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Mortgage refinancing supports private consumption

- A significant decline in interest rates in Denmark has led to a record-high number of refinancings of fixed rate mortgage loans to lower-rate loans. In 2019 up to and including August, around 85,000 homeowners opted for refinancing to new, lower-rate fixed loans.

- Upon mortgage refinancing, many homeowners raise more mortgage debt than they previously had. Evidence from refinancing activities in previous years shows that the additional funds are to a high degree used to finance increased consumption and for home improvements. However, homeowners also use these funds to increase their liquidity buffers and reduce bank debt.

- It is estimated that, viewed in isolation, refinancings can contribute by around 0.9 percentage points to private consumption growth. The option to refinance existing mortgages may act as a catalyst for borrowing more and consuming now rather than later.

Lower interest rates

The fall in interest rates makes mortgage refinancing attractive.

Read more

Kr. 245,000 of additional mortgage debt

Home equity is mortgaged when refinancing.

Read more

Kr. 145,000 for consumption, etc.

The funds are used for e.g. a new car, home improvements or extensions.

Read more

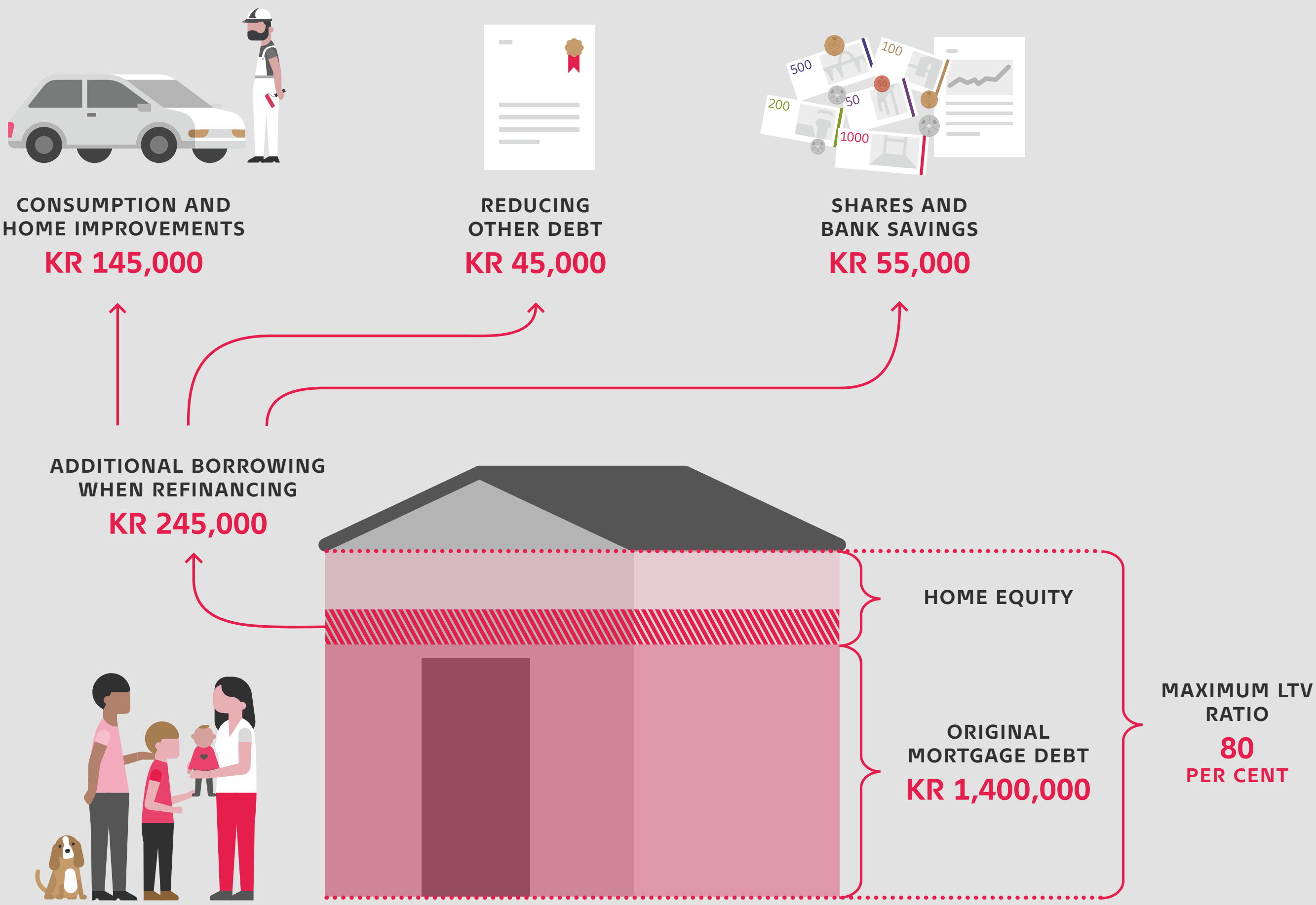
Homeowners may increase borrowing and consumption when refinancing

