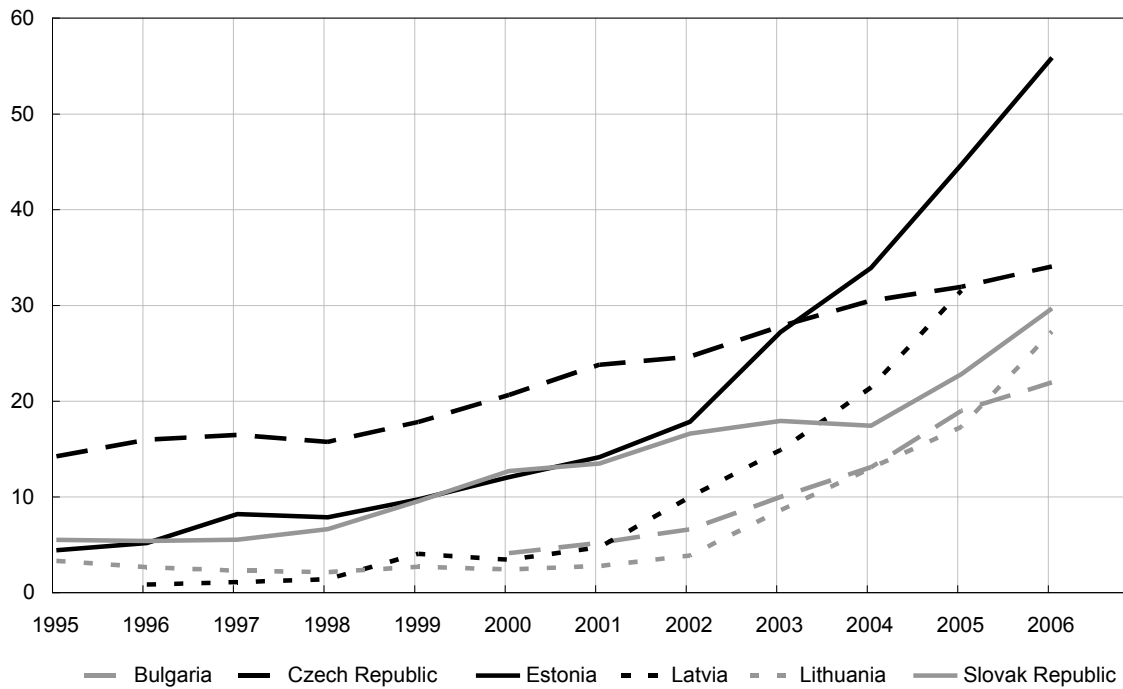
Source: Eurostat.

Graph 2
Household liabilities as a share of GDP
 In per cent



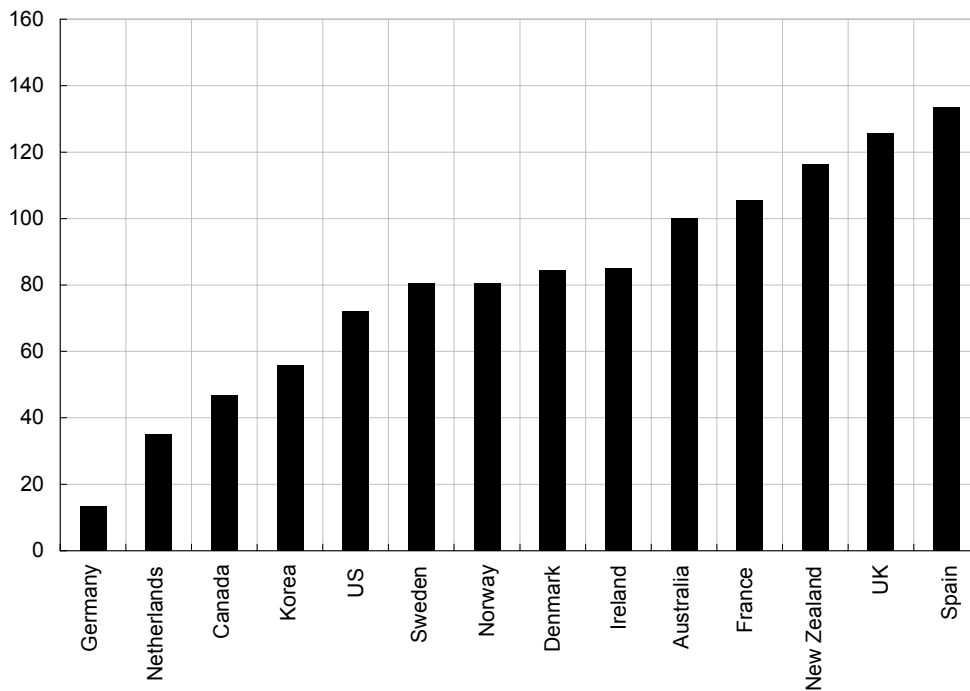
Source: Eurostat.

