Irving Fisher Committee on
Central Bank Statistics

BIS

12th biennial IFC Conference: "Statistics and beyond: new data for decision making in central banks"

22-23 August 2024

A closer look at new housing loans in Portugal: unlocking the power of credit microdata[1]

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[1] This contribution was prepared for the conference. The views expressed in this publication are those of the authors and do not necessarily represent the official views of the Committee, its members, or the BIS.

A Closer look at new housing loans in Portugal

Unlocking the power of credit microdata

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Abstract

In this paper, we introduce a novel algorithm utilizing microdata from the Portuguese Central Credit Register to discern new housing loans from credit transfers. These transfers involve debtors moving their loans between credit institutions, which in essence do not constitute new credit.
Our findings offer fresh insights into housing loan dynamics, revealing that in 2023, credit transfers comprised a substantial portion of new loans. Moreover, they accelerated the transition of housing loan portfolios from floating to mixed interest rates. This highlights the pivotal role of credit transfers in shaping the landscape of housing loans within the financial system.

Keywords: Housing loans, credit transfers, microdata
JEL classification: G21, C81

Contents

1. Introduction

In January 2022, 91%[1] of mortgage loans in Portugal were subject to floating interest rates, predominantly indexed to the 3, 6, and 12-month Euribor. As interest rates began to rise in the spring of 2022, there was widespread concern about the impact on the many thousands of households with floating-rate mortgages, as their monthly instalments would increase significantly, when the reset date arrived. As such the government passed legislation with the purpose of helping those households. In November 2022, a bill was introduced prohibiting credit institutions from charging any fees for early repayments on housing loans.

This situation created the need for a more comprehensive analysis beyond the regularly compiled statistics on housing loans published monthly by Banco de Portugal. The presence of a Central Credit Register (CCR) in Portugal, managed by Banco de Portugal, provides a unique opportunity to dive deeper into this credit market.

The CCR is a database which collects monthly information on a loan-by-loan basis for all credits granted in Portugal exceeding a 50€ threshold. For each loan, the CCR includes, *inter alia,* data on outstanding and initial amounts, debtors, the institution granting the credit, and collateral as well as a characterization of the loan conditions such as its maturity and interest rate. By combining this information, we can determine whether a new loan was originated from debtors moving between credit institutions, hence a credit transfer, or if it is a genuinely new loan in the system.

In this paper, we present a new algorithm which identifies, monthly, for each new housing loan granted during the reference period if it is a credit transfer or not. Furthermore, the identification is done by matching the new loan with an older loan which was early repaid. This allows us to look at the impact of credit transfers not only on new credit but also on early repayment amounts. Besides, it allows for comparative analyses of the loan conditions between the old and new loans, at a granular level.

The final algorithm, described in section 2, comprises two layers. Firstly, two matching algorithms are built, one based on amounts, and one based on collateral information. Then, the collateral-based algorithm is used to validate the amount-based one and to add some extra matchings. Thus, creating the final set of matchings.

Equipped with this identification of credit transfers on a loan-by-loan basis we can perform a more comprehensive analysis of new housing loans and collect some insights into the reaction of the Portuguese credit market to the rapid increase in interest rates. We present our key findings in section 3.

The main conclusion was that **2023 saw a marked increase in the amount of credit transfers**, such that they reached 27% of the amount of new housing loans while in previous years this phenomenon was negligible.

Moreover, most households opted to switch from floating interest rate to mixed-rate contracts. These mixed-rate contracts feature an initial period with a fixed interest rate, followed by a switch to a floating rate. Additionally, there was no significant

[1] Source: https://bpstat.bportugal.pt/serie/12710774

change in the maturity of the loans, as most transfers retained approximately the same residual maturity as their original loans.

The analyses presented here demonstrate the importance of microdata and administrative databases to help Central Banks keep track of new and rapid economic and financial developments and go beyond the aggregate statistics in a timely manner.

2. Identification of Credit Transfers

At Banco de Portugal, the main source of granular data concerning loans is the CCR. At the beginning of each month, credit granting institutions in Portugal report information to the CCR relative to the previous end-of-month credit stocks. Among the collected variables are the identification of the debtors, the initial and outstanding amounts, the early reimbursed amount as well as characteristics which are usually fixed throughout the life of the contract. Those include, the inception date, the type of interest rate, the reference rate, the maturity date, and information about collateral. Besides, if the collateral is a residential property, like in the majority cases of mortgages, a variable should be reported (*numRegProt)* which uniquely identifies the property securing the loan.

The primary objective of this new algorithm was to connect all these variables to identify loans that, although newly granted in the reference month by one credit institution, originated from debtors transferring their loans from another, previous, credit institution. We aimed to capture instances where individuals with existing housing loans decided to refinance their debt with a different lender. That is, we were not focused only on clients moving across banks, but we wished to pinpoint the transfer of the contract itself. Consequently, the goal was to separate cases when a household takes out a new credit because it is moving to a new residence, or when the new loan emerged due to reasons other than seeking to refinance that specific loan with better conditions, such as consolidation of several loans, divorces, or other factors.

Considering the principles described above, our goal was to identify a matching between a new loan granted during the reference period and a loan existing in the previous period, which was fully repaid before reaching its maturity, such that:

1. The set of debtors of both loans was exactly the same.
2. Both loans were secured by the same property.
3. The early repayment and the origination of the new loan occurred at the same point in time.