The fall in mortgage rates has led to a wave of refinancing, which should be expected to support private consumption. Many homeowners refinance their fixed rate mortgages to lower-rate mortgage loans. Some take the opportunity to raise additional mortgage debt at the same time, which can finance increased consumption. It is estimated that growth in private consumption may be lifted by around 0.9 percentage points, viewed in isolation, given that homeowners behave as they did during past waves of refinancing.

Refinancing may be of great significance to homeowners with fixed rate loans. For an average family, the additional borrowing when refinancing to a lower-rate loan can, for example, boost consumption by around kr. 145,000, cf. Box 1. The additional funds may be used e.g. to replace the family car or pay for the costs of builders and materials for home improvements. Some homeowners also use their increased borrowing to reduce e.g. bank debt and overdrafts or to build up a liquidity buffer for unexpected expenses.

Box 1

Homeowners often increase borrowing and consumption when refinancing

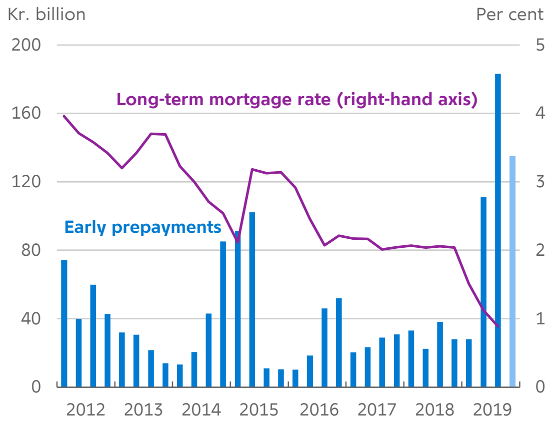


Many homeowners refinance to loans with lower, fixed rates in 2019

Falling mortgage rates allow Danish homeowners to refinance to lower-rate mortgage loans. Refinancing to lower-rate loans ensures homeowners lower housing costs due to the lower interest rate on their housing debt, cf. Box 2. The effective interest rate on 30-year fixed rate mortgage loans has fallen to 0.9 per cent in the beginning of September 2019, cf. Chart 1.

Prepayments are expected to amount to kr. 438 billion in 2019. The figures reflect borrowers' wishes to terminate their fixed rate loans before maturity. For instance, they wish to refinance to a new loan with a different interest rate, servicing profile, maturity or interest rate fixation period. The prepayment statistics also include homeowners and firms terminating loans in connection with property sales or for other reasons. Homeowners' refinancing of fixed rate loans to corresponding lower-rate loans is thus only a part of the statistics of total terminations.

Falling mortgage rates prompt many homeowners to terminate their fixed rate loans Chart 1



Note: The light blue bar on the right represents a Danske Bank estimate. In this chart, each calendar year comprises the April, July, October pay dates and the January pay date in the following year. Refinancing within a calendar year is assumed to comprise these pay dates.
Source: Danmarks Nationalbank and Scanrate Rio.

Refinancings to lower-rate loans are registered in the Land Registry

Mortgage refinancings to lower-rate loans are registered in the Land Registry on an ongoing basis. Refinancing to a lower-rate loan is defined as cancellation of the entry in the Land Registry of a fixed rate mortgage loan, and registration of a new, lower-rate mortgage loan secured on the same

Access to refinancing in the Danish mortgage credit system Box 2

The Danish mortgage credit system is special in that many homeowners have long-term fixed rate mortgage loans which can be prepaid at any time on special terms. This system structure protects homeowners from having to pay a very high price if they wish to buy back the debt before the loan matures. Moreover, it becomes cheaper to buy back the debt when interest rates increase, because the value of the debt decreases. The buy-back right has an option value for which the borrower pays the investor a premium as ongoing compensation, cf. Danmarks Nationalbank (2019b, Box 3).

