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Impacts of 2016 guidelines on mortgaging of homes

Guidelines on credit assessment

The Danish Financial Supervisory Authority's guidelines from 2016 on prudent credit assessment when granting housing loans in so-called growth areas have had an impact on the lending practices of credit institutions, albeit a modest one.

Read more

Dampened credit growth

The guidelines have made borrowers in growth areas borrow less than borrowers outside growth areas. No impact is seen on house prices.

Read more

Modest impact

The modest impact may be due to slow implementation, scope for deviation from the guidelines and the fact that the guidelines were in line with best practice in the institutions.

Read more

Focus on mortgaging of homes in growth areas

Since the financial crisis, there has been much focus on making the financial sector more resilient. One tool for achieving this objective has been an increased use of macroprudential regulation.[1]

Among the macroprudential measures implemented in Denmark are the guidelines issued by the Danish Financial Supervisory Authority, effective from March 2016, cf. Box 1. The guidelines focus on prudent credit assessment when granting housing loans in Copenhagen and environs and Aarhus – the so-called growth areas.[2] The guidelines were issued in response to, inter alia, the Systemic Risk Council's call for prudent credit assessment in these areas, which were characterised by rising house prices and a growing proportion of new lending to borrowers with high debt-to-income, DTI, ratios, cf. Chart 1.[3] One of the recommendations in the guidelines is that the income of a borrower to a larger extent than previously should be a constraint in the credit assessment process. In March 2017, the Danish Systemic Risk Council issued a recommendation addressed to the government in which it called for further emphasis on the DTI ratio in the credit assessment of borrowers. The government complied by introducing a DTI ratio limit in the Executive Order on good practice for mortgage lending, determining which loan types borrowers qualify for depending on their DTI. It is yet too early to assess the impact of this measure, and this Analysis focuses exclusively on the impact of the Danish Financial Supervisory Authority's guidelines.

Examples of measures targeting housing debt Box 1

2014 Announcement of Supervisory Diamond for mortgage banks (restrictions on mortgages with deferred amortisation or adjustable interest rate, etc.)

2015 5 per cent down payment requirement for home purchases implemented in the Executive Order on good practice for mortgage lending

2016 **Guidelines on prudent credit assessment when granting housing loans to households with high DTI ratios and insufficient wealth in growth areas**

2018 Restriction on loans with deferred amortisation or adjustable interest rate for borrowers with high DTI and LTV ratios introduced in the Executive Order on good practice for mortgage lending

1 See Box 2 for a detailed description of the foundation for applying macroprudential regulation.

2 The growth areas comprise the areas "Copenhagen City" and "Copenhagen environs", as defined by Statistics Denmark, and the City of Aarhus. Thus, the municipalities comprised are Copenhagen, Frederiksberg, Dragør, Tårnby, Albertslund, Ballerup, Brøndby, Gentofte, Gladsaxe, Glostrup, Herlev, Hvidovre, Høje-Taastrup, Ishøj, Lyngby-Taarbæk, Rødovre, Vallensbæk, and Aarhus.

3 See Danish Financial Supervisory Authority, Press release Vejledning om kreditvurdering ved belåning af boliger i vækstområder mv. (Guidelines on credit assessment when granting housing loans in growth areas, etc. – in Danish only) (*link*), 1 February 2016. The guidelines took effect in March 2016 and were subject to public consultation in November 2015. In other words, the guidelines were effective throughout most of 2016.

The Analysis assesses the impact of the measure on mortgage lending in the growth areas. The main result is that the measure had an impact – albeit a modest one – on credit growth to households in the growth areas. The results do not indicate an impact on house prices.

