FI analysis

Macroeconomic effects of debt-to-income limits

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Summary

Household indebtedness is associated with risks. In terms of credit risk, Finansinspektionen (FI) has made the assessment that the risk is currently small. Households have good margins and, in Sweden, it is very difficult from a legal perspective for households to be released from their obligation to repay their loans. Instead, the primary risk is to consumption, namely that households would be forced to reduce their consumption in order to continue to make their loan payments in the event of an economic downturn and a fall in house prices. The high indebtedness of households would thus amplify the economic downturn.

House prices have been rising and, as a result, so has the debt of households in relation to their income – i.e. the debt-to-income (DTI) ratios. A DTI limit could slow this trend, but limiting households' opportunities to borrow would also slow consumption and economic activity. We have studied different formulations of a DTI limit and found, for example, that a limit of 600 per cent with exemption for 15 per cent of the loans slows the rate at which debt increases over the next ten years by approximately 5 per cent. This scenario also has a negative effect on GDP growth, which slows by approximately 0.5 per cent after three years and 1 per cent after ten years. The larger the group restricted by the DTI limit, the slower the growth rate of both debt and the GDP.

However, a DTI limit would make households more resilient to shocks. This decreases the risk and consequences of a future financial crisis, as well as softening business cycle fluctuations. Calculations run through a model that has analysed financial crises in many countries indicate, for example, that a DTI limit of 600 per cent with exemption for 15 per cent of the loans would reduce the amount by which the GDP would fall during a financial crisis by approximately 0.5 percentage points. These calculations also indicate that the probability that a crisis would occur is approximately 0.5 percentage points lower and, as before, that the larger the group restricted by the DTI limit, the smaller the risk and consequences of a future financial crisis.

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Household indebtedness associated with risks

Since 1995, household debt in relation to income has risen from approximately 90 per cent to almost 180 per cent. This trend can be attributed to several factors, for example that home ownership has increased among households, taxes on services for the home have decreased and interest rates have demonstrated a continuous downward trend since the inflation target was introduced in 1993. There may still be risks, however, associated with a rapid increase in debt; risks for not only households and banks but also the Swedish economy as a whole. What are these risks?

RISKS INFLUENCED BY HOUSEHOLDS' BALANCE SHEETS AND CASH FLOWS

A household's balance sheet provides an overview of its assets and debt, the difference between which is the household's net wealth. A fall in the value of a household's assets will result in lower net wealth since the debt has not changed. Households may then opt to increase their savings in order to raise their net wealth, or sell assets to restore the relationship between their assets and debt. For some households, however, a fall in asset prices could mean that the value of their debts exceeds the value of their assets, i.e. that the household has negative net wealth. Even if they were to sell all of their assets to pay back their loans, these households would still have a residual debt.

A household's cash flow provides an overview of its income and expenses. The higher its debt in relation to its income, the larger the share of the income that is used to make interest and amortisation payments. If interest rates were to rise or a household were to suffer a loss of income, the household's cash flow would be negatively affected. The household would then be forced to adapt its other expenses, i.e. consumption and savings. If the cash flow were significantly affected, the household may even be forced to adjust its housing expenses by moving to less expensive housing.

If a household were to simultaneously experience payment problems and negative net wealth, there is a risk that the household's mortgage lender would suffer a loss. If many households were to experience such a scenario at the same time, financial stability could be threatened. FI currently makes the assessment that the risk of such an occurrence is small. The net wealth of households in general is large and FI's stress tests show that most households with new loans are able to make their payments even if the interest rates were to rise sharply.[1] In Sweden, it is also very difficult from a legal perspective for households to be released from their obligation to repay their loans. Because a personal bankruptcy would not remove the burden of a debt, households instead reduce their other expenses in order to be able to continue to make their interest and loan payments and keep their housing.

International experiences also indicate – much like in Sweden during the 1990s − that highly indebted households tend to reduce their consumption a lot in response to economic shocks. In such a scenario, high indebtedness could amplify an economic downturn. This applies both to households with large loans in relation to the value of the home (high loan-to-value ratios) and households with large loans in

1 See Finansinspektionen (2016).

relation to their disposable income (high debt-to-income ratios).[2] High indebtedness could therefore introduce risks for the macroeconomic development, even if there is only a small risk that credit losses will threaten financial stability.

Swedish households also have a high level of savings, for example through bank deposits, funds and shares. The value of these savings corresponds to approximately the value of the entire mortgage portfolio (the total outstanding mortgage volume).[3] The household sector as a whole, in other words, can be said to have used mortgages to finance its savings in financial assets. For many households, this has been good business since the return on financial assets has been higher than the interest rate on mortgages and house prices have risen. If house prices were to fall, households would be able to sell some of their financial assets and repay some debt to in order to keep the loan-to-value ratio at a desired level. Households therefore are also resilient to an isolated fall in house prices.