Graph 3
Household liabilities as a share of GDP
 In per cent



Source: Eurostat.

Graph 4
Change in nominal house prices, 2000–07
 In per cent



Source: Reuters EcoWin.

The case for micro data

The increase in household indebtedness has raised concerns about housing finance-related credit risk and the stability of the financial system, particularly if interest rates or unemployment were to rise. That adverse developments in the mortgage sector can have far-reaching consequences for financial stability has been amply illustrated by events in the United States. These events also show the need for central banks and supervisors to continuously follow developments in the mortgage market.

So far, no consensus has emerged on the best way to monitor and assess the risks to financial stability posed by the housing finance markets. Many agree, however, that it is important to collect data that allow for a more granular or differentiated analysis of household indebtedness. Evaluating potential financial stability risks emanating from housing finance markets is difficult if one relies exclusively on aggregate data from the financial and national accounts, as such data do not provide information regarding the distribution and matching of debt and interest expenditures and income. From a financial stability perspective, this suggests that more detailed data regarding individual households (so-called micro level data), may reveal pockets of vulnerabilities in the household sector.

Using micro data – the case of Sweden

By the mid-2000s, household indebtedness in Sweden was increasing rapidly towards the levels seen at the onset of Sweden's banking crisis in 1992 (see Graph 5). This was, of course, a source of concern and, given the inherent limitations of aggregate data, it was quickly recognised that in order to assess potential threats to systemic stability, more granular data were needed. This was the motivation for the Riksbank's decision to start working with micro data. In its current analysis of the household sector the Riksbank uses two micro datasets. The first is a smaller cross-sectional dataset that is a recurring item in the Riksbank's *Financial Stability Reports*. The second is a much larger panel dataset used for more in-depth analysis when it is necessary to follow the same household over time.

Cross-sectional data

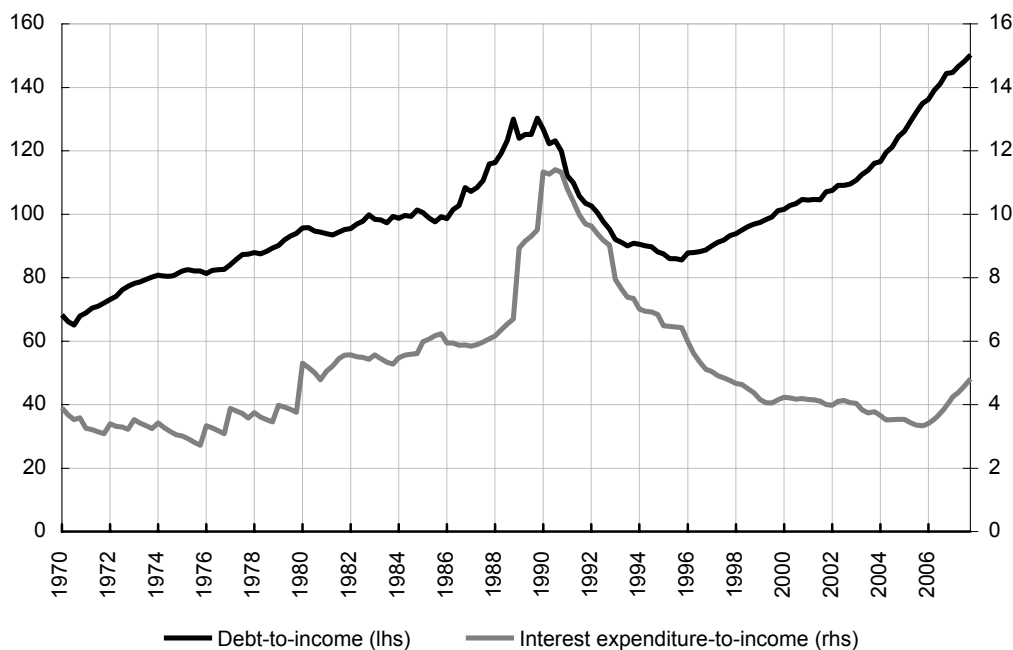
The cross-sectional dataset is compiled by Statistics Sweden, the Swedish government's statistical agency, and is obtained from an annual survey of the Swedish household sector. It covers income, debt and wealth and contains more than 1,000 socio-economic variables for around 20,000 households (40,000 individuals). The dataset is based on administrative information collected from government bodies responsible for income transfers and taxation. Each household in the survey is assigned a weight that corresponds to the number of households in the population that it represents. This allows us to aggregate the micro data in order to compare them with data from either the national or the financial accounts.