Homeowners with fixed rate loans may potentially profit from refinancing to higher-rate or lower-rate loans when interest rates change sufficiently.

- On *refinancing to lower-rate loans*, the existing mortgage loan can be prepaid at par, and a new, lower-coupon loan is raised at e.g. a price of 96-99 per 100. This entails a capital loss of 1-4 per cent. In addition, one-off refinancing costs should be taken into account, including prepayment and creation costs to the bank and mortgage credit institution and land registration fees to the central government. These costs should be viewed against the homeowner's ongoing savings of interest costs, all else equal. In addition, it allows the homeowner to refinance back to a higher-rate loan at a later stage.
- On *refinancing to higher-rate loans*, the new mortgage loan has a higher coupon rate than the prepaid loan. But the price of the existing mortgage loan has fallen, entailing a debt reduction for the homeowner when refinancing. This advantage should be viewed against the one-off refinancing costs and the homeowner's higher current interest costs, all else equal.

property.[1] A closer look at 30-year fixed rate mortgage loans reveals that many homeowners have refinanced to 1 and 1.5 per cent fixed rate loans, cf. Chart 2. The background to the wave of refinancing in 2019 is that existing fixed rate mortgage loans at the beginning of the year were predominantly 2-2.5 per cent loans, cf. Danmarks Nationalbank (2019a).

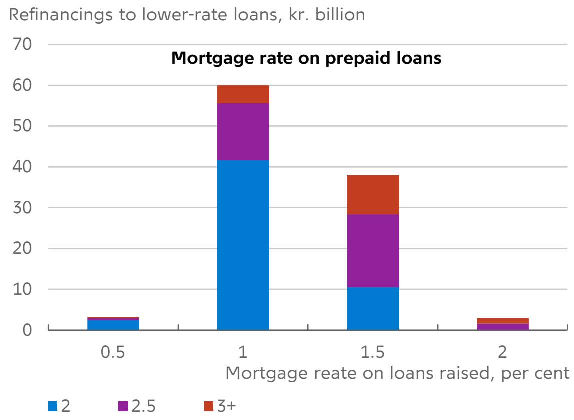
Refinancing to lower-rate loans reduces homeowners' debt service and increases borrowing

Falling mortgage rates and refinancing to lower-rate loans may potentially impact homeowners' financial situation via two channels: Firstly, the current interest payments decrease, reducing the debt service on the homeowner's total home financing. Secondly, borrowing is often increased in connection with refinancing.

The fall in homeowners' debt service corresponds, on average, to 2 per cent of their disposable income
The lower interest rates resulting from refinancing to lower-rate loans reduce all future interest payments, giving the homeowner more financial scope and liquidity for e.g. consumption. The level of interest rates has been falling since the financial crisis, and the Danes have predominantly consolidated their balance sheets in terms of increased savings and lower consumption in this period, cf. Kuchler and Hviid (2017). This reflects a long consolidation process during which households – especially those with high pre-crisis debt – have shown hesitant to consume despite the low interest rates.

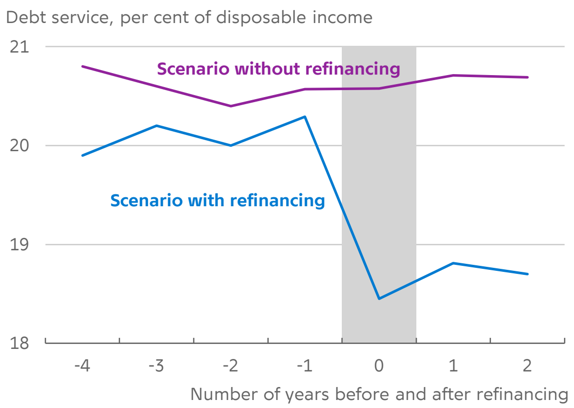
Evidence from past refinancing activity shows that refinancing to lower-rate loans reduces the average debt service on the homeowner's mortgage loan by an average of around 2 per cent of disposable income, cf. Chart 3. The change in debt service varies across homeowners, as their additional borrowing varies. Homeowners retaining or reducing their outstanding debt will experience the strongest reduc-

Many mortgage refinancings to fixed rate 1 and 1.5 per cent loans from January to August 2019 Chart 2



Note: The chart comprises only 30-year mortgages registered in the Land Registry. The full amount of refinancing to lower-rate loans for the October pay date has not yet been finally registered in the Land Registry. Consequently, it is assumed that registered loans with a principal of more than kr. 1 million for this pay date, which are not associated with housing transactions, constitute refinancings and not additional loans.
Source: Own calculations based on Land Registry data.

