

## Questioni di Economia e Finanza

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#### INSIDE HOUSEHOLD DEBT: DISENTANGLING MORTGAGES AND CONSUMER CREDIT, AND HOUSEHOLD AND BANK FACTORS. EVIDENCE FROM ITALY

by Massimiliano Affinito\*, Raffaele Santioni\* and Luca Tomassetti\*

#### Abstract

This paper contributes to the understanding of lending to households in three ways: we split household debt into its two main components (residential mortgages and consumer credit) and compare the factors most strongly associated with loan types; we analyse both demand-side (household) and supply-side (bank) characteristics related to loan types; and we use micro census data on all loans granted by all banks in Italy (bank-by-bank data) to all households across the Italian territory (province-by-province data). Our results show that household debt growth is related to the characteristics of banks as well as of households, and in different ways for mortgages and consumer loans. Mortgage growth is more significantly associated with bank capital and household income unequal distribution, while consumer credit is more significantly associated with bank profit components and household income level. We find that the relationship between loan growth and accumulated debt is negative for both types of loans, which is a reassuring result as it reduces concerns about over-indebtedness risk, even if we find that the effect is much larger for mortgage loans than for consumer credit.

#### JEL Classification: G01, G21.

**Keywords**: household debt, residential mortgages, consumer credit, supply and demand factors, income level and distribution, over-indebtedness, debt accumulation. **DOI**: 10.32057/0.QEF.2023.0788

#### Contents

1.	Introduction	5
2.	Testable hypotheses and the related literature	11
3.	Methodological approach	16
4.	Data sources and descriptive analysis	19
5.	Baseline results	21
	5.1 Supply-side bank factors	21
	5.2 Demand-side household characteristics	22
6.	Extensions: time, geography, bank categories	24
	6.1 Supply-side bank factors	26
	6.2 Demand-side household characteristics	27
7.	Robustness check	27
8.	Conclusions	28
Та	bles and figures	32
Re	ferences	47

<sup>\*</sup> Bank of Italy, Customer Protection and Financial Education Department, Financial Intermediaries Conduct Supervision Directorate.

#### **1.** Introduction<sup>1</sup>

Lending to households is a crucial determinant of economic growth, a relevant activity on banks' balance sheets (and, in this regards, especially after the global financial crisis, it is viewed as a potential source of macro financial instability), and essential to the sustainability of many people's lives (and, for this reason, it is at the core of financial customer protection). In other terms, the level and growth of household debt concerns the financial fragility of banks, but also of individuals, as well as the fair conduct of lenders, but also the informed choices of borrowers. Understanding the drivers of household lending is thus of key importance, to market practitioners, regulators and policy makers, and from a variety of points of view.

The goal of this empirical work is to examine the relationships between mortgage and consumer credit dynamics, on the one hand, and several bank-side and demand-side characteristics, on the other. To this end, we break down (bank-by-bank) the portfolio of household loans of each bank operating in Italy across the Italian administrative "counties" (provinces); we then run symmetric regressions and compare results across mortgage and consumer credit loans; and we saturate the estimates with a large set of interacted fixed effects to disentangle supply (bank) and demand (household) characteristics most strongly related to the two loan types. The contribution of the paper is threefold.

First, to the best of our knowledge, this is the first paper to compare the factors related to loan growth across mortgage lending and consumer credit. The relevance of mortgages is unquestionable. Access to credit for home-ownership is decisive for the growth and progress of a society (Charles and Hurst, 2003; Kuhn et al., 2020). The global financial crisis has also definitely demonstrated the prominent role of mortgages in macroeconomics and financial stability. Consumer credit constitutes a smaller part of lending to households and, in empirical research, tends to receive relatively minor attention (Finance, 2011; Crowe et al., 2013). Some studies focus on modelling total household credit with no distinction between mortgages and consumer credit (e.g., Djankov et al., 2007; Rubaszek and Serwa, 2014; Mian et al., 2017). The two forms of debt are

<sup>&</sup>lt;sup>1</sup>We thank, for their comments, Magda Bianco, Michele Carofiglio, Bruno Giannattasio, Silvia Magri, Luigi Federico Signorini, Massimiliano Stacchini, and all participants to the webinar held at the Bank of Italy. The usual disclaimer applies. The views expressed are those of the authors only and do not involve the responsibility of the Banca d'Italia. Contact emails: massimiliano.affinito@bancaditalia.it (Affinito); raffaele.santioni@bancaditalia.it (Santioni); luca.tomassetti@bancaditalia.it. (Tomassetti)

hardly substitutes. Mortgages tend to be very few in number and very large in amount, consumer credit is characterized by a high number and a modest average size of transactions. Households are unlikely to rely less on consumer credit by borrowing more in the mortgage market and vice-versa. However, the two types of lending are also related. For example, recovery in the real estate market, accompanied by higher activity in construction, increases demand for furnishings and household equipment, and these purchases are frequently financed by consumer credit. Our approach is to analyse in a symmetric way both segments and to compare the outcomes of the two with the idea that the comparison itself may help to better understand the drivers of household debt.

Second, we analyse both demand-side (household) and supply-side (bank) characteristics associated with household debt growth. As reviewed more in detail below, the literature (e.g., Castronova and Hagstrom, 2004; Yilmazer and DeVaney, 2005; Magri, 2007; Bertaut et al., 2009; Beck et al., 2012; Jappelli and Padula, 2013; Loschiavo, 2021) tends to attribute debt growth to household characteristics (income, age, education), and to neglect the potential role of bank characteristics (soundness, size, profitability). Yet, the general literature on *banking* has repeatedly proven the role that supply-side bank factors play in affecting the offer and the amount of credit (e.g., Berger and DeYoung, 1997; Kashyap and Stein, 2000; Peydro, 2010; Gobbi and Sette, 2014; Michelangeli and Sette, 2016; Accornero et al., 2017). In the distinction between mortgages and consumer credit, supply bank factors may also vary deeply. For example, lending activity in consumer credit requires extremely fast procedures for the assessment of creditworthiness, which can be even almost at the same time as the purchase decision and the credit application. Instead, in granting mortgages, the creditworthiness assessment is necessarily more pervasive, the procedures are much slower, and the implications for bank balance sheets are potentially much more extensive. Moreover, in consumer credit, lending activity is characterized by a clear predominance of the screening phase over the monitoring phase, and it is based almost exclusively on the use of hard information; the screening technology addresses the need to respond quickly to loan applications through automatic assessment procedures, and presents high fixed costs and low marginal costs. These large differences may determine very different effects of supply bank characteristics also on household lending. Therefore, our approach consists in exploiting our granular dataset and a large combination of interacted fixed effects to disentangle bank (supply) and household (demand) characteristics associated with household debt growth across the two loan types. Beyond a number of control variables on both sides, we investigate in particular the role of four relevant bank features (largely explored by the *banking* literature: bank size, capital, NPLs and profitability), and of three relevant household features (income level, income distribution, and debt accumulation and over-indebtedness).

Third, while the analyses on lending to households and household debt typically use either micro but sample data on surveys of groups of individual households (e.g., Castronova and Hagstrom, 2004; Yilmazer and DeVaney, 2005; Magri, 2007; Iacoviello, 2008; Bertaut et al., 2009; Loschiavo, 2021) or census but macro data on groups of countries (Jappelli and Padula, 2013; Jappelli et al., 2013; Coletta et al., 2014; Bahadir and Valey, 2017; Borowski et al., 2019), we explore another approach. We use micro census data on loan portfolios of all banks resident in Italy (broken down bankby-bank) to *all* households in Italy (broken down province-by-province of residence). To this purpose, we combine the granular data that each bank must report in Italy to the Supervisory Authority with household data from the Italian Statistical Institute (ISTAT) and the Italian Ministry of Economy and Finance (MEF). This approach allows us to (first) perform the analysis at a highly *granular* level, (second) generalize our results to the lending decisions of *all* banks operating in a country, (third) to *all* loans they grant to the household sector, (fourth) to the debt decisions of *all* households of the country, and therefore (fifth) to explore the links with both supply-side and demand-side characteristics. Of course, while we analyse virtually the entire debt held by Italian households, we do not have (obviously) information on the indebtedness and characteristics of each (individual) indebted Italian family. However, we can break down the loans that each bank grants to the household sector across the Italian territory by using Italian provinces as the unit of analysis. Provinces are Italian administrative "counties", that is, administrative divisions of intermediate level between municipalities and Regions and represent an ideal set to disaggregate information on loans. The availability of territorial data on loans to households is exactly one of the reasons why Italy is an interesting case to study. Italian provinces are very heterogeneous in terms of economic and financial structure and development, as well as in terms of household and banking characteristics. As argued for example by Barro (1991) and Gennaioli et al. (2014), the province level analysis enables us to exploit within country territorial heterogeneity as natural laboratories to understand sources of differences also between countries; in our case across market segments, loan types, and both borrower and lender perspectives. It is also important to stress that Italy is an interesting case because it is one of the largest economies of the euro-area, and it is a bank-based economy, where household debt is almost entirely conceded by banks, and mortgages and consumer credit are very relevant for the activity of banks and the life of households. Summing-up, on the bank-side we have data on each bank (about 400 banking groups or stand-alone banks), and on the household-side we have averaged data on household loans and household characteristics in each province (about 105 provinces).