While the survey offers very detailed insights into the economy of the household sector, it suffers from the obvious publication lags. Statistics Sweden prepares a preliminary version of the survey about 11 months after the end of the year. This version is not available to the public and does not include any data on household wealth. The final version of the survey, which is released a few months later, contains data on household wealth. In addition, the sample from the preliminary survey is altered to better match the population.

Another limitation is that the survey includes only household assets, liabilities and income that are reported to the authorities. In practice, this means that the survey underestimates disposable income since wages from the informal sector are excluded. It is also likely that the value of household 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, because interest payments are tax-deductible. Moreover, real assets are basically defined as real estate, ignoring assets such as jewellery, furs and cars. In sum, the household sector is in all likelihood better off financially than the survey indicates.

Graph 5
Ratio of debt and interest expenditures to disposable income
 In per cent



Source: Statistics Sweden.

The distribution of income, interest expenditures, assets and liabilities

One rough measure of the risks in household lending is the distribution of household debts across income categories, the notion being that the smaller the share of debts held by households with lower incomes, the lower the risks associated with household lending. Clearly, if the lower-income groups hold a very small share of total household debt, this could indicate the presence of binding credit constraints, which, in general, impose welfare costs on society. Hence, a heavily skewed debt distribution (towards high-income earners) is not necessarily benign.

To analyse the distribution of debt, income, wealth and households' ability to meet their debt payments, the household sector is divided by disposable income into five equally large categories. The ultimate purpose of the analysis is to find pockets of vulnerability that, under stress, may translate into credit losses in the banking sector. Households that do not hold any debt, and hence pose no risk of causing bank losses, are excluded from the analysis. Thus we study only the indebted households within each income category. As shown in Table 1, high disposable income, high indebtedness and large assets tend to go hand in hand. Reassuringly, 55% of total household debt is held by the highest income quintile (Income Category 5). The household sector also seems to have sufficient collateral to back its liabilities, as can be seen in the assets-to-debt ratios in Table 1.

Table 1
Descriptive statistics from 2005

Income category ¹	1	2	3	4	5
In thousands of Swedish kronor ²					
Disposable income	76	136	196	293	484
Financial wealth	119	90	166	269	675
Real wealth	365	488	662	1,111	2,777
In per cent					
Debt-to-income ratio	205	120	144	161	192
Post-tax interest-to-income ratio	3.5	3.3	3.9	4.4	5.1
Assets-to-debt ratio	314	359	293	293	300
Share of total debt	3	5	12	25	55

¹ Income Category 1 consists of the households with the lowest incomes; Income Category 5, the highest.

² SEK 1 = KRW 145.

Sources: Sveriges Riksbank; Statistics Sweden.

A more thorough investigation of the dataset shows that differences can be quite large within income categories as well. Income Category 1, the quintile with the lowest income, is the most heterogeneous of the five. It is difficult to generalise about this group, since it consists of individuals with very different characteristics and living situations. The statistics show that a major proportion of the households in this quintile do not have employment, income, assets or liabilities. Moreover, as can be seen in Table 1, the mean disposable income in this income category is quite low, and many households would find it hard to make ends meet on such a low income. Hence, there is reason to be sceptical about the quality of the data in the lowest income category.