Households, however, have partly invested in financial assets whose value is positively correlated with house prices. If the economy were to weaken and house prices fall, it is probable that the value of households' financial assets would also fall. Households would thus lose money on both their home and the financial assets they own. Despite their high level of savings, households may therefore be forced to sharply reduce their consumption, thus amplifying the economic downturn.[4] It is also conceivable that households have a goal for their financial wealth. A fall in value would thus mean that they would increase their savings even if their net wealth were still positive.

MACROECONOMIC RISKS ARE RISING

FI has taken measures to limit the risks posed by household indebtedness. The first was the mortgage cap, which limited how large a mortgage may be in relation to the value of the home. During the period 2002-2010, average loan-to-value ratios rose from 60 to 70 per cent for households with new loans. Since FI introduced the mortgage cap in 2010, loan-to-value ratios have stabilised and even decreased slightly. This has reduced the risk that households will be left with a residual debt if they are forced to sell their home following a fall in house prices.

FI also implemented high capital requirements for Swedish banks, introduced and raised the risk weight floor for mortgages and introduced and raised the countercyclical capital buffer. This has made the banks more resilient to shocks on the mortgage market, which means they are able to continue to grant loans to households and firms even if they were to suffer losses.

On 1 June 2016, FI will introduce an amortisation requirement, which means that households that take new loans with a loan-to-value ratio in excess of 50 per cent must amortise. Amortisation payments have clearly increased in recent years, and following the amortisation requirement they will continue to increase. This will decrease households' possibilities for financing their savings in financial assets with mortgages. The amortisation requirement therefore decreases in the long run both households' loan-to-value ratios and the size of their

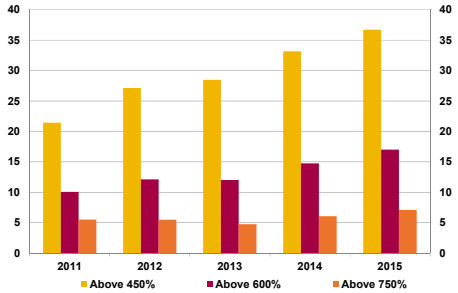
2 See e.g. Andersen *et al.* (2014) and Bunn and Rostom (2014).

3 The value of this unrestricted saving amounted to SEK 3,100 billion and mortgages to SEK 2,700 billion during Q1 2016 according to Statistic Sweden's Sparbarometer.

4 See e.g. Andersen *et al.* (2014) and Dynan (2012).

Diagram 1. Share of households with high DTI ratios

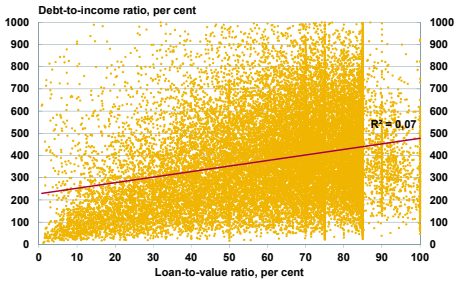
(Per cent)



Note: The diagram shows the percentage of households that have been granted a new mortgage that have total debts exceeding 450, 600 and 750 per cent, respectively, of their disposable income.

Source: FI.

Diagram 2. Loan-to-value and debt-to-income ratios



Note: The diagram shows the relationship between households' LTV and DTI ratios. R^2 shows how much of the variation in one variable is explained by the other variable.

Source: Finansinspektionen (2016).

balance sheets. It also decreases the risk that many households will simultaneously reduce their consumption if house prices were to fall and the economy were to weaken.

Despite these measures, there are still risks. More and more households are purchasing their home, and the majority of them hold a mortgage.[5] Almost eight out of ten households that are granted new loans have a loan-to-value ratio of more than 50 per cent. Approximately 70 per cent of the mortgage stock belongs to households with a loan-to-value ratio greater than 50 per cent. Many Swedish households are thereby relatively highly leveraged and could react strongly following shocks.

The percentage of households with large loans in relation to their income has also demonstrated a positive trend over the past five years (see Diagram 1). This development is largely due to the fact that house prices have risen much faster than household income over the past few years. As mentioned previously, experiences from other countries indicate that both households with a high loan-to-value ratio and households with a high debt-to-income ratio react more strongly to shocks. The relationship between a household's loan-to-value ratio and its debt-to-income ratio is weak (see Diagram 2). This means that there are households with high debt-to-income ratios that have a relatively low loan-to-value ratio. These households can be expected to be sensitive to shocks, but are only partially affected by the mortgage cap and the amortisation requirement, since these measures primarily affect households with high loan-to-value ratios.

If house prices were to continue to rise faster than household income, there is a risk that it will become even more common for households to borrow a lot in relation to their income. This will mean that the macroeconomic risks will continue to rise. A debt-to-income limit, i.e. a limit on how large a household's debts may be in relation to its disposable income, could counteract such a development.