The advantages of our approach over the literature that uses census but macro data on groups of countries are evident, since this literature analyses very aggregate data (country-by-country) both in terms of banks (they analyse the banking system of a country as a whole, while we examine bank-by-bank behaviour) and in terms of households (they analyse the household sector of a country as a whole, while we examine the household sector province-by-province). On the other hand, compared to the literature that uses micro but sample data on surveys, our approach presents a major limitation since we obviously cannot analyse the individual characteristics of individual households.<sup>2</sup> However, even in this comparison, our approach offers many advantages. First, survey data refer only to certain dates or are updated but with a low and not timely frequency, while these phenomena change strongly and rapidly over time (we use quarterly data from December 2009 to December 2021). Second, survey data, even when updated, do not contain a – or contain a modest – panel component (and that too with low frequency), and therefore they do not allow dynamic analysis (we analyse the dynamics of household debt over time). Third, and mainly, survey data contain detailed information but only on households, while they do not contain information on banks nor do they allow matching between respondents and banks where they are customers.<sup>3</sup> The lack of bank information implies two relevant limitations: surveys do not allow any supply-side analysis (for this reason, too, the literature on household debts typically looks only at household characteristics); and furthermore the impossibility of accounting for bank effects leads to potentially sorting effects and biased estimates even when household characteristics

<sup>&</sup>lt;sup>2</sup>There is no dataset in the world containing census data with both bank-by-bank and household-byhousehold information. In this perspective, the most detailed data are those of the national credit registers (CRs), which indeed contain information on bank-by-bank and household-by-household loans, but they typically apply a threshold to the data (in Italy, for example, the Central Credit Register contains only loans above 30,000 euros), which means that they do not contain information on consumer loans (which are usually much smaller), while a crucial point of our work is exactly the comparison between mortgages and consumer credit. Moreover, CRs contain detailed information on loans, but very limited information on household characteristics (e.g., age, nationality), and mainly no information for this kind of analysis (not even income, occupation, education).

<sup>&</sup>lt;sup>3</sup>Even when surveys contain the matching, samples are not selected to ensure statistical representativeness of the survey across banks.

are examined.<sup>4</sup>

Our approach and the granularity at bank-province level of our data make it possible to apply a robust identification strategy, in the spirit of empirical works à la Khwaja and Mian (2008), Paravisini (2008) and Amiti and Weinstein (2018), which allows us to control alternatively for both bank and household characteristics. Specifically, we alternate and combine a broad set of *time-variant* either bank or province (household) fixed effects, which allow us to absorb all factors that might potentially confound lending decisions alternatively on the bank and then the household side, and are therefore the most effective means to disentangle demand and supply factors that influence lending growth. To insulate lender-side features, we consider models that absorb all province (household) heterogeneity in the use of loan types through time-varying province fixed effects, and we also add bank fixed effects to control for unobservable time-invariant heterogeneity at the bank level. Symmetrically, to insulate borrower-side features, we control for all bank heterogeneity through time-varying bank fixed effects, and in addition we allow for province time-invariant heterogeneity through province dummies.

Our results show that household debt growth is related to both bank and household characteristics, and that the relationships between debt growth, on the one hand, and supply- and demand-side factors, on the other, differ substantially for residential mortgage and consumer loans. More in detail, we find three main results on bank characteristics and three main results on household characteristics.

Regarding bank characteristics, we find that: (i) the role of bank capital is more pronounced for mortgage loans than for consumer credit (a finding consistent with the greater weight of mortgages in banking activity, in terms of amount, risk-taking, and maturity transformation); (ii) mortgages are positively related, while consumer loans are negatively related, to bank size (which confirms the higher organizational complexity of loans for house purchase, but also the smaller size of banks that tend to be more active in consumer lending); (iii) consumer credit is associated with the components of banks' income statements more than mortgages (specifically, we find that some foreign banks tend to specialize at the same time in consumer credit and fee generating activities).

Turning to household characteristics, we find that, first, mortgages and consumer

<sup>&</sup>lt;sup>4</sup>To exemplify, if all respondents of a certain survey were customers of only two banks (with the first bank characterized by very tight and conservative lending policies, and the second by very permissive and loose lending policies), we would need to know which is which to control for their policies; otherwise, the results could depend only on the policies of the two banks and not on household decisions, and estimates in household variables would result biased.

credit differ exactly in what is probably the most relevant feature, namely, the role of household income level. We find that the relationship between debt growth and household income is statistically significant and negative only for consumer loans. This suggests that in consumer credit the relationship between loan growth and household income reflects the view of borrowers rather than of lenders, in the sense that, for lenders, household income is primarily a signal of borrowers' ability to repay debts (since higher income implies better creditworthiness) and should therefore be positively linked to loan growth, while, for borrowers, according in particular to the predictions of the permanent income and consumption smoothing hypotheses, household income should be negatively linked to debt growth (since current income is an inverse proxy for future income growth). Moreover, as we discuss below, the negative relationship between household income level and consumer credit could also be a sign that these loans are associated with income difficulties. Second, our results show, for the first time to our knowledge, that the relationship between debt growth and unequal income distribution is not uniform across the two loan types. So far, the literature has simply shown that income distribution matters in bank lending (Acciari and Mocetti, 2013, Coibion et al., 2014, Loschiavo, 2021), while we are the first to show that the relationship is significant and positive only for mortgage loans, suggesting that, where the income distribution is more concentrated, only the upper income classes receive loans for home purchase, while in consumer credit (confirming the findings on income level) the upper (lower) income classes are not favoured (penalised) in obtaining lending. Third, we find that the relationship between loan growth and debt-to-income ratio is negative for both types of loans, which is a reassuring result because it reduces concerns about the risk of over-indebtedness risk and is consistent with both "responsible borrowing" by households and "responsible lending" by banks; however, we also find that the effect is much larger for mortgage loans than for consumer credit and tends to decline in more recent phases.

The rest of the paper is structured as follows. Section 2 describes our testable hypotheses and the related literature. Sections 3 and 4 summarize, respectively, our empirical methodology and the data used in the analysis. Section 5 reports the baseline results. Section 6 discusses extensions in three dimensions: time, geographical areas, and bank categories. Section 7 describes robustness checks. Section 8 concludes.

#### 2. Testable hypotheses and the related literature

Our empirical analysis tests four hypotheses. The first hypothesis regards supplyside bank characteristics, and consists in verifying whether bank features (size, capital, profitability) are associated differently with household loan growth in mortgages and consumer credit. The other three hypotheses regard demand-side household characteristics and consist in verifying whether and how mortgage and consumer credit loans are differently associated with household income levels, income distribution, and accumulated leverages.

#### Supply-side (bank) factors versus demand-side (household) characteristics

Households' participation in credit markets and debt growth may depend on both supply and demand factors. As mentioned in the Introduction, the household finance literature typically uses either micro data from household surveys or macroeconomic cross-country data. The former examines the propensity to incur debt, or the amount of debt held, trying to identify the main drivers at the household level (e.g. Cox and Jappelli, 1993; Duca and Rosenthal, 1993; Leece, 1995; Leece, 2000; King and Leape, 1998; Castronova and Hagstrom, 2004; Yilmazer and DeVaney, 2005; Magri, 2007; Bertaut et al., 2009; Beck et al., 2012; Loschiavo, 2021); the latter instead investigates the determinants of household debt at the country level and focuses mainly on the reasons and causes of different propensities across systems (e.g., Hartropp, 1992; Davies et al., 2011; Chrystal and Mizen, 2005; Jappelli et al., 2013; Jappelli and Padula, 2013; Coletta et al., 2014; Paradiso et al., 2014; Caporale et al., 2015; Christelis et al., 2015; Borowski et al., 2019). Both approaches tend to attribute heterogeneous debt levels to household characteristics (age, education, income, etc.) rather than to bank characteristics. Indeed, even when the literature concludes that debt levels are due to supply factors, it refers to different economic and social environments (e.g., Guiso et al., 2004), or institutional arrangements such as enforcement costs of loan contracts (Fabbri and Padula, 2004) or efficiency of overall juridical systems (Jappelli et al., 2005; Jappelli and Padula, 2013). In this context, banking factors potentially affecting lending growth and household debt are neglected.

On the other hand, the literature on *banking* emphasizes the role that supply-side bank characteristics and business models can play in influencing the offer and the amount of credit. Banks with different characteristics (such as soundness and health, size, profitability) may have very different willingness and incentives to grant loans or make certain types of loans. In particular, a large literature focuses on the effects of heterogeneous levels of bank capital on lending (e.g., Kashyap and Stein, 2000; Gambacorta and Mistrulli, 2004; Peydro, 2010; Berrospide and Edge, 2010; Aiyar et al., 2014), but a number of works delves also into other features of bank models. For example, Berger and DeYoung (1997) investigate how bank efficiency affects lending policies; Gobbi and Sette (2014) study the role of lender size and concentration; Accornero et al. (2017) explore the impact of the amount of non-performing loans on the supply of bank credit.

Supply bank factors may also play a relevant role in shaping differently mortgages and consumer credit. For example, lending activity in consumer credit requires extremely fast procedures for the assessment of creditworthiness assessment, while in granting mortgages the creditworthiness assessment is necessarily more careful and slower. In consumer credit the screening technology addresses the need to respond quickly to loan applications and is based almost exclusively on the use of hard information, while in loans for house purchase, despite developments in digital lending, soft information may still play a role. Above all, in mortgages, the implications for bank balance sheets are potentially much more extensive because of both the larger euro amounts and the maturity transformation effects (e.g., Michelangeli and Sette, 2016).

By exploiting the link to this broader literature, our first hypothesis consists in examining whether the growth of loans and debt held by households for house purchase and consumer credit are associated differently (also) with bank factors. In selecting bank factors, we draw on the aforementioned literature, and thus we delve into four main characteristics of bank activity: capital, NPL weight, profitability, and size.

#### Income level

The expected relationship between household income level and loan growth is *exante* uncertain, and empirical results in the literature are often contrasting. To understand why, it suffices to remind that loan amount and growth (like all credit contract terms) are equilibrium outcomes, which reflect both borrower's and lender's perspectives. This means that, although income level describes a borrower feature, it affects both borrower and lender decisions, influencing loan *demand* by borrowing households, and loan *supply* by lending banks. The resulting effect on equilibrium loan growth may be opposite, depending on which perspective prevails.