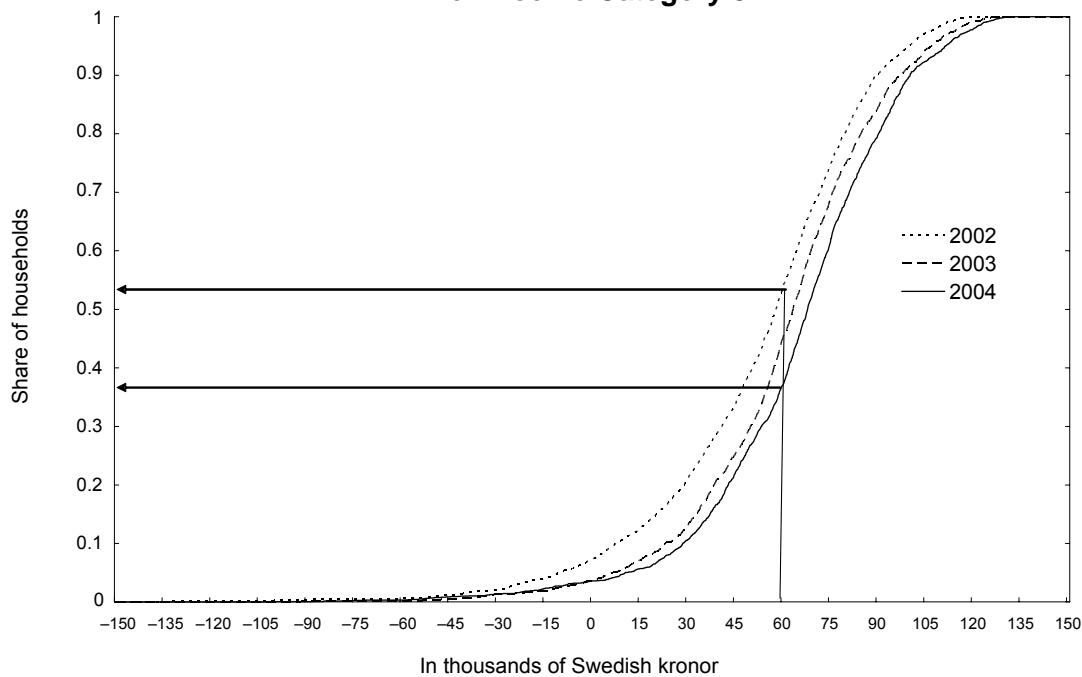
The financial margin

A different “ability to pay” measure that is increasingly being used by central banks is the absolute buffer or financial margin available to a household after it has serviced its debt and paid its living costs (see eg Johansson and Persson (2006), Magyar Nemzeti Bank (2007) and Zajączkowski and Żochowski (2007)). A household with a margin of less than zero would find it hard to make ends meet and therefore might default on its debts.

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 Graph 6). This gives an indication of how many households in each income category are below the margin and how close the other households are to it. In Graph 6 we plot the cumulative distribution of the households’ margins for Income Category 3 for the years 2002, 2003 and 2004. Graph 6 should be interpreted as follows: in 2002, about 53% of the households in Income Category 3 had an annual margin of not more than SEK 60,000. In 2004, this share had decreased to 37%. Thus, the households in Income Category 3 have significantly strengthened their financial positions between 2002 and 2004. By moving the vertical line (the one at SEK 60,000 in Graph 6) to the left or right, one quickly gets an idea of how sensitive the households in each income category are to changes in income and costs.

Graph 6

**Distribution of household margins
for Income Category 3**



Source: Statistics Sweden.

