Analysis

A debt-to-income cap would dampen economic fluctuations

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How would the economy react in the long term if the maximum size of housing loans granted by banks were tied to the customer's income instead of the value of the dwelling to be purchased? This question can be examined using the Bank of Finland's general equilibrium model. Based on analysis, the introduction of a maximum debt-to-income ratio, i.e. a debt-to-income cap, would have a moderate impact on long-term economic growth. A debt-to-income cap could, however, dampen economic fluctuations relative to the current loan-to-value cap.



Efficient financial markets are essential for the functioning of the economy. Their task is to allocate finance to investments and ensure that financially sound households obtain the financing they

need. Unsuccessful allocation of finance may create a leveraged bubble, the bursting of which has an immediate impact on the financial markets. In a worst-case scenario, a financial market disruption would jeopardise transmission of finance to the real economy.

Financial market disturbances can be prevented by ensuring that banks' capital positions are strong and borrowers' debt-servicing ability is sufficient. The maximum loan-to-value (LTV) currently applied enables an increase in debt levels when house prices and collateral values rise. The *debt-to-income* (DTI) cap proposed in the Ministry of Finance report[1] would prevent excessive indebtedness by borrowers and the creation of leveraged housing bubbles in Finland, as the amount of debt would be tied to developments in consumer incomes.

New policy measures may have an impact on consumer and bank behaviour, and thereby on the economy, even when regulation does not target the volume of credit granted in the long term. It is useful to examine these impacts using the Bank of Finland's general equilibrium model, Aino 3.0.[2,3] Aino 3.0 allows the estimation of long-term macroeconomic impacts in a situation where the constraint in use is a DTI constraint set to a neutral level.[4] A neutral calibration would mean that the ratio of housing loans to GDP would remain unchanged in the long term, also following the entry into force of the DTI constraint. Even though the analysis does not consider the fact that the constraints are overlapping, it nevertheless clarifies their differences and provides a picture of how the new regulation would impact the functioning of the economy.[5]

The first three columns in the table describe the long-term impacts of the various levels of the debt-to-income cap.[6] The figure in the first row describes the tightness of the constraint and shows which housing loans-to-GDP ratio would be achieved on the various levels of the DTI constraint. The percentages in the lower rows show how the transition from LTV regulation to the DTI constraint would impact the equilibrium level of the variables. The percentage figures are calculated by dividing the equilibrium level of a factor prevailing under the DTI constraint by the equilibrium level of the factor prevailing under LTV regulation. An analysis made using the general equilibrium model shows that replacing the LTV constraint with a DTI constraint set at a neutral level would not cause significant changes in long-term economic growth. This could be interpreted to mean the debt-to-income cap would not hamper the channelling of finance to high-return investments relative to the current situation.

A debt-to-income cap that is too tight would hamper the channelling of finance to the economy, which could slow economic growth. Based on the model, long-term economic growth is, however, not sensitive to the level of the DTI constraint even if the constraint were set to a level tighter than neutral, as in the model the rate of economic growth is determined mainly by productivity growth. Despite the uncertainties concerning the calibration of the neutral level of the debt-to-income

cap[7], in light of the analysis, small deviations would not cause significant side-effects on long-term economic growth.

The model's LTV constraint is countercyclical. Higher house prices increase the level of the loan cap, while a decline in prices tightens it[8]. In an environment of rising house prices, improved access to housing loans boosts the demand for housing and puts an upward pressure on the already high level of house prices. In contrast, if the maximum loan amount was tied to household incomes, it would curb household indebtedness when house prices grow faster than household incomes. Constraining the volume of housing loans in this situation would also dampen the upward pressure on house prices, as the DTI constraint would curb the growth in demand. The Ministry of Finance report also reminds us that residential investments are very sensitive to house prices. Via this mechanism, among others, fluctuations in house prices also create fluctuations in the broader economy.

