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**CHANGES IN THE SITUATION OF HOUSEHOLDS  
ON THE HUNGARIAN LOAN MARKET  
FOLLOWING FOREIGN CURRENCY LENDING**

*Theses of the Doctoral Dissertation*

Szeged, 2023

**University of Szeged**  
Faculty of Economics and Business Administration  
Doctoral School in Economics

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## **The significance of the topic and the relevance of the research**

The topic of the dissertation is the reorganization of the Hungarian retail credit market following foreign currency lending. The credit market of the 2010s was clearly defined by the legacy of foreign currency lending, which strongly influenced the behaviour of consumers, banks and the state, and initiated changes that shaped the balance of power between these three sectors. This was evident both in the case of the existing stock and the newly issued loans. The role of the state (including the central bank) as a regulator and as an active participant in the credit market has also strengthened. In the dissertation, I present these developments through several highlighted problems, in each case grouping the related thoughts around a well-defined empirical research question, which is usually exciting from a theoretical perspective as well.

A thorough understanding of the operational characteristics of the credit market is also crucial because consumption smoothing across life cycles and thus utility maximization (Modigliani – Brumberg 1954, Friedman

1957) cannot be imagined without a well-functioning credit market. Imperfections in the credit market, weak competition among banks, high loan interest rates, irrational behavior of consumers, low financial awareness are all factors (Bertola et al. 2006, Gathergood 2012, Gathergood – Weber 2014, Lusardi – Tufano 2009, Agarwal et al. 2014), which "deviate reality" from the developments expected by theory and can lead to suboptimal results. Excessive borrowing by households (and as the other side of the coin, banks' excessive willingness to lend) can also lead to financial stability problems at the macroeconomic level, as the 2007-2008 financial crisis drew attention to (Mian – Sufi 2014, Király – Nagy 2008).

## **Objectives, hypotheses and structure of the dissertation**

The main goal of the dissertation is to show how the relative power balance between banks, consumers and the state shifted between 2010 and 2020. The main assumption of the dissertation is that while at the beginning of the decade (and before) the market was

characterized by the excessive market power of banks vis-à-vis consumers (Móré – Nagy 2003, Móré – Nagy 2004, Molnár et al. 2007, Kézdi – Csorba 2012, Aczél et al. 2016, Hosszú – Dancsik 2018), as a result of state regulatory control and the direct intervention of the state in the credit market, this dominance was significantly reduced in the middle of the decade and in the second half of the decade, both in terms of the existing loan portfolio and the issuance of new loans.

The reorganization of the credit market at the center of the dissertation is explained through the examination of the following hypotheses. The first two hypotheses refer to the stock following foreign currency lending, the third and fourth hypotheses to the pricing of new housing loans, while the last two examine the latest elements of state intervention – the introduction of incentives through the loan market for demographic purposes and the repayment moratorium.

***H1:** In the case of debtors who remain in arrears, excessive indebtedness is the main motivation for non-payment, but there are also reasons for the*

*delay beyond the current financial and wealth situation of the household.*

According to the literature, debtors' default is typically induced by a life event resulting from excessive indebtedness. The main characteristics of this situation are the loan to value ratio being above 100 percent (the ratio of the gross value of the debt and the market value of the collateral) and insufficient income for repayment (Schelkle 2018, Gerlach-Kristen and Lyons 2015 ). Dancsik et al. (2015) shows, that excessive debt is also at the heart of the problem of Hungarian mortgage loans defaulting following foreign currency lending. However, in addition to the financial characteristics, defaulting can also have social and psychological costs (Agarwal et al. 2011, Bhutta et al. 2017). In the dissertation, I examine whether factors beyond financial indicators increase the probability of defaulting on domestic mortgage loans. Based on the international literature, we can expect that the social capital of the debtor's settlement increases the

probability that the debtor will repay his debt, while if more people in his environment are in arrears, it rather reduces the chance of this.