Debt-to-income limit slows economic growth

A DTI limit can be designed to be an absolute limit for each household's total debts in relation to its disposable income.[6] The regulation may also allow banks to offer a percentage of the loans they grant to households with higher DTI ratios if these households otherwise are creditworthy. In both the UK and Ireland, both of which recently introduced loan-to-income (LTI) limits, the regulations have allowed for such exemptions.[7]

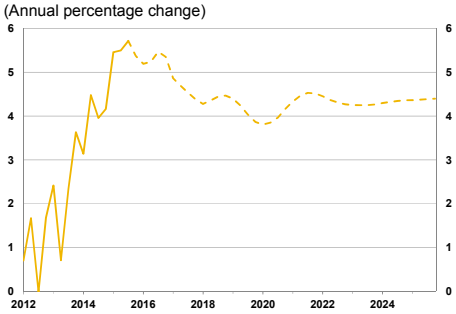
5 The percentage of owned homes in the housing portfolio increased from 59 to 66 per cent during the period 1995-2015.

6 In this document we will only analyse the effects of a limit on a household's total debts in relation to its income. This measure is called "debt-to-income" (DTI). It is also possible to regulate a household's mortgage in relation to income. This measurement is called "loan-to-income" (LTI).

7 In the UK, the LTI limit allows for a maximum of 15 per cent of the new mortgages to consist of loans where the LTI is greater than 450 per cent of the household's gross income. In Ireland, a maximum of 20 per cent of the loan volume may consist of mortgages where the LTI is greater than 350 per cent of the household's gross income. In other words, both countries have opted to implement an LTI limit that allows for exemptions.

Diagram 3. GDP

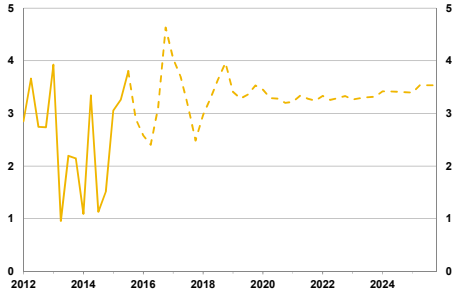
(Annual percentage change)



Sources: NIER and Statistics Sweden.

Diagram 4. Hourly wages

(Annual percentage change)

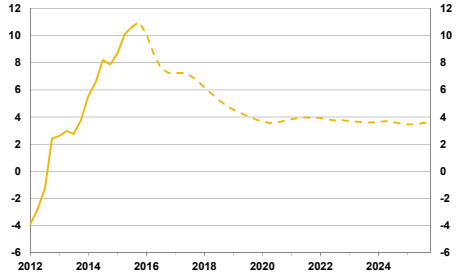


Note: Hourly wages are calculated as actual salaries divided by the number of hours worked.

Sources: NIER and Statistics Sweden.

Diagram 5. Real estate prices

(Annual percentage change)

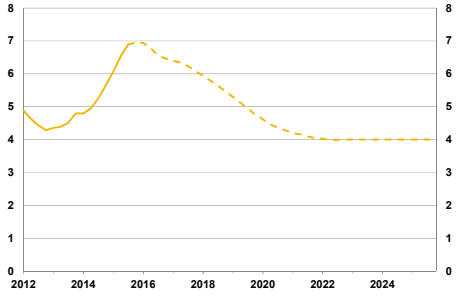


Note: The forecast is conditioned on the macroeconomic view of the NIER from December 2015.

Sources: Statistics Sweden and FI.

Diagram 6. Household debt

(Annual percentage change)



Note: The forecast is conditioned on the macroeconomic view of the NIER from December 2015.

Sources: Statistics Sweden and FI.

The designs of the LTI limits in these countries therefore contain two parameters: the limit itself and a limitation on how large a percentage of a bank's new mortgages may exceed this limit. In this document, we will study the consequences of four different DTI limits: 500 per cent with an exemption for 15 per cent of the loans, 600 per cent without exemptions, 600 per cent with exemption for 15 per cent of the loans and 700 per cent without exemptions.

The effects of a DTI limit depend on how quickly house prices, and thus debts, increase. We will therefore evaluate the consequences of each limit in both a main scenario where house prices rise slowly and an alternative scenario where house prices rise more rapidly.

SMALL REAL ECONOMIC EFFECTS IN THE MAIN SCENARIO

In order to study the DTI limits' most likely effects, we start with the forecasts from the National Institute of Economic Research (NIER) for nominal GDP, nominal hourly wages and the repo rate during the period 2016-2025 (see Diagrams 3 and 4).[8] We then use FI's model for household debt to extrapolate the development of house prices and household debt so they are consistent with NIER's macroeconomic view.[9] This creates a main scenario where the growth of both house prices and debt gradually slows (see Diagrams 5 and 6).

In order to estimate the development in total new lending, we use a debt equation

$$D_t = (1 - \alpha)D_{t-1} + L_t, \qquad (1)$$

where D is total debt, L is total new lending and α is the rate of amortisation in the mortgage stock. We calibrate the annual amortisation at 1.41 per cent in accordance with FI's assessment of how amortisation will develop once the amortisation requirement enters into force. This generates a forecast for the total new lending that is consistent with the total increase in debt.