On the one hand, from a bank point of view, the expected relationship between household income and loan growth is positive. For a lender, in fact, current income is a crucial piece of information that signals borrowers' ability to repay debt in the present. Thus, a higher income implies a higher borrower creditworthiness, and then should have a positive relationship with credit growth.

On the other hand, from a household point of view, the relationship between income and loan growth may be negative. In fact, for a household, the demand for debt (if it is determined by the maximization of the utility function, subject to an inter-temporal budget constraint) depends on the household's current and future income (in addition to uncertainty about future income, and preferences about the discount rate and the intertemporal elasticity of substitution). According to the life-cycle model and the permanent income hypothesis (Friedman, 1957), households borrow to spend more today (with respect to their disposable income) in anticipation of a higher future income tomorrow (consumption smoothing). In other words, since the permanent income hypothesis states that households' current consumption is determined not only by the current income but also by the expected future income, lower income may signal a higher expectation of future earnings, and thus may be associated with higher credit growth (e.g. Aiyagari, 1994; Ando and Modigliani, 1963; Attanasio et al., 2012; Cocco et al., 2005; Fernandez-Villaverde and Krueger, 2011). In addition, still from the household perspective, the same negative relationship may be predicted through the effect of social influence and imitation among peers. In fact, households whose income is below average in their social circle might decide to consume a larger share of their income to keep up with their peers. This choice would be consistent with the permanent income hypothesis, in the sense that people may assume that their income is more likely to increase in the future if their "neighbours" are wealthier, and thus may be inclined to increase current consumption levels by taking on more debt (Senik, 2008). This may be true for all income classes with respect to their reference group. Households at the bottom of the income ladder may be encouraged to borrow to improve a minimal consumption standard; near-to-toprank households might access credit to buy luxury goods.

The sign of the relationship between loan growth and income level is controversial also in the empirical literature, both in the streams that use micro but sample data and in those that use census but macro data. For example, Hartropp (1992), Chrystal and Mizen (2005), Davies et al. (2011), Jappelli et al. (2013), and Borowski et al. (2019), who all use macro data, Cox and Jappelli (1993), King and Leape (1998), Magri (2007) and Loschiavo (2021), who instead use micro data, find that current income has a positive impact on household debt (therefore reflecting the point of view of lenders). By contrast,

Paradiso et al. (2014) and Caporale et al. (2015), using specifications consistent with the life cycle hypothesis, find that lending to households is negatively linked to disposable income. In Duca and Rosenthal (1993) and in Leece (1995), Leece (2000), who use micro but sample data, and in Bahadir and Valev (2017), who use census but macro data, the relationship between the growth of household credit and income is statistically insignificant.

In the light of this debate and the mixed results, our second hypothesis consists in estimating the empirical relationship between loan growth and income level for mortgages and consumer credit in order to verify whether it differs in the two loan types. Our approach of analysing and comparing mortgages and consumer credit helps precisely to discern between different predictions and theories. In fact, the relationship between income and debt growth may be well different in the two segments, for three reasons. First, because demand for mortgage loans is less volatile and therefore less sensitive to income fluctuations, while demand for consumer credit is more sensitive to tempor-ary income variations (e.g., Del Rio and Young, 2006; Magri, 2007; Caporale et al., 2015). Second, because the positive relation in the lender supply-side perspective may be more pronounced for mortgages, whose larger amounts justify more prudent assessments of income-related repayment capacities. Third, because consumer credit, and not mortgages, might be used by households in adverse conditions to compensate income reductions.

#### Income unequal distribution

The evidence available at the micro level on the relationship between unequal income distribution and loans to households is scant and tends to find a positive relation. For example, Rajan and Lines (2010) argue that rising inequality may lead to higher loans to households because political pressure for redistribution allows low-income households, who otherwise would not have qualified to receive credit, to borrow. Krueger and Perri (2006) show that widening economic inequality leads households to borrow more to smooth consumption even in the presence of a volatile income. Along the same line, Iacoviello (2008) shows that household debt rises with income inequality, even if to a lower extent. Using data from Dutch, US and Italian household surveys respectively, Georgarakos et al. (2014), Coibion et al. (2014), and Loschiavo (2021) find that the more unequal a region, the more the debt grows, and indebted households are more concentrated among the richer ones. Also Claessens and Perotti (2007), Roine

et al. (2009), and Acciari and Mocetti (2013) conclude that when income distribution in more unequal, only upper income classes obtain credit.

The literature argues that the underlying reasons may again reflect a demand- or a supply- perspective. From the former, social influence and imitation among peers, which we have already mentioned in relation to income levels, may play an amplified role through income inequality because income inequality increases household incentives to take on debt. From the supply perspective, in addition to looking at income, banks also can look at the rank in the local income distribution and can decide that, when inequality is higher, higher income rank means an even higher ability to repay (Georgarakos et al., 2014, Coibion et al., 2014, and Loschiavo, 2021). This signalling power of income inequality is stressed also by an emerging body of evidence, which suggests that, since income position tends to persist over time when income inequality is higher, individuals at the bottom of the income distribution have a higher probability of remaining there and not receiving loans, while the opposite occurs to those at the top (Galor and Zeira, 1993; Piketty, 1997; Kopczuk et al., 2010; Stiglitz, 2012).

Again, our approach of analysing and comparing mortgages and consumer credit in a single framework allows us to test (and that is our third hypothesis) whether there is a relationship between loan growth and income distribution, for which debt type and in which direction.

#### Debt accumulation and over-indebtedness

A major concern for policymakers, both from a financial stability and a customer protection perspective, is the risk of over-indebtedness of households or specific groups or social segments of the population. Despite the wide institutional debate (FinCoNet, 2019; OECD, 2021; EBA, 2021), the empirical evidence on the issue is very limited. *Ex-ante* the relationship between the level of accumulated debt and credit growth should be negative if both households and banks are willing not to accumulate too much debt for the same individuals. However, *ex-ante* a positive relationship between the level of accumulated debt and credit growth could also arise for four reasons. First, a positive prediction might again be related to social influence and emulation among peers. If, as noted above, households with below-average incomes decide to consume a larger share of their income to keep up with peers, this choice could determine households' excessive spending and, as a result, over-indebtedness (Stiglitz, 2012; Bricker et al., 2021; Loschiavo, 2021). Second, if households have borrowed in the past in the hope of future

income increases (consistent with the permanent income and consumption smoothing hypothesis), increasingly indebted households (who in addition might be disillusioned in their expectations) could continue to borrow to maintain their consumption levels (Kumhof and Ranciere, 2010). Third, if debt (especially consumer credit) were actually used by some households in adverse income and financial circumstances to cover daily and monthly expenses, this could lead to a vicious cycle of debt accumulation. Fourth, even from the lender's perspective, the relation between accumulated debt and credit growth could be positive. Banks could in fact decide to keep on lending to indebted households because these have proven to guarantee repayments in the past, or because of evergreening practices (Peek and Rosengren, 2005; Hoshi and Kashyap, 2010; Albertazzi and Marchetti, 2010). Therefore our fourth hypothesis consists in verifying the empirical relationship between loan growth and accumulated debt, and in exploring whether it differs in mortgages and consumer credit.

#### 3. Methodological approach

As clarified, our analysis distinguishes between mortgage and consumer credit, and for both loan types it aims at disentangling supply (bank) and demand (household) factors related to lending growth. From a methodological point of view, we pursue this goal by leveraging the granularity of our data (bank-by-bank data to analyse supply factors and province-by-province data to analyse demand characteristics, with 13 years of quarterly data) to include in the analysis an extensive set of fixed effects in the spirit of empirical works à la Khwaja and Mian (2008), Paravisini (2008) and Amiti and Weinstein (2018).

The strategy consists in saturating regression equations with a large set of interacted fixed effects, which alternatively absorb all supply-side factors while estimating specific demand-side characteristics, or all demand-side factors while estimating specific supply-side characteristics. This means that we do not estimate both supply-side and demand-side factors in a single equation, but instead we estimate two different regression models because the sets of fixed effects alternatively refer to either banks or households and cannot be used in the same equation. Since we analyse two models for each loan type, we estimate a total of four regression models.

In formal terms, the first two models (alternatively referred to mortgages or consumer credit) have the structure of the following equation 1:

$$loan\_growth_{i,p,t} = \beta'_h S_{i,t-1} + \phi_i + \delta_{p,t} + \varepsilon_{i,p,t}$$
(1)

where *loan\_growth*<sub>*i*,*p*,*t*</sub> is the quarterly growth rate of either mortgages or consumer credit of bank *i* (with *i* = 1,..., *N*) in province *p* (with *p* = 1,..., *P*) at quarter *t* (with *t* = 1,..., *T*); *S*<sub>*i*,*t*-1</sub> is a matrix (*NT* × *h*) of supply-side regressors defined at bank level, *h* indicates the varying number of regressors (varying in different specifications), which are all lagged by one period;  $\beta_h$  is a vector of coefficients;  $\phi_i$  are bank fixed effects;  $\delta_{p,t}$ are interaction terms between time and province fixed effects; and  $\varepsilon_{i,p,t}$  are idiosyncratic errors, which distribution is i.i.d.

The second two models (again, alternatively referred to mortgages or consumer credit) have a symmetric structure as in the following equation 2:

$$loan_growth_{i,p,t} = \gamma'_g D_{p,t-1} + \theta_p + \lambda_{i,t} + \eta_{i,p,t}$$
(2)

where  $loan_growth_{i,p,t}$  is defined as in equation 1;  $D_{p,t-1}$  is a matrix  $(PT \times g)$  of demand-side regressors defined at province level, g indicates the varying number of regressors, which are again lagged by one period;  $\gamma_g$  is a vector of coefficients;  $\theta_p$  are province fixed effects;  $\lambda_{i,t}$  are interaction terms between time and bank fixed effects; and  $\eta_{i,p,t}$  are idiosyncratic i.i.d errors.