Refinancing to lower-rate loans entails a permanent reduction of debt service Chart 3



Note: The chart shows debt service before tax in the years before and after the year of refinancing, denoted as time 0. The scenario with refinancing includes homeowners refinancing to lower-rate loans at time 0, covering refinancing in years 2012-2014. The scenario without refinancing includes homeowners refinancing to lower-rate loans three years later. See the detailed method description in Box 4.
Source: Own calculations based on register data from Statistics Denmark.

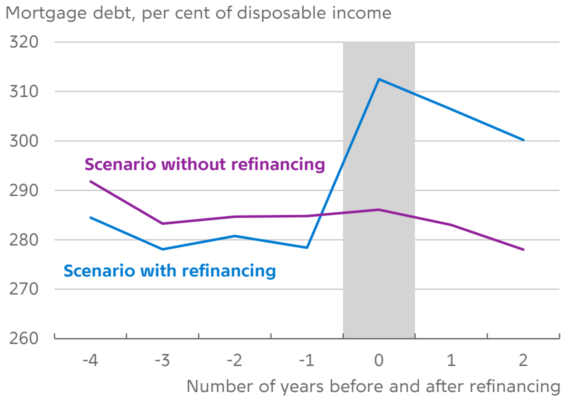
1 Refinancing here entails that the interest rate on the new loan must be lower than that on the prepaid loan. No distinction is made between selecting or deselecting deferred amortisation when refinancing.

tions in debt service, which is conversely increased by higher additional borrowing.

When interest payments fall as a result of refinancing to lower-rate loans, the principal payments will automatically rise a little. This is due to the annuity principle underlying the structure of mortgage loans. Moreover, the lower interest costs entail lower tax deductibility of negative capital income. If no additional debt is raised, the total debt service on the loan will fall, however, when the elements are all added up.

Recent years have seen a development towards more loans with amortisation. If deferred amortisation is deselected when refinancing, the homeowner's debt service will fall less or even rise.

Homeowners tend to increase their mortgage debt in the year of refinancing Chart 4



Note: The chart shows the median for nominal mortgage debt at any time relative to disposable income. The scenario with refinancing includes homeowners refinancing to lower-rate loans at time 0. The scenario without refinancing to lower-rate loans includes homeowners refinancing to lower-rate loans three years later. See the detailed method description in Box 4.
Source: Own calculations based on register data from Statistics Denmark.

Many borrowers raise more debt when refinancing to lower-rate loans

The falling interest rates make it cheaper for homeowners to increase their borrowing. The main reason is lower financing costs. In addition, the one-off costs per krone borrowed are lower when raising additional debt on refinancing to a lower-rate loan. This is because part of the one-off costs is fixed. For a homeowner wishing to raise more debt, the fall in interest rates and refinancing to a lower-rate loan may thus be catalysts for higher debt secured on the home.

A study from Danmarks Nationalbank shows that wealth gains in the housing market via rising house prices are realised and used for consumption to a higher degree when refinancing is an attractive option, cf. Andersen and Leth-Petersen (2019).[2] In other words, potential savings on interest payments may induce the homeowner to refinance to a lower-rate loan when it is also an advantage for the homeowner to raise more debt to finance e.g. higher consumption.

The total mortgaging rises notably in the year of refinancing and is maintained at a higher level than before the refinancing to a lower-rate loan, cf. Chart 4. In Chart 4, the scenario *with* refinancing (blue curve) illustrates the development in mortgage debt in the years before, during and after refinancing to lower-rate loans. Time 0 denotes the year of refinancing. The scenario *without* refinancing (purple curve) reflects the development in mortgaging for comparable homeowners not refinancing to lower-rate loans in the period shown. The purple curve can thus be interpreted as a counterfactual scenario and thus an illustration of how mortgage debt could have been for refinancing homeowners, if they had instead opted not to refinance at time 0. Thus, in principle, the difference between the two scenarios reflects the isolated effect of refinancing to a lower-rate loan on the mortgaging of the home.