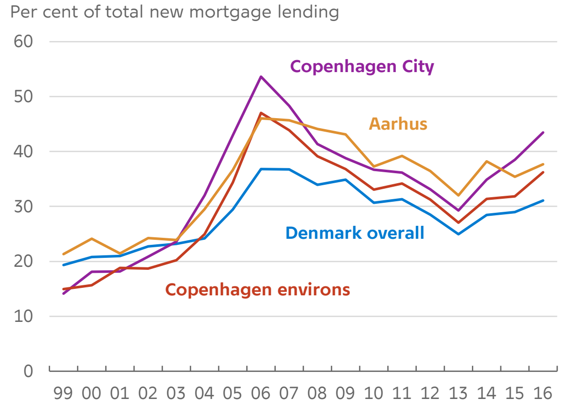
The key element of the guidelines is specific limits on a household's total debt relative to its gross income. For households with a DTI ratio of 4-5, aggregate wealth should generally remain positive if the value of the home declines by 10 per cent.[4] For households with a DTI ratio above 5, wealth should generally remain positive if the value of the home declines by 25 per cent. Loans breaching these limits will subsequently be referred to as loans to households with high DTI ratios and insufficient wealth.

The guidelines are "soft" in the sense that the institutions should include the principles in their credit assessment, but may deviate from the principles, for instance by opting for alternative risk limitation measures.

The guidelines comprise only credit assessments in relation to home purchases or top-up loans in the growth areas, i.e. new lending. So since March 2016, mortgage lending in these areas has been subject to the guidelines, while mortgage credit institutions have, in principle, been able to continue their lending practices unchanged in other municipalities. In principle, the geographical border makes it possible to identify the impact of the measure by comparing households just inside the growth area (affected) and households just outside the growth area (unaffected). Below, the focus is exclusively on the growth area of Copenhagen and surrounding municipalities.

Rising house prices in the Copenhagen area have, to some extent, been driven by notable price increases in the City of Copenhagen. However, the Analysis includes only municipalities in the growth area that are geographically adjacent to municipalities outside the growth area and municipalities located just outside the growth area. This ensures greater comparability between municipalities that are affected by the guidelines and municipalities that are not. That way, the estimated effects may be attributed, with greater probability, to the introduction of the guidelines rather than to urban/rural differences.

New mortgage lending to households with DTI ratios above 4 is increasing Chart 1



Note: Data from 2010 onwards is based on reporting by mortgage credit institutions at loan level, while data for previous years is based on information from SKAT (Danish Customs and Tax Administration).
Source: Own calculations on the basis of microdata from Statistics Denmark.

Modest impact on new lending

Danish register data enables a very precise evaluation of the impacts of the guidelines.

Initially, the focus is on the impact of the guidelines on mortgage lending in 2016. Here, the change in outstanding mortgage debt for households just inside and just outside the growth area is compared.

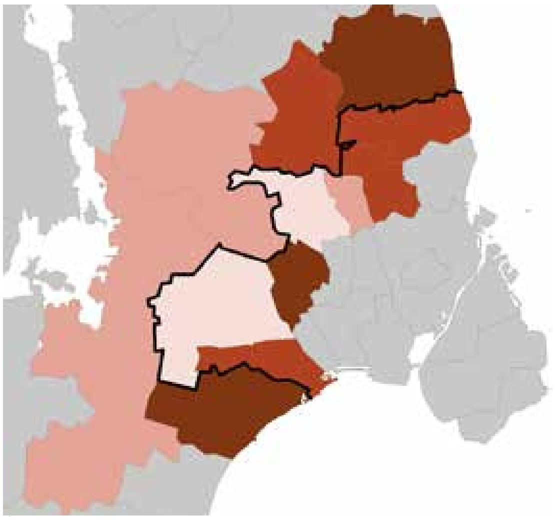
4 Here and below, net wealth is determined at household level as the sum of housing wealth as determined by the institutions and household financial wealth. In other words, pension wealth, among other factors, is disregarded.