As mentioned, the interaction terms  $\delta_{p,t}$  (in equation 1) and  $\lambda_{i,t}$  (in equation 2) play a key role. In equation 1,  $\delta_{p,t}$  are interactions between *province* × *time* fixed effects, which absorb all factors affecting lending decisions from the demand-side, and thus the residual variation in debt growth remains a function of bank characteristics. In other words,  $\delta_{p,t}$  account for and remove all time-invariant and time-varying, observable and unobservable, heterogeneity that at province level might affect the loan growth rate, and therefore allow estimations to focus on the role of bank characteristics included in the matrix  $S_{i,t-1}$ . To exemplify, the interaction terms  $\delta_{p,t}$  control for all demand-side factors such as demography (e.g., age, sex), institutional features (e.g., school, welfare), economic, structural and cycle differences (e.g., income, distribution, competition). Moreover,  $\delta_{p,t}$  also allow for financial differences, again time-invariant and time-varying, observable and unobservable, at province level, such as the level of financial development, and the presence and weight of non-bank financial institutions.

Symmetrically, in equation 2,  $\lambda_{i,t}$  are interactions between *bank* × *time* fixed effects, which absorb all factors affecting lending decisions from the supply-side, accounting for

and removing all time-invariant and time-varying, observable and unobservable, differences at bank level and therefore, in this case, the residual variation in debt growth is a function of time-varying covariates capturing specific household-province characteristics included in the matrix  $D_{p,t-1}$ . It is to highlight that both our sets of time-varying fixed effects  $\delta_{p,t}$  and  $\lambda_{i,t}$  also control for changes in the business cycle and in macro policies. This is important because changes in the business cycle, or in the monetary policy stance, or in the national and local level of government expenditures, also can affect lending decisions on both the supply and demand side.

The two matrices  $S_{i,t-1}$  and  $D_{p,t-1}$  include a number of covariates, and in particular our regressors of interest, which are proxies of the four testable hypotheses described above. The matrix  $S_{i,t-1}$  contains the four relevant bank variables (capital, NPL weight, profitability, and size); likewise, the matrix  $D_{p,t-1}$  contains the three relevant demand variables (income level, income distribution, and accumulated debts). The two matrices also contain an additional list of bank-level or province-level control variables because, while controlling for the other side through the interacted fixed effects, it is important also to take into account other specific (possibly close) supply-side and demand-side cofactors in order to discern between different hypotheses. In this light, on the supply bank side, we add variables measuring funding sources (deposits, bonds, etc.) and other forms of business (the share of loans to firms; the portfolio holdings, etc). On the demand side, we add the employment and unemployment rates, the shares of employees in the different sectors, the share of younger people and the level of education (variables that are very relevant because typically used to proxy the potential growth of future income in taking into account the life-cycle and permanent income hypothesis). Moreover, in the matrix  $D_{p,t-1}$  we include variables that capture other province-level financial characteristics such as the aggregate level of household deposits and of NPLs (while we do not need to do the same in equation 1 because in this case these aspects are absorbed by interaction terms  $\delta_{p,t}$ ). The complete list of all our covariates is reported in Table 1 and is described in the next Section.

Moreover, in order to avoid any omitted variable bias, we also include bank fixed effects  $\phi_i$  in equation 1 and province fixed effects  $\theta_p$  in equation 2, which exploit the time dimension of our data. These further fixed effects control for all unobserved, time-invariant drivers in the cross-section (Ludvigson, 1999; Nakajima and Ríos-Rull, 2014). For example, when exploring time-varying bank characteristics, bank fixed effects  $\phi_i$  control for specific business models adopted by banks; province fixed effects  $\theta_p$  control

for specific institutional settings.

Two last features of our empirical strategy are worth mentioning. First, although the goal of our equations is not to estimate causal nexuses but rather conditional correlations, nevertheless all covariates are lagged by one period (one quarter for quarterly data, and one year for annual data) because this approach, in addition to allowing us to analyse the dynamic relations between variables, yields more robust estimations and limits endogeneity concerns. Finally, the standard errors are clustered at bank, province and time level. This is important because variation also may be within the same bank or province.

#### 4. Data sources and descriptive evidence

We build a quarterly panel dataset on three dimensions: time, banks and Italian administrative provinces. Time is quarterly between December 2009 and December 2021 (T = 52). Bank-by-bank data include all banks resident in Italy, including foreign banks (during our sample period N is about 400 in each period). Province-by-province data include all provinces of Italy, which are Italian administrative "counties", that is, administrative divisions of intermediate level between municipalities and Regions and, as noted in the Introduction, represent an ideal set to take into account local characteristics. During our sample period the number of Italian provinces P varies between 103 and 110. It is to note that not all banks operate in all provinces, and in all periods. The full number of observations  $(T \times N \times P)$  is around 250,000. In order to collect information on banks and provinces we combine several data sources.

First, supply-side micro bank data are drawn from the Supervisory Reports that banks have to transmit to the Bank of Italy. These data include total outstanding amounts of credit that each bank grants to the household sector in each province of Italy. These data are collected on a monthly basis, and loans are distinguished in three classes according to the underlying purpose: loans for house purchase (or residential mortgages); loans for consumer credit; and loans for other purposes. Our dependent variables are computed as the quarter-by-quarter annual growth rates (alternatively) of the first two loan types. The growth rates are computed by following (bank-by-bank and province-by-province) the official methodology adopted by the Eurosystem across euro-area countries, that is, by correcting the variation of stocks for all those adjustments affecting loan changes that are not related to new flows of loans, including securitisations, write-offs, and statistical reclassifications. From the Supervisory Reports we also retrieve several banks' balance sheet data to compute our bank-side regressors (both key and control variables): capital, non-performing loans, loans to non financial corporations, deposits, bonds issued, securities portfolio, profits, fees and charges, operating costs, and total assets. To avoid data breaks following mergers and acquisitions, we apply the standard technique (the so called *pro-forma* approach) of simulating that all M&A occurred at the beginning of the sample period.

Second, demand-side household characteristics at province level are retrieved from two main data sources: the Italian National Statistical Institute (ISTAT) and the annual tax declarations published by the Italian Ministry of Economy and Finance (MEF). From the former we collect data on value added, population, percentage of population with tertiary education, age, employment and unemployment rate, population growth rate. Per capita value added is our proxy for income level. From the MEF, we use the income brackets from tax payers declarations to build the Gini index as our proxy for the concentration of income distribution, following the procedure applied by Acciari and Mocetti (2013).<sup>5</sup> Table 1 reports the list of our variables, how they are computed and the summary statistics.

Three stylized facts help to clarify the approach of our analysis. First, Figure 1 shows that in Italy the growth rates of the two loan types differ substantially, also over time; it also shows that in Italy during our sample period the growth of loans for house purchase is much more stable, while that of consumer credit allows us to identify three phases: consumer credit slowed down sharply after the global financial crisis until around the end of 2014 (in this phase Italy was deeply impacted by the euro-area sovereign debt crisis); it grew at a remarkable pace from 2015 until the outbreak of the Covid crisis; and then it fell much more abruptly than mortgages during the pandemic crisis (Banca d'Italia, 2021; Banca d'Italia, 2022). Second, Figure 2 shows that in all the countries represented, the two loan types, computed as debt-to-income ratios (red and blue portions of the histograms), are very different; and it shows that in Italy the mortgage debt-to-income ratio (the red portion of the histograms) is much lower than in

<sup>&</sup>lt;sup>5</sup>Fiscal income data underestimate gross disposable income from national accounts of ISTAT for two main reasons: tax evasion and the lack in fiscal data of capital income (Fiorio and D'Amuri, 2005; Marino and Zizza, 2012). Acciari and Mocetti (2013) estimate that these components account for almost 10% of income, and show that in any case there are no distorting effects because the correlation between the two income measures remains very high. We repeated the same exercises of Acciari and Mocetti (2013) on recent data and found the same results.

other countries, while the consumer credit debt-to-income ratio (the blue portion) is very similar. Our analysis aims at examining these differences, and at verifying whether (and possibly which) supply-side (bank) factors and demand-side (household) characteristics are more associated with these differences. Third, Figures 3 and 4 provide a glimpse of the very heterogeneous growth of both mortgages and consumer credit across provinces of Italy. We exploit precisely this heterogeneity to carry out our analysis.

#### 5. Baseline results

#### Supply-side bank factors

The results of equation 1 are reported in Table 2 for mortgages, and in Table 3 for consumer credit. Both tables present three specifications. The first specification includes all regressors except the variables related to bank profitability, which are then added in two alternative ways in the other two specifications. The second specification adds only the variable ROA, i.e. an indicator of bank total profits. The third specification instead uses two variables – 'fees and commissions' and 'operating costs' – which are two relevant items in bank income statements. As clarified, our approach relies on the comparison between the results of the symmetric estimates of mortgages and consumer credit loans. Four main results arise from this comparison.

First, while consumer credit growth is unrelated to the level of bank capital, mortgage growth tends to be positively and significantly associated with higher bank capital. This suggests that regulatory requirements affect consumer credit less than loans for house purchase, which indeed are more relevant in banks' balance sheets, both in terms of amount and maturity transformation.