***H2:** In the case of mortgage loans with variable interest rates, the reduction of interest rate risk by refinancing with a loan with a fixed interest rate can only be a solution for a smaller part of mortgages outstanding based on narrowly interpreted financial aspects in the current legal environment.*

The conversion of domestic foreign currency loans to forints in 2015 linked the interest rates of the affected mortgage portfolio to the 3-month interbank interest rate, which meant that a significant part of the forint-based mortgage loan portfolio (nearly 70 percent at the time) continued to face interest rate risk. One means of hedging the interest rate risk is if the debtors replace their previous debt with a new loan with a fixed interest rate. According to the international literature (Follain – Tzang 1988, Agarwal et al. 2016), the profitability of this



decision depends on (1) the one-time costs of the loan exchange, i.e. the prepayment fee of the old loan and the administrative costs related to taking out the new loan, (2) the duration, through which the debtor wants to keep his mortgage (practically the remaining maturity), (3) the difference between the interest rate of the old and the new loan, and (4) the tax implications of the interest payments and prepayment fees. In the dissertation, I assess the magnitude of the one-time costs of the loan exchange based on the legislation in force in Hungary in 2018, as well as the estimated margin difference available through refinancing. The underlying assumption is that the increased share of fixed-rate mortgages could not and cannot be realistically expected from loan refinancing alone.

***H3:** At the beginning of the new credit cycle, the pricing of newly disbursed housing loans was unreasonably high compared to the costs, especially in the case of loans with interest rates fixed for a*

*longer period, in which the market power of banks may have played a role.*

During the initial upward phase of the new credit cycle following foreign currency lending, the interest rate spread applied by domestic banks in the case of housing loans significantly exceeded the value experienced in other countries of the region. The interest rates set by the banks must cover the costs related to lending (Button et al. 2010) (operating expenses, expected loss), however, in the case of the premium over these items, the level of competition in the market also plays a significant role. According to the hypothesis of the dissertation, the higher costs, larger loan losses and low competition, which are characteristic of Hungarian banks, play a role in the development of high mark-ups in an international comparison – the latter especially in the market of housing loans with interest rates fixed over one year.

***H4:** In the increasing share of longer-term fixed-rate loans, previous foreign currency credit experience may have played a prominent role by strengthening debtors' motivation to avoid risk.*

Based on the international literature, differences in prices are one of the most important explanatory factors when borrowers decide on the method of interest payment (variable or fixed loan interest rates) (Koijen et al. 2009, Ehrmann – Ziegelmayr 2014). In Hungary, however, in the new credit cycle that started in the mid-2010s, the proportion of housing loans with fixed interest rates beyond one year was very high, even though their interest premium compared to loans with variable interest rates was significant, even after controlling for the steepness of the yield curve. The experience of foreign currency lending and the previous extremely high volatility of installments may have played a big role in this.

***H5:** Since 2018, the overall interest rate of loans with state-subsidies available under the Home Purchase Subsidy Scheme for Families (HPS) has been higher than that of market-based housing loans. The reason for this is that the customer must pay 3 percent interest anyway according to the relevant regulation, so there is no incentive to make banks' loan products compete.*

From the middle of the decade, the state became an increasingly active player in the credit market. Not only did its role as a regulator expand, but it also appeared with specific loan products that banks mediated to customers. In the case of HPS housing loans, the customer interest rate, which is fixed at 3 percent is supplemented by a subsidy linked to the 5-year government bond market reference yield. Based on the interest rate statistics, the average overall interest rate of subsidized housing loans (which includes both the part payable by the customer and the state interest subsidy) is significantly higher than the average interest rate of

market-based loans. In theory, this could also be caused by a composition effect (for example, if the subsidized loans are only available to particularly riskier households), however, I expect that the main reason may not be this, but rather the lack of competition arising from the given legal framework.

*H6: Since the loan moratorium introduced as a result of the coronavirus ultimately means additional borrowing for the debtor, according to theories related to credit demand, younger households, households with multiple children, and households facing credit supply constraints were more likely to use the program.*

In order to soften the economic effects of the coronavirus epidemic, the Government decided on March 18, 2020, to temporarily suspend the loan repayment obligations of household and non-financial corporations.

The domestic moratorium was automatically extended to all debtors subject to the legislation. If a debtor did not wish to take advantage of the program, he or she

could indicate this (with a statement or suggestive behavior, i.e. by continuing repayment) to the lending institution and restart and continue repayment, leaving the program.