The DTI constraint would curb growth in household loans in an upswing that is accompanied by rising house prices. In the case of the LTV constraint, a rise in collateral values loosens the loan-to-value cap, irrespective of the level of household income. But if the DTI constraint is in force, the debt-to-income cap will curb growth in the loan stock if the level of income remains unchanged. A rise in income levels enables larger borrowing also in the case of the LTV constraint, as households can use a share of their higher income to increase the size of the self-financed portion of their housing loan.

The last column in the table examines changes in the fluctuation of economic variables, in response to the transition from the LTV constraint to the DTI constraint. The percentages are calculated by dividing the standard deviation of the variable prevailing under DTI regulation with the standard deviation prevailing under LTV regulation.

The model analysis shows that transition to DTI regulation would decrease fluctuations particularly in the loan stock-to-GDP ratio and house prices compared with the current situation. The DTI constraint would be more successful than the LTV constraint in curbing growth in the credit stock and dampening the pick-up in house price inflation in an upswing, but on the other hand, a change in the constraint would not have a significant impact on long-term growth.

Calculations using the Bank of Finland's general equilibrium model show that the DTI constraint curbs household indebtedness particularly when house prices grow faster than household incomes. This may dampen economic fluctuations and prevent the adverse side-effects of indebtedness.

Impact assessment on the debt-to-income cap					
		Tight calibration	Neutral calibration	Loose calibration	Long-ter situation
	Housing loans-to-GDP ratio with various DTI constraint calibrations	100	147	200	Housing lo ratio
Long-term values relative to current situation if a neutral DTI constraint was in force (%)	Size of the housing loan stock	68	101	140	Size of the stock
	Growth in private consumption	100	101	103	Growth in consumpti
	Growth in private sector output	100	103	105	Growth in output
	House price inflation	100	100	100	House pric
	Growth in real labour income	99	101	103	Growth in income
	Growth in real wages	100	100	100	Growth in
	Man-hours	100	101	103	Man-hours
Source: Bank of Finland calculations.					

Notes

1. See https://julkaisut.valtioneuvosto.fi/handle/10024/161807. ↑
2. Macroeconomic impacts are modelled in a scenario in which the model's LTV constraint is replaced by the DTI constraint. In fact, an LTV constraint is not in force in Finland but an LTC constraint. The difference is due to the fact that in Finland, the volume of credit is constrained by the value of collateral (C) instead of the value (V) of the dwelling to be purchased. In the model, this type of a distinction is however very difficult to implement. ↑
3. For a detailed description of the Bank of Finland's general equilibrium model, i.e. the Aino 3.0 model, see Silvo and Verona (2020), The Aino 3.0 model, https://helda.helsinki.fi/bof/handle/123456789/17442. ↑
4. In fact, the Ministry of Finance report does not propose that the current maximum LTV ratio be replaced by a maximum debt-to-income ratio. Instead it proposes that the latter be incorporated into regulation. The LTC regulation applied in Finland was developed for monitoring banks' credit risks. Systemically, credit risks are very problematic particularly when a very large number of credit risk incidents take place simultaneously. The model is ↑

not suitable for modelling extreme incidents that cause a considerable amount of credit risks, and in this respect, the advantages of LTC regulation are not discernible in the modelling.

5. A more thorough analysis is presented in 'Economic effects of a debt-to-income constraint in Finland: Evidence from Aino 3.0 model', Bank of Finland Economics Review 1/2021. ↑
6. A tight calibration refers to a situation in which the DTI constraint is set to a level which in the long term generates a housing loans-to-GDP ratio of 100%. With a neutral calibration, the housing loans-to-GDP ratio remains unchanged at 147%. A loose calibration would allow the ratio to rise to 200% in the long term. ↑
7. See New mortgage-borrowers have an increasing amount of debt relative to income. ↑
8. The LTC constraint applied in Finland is also countercyclical in nature. Its operating principles are very similar to those of the LTV constraint used in the modelling, as housing assets comprise the majority of the collateral for housing loans. ↑

Keywords

Aino model, banks, debt-to-income cap, macroprudential stability, maximum loan-to-value ratio, mortgages