Second, and symmetrically, the relationship between mortgage credit growth and the burden of total NPLs is statistically insignificant, while that between consumer credit and the burden of total NPLs is significant and negative. The result is consistent with the related literature, which also shows low levels of NPLs in banks operating in consumer credit markets (e.g., Magri et al., 2021), and it can be read as a confirmation of the previous result on capital. In fact, the result on capital indicates that healthier banks (i.e., those more capitalized) have more mortgages, while this is not necessarily the case in consumer credit. The result on NPLs suggests that the level of capitalization is less relevant in consumer credit (and therefore even non particularly well-capitalized banks grant consumer credit loans) because banks operating in consumer credit are characterized by significantly lower levels of default. Third, both loan types' growth rates are significantly related to bank size, but the coefficient of the covariate is positive for loans for house purchase, while it is negative for consumer credit. These results indicate that mortgage loans require a higher degree of organizational complexity, which larger banks are more likely to be able to meet. Instead, small banks prefer lending (and possibly specializing) in consumer credit because it is a less complex banking activity with lower organizational and balance sheet implications.

Fourth, consumer credit is also significantly related to profit-related variables, while mortgage growth does not result to be associated with their developments. Interestingly, the growth of loans for consumption purposes is positively related with the covariate 'fees and commissions', while it is negatively associated with the variable 'operating costs'. This suggests that on average banks that are more active in consumer credit are those that also tend to specialize more in fee generating activities. At the same time, banks more active in the consumer credit segment are those with a lower level of costs, which could mean that banks specialized in consumer credit are on average more efficient, or it could highlight again that lending in consumer credit requires lower (organizational and operating) costs. We turn to this finding in Section 6.

It is worth stressing that also the economic impact of the four bank-side factors is relevant. To provide an estimation, we computed (using as benchmarks specifications 3 of both tables 2 and 3) the marginal effects on the dependent variables as we move from the 25th to the 75th percentile of each statistically significant regressor (other things being equal). The mortgage growth rate increases by more than half moving from the 25th to the 75th percentile of the variable bank capital, whilst the consumer credit rate decreases by almost the same amount moving from the 25th to the 75th percentile of the variable bank capital, whilst the consumer credit rate decreases by almost the same amount moving from the 25th to the 75th percentile of the variable NPLs. Likewise, the growth rates change by around 30 percent (rising in mort-gages and decreasing in consumer credit) moving from the 25th to the 75th percentile of the variable bank size. For consumer credit, the impact is around 50 percent also for 'fees and commissions' and 'operating costs'.

#### Demand-side household characteristics

The results of equation 2 are reported in Table 4 for mortgages, and in Table 5 for consumer credit. Also on the demand-side, both tables present three specifications that gradually add more control regressors (for details on our controls, see Section 7). Looking at the results for both loan types and at their comparison, three main results

emerge.

First, household income turns out to be statistically significant and negative in the consumer credit estimation, and not statistically significant in the mortgage estimation. The result suggests that the relationship between loan growth and income level in the mortgage loans has no systematic direction, probably because two opposing forces are at work. On the one hand, the lender's view urges the relationship to be positive (since income level is a crucial signal of creditworthiness); on the other hand, the borrower's view pushes the relationship to be negative (in the sense that current income may be an inverse proxy for future income growth). Since we find that the coefficient of per capita income is not significant, this suggests that neither effect prevails in mortgages. In contrast, in the consumer credit the coefficient of per capita income is always negative, which suggests that in this loan type the borrower perspective constantly prevails.

The finding that the bank perspective matters more for mortgage loans than for consumer credit is interesting and tallies with the results of equation 1, which already indicate that these loans are more relevant to banks' balance sheets. Moreover, our results show that the theory on permanent income holds only in consumer credit, namely, only in this debt type, households borrow at lower incomes. In addition, this result is also consistent with the concern that consumer credit may be associated with income hardship (e.g., Del Rio and Young, 2006; Magri, 2007; Magri et al., 2011; Albacete et al., 2013; Caporale et al., 2015; Cavalletti et al., 2020). In fact, as long as lower income households borrow (in the hope of future improvements), it cannot be ruled out that some households may decide to use consumer credit to cover daily expenses (in the hope of a temporary situation).

Second, the coefficient of the variable income inequality (measured by the Gini index) is instead positive and statistically significant for mortgages, and not statistically significant for consumer credit. These results are consistent with the findings of Claessens and Perotti (2007), Roine et al. (2009), and Acciari and Mocetti (2013), who also show a positive relationship between unequal income distribution and loans to the private sector and interpret this relation as due to loans to the highest incomes. The result is also consistent with Coibion et al. (2014) and Loschiavo (2021), who find that banks are less willing to lend to low-income households living in "unequal" regions. Our results contribute to this literature since (splitting the total household debt) they show that the relation is significant but only in the mortgage market, which suggests that only in the loans for house purchase, when income distribution is more concentrated, upper in-

come classes obtain more credit. By contrast, the same relationship does not hold for consumer credit, for which growth is unrelated to income distribution. This result could be read as a confirmation of the previous one on income level, since it suggests that in consumer credit the upper income classes are not favoured in borrowing.

Third, the coefficient of the variable total debt-to-income ratio presents the same negative significant sign as for both mortgages and consumer credit. Such a result is reassuring because it reduces concerns about the risk of over-indebtedness, and it is consistent with both a "responsible borrowing" attitude by households (households with a higher debt-to-income ratio decide not to accumulate further debt), and a "responsible lending" approach by banks (banks do not extend further loans to households who are highly indebted relative to their income). The result is comforting also because it could signal that banks adopt a long-run view in lending as they look not at short-period margins but at the debt sustainability and repayment likelihood. On the other hand, however, we also find that the effect is much larger in the mortgage regression than in the consumer credit, which instead is a less reassuring result because the decision not to accumulate more debt is less strong in consumer loans, exactly where we have already found that lower-income households accumulate more debt.

As with bank-side factors, household characteristics also show a relevant economic impact. Using as benchmarks specification 3 of both tables 4 and 5, both the mortgage and consumer credit growth rates fall by about 25 percent moving from the 25th to the 75th percentile of the variable total debt-to-income ratio. Similarly, the consumer credit rate decreases by almost 20 percent moving from the 25th to the 75th percentile of per capita income. The impact of income distribution is smaller but not negligible: the growth rate of mortgages rises by about 8 percent when moving from the 25th to the 75th percentile of the variable Gini index.

#### 6. Extensions: time, geography, bank categories

In order to further elaborate on the baseline results, we estimate new versions of models 1 and 2 allowing the coefficients to vary over three dimensions: time, geographical area, and bank institutional classification. The goal is to verify whether and to what extent the relations we have found so far between credit growth, on the one hand, and lender and borrower characteristics, on the other, may change according to the period considered, the zones where banks operate, and the category to which the bank belongs.

First, from the time perspective, we divide our sample period in the three intervals identified in Figure 1: the years 2009-2014, which include the sovereign debt crisis (which had a large impact on the Italian economy); the years 2015-2019, which constitute a period of economic recovery; and finally the years 2020-2021 corresponding to the outbreak of the Covid-19 pandemic. Second, from a geographical point of view, we consider the four macro-areas composing Italy: North West, North East, Centre, and South and Islands. Third, with regard to bank institutional categories, we combine three bank classifications: the distinction adopted by the European Single Supervisory Mechanism (SSM) between *significant* and *less significant* banks;<sup>6</sup> the distinction between cooperative and non-cooperative banks; and the distinction between domestic (Italian) and *foreign* banks. The first distinction between *significant* and *less significant* banks may be relevant because (as confirmed by our baseline results) larger and more complex institutions tend to follow different lending policies compared to smaller and more local banks; the distinction between *cooperative* and *non-cooperative* banks may matter as well because cooperative banks are often regarded as peculiar institutions according to many profiles including lending policies; the category of foreign banks may be helpful to capture and verify specific behaviours that banks from abroad might have compared to domestic institutions. By combining the three classifications, we obtain four categories of banks: domestic significant banks (different from cooperative banks); domestic significant cooperative banks; branches and subsidiaries of foreign banks; and domestic less significant banks.<sup>7</sup>

In operational terms, in order to estimate the effects of these dimensions, we do not run simply sample splitting of our dataset, but instead, we re-estimate three new versions of each model (respectively, for time, geography, and bank category) by interacting, in

<sup>&</sup>lt;sup>6</sup>The criteria for determining whether banks are considered *significant* – and therefore under the ECB's direct supervision – are set out in the SSM Regulation and the SSM Framework Regulation. To qualify as significant, banks must fulfil at least one of these criteria: (i) the total value of its assets exceeds  $\in$  30 billion; (ii) it is economically important for the specific country or the EU economy as a whole; (iii) the total value of its assets exceeds  $\in$  5 billion and the ratio of its cross-border assets/liabilities in more than one other participating Member State to its total assets/liabilities is above 20%, (iv) it has requested or received funding from the European Stability Mechanism or the European Financial Stability Facility.

<sup>&</sup>lt;sup>7</sup>We also analysed a fourth dimension regarding bank size. In this respect, we divided all banks in four quartiles (referring to the variable bank size, which is measured as a natural logarithm of total assets), and we assigned each bank to one of the four quartiles. Given that we have a data set spanning from 2009 to 2021, we computed the total assets distribution at each date, assigning quartiles to each bank, and then we used the first available entry in order to avoid potential endogeneity issues. However, we do not report these results on bank size because they are more homogeneous to the baseline ones or to those of the exercise on bank categories.

each version, each regressor with as many *dummies* as the groups identified in each dimension. The first exercise explores the role of *time*, and so we have three time dummies, which correspond to the three intervals described above. The second exercise explores the role of *geographical* areas, and we have four dummies corresponding to the four macro-areas of Italy. The third exercise investigates the role of *bank categories* and we have four dummies (one for each category). The approach of interacting each regressor with the new *dummies* instead of splitting the sample enables us to gain efficiency and allows direct comparison among the coefficients (e.g.Morck et al., 1988).<sup>8</sup>

#### Supply-side bank factors

Regarding soundness indicators (bank capital and NPLs), our baseline results have shown that capital requirements matter more in lending for house purchase, while NPLs are more significant in consumer credit. Now, when we allow the coefficients to vary over the different dimensions, we find some interesting qualifications. First, when we consider the three period spans, we find that the relation between consumer credit growth and bank capitalization is even significantly negative in the first span (Table 6), which confirms even more that a higher level of capitalization is not decisive in driving consumer credit. Second, geographically, we find that this negative relation between consumer credit and bank capital is only significant in the North-West of Italy, which is an interesting result because this is a rich area and consumer credit grew more in the expansive phase (Table 7). Third, from the bank category perspective, we find that the positive relation between mortgages and bank capital is statistically significant for both significant and less significant domestic banks, while it is statistically not significant for foreign and cooperative banks, which confirms the peculiarity of these institutions (Table 8). Likewise, the negative relation between consumer credit and bank capital is statistically significant only for cooperative banks (Table 9). Fourth, the negative relation between consumer loans and NPLs is confirmed in all phases and geographical areas, while in the exercise on bank categories it is confirmed only for foreign banks, and it is positive for cooperative banks (which therefore present for consumer loans a negative relation with capital and a positive relation with NPLs).