In the dissertation, I argue that the loan moratorium practically meant additional financing for the debtors, which could be used automatically within the framework of the conditions dictated by the legislation. Thus, while the program was expected to be more likely used by more vulnerable, financially strained households (Drabancz et al. 2021), the classic motivations for borrowing could also increase the likelihood of participation, such as lower age, current income falling short of permanent income, or the presence of credit supply constraints.

In the dissertation, after the introduction, I cover the research topic in a total of five chapters, which chapters are followed by the summary. In *Chapter 2*, following the introduction, I present the theoretical framework of household indebtedness, starting from the theories of the life cycle hypothesis (Modigliani - Brumberg 1954) and permanent income (Friedman 1957), and then the refutations and extensions of these theories, relevant to the

topic of the dissertation (Bertola et al. 2006), is also presented.

*Chapter 3* introduces the main issues examined in the dissertation and provides a historical background for understanding retail lending in the 2010s.

The focus of *Chapter 4* is the afterlife of the stock built up as a result of foreign currency lending. One of the main questions of the chapter is why overdue loans remained permanently non-performing, despite the fact that the real economy went through a marked recovery in the meantime (Hypothesis 1). After that, I will deal with the issue of the interest rate risk of the existing stock and the possibility of loan refinancing (Hypothesis 2).

In *Chapter 5*, I move on to the analysis of the market for newly issued housing loans, with regard to the analysis of bank pricing and the decision of domestic customers on the method (fixed vs floating) of interest payment. The chapter focuses on the problem of excessively high interest rates, i.e. the issue of banking market power (Hypothesis 3). After that, I discuss the possible factors that determine interest rates, as well as how the experience of foreign currency lending may have influenced the risk

aversion of households and, through this, the demand for loans with interest rates fixed for different terms (Hypothesis 4).

*Chapter 6* continues to deal with the market for new loans, but while Chapter 5 analyzes the relations between banks and consumers, Chapter 6 focuses on the state's intervention in the credit market. The chapter focuses on changes in the regulatory framework, followed by the promotion of demographic goals through the credit market and specifically on the pricing of HPS loans (Hypothesis 5). Finally, I also deal with the issue of the loan moratorium introduced because of the 2020 coronavirus epidemic, using questionnaire data. Although the scope of the latter measure was extended to the stock existing at the time of the introduction of the moratorium, I argue that the introduction of the moratorium ultimately meant additional financing (i.e. new borrowing) for the debtors participating in it (Hypothesis 6).



## **Data and methodology of the research**

A significant part of the dissertation is based on data collected by the Magyar Nemzeti Bank (MNB, the Central Bank of Hungary). Most of these are data provided by credit institutions, which are supplemented by data received from other institutions (National Tax and Customs Administration, National Directorate General of Pension Payments). In the case of international comparisons, I typically relied on data from the European Central Bank and national central banks.

The peculiarity of the available domestic databases is that, starting from 2014, with a gradually expanding data content, a lot of information about loans is available at the micro level (contract and debtor level in anonymized form). This provides much more precise control possibilities than starting from macro-level variables, and the size of the available samples typically represents tens of thousands (in some cases hundreds of thousands) of observations, which leads to more well-founded estimation results. In addition to administrative data from banks, the chapter on the payment moratorium of the dissertation is based on the results of a survey carried out

by the MNB – with the cooperation of the credit institutions.

All of the empirical studies included in the dissertation are based on micro-level data and depending on the target variable (continuous or binary) I estimate linear regression and/or logit and probit models. The advantage of these models is that they can capture the correlation between the target variable and the explanatory variables selected from the point of view of the research question, while fixing the other control variables. However, the methodology is not free from disadvantages either. The relationship shown between the variables is well founded only if the estimation is not (excessively) distorted by the omitted variables. Multivariate regression cannot eliminate the problem of reverse causality by itself either, since it essentially captures conditional correlations between variables, regardless of their direction. Highlighting these disadvantages is also important because most of the databases used in the dissertation are of an administrative nature (Békés - Kézdi 2021) and were not prepared for the sophisticated identification of causal relationships, which limits the range of applicable

methodologies and their accuracy. From a methodological point of view, the biggest challenge is omitted variables and the use of appropriate control variables. Bank data typically do not contain sufficient information regarding the socio-demographic background of debtors.