Without a limit, DTI ratios continue to rise

FI's mortgage survey contains a sample of all of the households that took out a loan to purchase a home. The survey contains information about, for example, how large a loan the households raised to finance the purchase of their home, the loans they had before they purchased the home, what they paid for the home (the purchase price) and the size of their disposable income. The most recent survey was gathered during Q3 2015 and included approximately 30,000 households.[10] This provides a snapshot at a specific moment in time of the distribution of individual DTI ratios (see Diagram 7).

In order to calculate how a DTI limit affects lending and macroeconomic developments, we start by studying what happens to DTI ratios if FI were not to implement a DTI limit. Since hourly wages, house prices and total debts increase in the main scenario, the distribution of DTI ratios for households that in the future take out new loans to purchase a home will change.[11] In order to obtain a forecast for the DTI

8 The full forecast is described in NIER (2015).

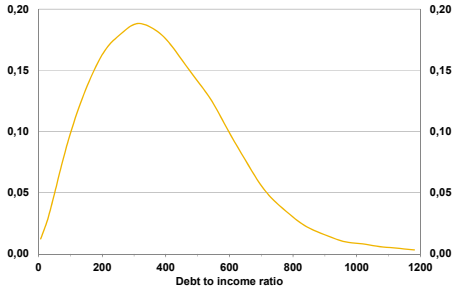
9 The model is described in Finansinspektionen (2015).

10 For a full description of the mortgage survey, see Finansinspektionen (2016).

11 Alfeldt *et al.* (2015) do not extrapolate the DTI ratios in the mortgage survey. Our extrapolation results in rising DTI ratios, and as such more households that are limited by the regula-

Diagram 7. The distribution of DTI ratios in the mortgage survey

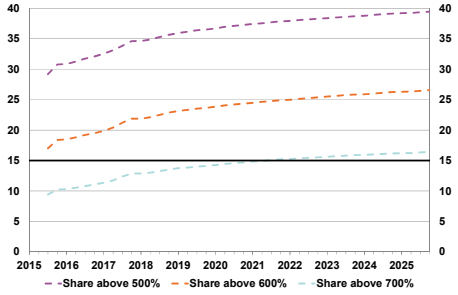
(Probability density)



Source: Finansinspektionen (2016).

Diagram 8. Share of households with a DTI ratio above 500, 600 and 700 per cent.

(Per cent)

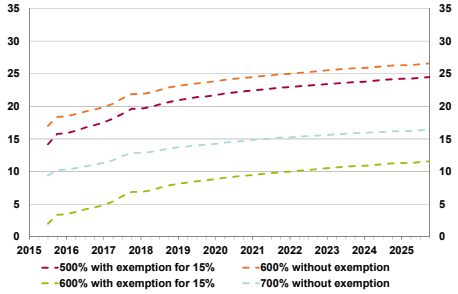


Note: Refers to DTI ratios in mortgage surveys extrapolated in accordance with the main scenario.

Source: FI.

Diagram 9. Share of households affected by each DTI limit in the main scenario

(Per cent)



Note: Refers to DTI ratios in mortgage surveys extrapolated in accordance with the main scenario.

Source: FI.

ratios in future mortgage surveys, we therefore extrapolate the variables in the mortgage survey at the household level to match the development in the main scenario.

We extrapolate these figures by letting the disposable income of each household in the mortgage survey increase at the same rate as the hourly wages in the main scenario.[12] Each purchase price is extrapolated in a similar way using the increase in house prices. The new loans in the mortgage survey are extrapolated using the rate at which house prices are rising. Finally, we extrapolate the existing loans in the mortgage survey so that the total amount of loans in the survey increases at the same rate as the total debts.[13]

Since both house prices and total household debt are rising faster than hourly wages, the DTI ratios go up in the future mortgage surveys. The percentage of households with DTI ratios greater than 500, 600 and 700 per cent, respectively, is also rising (see Diagram 8). This means that all of the DTI limits evaluated in this study would limit lending opportunities in the main scenario. The largest, and approximately equal, effects come from a DTI limit of 500 per cent with exemption for 15 per cent of the loans and a DTI limit of 600 per cent without exemptions. Of the studied limits, a DTI limit of 600 per cent with exemption for 15 per cent of the loans leads to the lowest limitation on households' lending opportunities (see Diagram 9).

DTI limits slow debt growth

Let us now turn to the effects a DTI limit would have on aggregate debt growth, if such a limit were introduced. These effects are not only dependent on how the DTI limit is designed, but also on the actions taken by households that are not allowed to borrow as much as they would like. These households may choose to purchase a smaller or less expensive home and thus borrow less, but they may also opt to delay their purchase and thus not borrow at all. The more households that choose to delay the purchase of a home, the more total debt growth will slow.

We make the assumption here that half of the households that are restricted by a DTI limit will choose not to take out a loan and half will choose to borrow as much as they can while still staying below the limit.[14] This gives us forecasts for how new lending in the mortgage survey would develop for each of the four DTI limits.[15]

In order to transcribe the forecasts for new lending in the mortgage surveys into forecasts of total debt, we once again use debt equation (1). We start with the original forecast for total new lending and scale it down as much as new lending decreases in the mortgage surveys.[16]

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tions. We therefore find that the DTI limit has significantly larger effects on the aggregate DTI ratio.