Turning to bank income indicators, our baseline results have shown that the growth of consumer loans is positively associated with 'fees and commissions', and negatively

<sup>&</sup>lt;sup>8</sup>All in all, we performed 12 new estimation exercises: the two loan types  $\times$  the two sides (the supplyand the demand side)  $\times$  the three dimensions (time, geography, category). For the sake of brevity, we do not report all results, which however are available from the authors upon request).

associated with 'operating costs'. Our extensions show that, first, higher loan growth is more likely to be related to higher fees and lower costs during expansionary periods (i.e., in our second span). Instead consumer credit turns out to be positively associated with operating costs during recessions (Table 6). Second, the regressions on bank categories reveal that the relation between credit growth, on the one side, and 'fees and commissions' and 'operating costs', on the other side, involve different institutional types (Table 9). The growth of consumer credit is significantly and positively associated with fees and commissions for cooperative and foreign banks. Instead, consumer credit growth is significantly and negatively associated to operating costs only for foreign banks. The relationship between credit growth and costs is positive for *less significant* banks, which is the only category of banks that makes more consumer loans (even) when their operating costs are significantly higher.

#### Demand-side household characteristics

As for the demand-side covariates, the most interesting results concern the time dimension. First, the negative relationship between consumer credit and household income level is statistically significant only in the first time period, that is, during a restrictive phase (Table 11). This reinforces the concern that the use of consumer credit can serve as a substitute for shortage of income. Second, the negative relationship between the two types of loans and the total debt-to-income ratio holds for all time spans, but the statistical significance and magnitude of coefficients tend to weaken over time, which reduces the reassuring finding stressed in the baseline results (tables 10 and 11). Third, the relationship between consumer credit growth and the Gini index (which was not significant in the baseline results) is significantly negative in the second and third time spans, which confirms that consumer credit increases more where income is less concentrated, that is, where there are fewer top earners.

#### 7. Robustness checks

As noted in Section 3, the use of interaction terms  $\delta_{p,t}$  (in equation 1) and  $\lambda_{i,t}$  (in equation 2), and the use of bank fixed effects  $\phi_i$  (in equation 1) and province fixed effects  $\theta_p$  (in equation 2), help (also) to avoid omitted variable biases. However, as clarified, at the scope, we have also included in the two matrices  $S_{i,t-1}$  and  $D_{p,t-1}$  several bank-level and province-level regressors to control for other effects. The tables of results indicate

the control variables included in the regressions. In particular, we experimented with the following controls.

At the bank level, we experimented, first, with variables measuring alternative asset-side activities (such as the share of loans to non-financial corporations or of securities holdings in total assets) and with variables measuring different funding sources (such as the share of deposits, bonds, and central bank refinancing). In all cases the results remained stable. Second, we also experimented with the use of alternative definitions of the same variables. For example, the variables defined as a ratio were also computed as natural logarithms of the ratios, and the results did not change.

At the household level, we tested, first, the dependence between loan growth and per capita income by adding cyclical, demographic, and structural variables (activity in construction, share of young people in the population, level of education) as indirect determinants of creditworthiness and lending. As mentioned, the share of younger people and level of education are particularly relevant control variables because typically they are used to proxy the potential growth of future income in accounting for the permanent income hypothesis.<sup>9</sup> The results remained stable. Second, we also replaced the covariate 'per capita income' with the covariate 'per capita income growth rate', and obtained the same results. The results did not change even when we included at once both versions of the per capita income variables. Third, in order to verify whether the presence of greater wealth could impact the other results, in particular those regarding income level and distribution, we included in the estimations, both separately and together, the portfolio of securities and the amount of deposits held by households in each province, scaled by population. The results remained unchanged. Fourth, we added the total share of NPLs on total loans aggregated at the province level in each province to check whether a higher average risk of local borrowers could affect the other results, which instead remained stable.

#### 8. Conclusions

Lending to households is a core activity for banks, and it is crucial in the lives of many people. It is at the centre of institutional debate in both financial stability and

<sup>&</sup>lt;sup>9</sup>Reflecting the life cycle and permanent income hypothesis, a higher proportion of young people in the population is supposed to lead to an increase in consumer credit to smooth consumption with expectations of rising income. Likewise, education is expected to positively affect consumer credit as a higher level of educational qualification should lead to an expectation of a higher and more stable future income (Del-Rio and Young, 2005 and Grant, 2007).

consumer protection fora. The level and growth of household debt are monitored to analyse the financial fragility of individuals and banks, the degree of information and awareness of borrowers, and the fair conduct of lenders.

This work contributes to the understanding of lending to households in three ways. First, we analyse, separately but symmetrically, the two main components of household debt - residential mortgage and consumer credit loans - and compare the results of our estimates across the two loan types, with the idea that the comparison itself may help to better understand the drivers of total household debt. Second, we analyse both demandside (household) and supply-side (bank) characteristics associated with household loan growth because supply factors may also play a relevant role in explaining lending to households, because they are decisive in studying the conduct of banks and because, if they are not taken into account, results on household characteristics may be biased. Third, we use micro census data based on individual bank reports to the supervisory authority, which allow us to perform the analysis to a highly granular level, to generalize our results to the lending decisions of all banks operating in Italy, to all their loans to households, and therefore examine the indebtedness choices of virtually all Italian households. Although, obviously, we cannot have information on the debt and characteristics of each Italian family, we disaggregate the loans that each bank extends to the household sector across the Italian territory and use Italian provinces (counties) as the unit of analysis. Provinces are often used in the analyses as they are very heterogeneous in terms of economic and financial structure and development, as well as in terms of household and bank characteristics; therefore an analysis at province level makes it possible to exploit within country heterogeneities as natural laboratories to understand sources of differences. We primarily show that growth rates of mortgages and consumer credit differ deeply across Italian provinces, and then we explore and exploit this heterogeneity to search for the factors most related to both types of household debt. From a methodological point of view, our approach enables us to include in our regressions an extensive set of fixed effects (variously combining banks, province/households, and time effects), which allow us to account for all factors affecting the lending decisions and to disentangle demand and supply factors that are most associated with debt growth.

Our results show that loan growth to households is related to both bank and household characteristics, and in different ways for residential mortgage and consumer credit loans. We find three main results on bank characteristics and three main results on household characteristics.

Regarding bank characteristics, we show that for mortgage loans the relationship between loan growth and bank capital is positive, while for consumer credit it is statistically insignificant, and even becomes negative in some periods and for smaller banks. The result is consistent with the greater impact of mortgages in banking activity, both in terms of amounts and effects on risk-taking and maturity transformation. Symmetrically, we show that the relationship between credit growth and burden of NPLs is not statistically significant for mortgage credit, while it is significant and negative for consumer credit, suggesting that in consumer credit the level of capitalization is less relevant precisely because more active banks are characterized by lower levels of defaults (even if this not always true for all banks in all periods). Instead, the development of bank income components is more relevant for banks more active in consumer credit, especially during phases of expansion. In particular, the growth of consumer credit is associated significantly and positively with fees and commissions, and significantly and negatively with operating costs, since some banks, in particular from abroad, seem to specialize at the same time in consumer credit and in fee generating activities and to exploit the circumstance that this loan type requires lower organizational costs.

Regarding demand-side characteristics, we find that the relationship between debt growth and household income level is not statistically significant in the mortgage market, reflecting also the point of view of lenders (for whom household income is primarily a signal of borrowers' ability to repay debts), while it is significantly negative in consumer loans, mainly in restrictive phases, reflecting therefore the point of view of households and the predictions of the permanent income and consumption smoothing hypothesis (according to which lower incomes signal higher expectations of future earnings). Moreover, the negative relation between consumer credit and income confirms the concern that these loans are associated with cases of income shortage. Then, we find that the relationship between debt growth and unequal income distribution is significant and positive only for mortgage loans, suggesting that where income is more concentrated only the upper income classes receive loans for home purchase, while in consumer credit the relationship is not significant, or even negative in some phases, suggesting (in line with the result on income levels) that in this loan type the lower income strata are not disadvantaged in obtaining credit. Finally, the relationship between loan growth and the level of accumulated debt is negative for both types of loans, which is a reassuring result because it reduces concerns about the risk of over-indebtedness; however, we also find that the effect is much larger for mortgage loans than for consumer credit and moreover

it tends to decrease over our sample time, which is an incentive to keep the issue under review.



The figure shows the percentage growth rate of consumer credit (red line) and residential mortgages (blue line) in Italy. The growth rate is computed each quarter on a yearly basis. The 12 months variations are computed net of reclassification, value adjustments and other variations independent from pure transactions. Source: Bank of Italy - Supervisory reports.



Figure 2: Debt to Income ratio: international comparison

Mortgage loans Consumer credit Other debt The figure reports the households' financial indebtedness as a percentage of gross disposable income across different countries and Euro Area. Data for 2022 refers to the first quarter. Source: Bank of Italy - August 2022.