The three conditions above capture the essence of a credit transfer. Unfortunately, their application to the real data available is rather more complex than might seem at first sight. In the next sections we explain how we were able to overcome the difficulties posed by available data to build a reliable algorithm to signal credit transfers.

2.1 Data Processing and main hypothesis

In the CCR, each loan is identified uniquely throughout its life by a unique code and each debtor is also attributed a unique identifier across the entire database. Thus, it is straight forward to evaluate if two loans have the same set of debtors. Unfortunately, the next two conditions regarding collateral information and the timing of granting of the new loan *versus* the reimbursement of the old one are not as linear.

The CCR contains information about protections and, for each residential property used as collateral on a loan, the variable *numRegProt* should be reported in such way as to uniquely identify each property across the entire database. In theory, this variable could be used to identify the same property when it is used to secure loans granted by different institutions.

The variable should be reported as follows: six digits that identify the parish where the property is located, followed by the code which identifies the property in the local property registry (artigo matricial), separated by a hyphen. If the house is part of a building, for example an apartment, a letter identifying the fraction should be reported as well.

The first analysis to this variable showed that there was a lack of sufficient harmonization across reporting institutions. Thus, rendering it complicated to directly use this variable to assess if two loans have the same collateral property. Consequently, it was necessary to perform some data processing and to create auxiliary variables to improve this mapping.

In the end, it was not possible to use collateral information for 5 credit institutions. Among new housing loans granted in 2023, it was only possible to use collateral information for 65% of them. Hence, it was necessary to develop an algorithm based on loan amounts to guarantee the outcome covered the entire spectrum of new housing loans. So, condition 2 had to be relaxed because it was not possible to check it for the entire universe of housing loans.

Finally, due to natural delays on operations processing, and the fact that the frequency of our data is monthly and not daily, it is not always the case that the recording of the new loan and the early amortization of the old loan show up in the same reference period. Hence, we allowed for a one-month lag. That is, the third condition was relaxed to accommodate situations where the repayment of the old contract was recorded one month after the origination of the new loan.

Bearing in mind the restrictions mentioned, our algorithm to match old and new loans was built in two steps. Firstly, an amount-based matching was created, not considering any information about collateral but forcing the amounts of the two loans to be similar. Secondly, a matching between loans with the same collateral, but not necessarily with similar amounts, was built. Finally, the two matching strategies were joined together to create a final algorithm which is robust enough and can be used to mark credit transfers. In the following sections we detail each of the steps.

2.2 Amount Based Loan Matching Algorithm

The main assumption behind this matching is that if for two loans – an existing loan and a new contract – the borrowers are the same and the amount early repaid in the existing loan is close to the initial amount of the new contract, then the new contract is a refinancing of the old one.

Implementation of the Algorithm

For each new loan granted in the reference month, we identify its set of debtors. The first step is to try to match new housing loans with early repaid ones based only on the set of debtors. In this matching we allow for a 1-month lag between the inception of the new contract and the recording of the early repayment, if the new loan starts in the last four working days of the reference month.

At this stage, many of these matches will not be credit transfers. To help us select only the relevant pairings we define a disparity coefficient as:

$$Coef = \frac{|montIni - montReembAnt|}{montIni} \times 100$$

where $montIni$ stands for the initial amount and $montReembAnt$ is the amount amortized early.

One may think that similar amounts should mean taking $\mathrm{Coef}=0$. However, it is important to set a limit greater than zero to account for reporting mismatches and for individuals who decide to reduce part of their debt simultaneously with the transfer. Our goal is to capture those who sought better loan conditions in response to the interest rate hike and so, it is plausible that some of these borrowers may take the opportunity to reimburse a small part of the loan using their savings. Doing so would help them manage the increase in their monthly installments due to the rising interest rates in the credit market. So, the question is how to choose the upper bound bellow which a matching should be considered a credit transfer?

To determine an appropriate upper bound, we performed a sensitivity test, in which we tested three different scenarios, $Coef<5\%$, $Coef<10\%$ and $Coef<20\%$. The test was only performed on the matchings with no lag between the origination of the new loan and the recording of the early repayment.

The conclusion was that above the 5% threshold the number of matchings was residual as we can see in Figure 1. Hence, we adopted a conservative approach and chose as our threshold the 5%. Which means that from the matchings obtained above, only those with $Coef<5\%$ are classified as credit transfers.

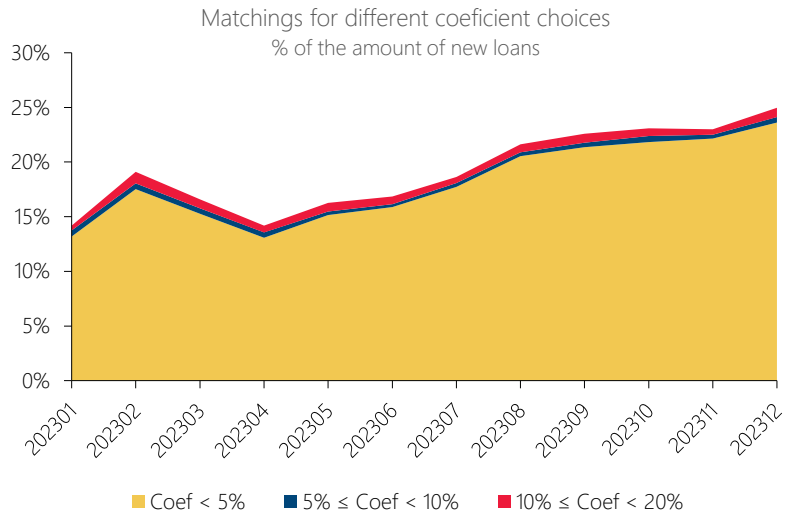


Figure 1. Percentage of the amount of new housing loans matched with old early repaid ones considering different disparity coefficients. Here we only considerer matchings where the amortization of the old loan and the origination of the new one is recorded in the same month.