Prior to the ongoing wave of refinancing, Danish homeowners with fixed rate loans had an average outstanding debt to mortgage credit institutions of kr. 1.4 million, corresponding to a loan-to-value,

2 Homeowners may increase their borrowing independently of interest rate changes. However, a study from Danmarks Nationalbank shows that unexpected increases in the value of the home are realised and used for consumption or home improvements when refinancing is potentially advantageous, cf. Andersen and Leth-Petersen (2019).

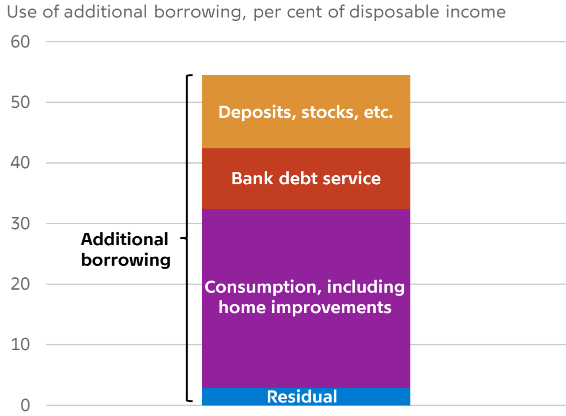
LTV, ratio of 58 per cent.[3] This provides the homeowners considerable home equity, since the maximum LTV limit on mortgage credit is 80 per cent. In most cases, the one-off refinancing costs can be financed using the proceeds from the new loan. Accordingly, additional borrowing is, effectively, characterised by the new loan to be larger than just covering the transaction costs and any capital loss.[4]

Additional borrowing is predominantly used for increased consumption

During previous waves of refinancing, additional borrowing was predominantly used to finance increased consumption. The average additional borrowing per refinancing to a lower-rate loan was 55 per cent of the homeowner's disposable income in the year of refinancing, cf. Chart 5. It comprises only homeowners, who actually did raise additional borrowing. In the same year, homeowners increased consumption, including home improvements, at a level corresponding to 30 per cent of their disposable income. Principal payments on bank debt and savings in free funds, including e.g. deposits and investment in shares and bonds, rose by an average of 10 and 12 per cent, respectively, of disposable income in the year of refinancing.

Homeowners raising more debt and increasing consumption in connection with refinancing to lower-rate loans will typically be those who previously did not find it profitable. Other homeowners used the refinancing to lower-rate loans to make their finances more robust by repaying more expensive debt. Bank debt is usually variable rate debt. Reducing bank debt via a fixed rate mortgage loan allows homeowners to reduce their exposure to future increases in interest payments. Finally, a third group of homeowners opts for building up their liquidity buffers, e.g. for unexpected expenses. This buffer may consist of bank deposits, shares and bonds. In practice, homeowners may go for a combination of these options.

Additional borrowing is predominantly used for increased consumption in the year of refinancing Chart 5



Note: The bar illustrates the average change in the year of refinancing as a ratio of the homeowner's disposable income. The estimates are conditional on the homeowner increasing mortgage debt by at least 5 per cent in connection with the refinancing. See Box 4 for a more detailed explanation.
Source: Own calculations based on register data from Statistics Denmark.

It is not possible to break down the consumption effect by durable and non-durable consumer goods. This means that the increased consumption may reflect e.g. higher consumption of groceries or higher consumption in restaurants, but it may also indicate homeowners buying large consumer goods. On the basis of data from the Register of Motor Vehicles, it is predicted that the probability of the homeowner buying a new car rises by 10 per cent on average in connection with refinancing to lower-rate loans. This indicates that homeowners to a certain degree tend to buy durable consumer goods in connection with refinancing to lower-rate loans. The consumption may also reflect investment in home improvements, including e.g. maintenance or extensions.

3 The figures are based on Statistics Denmark's register data from 2017.

4 Given that both elements vary between loans, the analysis assumes that additional borrowing of at least 5 per cent indicates a real increase in the debt on refinancing.