12 This assumption may be conservative. It is possible that the households that are granted new loans have a stronger future income development than households on average.

13 NIER (2016) provides a detailed description of these extrapolations.

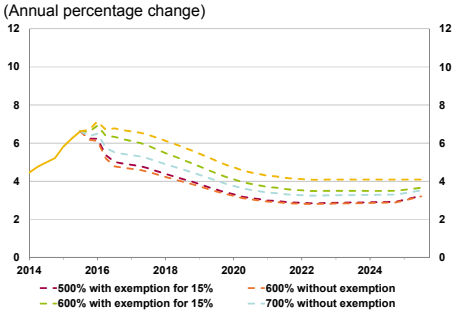
14 Formally, we always calculate these two cases separately (households that are restricted by the limit either do not take out a loan at all or borrow up to the limit). We then report the average effects, which is the same as half not taking out a loan at all and half borrowing as much as they are allowed under the DTI limit.

15 A DTI limit does not affect existing loans in the mortgage survey; only new loans are restricted.

16 This means that we assume that the new loans in the mortgage survey are a constant percentage of total new lending. NIER (2016) shows the calculations in detail.

Diagram 10. Effects on household debt in the main scenario

(Annual percentage change)

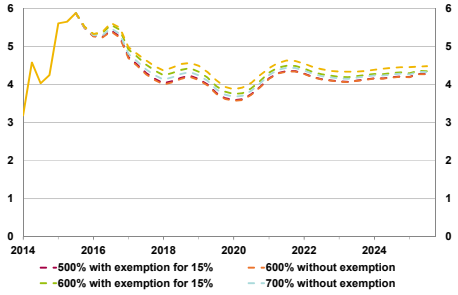


Note: The diagram shows the development with different DTI limits.

Sources: Statistics Sweden and FI.

Diagram 11. Effects on GDP in the main scenario.

(Annual percentage change)



Note: The diagram shows the development with different DTI limits.

Sources: The NIER, Statistics Sweden and FI.

A DTI limit of 600 per cent with exemption for 15 per cent of new lending reduces debt growth by at the most 0.5 percentage points (see Diagram 10). After three years, the debts are approximately 2 per cent lower than if no limit were introduced. After ten years, debt is approximately 5 per cent lower (see Table 1). A DTI limit of 500 per cent with exemption for 15 per cent of the loans and a DTI limit of 600 per cent with no exemptions decreases the growth rate of debt by at the most 2 percentage points. After ten years, debts are approximately 13 per cent lower than if no limit were introduced.

In other words, the DTI limits restrict growth in household debt. Let us now study how house prices and real economic growth are affected.

House prices slow, but the effects on the economy are small

We use three different models to calculate the effect of each DTI limit.[17] These models are primarily designed to estimate the short-term economic effects of a DTI limit. In the long run, supply factors such as capital formation, number of hours worked and productivity determine growth in GDP. Since a DTI limit probably would not have a material effect on any of these supply factors, the long-run effect of the limit on GDP would be small.[18]

We study in the three models how GDP, hourly wages and house prices develop when the growth rate of total debt increase is lower.[19] We then describe the average effects of these three models.

All of the studied DTI limits have a small effect on the economy. GDP growth slows by at the most just under 0.5 percentage points under the strictest formulation of the regulation. After three years GDP growth is approximately 1 per cent lower than if no DTI limit is introduced. A DTI limit of 600 per cent with exemption for 15 per cent of the loans slows GDP growth by just under 0.2 percentage points, and after three years GDP is approximately 0.3 per cent lower (see Diagram 11 and Table 1).[20]

Table 1. Total effects of the regulations in 2018 (2025) in the main scenario.

(Per cent)

Debt-to-income limit	Debt	House prices	GDP	Aggr. DTI
500% with exemption for 15%	5.2 (12.4)	3.4 (7.6)	0.9 (2.6)	4.4 (10.0)
600% without exemption	5.7 (13.2)	3.8 (8.1)	1.0 (2.8)	4.8 (10.6)
600% with exemption for 15%	1.7 (5.4)	1.2 (3.3)	0.3 (1.2)	1.5 (4.1)
700% without exemption	3.7 (8.7)	2.4 (5.3)	0.6 (1.8)	3.1 (6.8)

Note: The table shows how much lower each variable would be in per cent in the last quarter of 2018 (2025) if each DTI limit were introduced. The deviation is calculated in relation to the outcome if no limit is introduced.

Source: FI.

17 NIER (2016) uses four models. We have opted to only use the two Bayesian VAR models and the error correction model. We ignore the effects from the general equilibrium model since these effects are very small in the model. This gives us a conservative estimate of the effects. The results in Diagrams 11-12 and 15-18 are the averages from the three models.