Figure 3: Residential mortgage loans growth rates - heterogeneity across Italian provinces

The figure reports the geographical distribution of residential mortgage loans growth rate at provincial level. Each map represents the quartile distribution for Italian provinces. The darker the color, the higher the related quartile and the value for that specific province. The percentage changes are computed net of reclassification, value adjustments and other variations independent from pure transactions. Source: Bank of Italy - Supervisory reports.



Figure 4: Consumer credit loans growth rates - heterogeneity across Italian provinces

The figure reports the geographical distribution of consumer credit growth rates at provincial level. Each map represents the quartile distribution for italian provinces. The darker the color, the higher the related quartile and the value for that specific province. The percentage changes are computed net of reclassification, value adjustments and other variations independent from pure transactions. Source: Bank of Italy - Supervisory reports.

#### Table 1: Summary statistics

The table reports some summary statistics of the key variables used in the analyses included the outcome variables. Loan growth rates are computed for each bank, in each period, in each province; therefore, unlike aggregate data, the averages, and the other distribution statistics, reflect this non-weighted perspective. All variables are lagged as described in the Section 3

Variables	Description	Mean	Std. Dev.	Median	Obs.
Residential mortgages growth rate	Quarter-by-quarter annual growth rates of residential mort- gages granted to households by each bank in each province of Italy	-0.008	0.053	-0.009	205,595
Consumer Credit growth rate	Quarter-by-quarter annual growth rates of consumer credit granted to households by each bank in each province of Italy	-0.017	0.109	-0.014	256,078
Capital on total assets	Capital and reserves of each bank scaled by total assets	0.103	0.055	0.099	310,353
NPLs on total assets	Total outstanding amount of non-performing loans on balance sheet of each bank scaled by total assets	0.038	0.044	0.026	311,944
Log of total as- sets	Logarithm of total outstanding amount of assets of each bank	8.89	2.092	8.707	315,009
Return on total assets (ROA)	Profits in the income statement of each bank scaled by total assets	0.001	0.014	0.002	314,640
Fees and com- missions	Fees and commissions earned by each bank scaled by inter- mediation margin	0.484	1.615	0.329	310,988
Operating costs	Operating costs in the income statement of each bank scaled by intermediation margin	1.211	20.411	0.665	314,640
Total securities	Total outstanding amount of securities (bonds and shares) held by each bank in the portfolio scaled by total assets.	0.193	0.168	0.178	310,854
Loans to NFC	Total outstanding amount of loans granted by each bank to non-financial corporations scaled by total assets	0.232	0.148	0.247	315,009
Bonds issued	Total outstanding amount of bonds issued by each bank scaled by total assets	0.088	0.105	0.047	315,009
Households' deposits	Households' total deposits in each bank scaled by total assets	0.288	0.198	0.296	315,009

				(co	ntinued)
NFCs' deposits	Non-financial corporations' total deposits in each bank scaled by total assets	0.077	0.072	0.069	315,009
Refinancing funds (mon. pol. operations)	Total outstanding amount of refinancing liquidity obtained by each bank via conventional and unconventional monetary policy operations scaled by total assets	0.048	0.057	0.025	312,945
Per capita in- come (log)	Added value, i.e., the value of output less the value of inter- mediate consumption; it is a measure of the contribution to the economic growth in terms of new goods and services available for final consumption. The aggregate is available at provincial level with yearly frequency	3.118	0.284	3.152	300,024
Debt-to-income ratio	Provincial ratio between the sum of all sources of households' debt and value added	0.378	0.064	0.373	300,024
Income inequal- ity distribution (Gini index)	Index available at provincial level and on yearly frequency fi- nalized to measure the level of disequality in terms of dispos- able income within provinces	0.411	0.023	0.407	304,521
Households' per capita securities (log)	Households' financial securities in custody of banks available at provincial level with yearly frequency at their fair value	2.448	0.706	2.605	299,765
Share of popu- lation in tertiary sector	Yearly percentage of population with tertiary education at re- gional level	0.112	0.022	0.108	304,521
Employment rate	Rate of employment available at provincial level with yearly frequency	0.437	0.072	0.461	296,424
Unemployment rate	Rate of unemployment available at provincial level with yearly frequency	0.108	0.055	0.09	296,424
Households' per capita deposits (log)	Bank deposits held by households available at provincial level with yearly frequency	2.668	0.312	2.712	299,765
NPLs on total loans (log)	Ratio between non-performing loans and all loans aggreg- ated at provincial level based on customer location available at yearly frequency	1.509	0.542	1.554	304,262

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The table reports OLS regression coefficients and associated robust standard errors in parentheses. The dependent variable is the quarterly residential mortgage growth rate for each bank in each province as a function of bank-level covariates. Control variables at bank level include: total securities on total assets, loans to NFCs on total assets, bonds issued on total assets, households' deposits on total assets, NFCs' deposits on total assets, refinancing funds on total assets. Standard errors are White-corrected for heteroskedasticity and clustered at the bank, time and province level. \*\*\*, \*\*, and \* indicate that the coefficient estimate is significantly different from zero at 1%, 5%, and 10%, respectively. See Table 1 for variable definitions.

VARIABLES	(1)	(2)	(3)
Capital on total assets	0.0383*	0.0395*	0.0332
	(0.0214)	(0.0214)	(0.0214)
NPLs on total assets	-0.0436	-0.0430	-0.0429
	(0.0301)	(0.0300)	(0.0308)
Total assets (Log)	0.0092***	0.0090***	0.0084**
	(0.0033)	(0.0033)	(0.0034)
ROA		0.0560	
		(0.0593)	
Fees and commissions on intermediation margin			-0.0006
			(0.0005)
Operating costs on intermediation margin			0.0000
			(0.0000)
Control variables at bank level	Yes	Yes	Yes
Observations	198,378	198,378	195,528
R-squared	0.132	0.132	0.131
Bank FE	Yes	Yes	Yes
Province x Time FE	Yes	Yes	Yes

The table reports OLS regression coefficients and associated robust standard errors in parentheses. The dependent variable is the quarterly consumer credit growth rate for each bank in each province as a function of bank-level covariates. Control variables at bank level include: total securities on total assets, loans to NFCs on total assets, bonds issued on total assets, households' deposits on total assets, NFCs' deposits on total assets, refinancing funds on total assets. Standard errors are White-corrected for heteroskedasticity and clustered at the bank, time and province level. \*\*\*, \*\*, and \* indicate that the coefficient estimate is significantly different from zero at 1%, 5%, and 10%, respectively. See Table 1 for variable definitions.

VARIABLES	(1)	(2)	(3)
Capital on total assets	-0.1434	-0.1442	-0.1253
	(0.1021)	(0.1022)	(0.1044)
NPLs on total assets	-0.4040***	-0.4043***	-0.3882***
	(0.1132)	(0.1145)	(0.1262)
Total assets (Log)	-0.0313***	-0.0304**	-0.0267**
	(0.0113)	(0.0114)	(0.0113)
ROA		-0.1082	
		(0.2453)	
Fees and commissions on intermediation margin			0.0104*
			(0.0054)
Operating costs on intermediation margin			-0.0007*
			(0.0004)
Control variables at bank level	Yes	Yes	Yes
Observations	247,944	247,575	246,772
R-squared	0.213	0.213	0.207
Bank FE	Yes	Yes	Yes
Province x Time FE	Yes	Yes	Yes

#### Table 4: Demand-side household characteristics associated with residential mortgage loans growth

The table reports OLS regression coefficients and associated robust standard errors in parentheses. The dependent variable is the quarterly residential mortgage loans growth rate for each bank in each province as a function of province-level covariates. Control variables at householdprovince level include: households' securities per capita, share of regional population in tertiary sector, share of younger people, unemployment rate, employment rate, households' deposits per capita, NPL on total loans. Standard errors are White-corrected for heteroskedasticity and clustered at the bank, time and province level. \*\*\*, \*\*, and \* indicate that the coefficient estimate is significantly different from zero at 1%, 5%, and 10%, respectively. See Table 1 for variable definitions.

VARIABLES	(1)	(2)	(3)
Per capita income (log)	-0.0148	-0.0086	-0.0143
	(0.0153)	(0.0133)	(0.0146)
Debt to income ratio	-0.0774**	-0.0716**	-0.0739**
	(0.0321)	(0.0272)	(0.0314)
Income inequality distribution (Gini index)	0.1174*	0.1160*	0.1128*
	(0.0597)	(0.0591)	(0.0595)
Per capita households' deposits (log)		-0.0003	-0.0038
		(0.0003)	(0.0038)
NPLs on total loans (log)			-0.0007
			(0.0023)
Control variables at household-province level	Yes	Yes	Yes
Observations	204,232	204,232	204,232
R-squared	0.152	0.152	0.152
Provinces FE	Yes	Yes	Yes
Bank x Time FE	Yes	Yes	Yes

### Table 5: Demand-side household characteristics associated with consumer credit growth

The table reports OLS regression coefficients and associated robust standard errors in parentheses. The dependent variable is the quarterly consumer credit growth rate for each bank in each province as a function of province-level covariates. Control variables at household-province level include: households' securities per capita, share of regional population in tertiary sector, share of younger people, unemployment rate, employment rate, households' deposits per capita, NPL on total loans. Standard errors are White-corrected for heteroskedasticity and clustered at the bank, time and province level. \*\*\*, \*\*, and \* indicate that the coefficient estimate is significantly different from zero at 1%, 5%, and 10%, respectively. See Table 1 for variable definitions.