Chart 2 illustrates the change in the proportion of borrowers in selected municipalities breaching the combined limits of the guidelines. In the colour scheme, the coloured area marks municipalities that are geographically located just inside or just outside the growth area. The shade of red indicates the change in the volume of borrowers breaching the guideline limit values from 2015 to 2016. The black line shows the border of the Copenhagen growth area. The focus is exclusively on municipalities adjacent to the border, the purpose being to include as comparable municipalities as possible in the Analysis. In the geographical illustration, the red colour is of a darker shade in municipalities outside the growth area than in the neighbouring municipalities just inside the growth area, except for the border between the municipalities of Albertslund and Egedal. This indicates that, in 2016, new lending to households with high DTI ratios and insufficient wealth increased less in municipalities subject to the guidelines, and, accordingly, that the guidelines have dampened credit growth. Changes in the proportion of households breaching the guidelines are relatively small, one reason being that many households are far from the limits introduced.

There could be a number of explanations why new lending breaching the guideline limit values was lower in municipalities just outside the growth area than in municipalities just inside the growth area. Such explanations include differences in the types of families living inside and outside the growth area, respectively, including differences in incomes and wealth. By applying register data at household level in the formalised analysis below, it is possible to adjust for observable differences in households.

The proportion of borrowers breaching the guidelines rose faster outside the growth area in 2016, percentage points

Chart 2



Note: The chart illustrates the proportion of borrowers with a high DTI ratio and insufficient wealth in 2016 less the same proportion for 2015. A darker shade of red reflects a greater proportion of borrowers with high debt and insufficient wealth from 2015 to 2016. The chart comprises those municipalities in the growth area, i.e. "Copenhagen City" and "Copenhagen environs", that are directly adjacent to municipalities outside the growth area and municipalities just outside the growth area. The division is illustrated by the black line.

Source: Register data from Statistics Denmark and own calculations.

To understand the impact of the guidelines on lending in 2016, we zoom in on the borrowers taking out new mortgage loans in 2016-17.

If the guidelines have served their purpose, the probability of having a loan application approved by the institutions in 2016 will be lower for affected households than for unaffected households. Moreover, all else equal, smaller loans will presumably be granted to borrowers inside the growth area. For instance, the institutions will presumably approve loan applications from households looking to take out loans that will result in a DTI ratio below 400 per cent of their incomes. On the other hand, households requesting a DTI ratio in breach of the guidelines will presumably have their loan applications rejected, be encouraged to apply for a smaller loan or find secondary financing elsewhere. In order to assess whether the guidelines have had any impact on the overall debt development in the growth area, the focus is on all households taking out new mortgage loans in 2016-17 and residing in or taking up residence in municipalities adjacent to the border of the growth area. By comparing these two groups – the groups inside and outside the growth area, respectively – over the calendar years, the impact of the guidelines is illustrated by comparing the annual change in outstanding mortgage debt.

The results show that borrowers subject to the guidelines on average took out mortgage debt totalling about kr. 40,000 less in 2016-17 than comparable households in municipalities outside the growth area

The rationale for applying macroprudential policy

Box 2

As demonstrated by the financial crisis, financial sector imbalances can result in huge economic costs. Fiscal and monetary policies were generally insufficient to address these imbalances. Since the crisis, macroprudential policy has moved up on the agenda of many central banks and authorities. Macroprudential policy addresses risks in the financial system as a whole (systemic risks) and should be seen as a complement to the supervision of the individual financial enterprises ("microprudential" policy). In other words, the objective of macroprudential policy is to ensure financial stability.

If systemic risks materialise, this could inhibit the ability of the financial system to provide financial products and services to such an extent that it will negatively affect the macroeconomy. Macroprudential policy aims to address various market failures and externalities. Examples of externalities and risks that could develop into systemic risks are excess risk-taking in the financial sector or underestimation of financial risks when the economy is growing. Another example is steeply rising prices of assets such as real estate. If house prices outpace e.g. income growth for an extended period of time, house prices may fall back later. Given that a large portion of the balance sheets of banks and mortgage credit institutions are collateralised by real estate, a large drop in house prices could lead to deteriorating credit quality and losses that could impact the financial system's ability to provide credit. Another example of an externality is interconnectedness among financial players that could result in contagion of one institution's problems to another institution. When individual institutions do not take externalities into account, this could have implications for the system as a whole, thereby motivating intervention. Macroprudential policy seeks to prevent risks from evolving into systemic risks. In order to cushion such self-reinforcing negative effects, macroprudential instruments tend to be countercyclical.