In fact, for 90% of the new housing loans identified as transfers, in 2023, the coefficient was less than 3% and the average coefficient was 0.16%, which means that most of the credit transfers were well below the 5% threshold. This ensures that our matching algorithm effectively identifies genuine credit transfers while accommodating slight variations in repayment and reporting.

2.3 Collateral Based Loan Matching Algorithm

This algorithm keeps the assumption that the debtors of both loans must be the same and allows for the one-month lag between the recording of the new loan and the recording of the early repayment of the old one, when the new loan starts in the last four working days of the month. Here, we perform the matching between the old early repaid loan secured by a given real estate collateral and a new loan granted by a different credit institution but secured by the same property.

Implementation of the Algorithm

To implement this algorithm, we began by identifying the real estate collaterals reported in the CCR based on the variable *numRegProt*. This variable should uniquely identify each property. However, since each financial institution may report this information differently, we conducted a detailed individual treatment for each bank, in order to standardize the data.

For each financial institution, we separated the variable of interest (*numRegProt*) into three new variables: one for the parish, one for the registry code, and one for the house fraction. This decomposition aimed to facilitate the accurate matching of the same property using these specific elements. After cleaning and standardizing these three variables, we incorporated another reported variable into the mix, the NUTS III

of the collateral. This additional data point helped us estimate the phenomenon more clearly and enhance the accuracy of our matching process.

Categorization of Loans

Following these steps, we categorized the universes of new and old loans into four distinct categories:

1. **Loans that match by all three new variables**: This category includes loans where the parish, registry number, and house fraction all match between the old and new loans.
2. **Loans that match by the parish and the registry code**: This category includes loans where the parish and registry number match, but the house fraction may not be reported or may differ.
3. **Loans that match by NUTS III of the collateral and the registry code**: This category focuses on loans where the NUTS III region and the registry code match, providing a regional and property-specific match.
4. **Loans that had no parish reported but matched by the registry code**: This category includes loans where the parish is not reported, but the registry code matches, allowing for partial but significant matching.

This strategy allows us to systematically identify and analyze credit transfers, ensuring that the same collateral and debtors are consistently accounted for, across different financial institutions and as such bypass the limitations imposed by the lack of harmonization of the information reported by different credit institutions.

Hence, although we cannot use the collateral algorithm on its own because of the lack of coverage, this mapping can be used to validate and complement the amount-based algorithm. In particular, since we do not impose any limitation on the amounts of the old and new loans, we can use this mapping to add the cases when people refinance their mortgage while also reducing their debt and mark those as credit transfers as well.

2.4 Validation and the Final Matching Algorithm

The two algorithms described above create two different sets of matchings between old and new loans and they must be merged to produce a final matching. To obtain a more robust result we performed cross-validation between the two algorithms.

Using the amount-based algorithm we can validate the collateral algorithm: 87% of the matchings found through the collateral based algorithm were also marked by the amount base algorithm, for 2023. This high coverage rate demonstrates the algorithm's reliability and its ability to accurately identify credit transfers.

On the other hand, 73% of the matchings in 2023 identified by the amount-based algorithm were also identified by the collateral based one. Given the limitations imposed by the lack of harmonization across credit institutions on the reporting of collateral information, this is a significant coverage. Furthermore, for those credits not matched by the collateral algorithm the disparity coefficient is on average 0.18% which give us confidence that they are in fact credit transfers.

Given these results, the final algorithm is the following: the credit transfers identified by the amount-based algorithm are all considered as such. Then, we add the matchings identified by the collateral-based algorithm where the amount of the new loan is smaller than the early repaid amount of the old loan.

To sum up, to get a universal coverage we use the amount algorithm to identify most matches and then use the collateral algorithm to validate our results and to add additional matches. These additional matches correspond to those cases where households take the opportunity to reduce their debt at the same time as their loan transfer.

3. Main Results

The first important result is that the phenomenon of credit transfers became highly relevant during 2023. Specially, new loans originating from credit transfers accounted for 27% of the amount of new housing loans. This represents a substantial increase compared to previous years, with credit transfers comprising only 7% of new housing loans in 2022 and 6% in 2021. This notable increase underscores the growing impact of loan transfers in the housing loan market.

Several factors contributed to the surge in credit transfers. Notably, the increase in interest rates prompted households to seek better loan conditions. Additionally, a significant change in legislation played a crucial role. In November 2022, the Portuguese Government introduced a decree-law prohibiting credit institutions from charging any fees for early repayments on housing loans[2]. This policy, effective until the end of 2024, significantly reduced the cost of refinancing housing debt, thereby encouraging more households to transfer their loans.