## **Results of the dissertation**

Chapter 4.1. of the dissertation attempts to identify the main explanatory factors for non-performing mortgage loans. Based on the results of the presented logistic regressions, the reason for being in arrears is excessive indebtedness, in line with previous literature results, but the model results also indicate that there are reasons for the delay that go beyond strictly economic and financial rationality. The debt of delinquent customers is more likely to be unable to be reduced in places where more people have delinquent loans and the size of the estimated social capital is greater. These results point to the fact that state measures aimed at defaulting customers must not only address the economic and financial causes of default, but must also deal with the social embeddedness of the

problem, i.e. what the late debtors consider fair and reasonable.

*T1: The probability of mortgage loans remaining in arrears is increased by the higher level of indebtedness of the household concerned, but at the same time, the social embeddedness of default also plays a role in this decision.*

After the conversion of foreign currency loans into forints, in the case of a very significant stock, the interest rate on the loans became linked to the short, 3-month interbank interest rates. One of the means of hedging the interest rate risk is loan refinancing, however, according to the results presented in chapter 4.2., in 2018 only 22-31 percent of the variable-rate mortgage portfolio could have been refinanced in a financially rewarding way.

*T2: In the case of a substantial part of the HUF mortgage loan stock with variable interest rates, which has increased as a result of the forint conversion, it is not expected that the debtors will*

*reduce their interest rate risk through loan refinancing. In 2018, approximately refinancing 22-31 percent of the affected portfolio could be considered as profitable, i.e. in the case of such a portion of the loans, such a reduction in the interest rate spread was achievable on the loan, which would have compensated the debtors for the significant one-time costs of loan refinancing.*

Even in the new regulatory environment of the new loan market, the old truth that the retail credit market is characterized by high prices and low competition remained typical. Chapter 5.1 shows that at the beginning of the new credit cycle, in 2014-2015, the spreads on Hungarian housing loans significantly exceeded the similar indicators of both regional countries and the eurozone. Based on the linear regression estimated on the sample containing the loan contracts of domestic banks, it can be said that the high mark-up was primarily characteristic of less efficient banks with higher credit losses and characterized by greater market power. Both the estimate and the descriptive statistics drew attention to the

fact that a high mark-up was primarily stemming from loans with an initial interest period of more than one year, i.e. with a longer fixed interest rate. In the case of these loans, the size of the mark-up compared to loans with variable interest rates was considered high even if the different funding costs of these loans were considered.

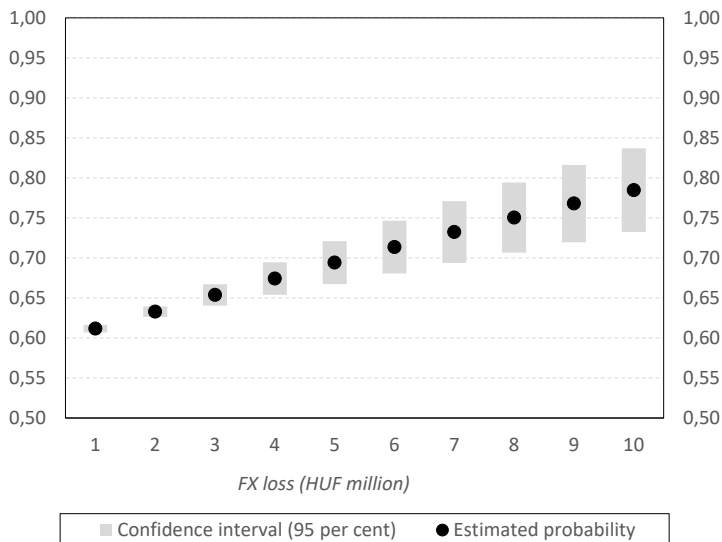
*T3: The new credit cycle following foreign currency lending started with high mark-ups for housing loans, even in international comparison. Among the reasons for this, the relatively high operating expenses and loan losses of domestic banks also played a role, as did the weak competitive situation between institutions. The problem of high interest rate spreads particularly affected housing loans with interest rates fixed beyond one year.*

In the period following foreign currency lending, domestic households were willing to pay a significant premium when taking out housing loans with interest rates fixed for a longer period. Chapter 5.2 examines what influences whether a borrower takes out a housing loan

with long-term fixed or a floating rate. Based on the results of the estimation, previous experience with foreign currency loans play a significant role in this decision (Figure 1).