However, as the ultimate goal is to monitor potential credit losses in the banking sector, it does not suffice to just calculate the proportion of households that lie below the margin without taking into account their share of the total debt of the household sector (“exposure at default”, EAD) and the value of the assets that can be used to cover losses incurred by a default (“loss given default”, LGD). If a large proportion of the household sector lacks a financial cushion but holds very little debt, the aggregate risk associated with household lending is small. Finally, to gauge the potential losses that banks would incur were the vulnerable households to default, one can calculate the net worth – ie assets minus liabilities – of the vulnerable households. If the net worth of a household is larger than zero it does not matter whether the household defaults, since the credit loss would still be zero. The Riksbank found that even if the vulnerable households were to default on their debts, a majority of debts would be covered by collateral and hence losses would remain limited.

In Table 2, we calculate the proportion of households with negative margins and the EAD and LGD within each income category. The second column lists the proportion of indebted (vulnerable) households per income category that lie below the margin. The next column shows the vulnerable households’ share of total household debt (EAD). The last column shows the debts held by households below the margin in each category that are not covered by assets as a share of total household debt (LGD). For example, in Income Category 2, 6.1% of all indebted households have a margin that is less than zero. These 6.1%, in turn, hold 1.0% 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 defaulting households that would not be covered by assets amounts to 0.09% of the total debt held by the household sector. If one repeats the exercise for all the indebted households, one arrives at the following conclusion: 6.3% of all the indebted households in the survey have negative margins and thus, at least technically, run the risk of defaulting on their debt. Together, these households hold 5.6% of total household debt. If they were to default, creditors would suffer losses corresponding to 0.9% of total household debts. This figure is substantially lower than actual

credit losses as reported by banks. This supports our suspicion, raised above, that households – especially those in the first income category – have incomes and assets that are not recorded in the survey.

Table 2
Proportion of vulnerable households, EAD and LGD in 2005
 In per cent

Income category	Vulnerable households per category	EAD as a share of total household debt	LGD as a share of total household debt
1	66.87	2.28	0.57
2	6.10	1.06	0.09
3	1.98	0.83	0.09
4	0.61	0.74	0.08
5	0.04	0.05	0.01
Total	7.35	4.98	0.83

Sources: Sveriges Riksbank; Statistics Sweden.

One of the main benefits of working with an absolute financial margin is that it offers a transparent framework that can be used to stress-test the household sector. The Riksbank continuously performs stress tests to investigate the effects on potential credit losses of a variety of adverse macroeconomic scenarios. In general, the Riksbank found that credit losses from household lending can be expected to be low, even in the face of an adverse macroeconomic development. Moreover, credit losses are found to be more responsive to changes in interest rates than to unemployment. One explanation for this is the composition of household debt and income. Household debt is, by and large, concentrated in the highest income category. These households often consist of two employed adults and hence have two incomes. Thus, even if one individual in the household becomes unemployed, the other individual's income, together with unemployment benefits, is usually enough to cover living costs and interest payments.