Macroprudential authorities can implement various measures to address the build-up of systemic risks. Ideally, the build-up can be identified at an early stage. That way, initiatives can be taken to address the risks and prevent them from escalating to a level where they may have large negative impacts on the financial system and the real economy. Macroprudential measures could, for instance, be requirements for financial institutions to set aside extra capital – to deal with unforeseen events and shocks. The size of these capital buffers may vary over time (countercyclical capital buffers) and be greater for certain types of institutions (SIFI buffers). Macroprudential authorities may also seek to address the build-up of risks and vulnerabilities more directly, for instance by imposing requirements on the institutions' credit policies and conditions for extending loans secured by real estate. For example, limits could be placed on the amount home buyers can borrow relative to the cost of a house or to their income. Such caps can be used to cool potentially rapid credit growth during periods of, say, soaring house prices.

In Denmark, the Systemic Risk Council (the Council) is the macroprudential authority. The Council consists of representatives from Danmarks Nationalbank, the Danish Financial Supervisory Authority, the economic ministries and three independent representatives. The Council monitors the financial system, makes recommendations regarding policy measures and evaluates policy measures. The government (the Minister for Industry, Business and Financial Affairs) is the designated macroprudential authority. The Council typically makes recommendations to the government regarding policy measures on a "comply-or-explain" basis. This means that the government must either implement the recommendation (comply) or publicly explain why it has decided not to implement the recommendation (explain). In practice, micro- and macroprudential policies tend to overlap. Consequently, several of the Danish Financial Supervisory Authority's guidelines for banks and mortgage credit institutions, which are, in principle, intended for microprudential purposes, also have macroprudential implications. An obvious example is the Danish Financial Supervisory Authority's guidelines on prudent lending in growth areas.

relative to 2015, cf. Chart 3 (left). The vertical lines indicate the 95 per cent uncertainty bands. A comparison of all years before the introduction of the guidelines with 2016-17 shows that mortgage lending has been reduced by kr. 30,000 inside the growth area. In the years prior to 2016, when the guidelines took effect, there are no significant differences between households' year-on-year changes in mortgage debt in the two groups. An examination of the propensity to take out mortgage loans during the same period also shows the same behaviour among affected and unaffected households. This indicates that the households are sufficiently comparable to support the notion that the introduction of the guidelines brought about the impact in 2016-17.

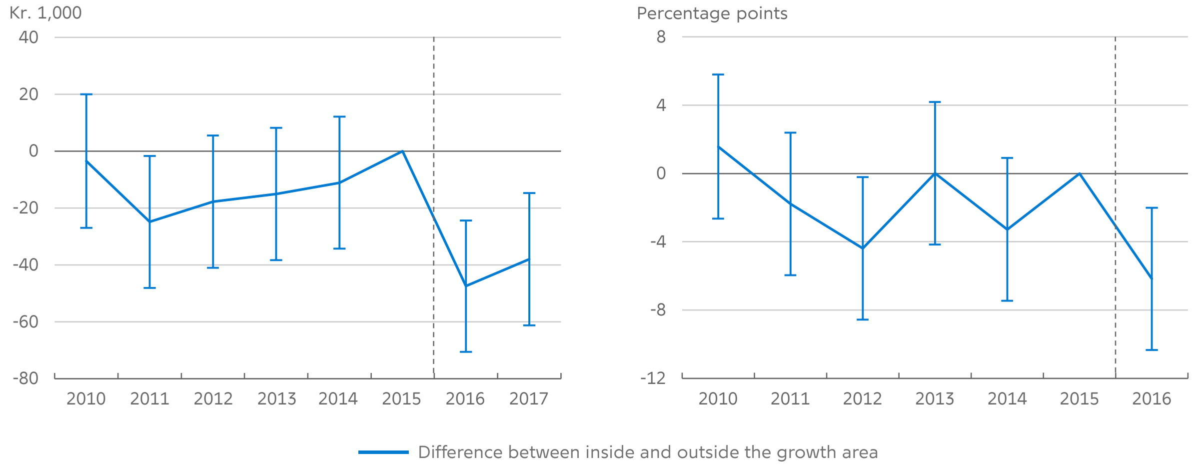
The guidelines are particularly linked to borrowers' DTI ratios. So for the same households we calculate the annual change in the DTI ratio in the same manner as for mortgage debt in order to better identify