The trend of increased credit transfers has persisted into 2024. According to our estimates, 28% of the amount of new housing loans in the first quarter of 2024 originated from credit transfers. This sustained significance of credit transfers highlights the continuing influence of both economic conditions and legislative measures on the housing loan market.

[2] The legislation only covered housing loans for the purchase or construction of permanent residence houses. Nevertheless, this constitutes 85% of the stock of housing loans.

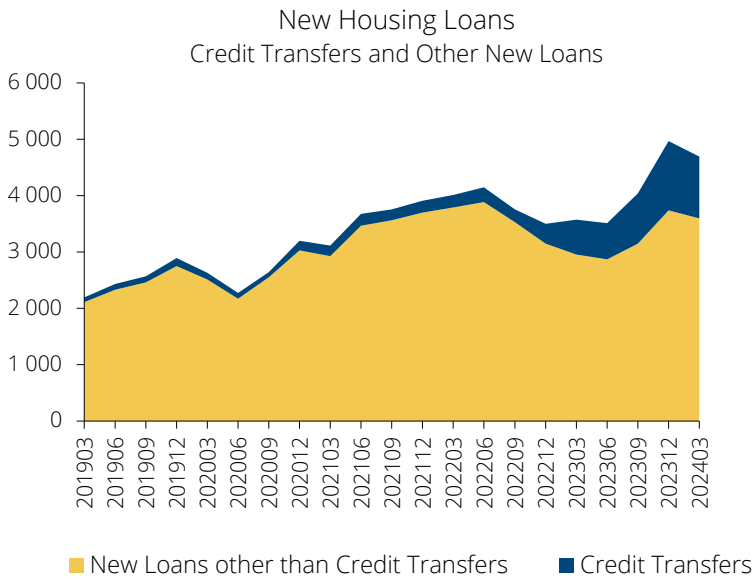


Figure 2. New housing loans

The value added by the identification of credit transfers on a loan-by-loan basis is that it we can dive deeper and analyse the characteristics of the old and the new loans and thus characterize the changes in the structure of the housing loan stock due to credit transfers.

Which loans were transferred?

Delving deeper into the characteristics of transferred loans reveals insightful patterns. From the loans transferred during 2023, 81% were originated after 2016, a period characterized by historically low interest rates (Figure 3). Furthermore, 97% of the amount of transferred loans was associated to floating interest rates, with 63% indexed to the 12-month Euribor. This specific indexing means that these loans had their interest rates reset annually. As a result, households with loans indexed to the 12-month Euribor experienced the most significant increases in their monthly instalments following the interest rate hikes that began in the spring of 2022. This was due to the fact that the 12-month Euribor remained higher than the 3 or 6-month Euribor during this period and to the harsher impact of the rates increase given it was more concentrated in time.

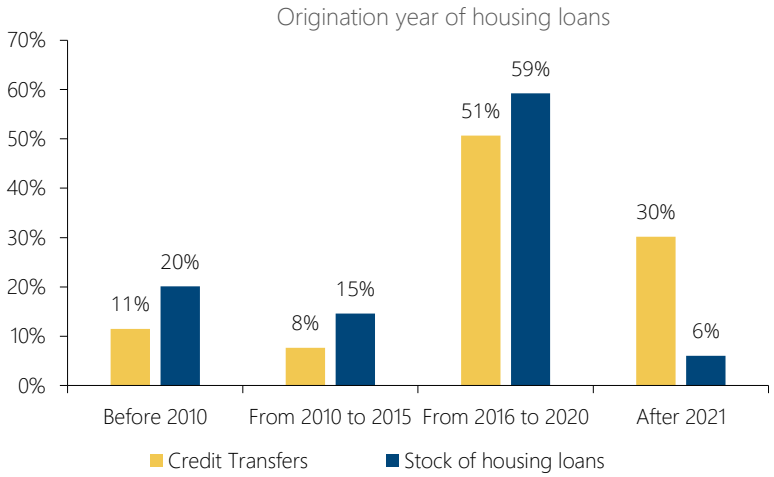


Figure 3. Credit transfers and stock of housing loans by origination year

What were the main changes?

The identification of credit transfers on a loan-by-loan basis allows for a granular analysis of the changes in the structure of the housing loan stock. Our findings indicate that most households opted to switch from floating interest rates to mixed-rate contracts. Among credit transfers in 2023, 61% changed from floating to mixed interest rate. These mixed-rate contracts typically feature an initial period with a fixed interest rate, followed by a transition to a floating rate. This shift helped households manage the financial impact of rising interest rates more effectively.

If we follow the rational that households were transferring their loans looking for a strategy to accommodate a high interest rate environment one could expect they could look to extend the maturity of their loans as spreading the payments over a longer period would help reduce the monthly installment. Nevertheless, despite the substantial increase in credit transfers, there was no significant change in the maturity of the loans (75% of transfers recording either a small decrease or no change at all in its residual maturity). Most transferred loans retained approximately the same residual maturity as their original loans. This suggests that households were primarily motivated by the desire to secure better interest rates rather than altering the loan term. This stability may also be influenced by the macroprudential rules that are in place in Portugal since 2018, which put a cap of 35 years on the contract maturity for debtors older than 35 and recommend banks an average 30-year maturity on new loans granted every quarter. Hence, given that the average residual maturity of the transferred loans was 31 years, there was not much room for a general increase of maturities while keeping in line with the macroprudential rules.