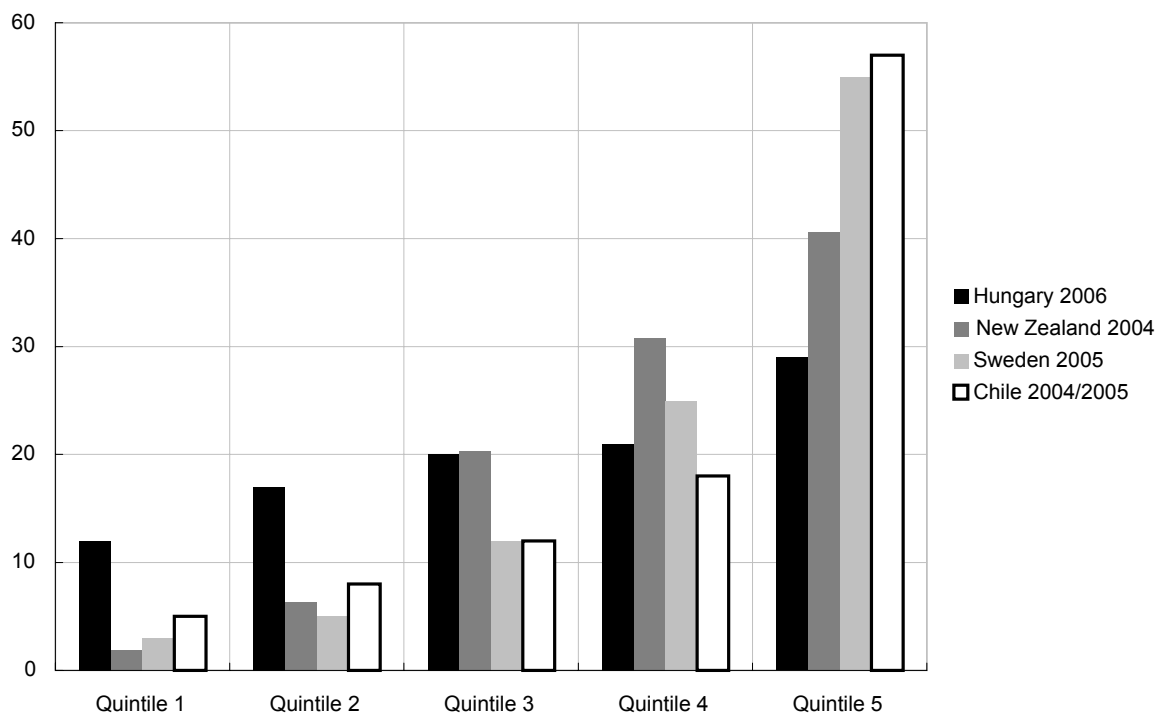
Brief comparison with other countries

While central banks increasingly are relying on micro data in their analysis of the household sector, unfortunately no consensus has emerged on how to report the results. This, in concert with the obvious differences in data definitions and coverage, means that it is hard to compare results. Given these caveats it is still worth making such comparisons. In the process of writing this paper, I came across three countries whose central banks, like the Riksbank, have calculated the share of debt held by different income categories.

As can be clearly seen in Graph 7, which plots the distribution of debts across income quintiles in four countries, the higher income echelons hold the largest share of household debt in all the surveyed countries. Nonetheless, Graph 7 also tells us that there are some surprising differences between countries. The countries that have the most uneven debt distribution are Sweden and Chile. Given that Sweden has one of the most even income distributions in the world, an educated guess would be that debt distribution also would be even. This is not the case, however, as indicated by Graph 7. This is consistent with the

findings of a report by the Committee on Global Financial Stability (CGFS (2006)) that concluded that institutional setups and other aspects of public policy are important determinants of the characteristics of household indebtedness in various countries.

Graph 7
The share of debt held by different income quintiles
 In per cent



The results should first and foremost be seen as indicative, since differences in definitions make exact comparisons difficult.

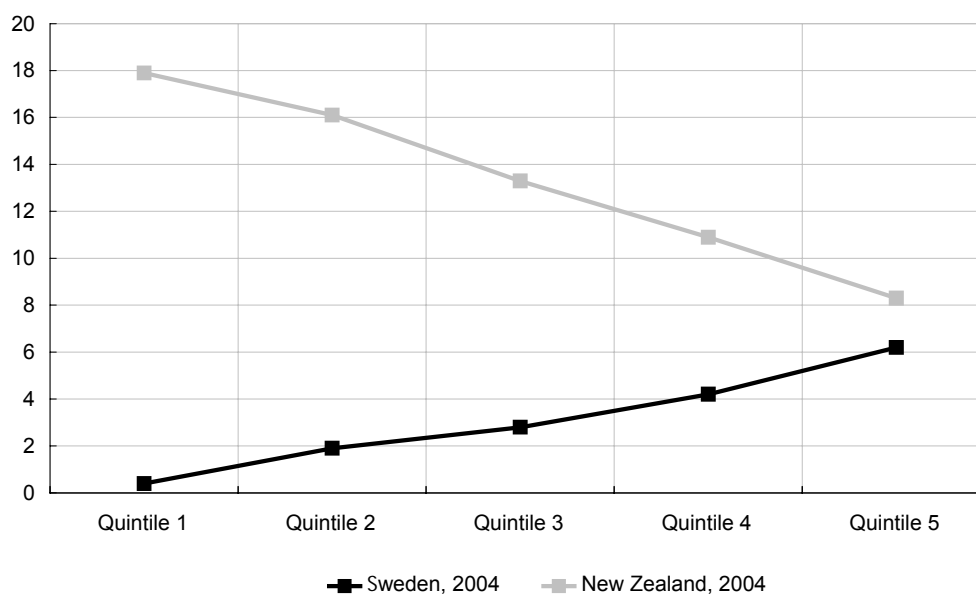
Sources: Cox et al (2006); Magyar Nemzeti Bank (2007); Reserve Bank of New Zealand (2006); Sveriges Riksbank; Statistics Sweden.