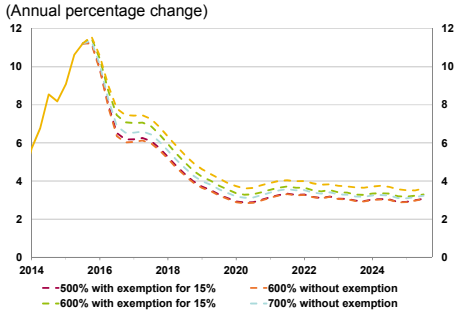
18 In the long run, the DTI limit may have a negative impact on the labour supply, since lower debts make households richer. Through the income effect, households can choose to work fewer hours.

19 Formally, we generate a forecast that is conditioned on a lower rate of debt growth. By calculating the macroeconomic effects as a separate step, we miss any feedback effects from house prices and GDP back to debts.

20 The effects on the hourly wages are approximately as large as the GDP effects and are therefore not reported.

Diagram 12. Effects on house prices in the main scenario.

(Annual percentage change)

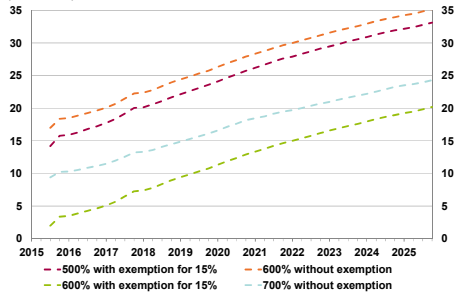


Note: The diagram shows the development with different DTI limits.

Sources: Statistics Sweden and FI

Diagram 13. Share of households affected by each DTI limit in the alternative scenario

(Per cent)

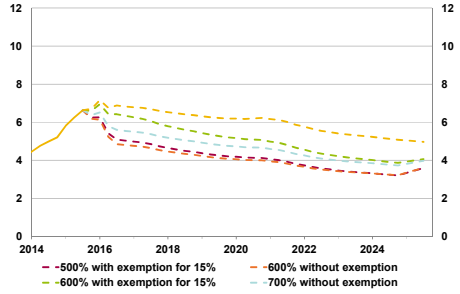


Note: Refers to DTI ratios in mortgage surveys extrapolated in accordance with the alternative scenario.

Source: FI.

Diagram 14. Effects on household debt in the alternative scenario

(Annual percentage change)

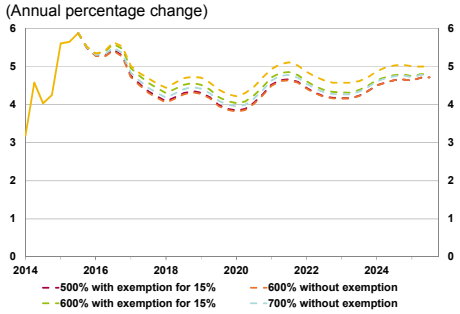


Note: The diagram shows the development with different DTI limits.

Sources: Statistics Sweden and FI

Diagram 15. Effects on GDP in the alternative scenario

(Annual percentage change)



Note: The diagram shows the development with different DTI limits.

Sources: The NIER, Statistics Sweden and FI.

The largest effect can be seen in the rate of increase in house prices, which at the most slows by approximately 1.5 percentage points in the two strictest formulations of the DTI limits (see Diagram 12). A DTI limit of 600 per cent with exemption for 15 per cent of the loans slows the rate at which house prices increase by approximately 0.5 percentage points.

In general, the four formulations of the DTI limit have a small effect on GDP and hourly wages in the main scenario. The greatest impact is on debt and house prices.

LARGER EFFECTS IF HOUSE PRICES INCREASE MORE RAPIDLY

In the main scenario, house prices and households' need for loans slow even if a DTI limit is not introduced. As a result, the DTI limits have small effects on real economic growth. If house prices increase more rapidly than in the main scenario, a DTI limit would have greater effects. We illustrate this through a scenario where house prices are increasing more rapidly.[21] In this scenario, the repo rate is raised faster than in the main scenario. GDP, hourly wages and debts also rise faster. As a result, a larger percentage of households are affected by each DTI limit (see Diagram 13).

The effects of a DTI limit also are larger. The growth rate of debt slows by at the most approximately 2 percentage points under the two strictest formulations of the DTI limit. After three years, debt is approximately 6 per cent lower, the GDP approximately 1 per cent lower and house prices approximately 4 per cent lower (see Diagrams 14-16 and Table 2).

Table 2. Total effects of the regulations in 2018 (2025) in the alternative scenario with higher house prices.

(Per cent)

Debt-to-income limit	Debt	House prices	GDP	Aggr. DTI
500% with exemption for 15%	5.6 (16.4)	3.7 (10.4)	0.9 (3.5)	4.7 (13.5)
600% without exemption	6.1 (17.2)	4.1 (10.9)	1.0 (3.6)	5.2 (14.2)
600% with exemption for 15%	2.0 (8.8)	1.3 (5.6)	0.3 (1.9)	1.7 (7.1)
700% without exemption	4.0 (12.2)	2.6 (7.6)	0.7 (2.6)	3.4 (9.9)

Note: The table shows how much lower each variable would be in per cent in the last quarter of 2018 (2025) if each DTI limit were introduced. The deviation is calculated in relation to the outcome if no limit is introduced.