An intriguing observation is that from May 2022 to May 2023, many households accepted higher interest rates when transferring loans between institutions, as illustrated in Figure 4. This seemingly counterintuitive result can be explained by households seeking to transfer loans before their next reset period, when they could expect to have an even higher interest rate. So, they accepted higher rates because they were not yet impacted by the increase in the interest rate that would result after the reset. For those which had their loans indexed to 12-month Euribor, 50% had less

than 7 months left until the next rate adjustment. That is, when they transferred the credit, their interest was still fixed at a comparatively low rate, since the increases in Euribor started in April 2022, when it crossed to positive values after more than 6 years on negative terrain.

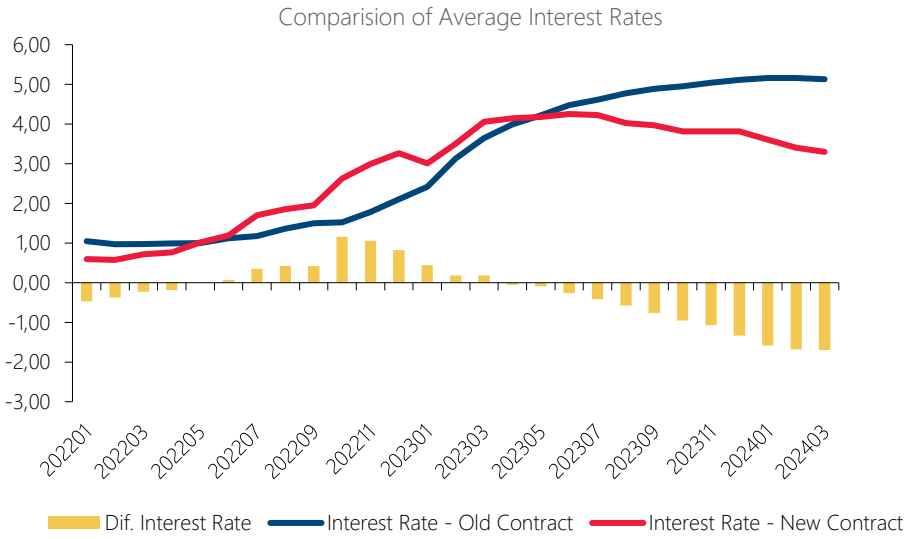


Figure 4. Evolution of Interest Rates of Credit Transfers

Hence, this data indicates that since the interest rate escalation started, households changed their behavior and have looked to switch between credit institutions looking for better conditions, which was not common in the Portuguese credit market before.

4. Conclusion

For a Central Bank, it is vital to pay close attention to credit markets and to its dynamics. For that reason, they produce monthly statistics concerning new business amounts and interest rates as well as detailed statistics about the stocks of loans on the banks' balance sheets. However, reality is a changing target and we at the statistics departments in Central Banks must venture to understand it.

The existence of granular administrative databases, like the CCR has proved itself of a fundamental importance. With its level of granularity and the vastness of its information. It works as a magnifying glass which makes it possible to look beyond the aggregate statistics. To explore this data is particularly important in times when there are big and fast changes in the economy, like what was recently recorded, since it makes possible to develop new indicators to describe new realities in a tempestive manner.

The novel algorithm presented in this paper is a practical example of the important role of microdata. By combining several variables of the CCR we were able to identify credit transfers loan-by-loan, enabling deeper insights into the behavior of borrowers who switch institutions.

In conclusion, the marked increase in credit transfers in 2023, driven by rising interest rates and legislative changes, has significantly influenced the housing loan market in Portugal. The sustained trend in 2024 and the detailed analysis of transferred loans underscore the relevant role of credit transfers in shaping the financial landscape. Our findings highlight the value of granular microdata in understanding new market dynamics with detail and in relatively short time, providing essential insights for policymakers.