Another metric for measuring the risk in the household sector that was explored in Table 1 is the share of income that different income quintiles in Sweden devote to interest expenditures. Interestingly, the Reserve Bank of New Zealand also computed this metric in its 2006 *Financial Stability Report* (see Graph 8). What is striking is the lack of similarity between the two countries. First of all, the average ratio of interest to disposable income is lower in Sweden than in New Zealand. One reason for this is, obviously, that mortgage rates were substantially higher in New Zealand than in Sweden in 2004. More puzzling, however, are the different slopes of the two lines – the interest ratio rises as income rises in Sweden, while the opposite happens in New Zealand. Since households in the highest income quintiles in Sweden and New Zealand devote roughly the same share of their income to interest expenditures, this suggests that wealthier households in Sweden and New Zealand are equally well equipped to handle rising interest rates, while economically weaker households are more at risk in New Zealand than in Sweden.

Graph 8

**Ratio of interest to disposable income
for different income quintiles**

In per cent



The results should first and foremost be seen as indicative, since differences in definitions make exact comparisons difficult.

Sources: Reserve Bank of New Zealand (2006); Sveriges Riksbank; Statistics Sweden.

Panel data

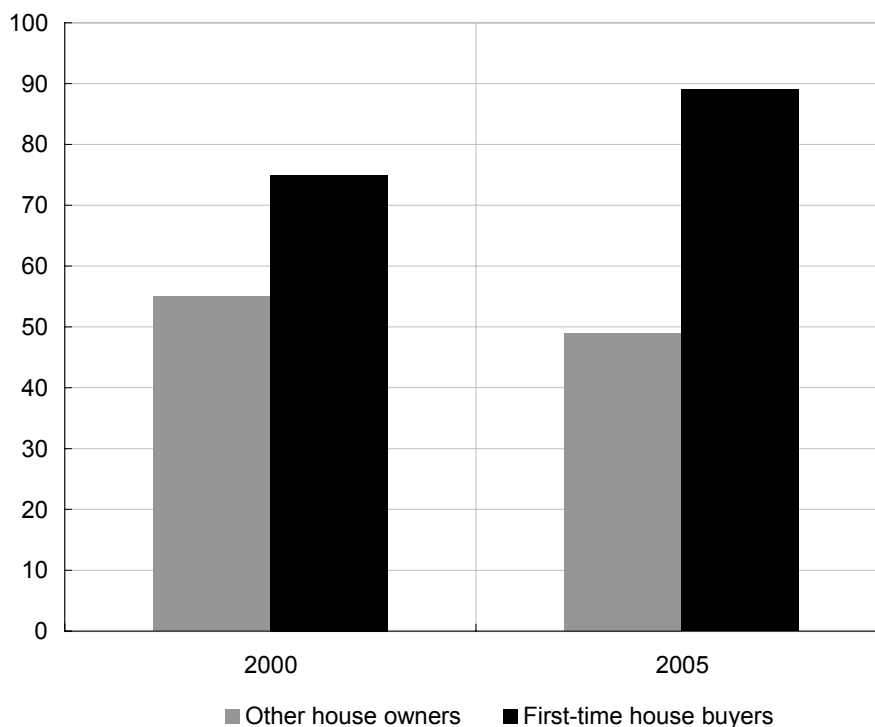
Most empirical work on household borrowing and saving relies on surveys. However, to investigate cross-sectional differences in borrowing and saving it is preferable to follow households over time. In other words, we would like to have panel data rather than repeated cross-sections. Statistics Sweden provides a longitudinal dataset named LINDA that contains extensive and detailed information on economic and demographic variables for individuals. Demographic information includes age, gender, birthplace, nationality, etc. Each individual has an identification number as well as a household identification number. The economic information includes labour and capital income as well as public and private pension income. In addition, there is a detailed list of welfare transfers such as unemployment benefits, paternity and maternity allowances, student allowances and disability support. Detailed information on real and financial assets (also supplied by Statistics Sweden) is added to the LINDA data.