The estimate only reveals information about those who previously had a foreign currency loan, however, in my opinion due to the wide publicity of foreign currency loans and the fact that they affected many households, this experience (trauma at the social level) probably had an impact on the entire credit market in this respect. However, I did not have a suitable database to support this assumption.

*Figure 1* Estimated probability of choosing the fixed interest rate at different values of FX loss suffered



*Note:* the figure shows the estimated probability of choosing a fixed-rate loan as a function of the exchange rate loss suffered, while the other variables were fixed at the sample mean. In the figure, the exchange rate loss is shown up to HUF 10 million, however, the average value typical of the former foreign currency borrowers in the sample is significantly lower than this (HUF 1.5 million), while the maximum of the variable is HUF 23 million. *Source:* Calculation by the Author.

***T4:*** Based on the results of the logistic regression, it is significantly more likely that someone took out a loan with a fixed interest rate if they previously had



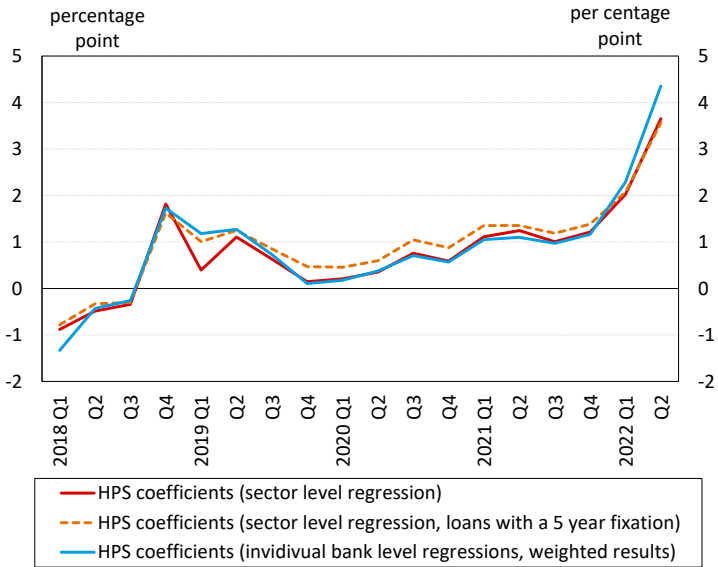
*a foreign currency loan that caused exchange rate losses.*

Chapter 6.2 points out that in the case of HPS loans (for which the state supplements the 3 percent customer interest rate with a subsidy linked to the 5-year government bond market yield), the overall interest rate was significantly, already in 2021, more than 1 percentage point higher than the market-based in the case of loans, which difference increased further after the start of the interest rate hike cycle in June 2021. This difference is not caused by the different customer and transaction composition of the two product types, which was controlled for by linear regression and by examining debtors who took out both market and subsidized loans (Figure 2).

The pricing discrepancy of HPS loans suggests that the legislation does not provide adequate incentives to keep the costs of the program to a minimum depending on the goals to be achieved. Thus, while the balance between borrowers and banks is actually more favorable for these products under the influence of the state, the balance

between banks and taxpayers is upset due to excessive fiscal costs.

*Figure 2. The interest rate difference between subsidized HPS loans and market-based loans filtered by the composition effect*



Source: Calculation by the Author.

**T5:** *HPS loans are generally more expensive than market-based housing loans, and this is not caused by the composition effect, but by the independent*

*pricing practices of credit institutions, i.e. the lack of competition.*

The high point of the state's intervention in the credit market was the loan moratorium introduced because of the coronavirus. With the measure, it was declared that debtors could suspend debt service for a longer period on a household loan portfolio of approximately HUF 8,000 billion. In Chapter 6.3 the dissertation argues that the payment moratorium can be understood as additional borrowing, since due to its rules (later payment), the debtors have access to new liquidity in the present, which they must pay after the original term (Table 1).