A CLOSER LOOK AT NEW HOUSING LOANS

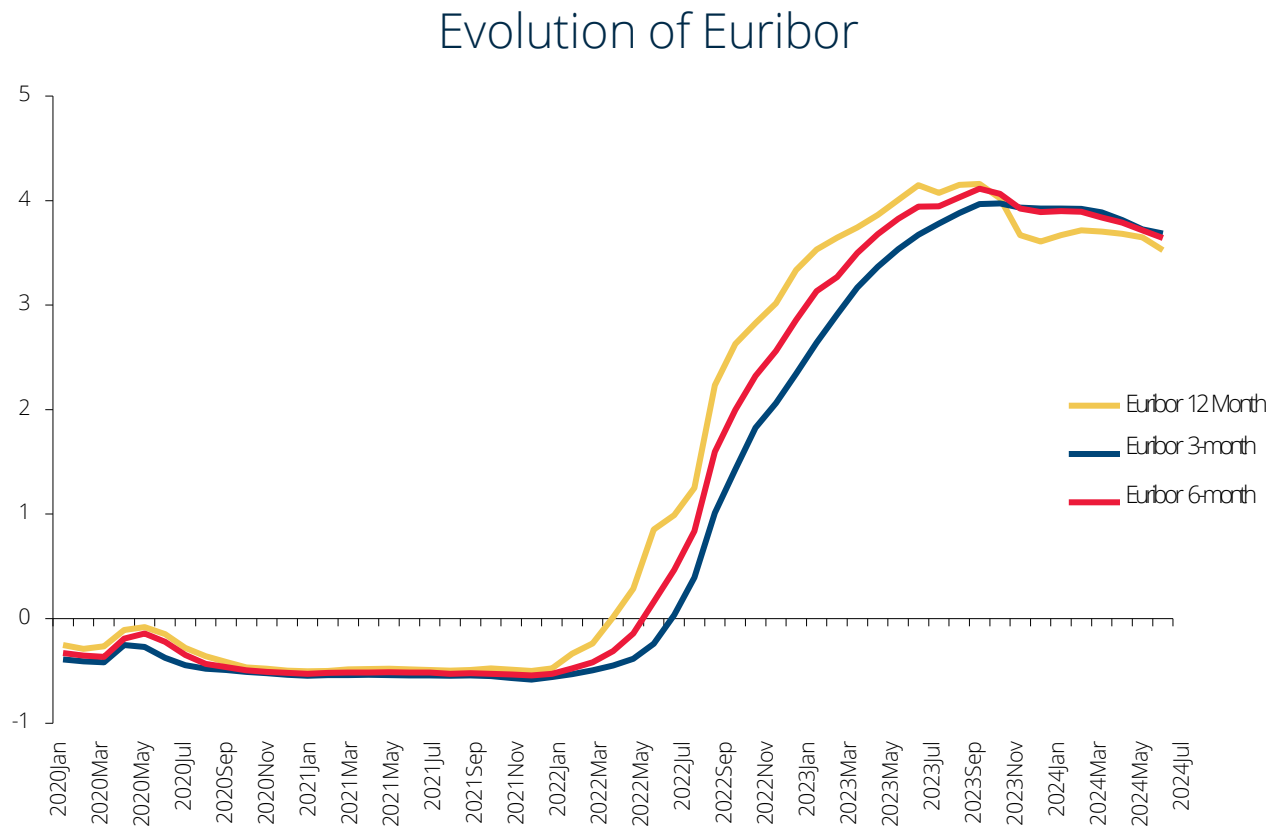
UNLOCKING THE POWER OF CREDIT MICRODATA

AGO. 2024

ANA REIS | DIANA MARTINS

BANCO DE PORTUGAL
EUROSISTEMA

INTRODUCTION



- Since April 2022 there was a fast increase in interest rates.
- In January 2022, Portugal had 91% of its housing loans on a floating rate.
- The government introduced a bill prohibiting credit institutions from charging any fees for early repayments on housing loans, in November 2022.
- There was a need for a more comprehensive analysis beyond the frequently compiled statistics on housing loans.

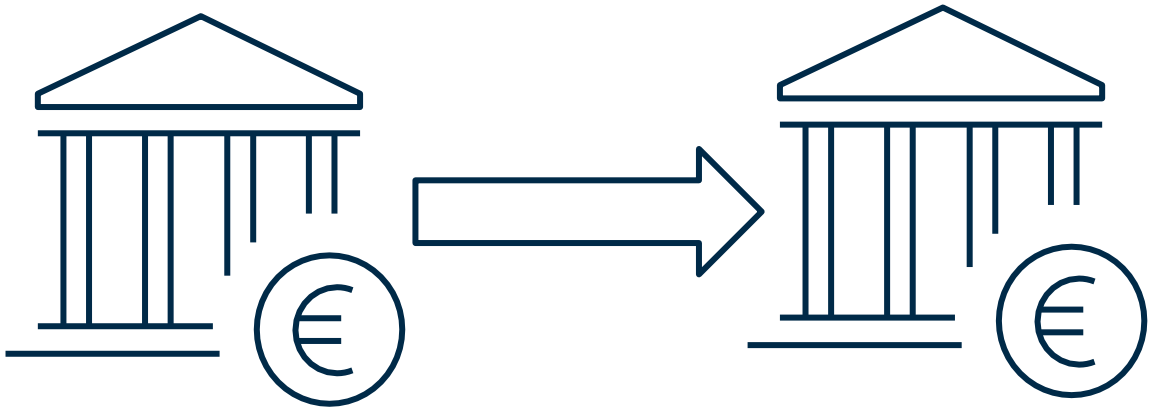
WHAT IS A CREDIT TRANSFER?

The conceptual definition

- The set of debtors of both loans of the old and the new contract are the same ✓
- Both loans were secured by the same property !
- The early repayment and the origination of the new loan occurred at the same point in time. !

What are the challenges ?

- Lack of harmonization of data about colateral across reporting institutions
- Delays in recording of early repayments
- Frequency of our data (monthly)



Early reimbursement

Origination of a new loan

HOW DID WE DEFINE A CREDIT TRANSFER?