Source: FI.

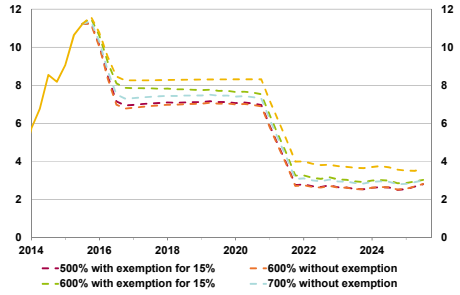
A DTI ratio of 600 per cent with exemption for 15 per cent of the loans slows the rate at which debt grows by at the most just under 1 percentage point, and after three years debt is approximately 2 per cent lower. GDP growth slows by approximately 0.2 percentage points, and after three years GDP is approximately 0.3 per cent lower.

As a whole, a scenario with higher house prices increases the number of households restricted by the different designs of the DTI limit. This could result in a significant slow-down in the rate at which debts are growing, which is primarily reflected in lower house prices. The real economic effects are also somewhat larger in this scenario.

21 In the scenario with higher house prices, we assume that these prices increase for five years at the same rate as they have increased in recent years. The rate of increase then gradually returns to the rate of increase in the main scenario.

Diagram 16. Effects on house prices in the alternative scenario

(Annual percentage change)

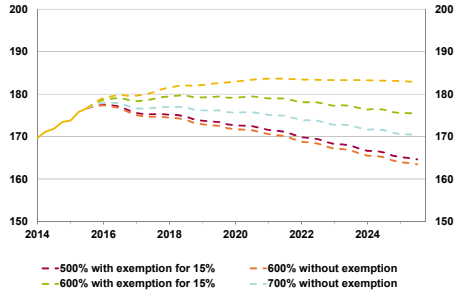


Note: The diagram shows the development with different DTI limits.

Sources: Statistics Sweden and FI

Diagram 17. Aggregate DTI ratios in the main scenario

(Per cent)

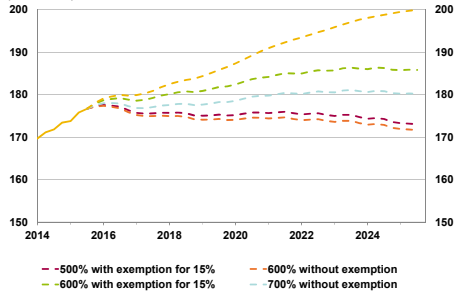


Note: The diagram shows the development with different DTI limits.

Sources: Statistics Sweden and FI

Diagram 18. Aggregate DTI ratios in the alternative scenario

(Per cent)



Note: The diagram shows the development with different DTI limits.

Sources: Statistics Sweden and FI

How does a DTI limit affect the developments in the event of a future crisis?

The aim of the DTI limit is to make households more resilient to financial crises and economic downturns. This decreases the risk of a negative spiral in which highly indebted households reduce their consumption and thus amplify the downturn. It is not possible to calculate this effect using the models we have used up until this point. However, we can take the estimated effects of, for example, the aggregate DTI ratio and put them into empirical models that study the relationship between debt accumulation and financial crises. These models are based on a selection of financial crises and thus are not clearly representative of the current situation in Sweden. They also do not capture the effect that a reduction in the share of highly indebted households could mitigate more normal fluctuations. What the models can do, however, is estimate the conceivable effects of a DTI limit on the severity of the downturn and the probability that a crisis would occur.

SLIGHTLY SMALLER CONSEQUENCES OF A FINANCIAL CRISIS

Several empirical studies indicate that both financial crises and major macroeconomic downturns primarily occur after a period of rapid credit growth or a rapidly rising DTI ratio. IMF (2012) and Bunn and Rostom (2014) find that if the aggregate DTI ratio increased by 10 percentage points during the five years prior to the most recent financial crisis, household consumption fell by almost 3 percentage points more compared to if the DTI ratio had remained stable before the crisis.[22] Flodén (2014) confirms the effects on consumption and finds in addition that the effect on GDP is slightly smaller and the effects on house prices are approximately twice as large as on consumption.

The introduction of a DTI limit slows growth in the aggregate DTI ratio by up to approximately 10 percentage points during the last five years in the main scenario compared to if no regulation were introduced (see Diagram 17). If this effect is combined with the calculations by the IMF and Bunn and Rostom, the results suggest that the fall in consumption – given that a crisis occurs – could be mitigated by up to 3 percentage points if the DTI limit were introduced.

Using Flodén's equations, we can calculate the extent to which the fall in GDP, consumption and house prices would be reduced, as well as the reduction in the rise in unemployment, if a crisis were to occur during the period 2025–2030. The results confirm that a DTI limit alleviates the downturn in a future financial crisis. The strictest formulation of the DTI limit reduces the fall in GDP during the five years of the crisis by almost 1 percentage point (see Table 3). At the same time, unemployment would rise by 0.4 percentage points less. A DTI limit of 600 per cent with exemption for 15 per cent of the loans reduces the fall in GDP in a future financial crisis by 0.3 percentage points during the five years following the outbreak of the crisis.