***T6:** Based on the results of the linear probability model presented in the chapter, in addition to the fact that more vulnerable debtors were more likely to use the moratorium, previously credit-constrained households could also use it to satisfy their credit demand. This is indicated by the fact that those debtors who had a rejected credit assessment in the two years prior to March 2021 (including if*

they obtained a smaller amount of financing than they wanted or if they did not even submit their loan application due to fear of rejection) have a substantially probability to have participated in the program, even after controlling for other explanatory variables.

Table 1 Schematic repayment paths with and without participation in the scheme

	Moratorium					Original maturity				Maturity prolongation			
	March 2020	April 2020	May 2020	(...)	June 2021	July 2021	(...)	T-1	T	T+1	T+2	(...)	T+m
Cash flows – without moratorium	-C	-C	-C	(...)	-C	-C	(...)	-C	-C				
Cash flows – with moratorium						-C	(...)	-C	-C	-C	-C	(...)	-C
<b>Difference</b>	+C	+C	+C	(...)	+C	-	-	-	-	-C	-C	(...)	-C

*Note:* C denotes the size of the monthly instalment, T denotes the original maturity date, m denotes the required maturity extension. To this schematic representation, we assumed that the instalment is fixed in time (this will not necessarily hold in the case of a variable-rate loan), so the instalment amount is constant. Instalments can also change due to changes in interest rates, and the last instalment may not be the same as the previous instalments. *Source:* Calculation by the Author.

## **Future research**

The dissertation did not deal with several important questions that could serve as the subject of further research, which will probably determine the next decade to a large extent. In my opinion, three important topics are worth highlighting: demographic changes, the role of digitalization and the issue of greening the economy.

From the point of view of demographic trends and the aging of society, it is a question of great importance what determines the motivations for taking out a loan in Hungary today, and in particular, what role does starting a family and related plans play in indebtedness. The government's demographic stimulus policy relies to a very large extent on subsidies realized through the credit market, so it would be important to thoroughly assess how it affects having children if adequate amounts and prices of financing are not available. In relation to family allowances, their full price (understood together with state subsidy) is also crucial, especially in the current, sharply rising interest rate environment. In the dissertation, I only dealt with the pricing of HPS loans, however, the issue of pricing also arises in the case of prenatal baby support

loans, especially in the light of the state guarantee behind the product. The fact that the government corrected the pricing of these products in 2022 may indicate the possible recognition of this issue. In the case of HPS loans, the cost reimbursement provided to banks, while in the case of prenatal baby support loans, the interest subsidy was also reduced – at least in the case of new disbursements.

From the point of view of our topic, the second key factor of the 2020-2030 decade is expected to be the development of technology, the creation and use of large databases in the market of financial services and within that, the loan market. More data and the more efficient use of data than before can both contribute to the reduction of banks' operating expenses, more accurate estimation of credit losses, easier comparison of individual bank offers, and simplification of loan refinancing. These factors, as the dissertation also pointed out, are all capable of contributing to the reduction of bank loan interest rates. However, the creation of databases is not easy, the state also has a significant role in providing access to the appropriate data, on the one hand by creating public databases and share it with banks (and other stakeholders)

in a controlled fashion, and on the other hand by optimally designing data protection frameworks. After a point, the price of efficiency is our privacy, and while we consider it natural for the bank to be able to learn about our income during the credit assessment, we are probably wary of it being able to access our social media profiles or draw far-reaching conclusions from our browsing history. All of these can lead to more accurate credit assessment and, due to the reduction of information asymmetry, lower interest rates on average, but it is not sure whether we want to pay the price neither as individuals nor as a society. The trade-off between efficiency and data protection will be an important research topic in the next decade, for financial economics, ethics and data science as well.

The third important theme defining the next decade is the green transition of the economy and the role of bank financing in this. In Hungary, households and residential properties are one of the most significant sources of carbon dioxide emissions, so a large reserve can be identified in the development of the energy efficiency of residential properties. However, this has to be financed by someone,

an important question is what role the banking system and the retail credit market will play in this change.

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## Own publications in the field of the thesis

### *Journal articles*

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