- The algorithm to match old and new loans was built in two steps:

Amount Based Algorithm

- The same set of debtors in both loans
- Does not consider any information about collateral
- Early reimbursed amount of the old and initial amount of the new loan differ in less than 5%

Collateral Based Algorithm

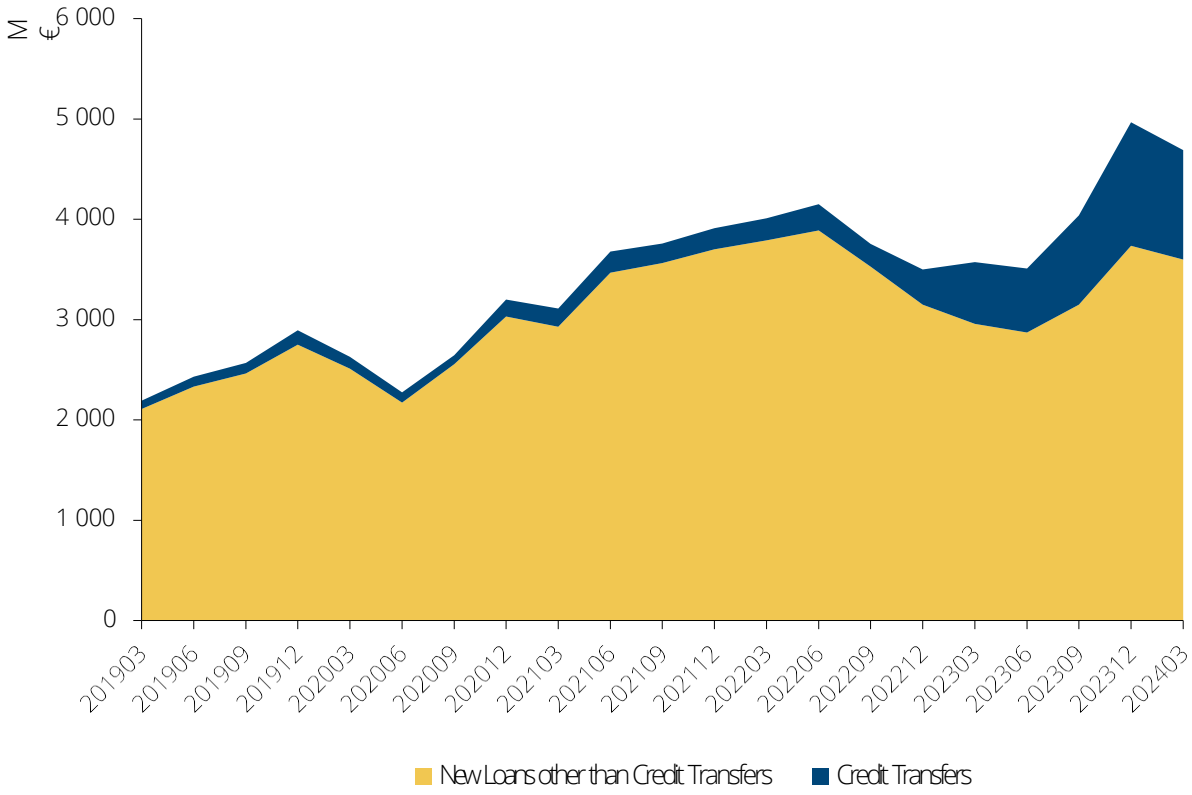
- The old and new loans have the same collateral
- The amounts may be different

- The two matching strategies were joined together to create a final algorithm which is robust enough and can be used to mark credit transfers.

KEY RESULTS

New Housing loans

Credit Transfers and Other New Loans



Impact on the aggregated statistics

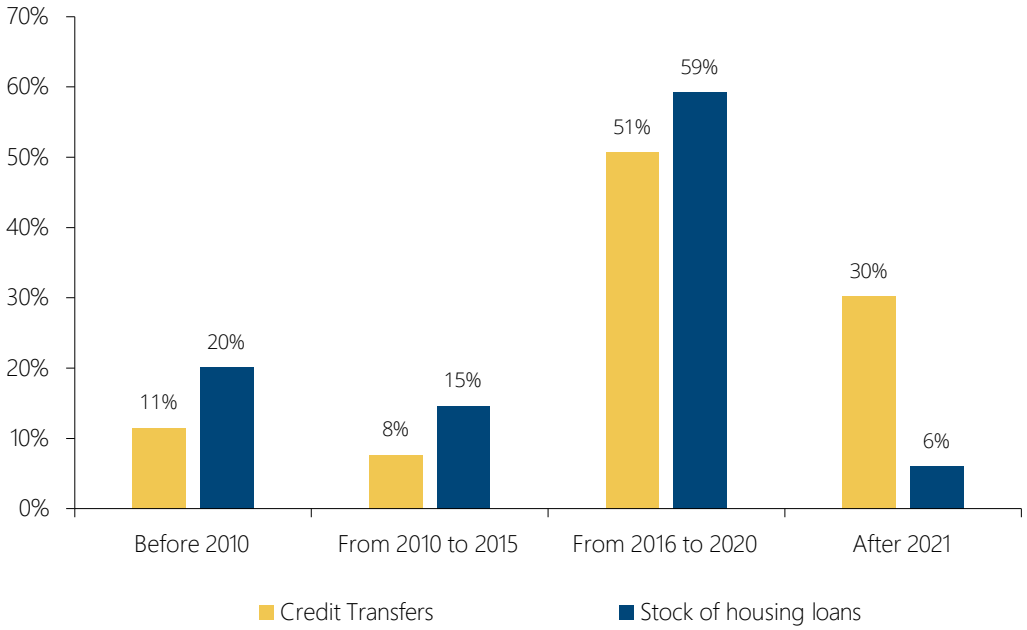
- In 2023, credit transfers accounted for 27% of the amount of new housing loans.
- This represents a substantial increase compared to previous years.
- Several factors contributed to the surge in credit transfers: The increase in interest rates and the change in legislation.
- This trend persisted in the first quarter of 2024.