Many refinancings stimulate private consumption overall

Private consumption is continually affected by refinancing to lower-rate loans. The contribution to total private consumption is large in years of high refinancing activity and smaller in years of low refinancing activity. Additional borrowing against the home may finance increased consumption, but the increase in consumption should not be viewed as a permanent rise in demand. In contrast, the increased consumption reflects homeowners moving forward future consumption opportunities.

Considering all refinancings to fixed lower-rate loans, the estimated increase in consumption per case of such refinancing corresponds to 20 per cent of disposable income. We estimate the contribution to overall private consumption by connecting the homeowners' average consumption response to average disposable income and the total number of refinancings within the year, cf. Box 3.

It is assessed that the ongoing wave of refinancing can contribute around kr. 11 billion to private consumption in 2019. By comparison, the contribution was by kr. 2 billion in 2018, a year with relatively low refinancing activity. Viewed in isolation, refinancing to lower-rate loans can thus contribute by 0.9 percentage points to growth in private consumption in 2019, cf. Chart 6. This is a considerable contribution relative to previous years, reflecting a notably higher number of refinancings in 2019 than in 2018, cf. Box 3.

Other channels for the potential impact of the fall in interest rates on household consumption
The effect of additional borrowing on consumption is solely based on the behaviour of homeowners

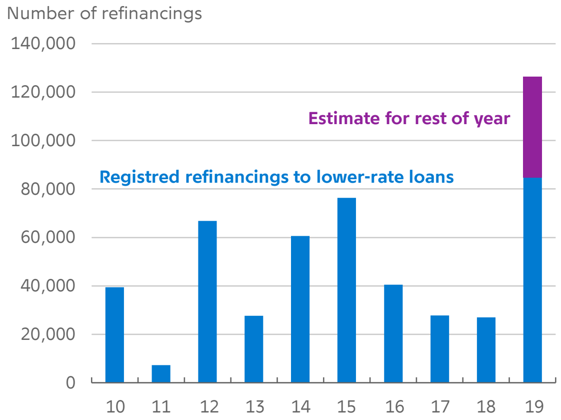
The refinancing contribution to private consumption is estimated on the basis of loan termination data

Box 3

Data on refinancing numbers can be compiled on an ongoing basis via Land Registry registrations from day to day. Refinancing is registered here when a homeowner cancels the registration of a mortgage loan against the home and registers a new loan with a lower coupon rate, secured on the same property. The number of refinancings to lower-rate loans is estimated at around 85,000 from January to August 2019. Here it is assumed that loans raised around the October pay date with a principal amount of more than kr. 1 million and not associated with housing transactions reflect refinancing. This assumption is necessary, given that the Land Registry registration of the existing loans has not yet been registered as cancelled.

The number of refinancings to lower-rate loans is expected to be 126,000 in total in 2019. This figure reflects a nowcast based on a linear regression model using the prepayment statistics (see Chart 1) as an explanatory variable in the period 2010-18.

The chart is based on two data sources. The years 2017-19 show Land Registry registrations, while the preceding years illustrate registrations from Statistics Denmark register data. Both data sources contain data for 2017 when around 6 per cent more refinancings were registered in the Land Registry. Accordingly, the period 2010-16 has been adjusted upwards by this discrepancy.



The contribution to private consumption measured in kroner is calculated as the number of refinancings within the year multiplied by the consumption effect of 20 per cent of the average disposable income for homeowners in the same year:

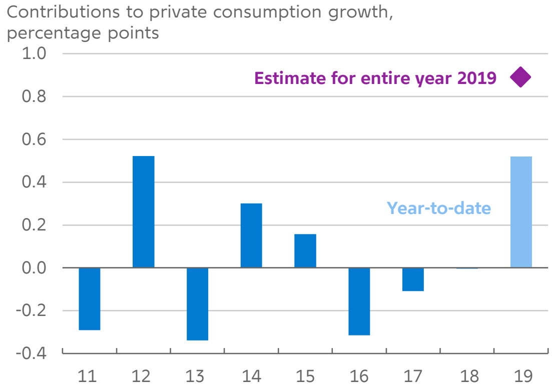
$$\Delta C_t = Number\ of\ refinancings_t \times 0.2 \times Disposable\ income_t$$

The contributions are converted to real growth contributions and are illustrated in Chart 6. In each year, the consumption effect thus depends on the refinancing activity and the development in disposable income.