Households in the growth area are taking out smaller loans after the introduction of the guidelines

Chart 3

Annual difference in mortgage debt development for households taking out loans in 2016-2017

Annual difference in DTI ratio development for households taking out loans in 2016



Note: The charts illustrate that year-on-year changes in mortgage debt and DTI ratio show a significantly different trend over time when households just inside the growth area are compared with households close to but outside the growth area. The broken lines indicate the time when the guidelines took effect. Only households taking out new mortgage loans in 2016-2017 are included, given that the guidelines are expected to reduce new lending. The DTI ratio cannot be calculated for 2017 due to lack of income data at household level. The vertical columns indicate the 95 per cent uncertainty bands. See Box 3 for a further description of the methodology.

Source: Register data from Statistics Denmark and own calculations.

the isolated impact of the guidelines.[5] Households taking out loans in 2016 increased their DTI ratios less in 2016 if they lived inside the growth area than outside the growth area, cf. Chart 3 (right). The vertical uncertainty bands show that the reduction of the DTI ratio is statistically significant. A comparison of the years prior to the introduction of the guidelines, seen collectively, with developments in 2016 shows that, on average, the DTI ratio has increased by 4.8 percentage points less inside the growth area than outside. This result indicates that the guidelines have had an impact on the average household DTI ratio, albeit a modest one, considering that their average debt was equivalent to just below 280 per cent of gross income in 2016.

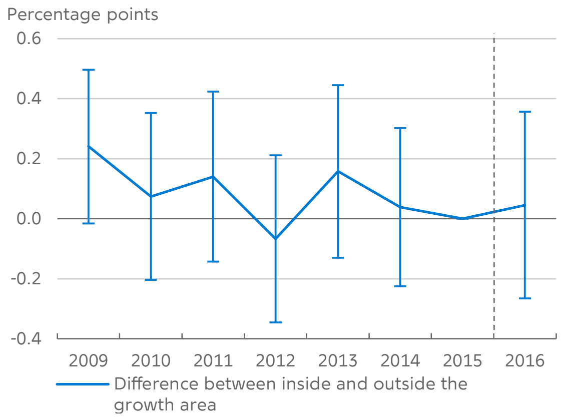
So far, the Analysis has been focusing on the amount borrowed by households taking out loans. The guidelines may also have caused some loan applications to be rejected, and hence the probability of taking out a new loan has been reduced in the growth area since 2016. An analysis of the probability that households take out new loans, which do not comply with the guidelines, shows no significant impacts of the guidelines, cf. Chart 4. Thus, the overall conclusion is that the guidelines have not had any impact on who has been granted loans, but those who have been granted loans and are subject to the guidelines have been granted slightly smaller loans.

5 Please note that gross income over the calendar year, as determined in the registers, is not necessarily the same as that applied by credit institutions in their credit assessment at the time of assessment. This could cause noise in the DTI ratio measured.