Which loans were transfered?

KEY RESULTS

Which loans were transfered?

Origination year of housing loans



- Mostly loans originated after 2016 (81%).
- 97% of the transferred loan amounts were on floating rates.
- 63% were indexed to the 12-month Euribor.

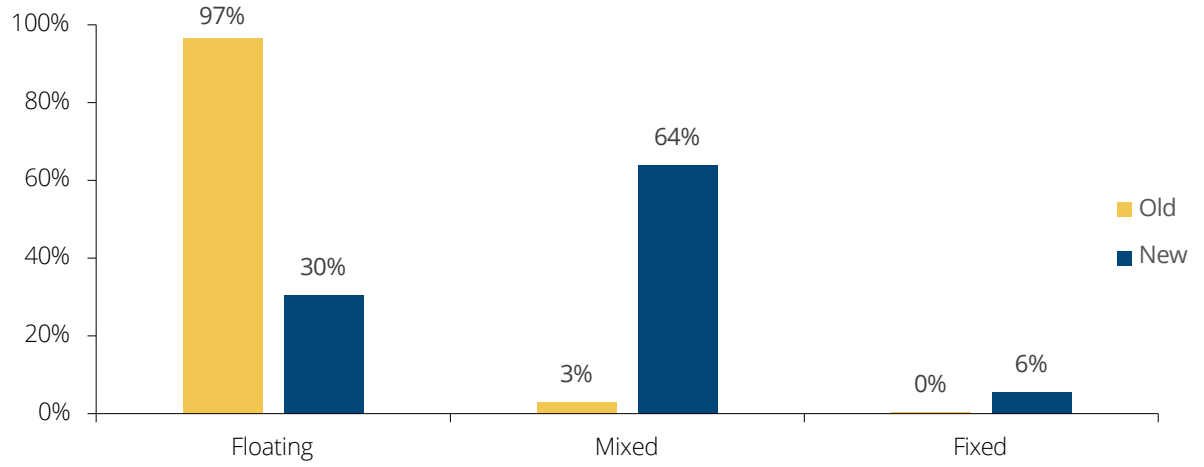
What were the main changes?

KEY RESULTS

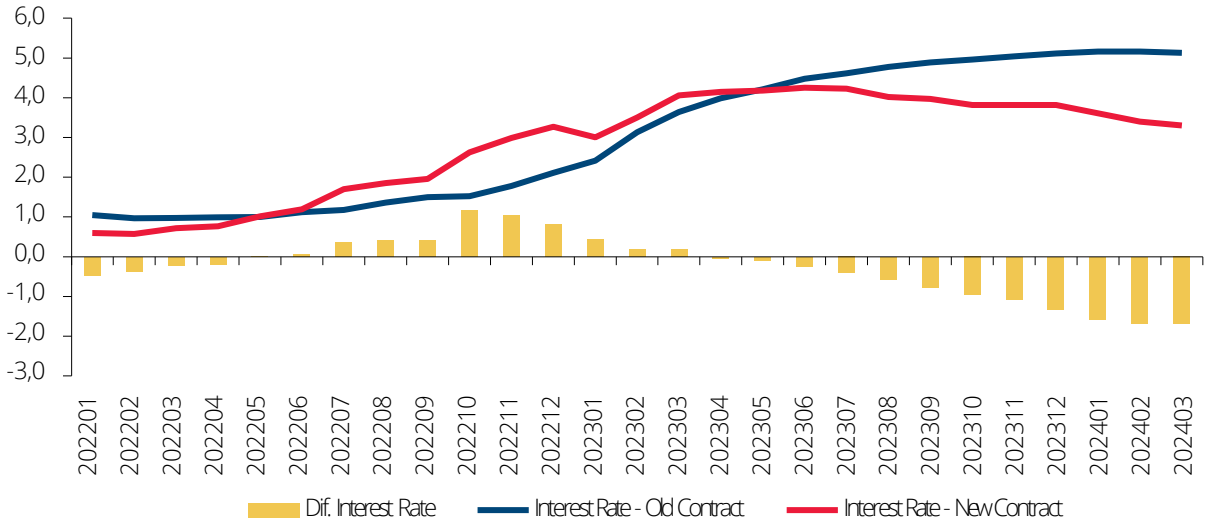
What were the main changes?

- The majority opted to switch from floating interest rates to mixed-rate contracts (61%).
- There was no significant change in the maturity of the loans (75% either decrease or had no change at all).
- From May 2022 to May 2023, on average households accepted higher interest rates when transferring loans between institutions.
- Households sought to transfer loans before their next reset period.

Credit Transfers by type of interest rate



Comparison of Average Interest Rates



CONCLUSIONS

- For a Central Bank, it is vital to pay close attention to credit markets and to its dynamics.

Credit Transfers

- Credit Transfers were a relevant phenomena that helped reshape the credit market in Portugal
- The sustained trend in 2024 and the detailed analysis of transferred loans underscore the critical role of credit transfers in shaping the financial landscape.

Granular Data

- It works as a magnifying glass which makes it possible to look beyond the aggregate statistics.
- Our findings highlight the value of granular microdata in providing essential insights for policymakers.