The household identification number makes it possible to group individuals at the family level and to construct household data. The LINDA and wealth data contain information on nearly 800,000 individuals each year. Using these data, we construct around 300,000 households; the head of household is defined as the member with the highest disposable income. The obvious advantage of using the LINDA dataset is that we can follow the same household over time. The disadvantage, compared with the data from the smaller survey described above, is that households are defined slightly differently under the LINDA dataset: since unmarried childless couples are considered to be two separate households, the LINDA dataset overestimates the number of single-member households.

The LINDA and wealth data have been used to study the loan-to-value ratio for first-time homebuyers and other homeowners between 2000 and 2005. The results show that the loan-to-value ratio declined for the majority of households but rose rapidly for first-time

buyers. A comparison shows that the percentage of first-time buyers rose from 2% of households in 2000 to 4% in 2005. At the same time, the loan-to-value ratio also rose for first-time buyers, from 75% in 2000 to 89% in 2005 (see Graph 9). This means that the risks increased significantly for households that entered the housing market at a later stage. However, first-time homebuyers account for a very small percentage of homeowners. More than 95% of the households who own their own homes have done so for at least two years and have seen a drop in their loan-to-value ratio.

Graph 9
Households' loan-to-value ratio
 In per cent



Sources: Sveriges Riksbank; Statistics Sweden.

Summary and concluding remarks

Household borrowing has increased considerably in the past few years in many advanced economies, raising questions about the vulnerability of the household and banking sectors. In this paper we have reviewed the Riksbank's work with micro data in analysing households' assets, liabilities and ability to pay. One important conclusion is that the majority of housing loans are held by high-income households, which also own the bulk of real and financial assets. The most vulnerable households – those that have no financial cushion for unexpected expenses – are largely debt-free. Heavily indebted individual households could run into problems servicing their debts. This is especially true for first-time homebuyers who are highly indebted. We also compared, to the best of our abilities, the debt situation of households in Sweden with that in other countries. In general we found not only similarities but also some surprising differences, which could provide an incentive for more central banks to undertake a micro analysis of the household sector.

Our analysis also illustrates that having access to data and statistics on developments in the housing finance market and household sector is important in analysing not only the risks to financial stability stemming from the indebtedness of the household sector but also the impact of growth in the housing finance markets on the monetary policy transmission mechanism. Since housing finance markets in Asia have grown over the last couple of years, central banks and other authorities will need better data on the housing market and on the balance sheets of individual households in order to assess fully developments in the housing and housing finance markets.

References

Banking Supervision Committee of the European System of Central Banks (2007): "EU banks' exposure to residential property markets", *EU banking sector stability*, European Central Bank, Frankfurt, 14 November, pp 38–56.

Committee on the Global Financial System (2006): "Housing finance in the global financial market", *CGFS publications*, no 26, Basel, January.

Cox, P, E Parrado and J Ruiz-Tagle (2006): "The distribution of assets, debt and income among Chilean households", *Central Bank of Chile Working Papers*, no 388, Santiago, December.

Girouard N, M Kennedy and C André (2007): "Has the rise in debt made households more vulnerable?" *OECD Working Papers*, no 535, 3 January.

Johansson, M W and M Persson (2006): "Swedish households' indebtedness and ability to pay – a household level study", *Sveriges Riksbank Economic Review*, no 3, 18 December, pp 24–41, www.riksbank.se/templates/Page.aspx?id=23488.

Magyar Nemzeti Bank (2007): *Report on Financial Stability*, Budapest, April.

Reserve Bank of New Zealand (2006): *Financial Stability Report*, Wellington, May.

Warnock, V C and F E Warnock (2007): "Markets and housing finance", *NBER Working Papers*, no 13081, May.

Zajączkowski, S and D Żochowski (2007): "Housing loans growth, foreign currency risk and supervisory response: the Polish case", 7 November, www.nbp.pl/Konferencje/NBP_Nov2007/Speakers/Zochowski.pdf.