No impact on house prices

On the demand side, house prices are determined by home buyers. The guidelines may have had a negative impact on house prices if it has caused some households to feel compelled to purchase a less expensive home than they would otherwise have done or to abstain from realising the home purchase altogether. However, there are no indications to this effect in 2016, when the guidelines took effect. Chart 5 illustrates home buyers' choices of house prices relative to incomes in the municipalities on either side of the border of the growth area in 2015 and 2016. As can be seen, the guidelines have not caused a shift in the house price-income ratio in the growth area compared with the surrounding, unaffected municipalities. Thus, there are no indications that home buyers have reduced their home investments as a result of the guidelines. However, purchasers in both areas seem to have opted for slightly more expensive homes relative to their incomes.

The guidelines have not affected the probability of breaching the guideline limit values Chart 4



Note: The chart illustrates, on a year-by-year basis, the difference in the probability of breaching the guideline limit among households in the growth area and households close to but outside the growth area. The broken line indicates the time when the guidelines took effect. Only households taking out new mortgage loans in 2016 are included, given that the guidelines are expected to reduce the proportion of new lending breaching the guideline limit values. The vertical lines indicate the 95 per cent uncertainty bands. See Box 3 for a further description of the methodology.

Source: Register data from Statistics Denmark and own calculations.

How can the modest impact of the guidelines be explained?

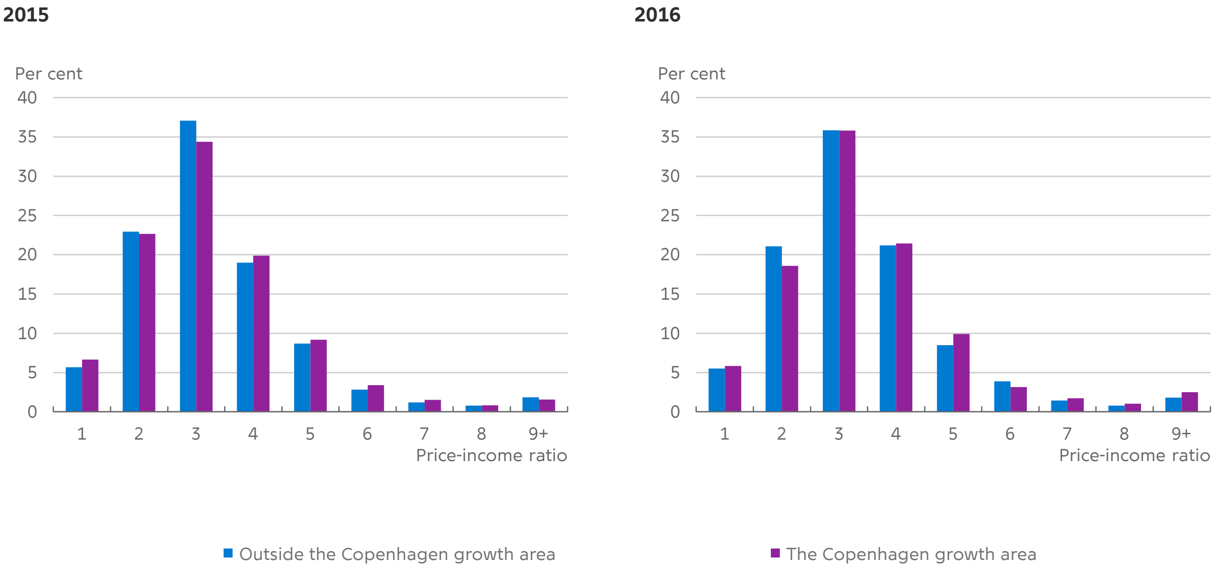
The rationale for the introduction of the guidelines was a steep rise in house prices over a number of years. This raised the concern that, if continued, this development would lead to easing of credit standards, as seen in the run-up to the financial crisis. Consequently, the primary aims of the guidelines were to contain the households' leverage ratio and improve the resilience of credit institutions. The guideline limits for DTI ratio and net wealth were in line with best practice for the institutions' credit policy. In other words, the intention was not to recast the existing standards. In itself, the design of the guidelines may explain why, as shown by the Analysis, the guidelines had a relative modest impact on new lending in the growth areas in 2016.