22 Flodén (2014) includes the aggregate DTI ratio's average growth rate during the five years prior to the financial crisis as an explanatory variable in the regression analysis. An increase of 10 percentage points in total corresponds to an annual growth rate of 2 per cent. The coefficient on the increase in debt is approximately -1, which means that the fall in consumption will be approximately 2 percentage points larger from this debt accumulation.

Table 3. Reduced severity of a downturn in the event of a crisis during 2025-2030

(Percentage points)

Debt-to-income limit	GDP	Consumption	PPI	Unemployment
500% with exemption for 15%	0.7 (1.2)	1.1 (1.7)	3.1 (4.9)	0.4 (0.7)
600% without exemption	0.8 (1.2)	1.1 (1.7)	3.3 (5.0)	0.4 (0.7)
600% with exemption for 15%	0.3 (0.6)	0.4 (0.9)	1.3 (2.7)	0.2 (0.4)
700% without exemption	0.5 (0.8)	0.7 (1.2)	2.1 (3.5)	0.3 (0.5)

Note: Figures in parentheses refer to effects in the alternative scenario, which has higher house prices. PPI refers to the property price index.

Source: Flodén (2014) and own calculations.

FINANCIAL CRISES ALSO BECOME LESS COMMON

Some studies indicate that indebtedness also affects the probability that a crisis will occur. One such study is Schularick and Taylor (2012), which studies financial crises in 14 countries during the period 1870-2010. This study finds that crises occur on average every 25 years, which means that the probability of a financial crisis occurring during any given year is 4 per cent. However, the study also notes that this probability increases by almost 3 percentage points if real debts increase by 7 per cent more than normal over a five-year period.

This indicates that a DTI limit, through its effect on the rate at which debt increases, could also decrease the risk that a financial crisis would occur. If we combine the estimated reduction in debt as a result of the DTI limit (Diagrams 10 and 14) with the results from Schularick and Taylor, we obtain an indication of how large this effect could be.

By slowing the rate at which debt grows via the DTI limit in the main scenario, the probability that a crisis would occur falls by up to 0.6 percentage points. In the alternative scenario, which assumes higher house prices, this probability falls by almost 1 percentage point. The probability that a crisis will occur decreases as the number of households that must reduce their debts if a DTI limit were to be introduced rises (see Table 4).

Table 4. Reduced probability of a crisis in 2025

(Percentage points)

Debt-to-income limit	Lower probability
500% with exemption for 15%	0.5 (0.9)
600% without exemption	0.6 (0.9)
600% with exemption for 15%	0.3 (0.5)
700% without exemption	0.4 (0.6)

Note: Figures in parentheses refer to effects in the alternative scenario, which has higher house prices.

Source: Schularick and Taylor (2012) and own calculations.

These empirical studies indicate that a DTI limit reduces both the probability that a crisis will occur and its consequences should it occur. However, the estimation of the size of these effects is associated with a high degree of uncertainty. For example, it should be noted that Schularick and Taylor study financial crises where the financial system suffers severe shocks, while the primary goal of the DTI limit in Sweden would be to reduce the risk that highly indebted households would amplify an economic downturn by reducing their consumption.

Concluding remarks

There are risks associated with the rising debts of households. FI judges the largest risk to be macrofinancial. This means that highly indebted households may be forced to reduce their consumption if the economy were to fall, unemployment rise and house prices and the value of households' financial assets fall. Because of their high indebtedness, households would amplify the negative spiral.

In order to mitigate this risk, it is possible to introduce measures such as a DTI limit. All formulations of the DTI limit that we have studied here decrease indebtedness. As a result, the risk of a financial crisis would also decrease. This also reduces the consequences of a crisis, if one were to occur. The more households affected by the DTI limit, the greater the beneficial effect of the regulation. It is also likely that more normal economic fluctuations would be softened if there were fewer highly indebted households, but we have not attempted to estimate this effect.

A DTI limit would also introduce limitations on the ability of households to borrow and smooth their consumption over their life cycle. A DTI limit will thus reduce GDP growth, at least in the short term. The more households that are affected by the DTI limit, the greater the effects on the economy. There is therefore a risk that a DTI limit that is too restrictive and would have a broad impact on households' lending possibilities could be the factor that triggers the course of events that the regulations intended to prevent.

The estimates presented here indicate that the short-term, negative effects on GDP are larger than the expected positive effects of fewer and less severe crises. But it is significantly easier to quantify the impact that a DTI limit would have on the economy in the near future than to estimate the benefits of crises being less frequent and less severe. Crises do not occur often and they differ from each other, both in terms of their triggers and their course of events. This makes it difficult to determine the expected benefits of a DTI limit. All of the model calculations are affected by the assumptions made and the choices of models. The results are therefore uncertain and should be interpreted with caution. It is necessary – both here and in other areas of policy – to also take qualitative assessments into consideration before making decisions about different types of regulations. Nevertheless, calculations of the type presented in this analysis can contribute to the understanding of how potential regulations could affect the economy.

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