who have refinanced from a fixed rate loan to a new, lower-rate fixed loan. It does not take into account potential effects of the fall in interest rates on private consumption for homeowners refinancing to or from adjustable rate loans or not refinancing their loans at all. Changes in consumption for homeowners, who automatically have their adjustable rate reset, are not included either. The analysis thus disregards some potential effects of the fall in interest rates on private consumption, and the estimated effects on consumption of falling mortgage rates via refinancing are associated with uncertainty. Moreover, the analysis evaluates the consumption gain only in terms of the homeowner exercising their buy-back option. Accordingly, no account is taken of the potential consumption loss resulting from the borrower continuously paying for the right to refinance in the form of a higher interest rate compared with a situation without the right to refinance.

Large refinancing contribution to growth in private consumption

Chart 6



Note: Year-to-date covers 2019 up to and including August.
Source: Own calculations based on register data from Statistics Denmark and the Land Registry.

Homeowners' borrowing and consumption behaviour is estimated on the basis of Statistics Denmark register data

Box 4

We have constructed an event study based on the time variation in homeowners' refinancing of fixed rate mortgage loans to lower-rate loans. The analysis thus takes advantage of the coupon rate spread which is a natural consequence of the fact that all existing loans have been raised at different times. A fall in the market rate on long-term mortgage bonds may provide an incentive for homeowners with relatively high coupon rates on outstanding loans to refinance to lower-rate loans, while this would not be an advantage for other homeowners with lower coupon rates on existing loans.

The analysis is based on a linear regression model in which the explanatory variable is either consumption, mortgage debt, bank debt, free savings or other measures of consumption and saving behaviour. The consumption measure is imputed on the basis of the consumption identity C=Y-S, where C is consumption, Y is disposable income, and S is the change in total net savings.[1] The consumption and savings variables have all been divided by an average of household disposable income in 2009-10. The model is estimated at household level for the period 2010-14. The dataset comprises all Danish households that refinanced existing fixed rate mortgage loans to lower-rate loans in the period 2010-17. A condition is that the refinancing only results in a coupon rate reduction, while the maturity segment and debt service profile remain unchanged. Finally, all cases of refinancing related to house transactions are excluded.

$$\Delta C_{i,t} = \alpha + \beta_1 K_i + \beta_2 POST_t + \beta_3 K_i \times POST_t + \gamma X_{i,t-1} + Z_i + \omega_i + \varepsilon_{i,t}$$

The empirical strategy exploits that identical events take place for different households at intervals of a few years. The above equation specifies the regression with the example where the dependent variable is the annual change in consumption for homeowner *i*. The indicator K_i takes the value 1 for homeowner *i*, if the household refinanced a fixed rate mortgage loan to a lower-rate loan in the period 2012-14. The indicator takes the value 0 for households who refinanced in the period 2015-17. The variable $POST_t$ takes the value 1 in the year of refinancing for individual homeowners and the value 0 in all preceding years. The vector $X_{i,t-1}$ contains a number of control variables in the preceding year, including net wealth, remaining maturity, deferred amortisation option and coupon rate. The vector Z_i contains several personal characteristics, including age, municipality of residence, gender, level of education, marital status and labour market affiliation, while $\varepsilon_{i,t-1}$ is the error term.

The difference between the scenarios with and without refinancing is interpreted as the effect of refinancing to lower-rate loans. The parallel development in the scenarios prior to the refinancing to a lower-rate loan indicates that the borrowing behaviour would have been the same in the two scenarios if the refinancing to a lower-rate loan had not taken place, cf. Charts 3 and 4.

1. See Browning and Leth-Petersen (2003) and Abildgren and Kuchler (2018).

In general, the fall in interest rates may also affect homeowners in several other ways. For instance, the fall in interest rates may contribute to increased consumption via redistribution of disposable income. When interest rates decline, disposable income is reduced, viewed in isolation, for households with substantial net financial savings. At the same time, the disposable incomes of indebted households are increased. The marginal propensity to consume is greater for the latter group than for the former group, cf. Crawley and Kuchler (2018). The redistribution resulting from the fall in interest rates thus contributes to stimulating total consumption in Denmark.

Finally, falling interest rates will reduce the return on pension wealth, a large element of total savings of Danish households. Despite homeowners' gain from exploiting the falling interest rates to refinance they may suffer losses on their savings due to the falling interest rates.

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