Another explanation is that the guidelines are formulated as "soft" requirements, i.e. credit institutions may, in certain circumstances, deviate from the requirements – for instance for young individuals whose income levels are expected to increase, e.g. after graduation. The dataset does not capture such exceptions.

However, as indicated by a recent report by the Danish Financial Supervisory Authority, the relatively modest impact may also reflect the institutions' failure to fully implement the guidelines in their credit policies.[6] Therefore, the impact of the measure may increase as it becomes fully implemented in credit policies. The perception that the measure was

6 See Danish Financial Supervisory Authority, Press release Flere banker tager høj risiko ved boliglån i vækstområder (More banks assume high risks on housing loans in growth areas – in Danish only) *(link)* of 4 September 2018.

The distribution of households' home purchases is not affected by the guidelines Chart 5



Note: The charts display the probability distribution across price-income choices for home buyers in the areas affected. The range "1" covers purchases within the range of 0 and 1. Price-income is calculated as the purchase price of the home relative to household gross income.
Source: Register data from Statistics Denmark and own calculations.

insufficient was also part of the reason why, in March 2017, the Systemic Risk Council recommended that the Danish government should introduce a harder DTI requirement. This requirement took effect for all of Denmark on 1 January 2018 through an update of the Executive Order on good practice.[7] It is yet too early to assess the impact of this measure.

In principle, the institutions may have rolled out the guidelines throughout the country, thereby over-implementing the measure. This would mean that the impact of the guidelines is underestimated in this Analysis. However, lending activities increased from 2015 to 2016, and thus the modest impacts do not seem to be caused by over-implementation.

7 See Systemic Risk Council, Recommendation on limiting risky loan types at high levels of indebtedness *(link)*, 30 March 2017.

How we proceeded

Box 3

The empirical analysis is designed as a difference-in-differences regression model. The Danish Financial Supervisory Authority subjected the growth municipalities to tighter lending guidelines in 2016 with its guidelines for lending to home owners, while municipalities close to – but outside of – the growth areas were not included. This is utilised in the model. In principle, the fact that two geographically delimited areas were subjected to different lending guidelines over time makes it possible statistically to identify the impact of the measure. However, in this Analysis, developments in the key variables to be measured, such as the change in credit growth and DTI ratio, must be identical across the two geographically delimited areas prior to the update of the credit policy, since this indicates that households are sufficiently comparable for the purpose of the Analysis.

The following regression model is used for quantifying the key variables:

$$y_{it} = \alpha + \beta_1 V_i + \beta_2 Post_t + \beta_3 V_i \times Post_t + X_{it-1} + \varepsilon_{it},$$

where y_{it} is the dependent variable, for example the change in mortgage debt or the DTI ratio. V_i is an indicator taking the value 1 for municipalities inside the growth area and 0 otherwise. $Post_t$ is an indicator taking the value 1 in and after 2016 and 0 otherwise. The vector X_{it-1} includes control variables at household level. Thus, the parameter value β_3 identifies the change between affected and unaffected municipalities from the period of identical lending guidelines until the period in which credit policy deviates for the two areas. To illustrate results geographically and test whether affected and unaffected municipalities had identical developments in the dependent variable prior to 2016, a variation of the above regression is defined where the indicator, V_i, is interacted with year dummies:

$$y_{it} = \alpha + \beta_1 V_i + \beta_2 Year_t + \beta_3^t V_i \times Year_t + X_{it-1} + \varepsilon_{it}.$$

Here, the parameter β_3^t quantifies the difference in the dependent variable between affected and unaffected municipalities in the year t. Both models control for the preceding year's value of financial wealth and income.

The dependent variables of the analysis are the annual change in mortgage debt (Chart 3, left) and the annual change in DTI ratio (Chart 3, right).

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