VARIABLES	(1)	(2)	(3)
Per capita income (log)	-0.0274**	-0.0210*	-0.0272**
	(0.0124)	(0.0124)	(0.0126)
Debt to income ratio	-0.0471***	-0.0387*	-0.0459***
	(0.0160)	(0.0194)	(0.0159)
Income inequality distribution (Gini index)	-0.0796	-0.0777	-0.0812
	(0.0526)	(0.0508)	(0.0510)
Per capita households' deposits (log)		-0.0000	0.0005
		(0.0004)	(0.0042)
NPLs on total loans (log)			-0.0014
-			(0.0021)
Control variables at household-province level	Yes	Yes	Yes
-			
Observations	234,061	234,061	234,061
R-squared	0.400	0.400	0.400
Provinces FE	Yes	Yes	Yes
Bank x Time FE	Yes	Yes	Yes

### Table 6: Supply-side bank factors associated with consumer credit growth: over time heterogeneity

The table reports OLS regression coefficients and associated robust standard errors in parentheses. The dependent variable is the quarterly consumer credit growth for each bank in each province as a function of bank-level covariates interacted with the time variable. Control variables at bank level include: total securities on total assets, loans to NFCs on total assets, bonds issued on total assets, households' deposits on total assets, NFCs' deposits on total assets, refinancing funds on total assets. Standard errors are White-corrected for heteroskedasticity and clustered at the bank, time and province level. \*\*\*, \*\*, and \* indicate that the coefficient estimate is significantly different from zero at 1%, 5%, and 10%, respectively. See Table 1 for variable definitions.

VARIABLES	2009-2014	2015-2019	2020-2021
Capital on total assets	-0.2829**	-0.0457	-0.0766
	(0.112)	(0.114)	(0.112)
NPLs on total assets	-0.0461	-0.3486***	-0.5912***
	(0.178)	(0.107)	(0.208)
Total assets (Log)	-0.0376***	-0.0407***	-0.0412***
	(0.011)	(0.012)	(0.012)
Fees and commissions on intermediation margin	0.0205	0.0156**	0.0125
	(0.018)	(0.007)	(0.012)
Operating costs on intermediation margin	0.0250***	-0.0011**	-0.0069
	(0.006)	(0.000)	(0.008)
Control variables at bank level	Yes	Yes	Yes
Observations		246,772	
R-squared		0.218	
Bank FE		Yes	
Province x Time FE		Yes	

#### Table 7: Supply-side bank factors associated with consumer credit growth: heterogeneity across macro-areas

The table reports OLS regression coefficients and associated robust standard errors in parentheses. The dependent variable is the quarterly consumer credit growth for each bank in each province as a function of bank-level covariates interacted with macro-areas variable. Control variables at bank level include: total securities on total assets, loans to NFCs on total assets, bonds issued on total assets, households' deposits on total assets, NFCs' deposits on total assets, refinancing funds on total assets. Standard errors are White-corrected for heteroskedasticity and clustered at the bank, time and province level. \*\*\*, \*\*, and \* indicate that the coefficient estimate is significantly different from zero at 1%, 5%, and 10%, respectively. See Table 1 in the Appendix for variable definitions.

VARIABLES	BLES North North West East		Centre	South and Islands	
Capital on total assets	-0 1739*	-0 1211	-0.0981	-0 0949	
Cupitui on total assets	(0.098)	(0.106)	(0.107)	(0.113)	
NPLs on total assets	-0.4246***	-0.3798***	-0.3931***	-0.3695**	
	(0.130)	(0.120)	(0.124)	(0.138)	
Total assets (Log)	-0.0268**	-0.0276**	-0.0271**	-0.0273**	
	(0.011)	(0.011)	(0.011)	(0.011)	
Fees and commissions on intermediation margin	0.0122*	0.0118**	0.0134**	0.0071	
	(0.007)	(0.006)	(0.006)	(0.005)	
Operating costs on intermediation margin	-0.0008*	-0.0007*	-0.0009**	-0.0005	
	(0.000)	(0.000)	(0.000)	(0.000)	
Control variables at bank level	Yes	Yes	Yes	Yes	
Observations	246,772				
R-squared	0.209				
Bank FE	Yes				
Province x Time FE	Yes				

### Table 8: Supply-side bank factors associated with residential mortgage loans growth: heterogeneity across bank categories

The table reports OLS regression coefficients and associated robust standard errors in parentheses. The dependent variable is the quarterly residential mortgage loans growth rate for each bank in each province as a function of bank-level covariates interacted with a bank categories variable. Control variables at bank level include: total securities on total assets, loans to NFCs on total assets, bonds issued on total assets, households' deposits on total assets, NFCs' deposits on total assets, refinancing funds on total assets. Standard errors are White-corrected for heteroskedasticity and clustered at the bank, time and province level. \*\*\*, \*\*, and \* indicate that the coefficient estimate is significantly different from zero at 1%, 5%, and 10%, respectively. See Table 1 for variable definitions.

VARIABLES	Significant banking groups	Rest of system	Branches and subs. of signif. banking groups	Significant banking groups cooperative	
Capital on total assets	0.1472*	0.0453**	-0.0315	0.0100	
	(0.088)	(0.023)	(0.049)	(0.160)	
NPLs on total assets	-0.0711	-0.0421	-0.0363	-0.1162	
	(0.113)	(0.033)	(0.034)	(0.201)	
Total assets (Log)	-0.0064	0.0096***	0.0086	0.0077	
	(0.006)	(0.003)	(0.005)	(0.049)	
Fees and commissions on intermediation margin	0.0182	0.0000	-0.0004	-0.0156	
	(0.035)	(0.006)	(0.001)	(0.039)	
Operating costs on intermediation margin	-0.0018	0.0001	0.0000	0.0370	
	(0.017)	(0.001)	(0.000)	(0.047)	
Control variables at bank level	Yes	Yes	Yes	Yes	
Observations			195,528		
R-squared	0.137				
Bank FE	Yes				
Province x Time FE			Yes		

#### Table 9: Supply-side bank factors associated with consumer credit growth: heterogeneity across bank categories

The table reports OLS regression coefficients and associated robust standard errors in parentheses. The dependent variable is the quarterly consumer credit growth rate for each bank in each province as a function of bank-level covariates interacted with a bank categories variable. Control variables at bank level include: total securities on total assets, loans to NFCs on total assets, bonds issued on total assets, households' deposits on total assets, NFCs' deposits on total assets, refinancing funds on total assets. Standard errors are White-corrected for heteroskedasticity and clustered at the bank, time and province level. \*\*\*, \*\*, and \* indicate that the coefficient estimate is significantly different from zero at 1%, 5%, and 10%, respectively. See Table 1 for variable definitions.

VARIABLES	Significant banking groups	Rest of system	Branches and subs. of signif. banking groups	Significant banking groups cooperative	
Capital on total assets	0.2499	-0.1964	-0.0887	-0.6065***	
	(0.314)	(0.134)	(0.160)	(0.197)	
NPLs on total assets	-0.3422	-0.2516	-0.4580***	0.5312*	
	(0.295)	(0.151)	(0.105)	(0.278)	
Total assets (Log)	-0.0112	-0.0235	-0.0184	0.0585	
	(0.021)	(0.014)	(0.020)	(0.056)	
Fees and commissions on intermediation margin	0.0815	0.0160	0.0079**	0.0620*	
	(0.053)	(0.020)	(0.004)	(0.032)	
Operating costs on intermediation margin	-0.0085	0.0129**	-0.0005**	-0.1091	
	(0.024)	(0.005)	(0.000)	(0.082)	
Control variables at bank level	Yes	Yes	Yes	Yes	
Observations			246,772		
R-squared			0.214		
Bank FE	Yes				
Province x Time FE			Yes		

#### Table 10: Demand-side household characteristics associated with residential mortgage loans growth: over time heterogeneity

The table reports OLS regression coefficients and associated robust standard errors in parentheses. The dependent variable is the quarterly residential mortgage loans growth rate for each bank in each province as a function of province-level covariates interacted with the time variable. Control variables at household-province level include: households' securities per capita, share of regional population in tertiary sector, share of younger people, unemployment rate, employment rate, households' deposits per capita, NPL on total loans. Standard errors are White-corrected for heteroskedasticity and clustered at the bank, time and province level. \*\*\*, \*\*, and \* indicate that the coefficient estimate is significantly different from zero at 1%, 5%, and 10%, respectively. See Table 1 for variable definitions.

VARIABLES	2009-2014	2015-2019	2020-2021
Per capita income (log)	-0.0083	-0.0182	-0.0093
	(0.015)	(0.016)	(0.017)
Debt to income ratio	-0.0750**	-0.0825**	-0.0650*
	(0.035)	(0.036)	(0.036)
Income inequality distribution (Gini index)	0.3236**	0.0438	0.0000
	(0.1486)	(0.0733)	(0.0000)
Per capita households' deposits (log)	-0.0061	-0.0054	-0.0023
	(0.005)	(0.006)	(0.008)
NPLs on total loans (log)	-0.0013	0.0005	-0.0002
	(0.003)	(0.003)	(0.003)
Control variables at household-province level	Yes	Yes	Yes
Observations	204,232		
R-squared	0.152		
Provinces FE	Yes		
Bank x Time FE	Yes		

### Table 11: Demand-side household characteristics associated with consumer credit growth: over time heterogeneity

The table reports OLS regression coefficients and associated robust standard errors in parentheses. The dependent variable is the quarterly consumer credit growth rate for each bank in each province as a function of province-level covariates interacted with the time variable. Control variables at household-province level include: households' securities per capita, share of regional population in tertiary sector, share of younger people, unemployment rate, employment rate, households' deposits per capita, NPL on total loans. Standard errors are White-corrected for heteroskedasticity and clustered at the bank, time and province level. \*\*\*, \*\*, and \* indicate that the coefficient estimate is significantly different from zero at 1%, 5%, and 10%, respectively. See Table 1 for variable definitions.

VARIABLES	2009-2014	2015-2019	2020-2021
Per capita income (log)	-0.0248**	-0.0183	-0.0193
	(0.011)	(0.012)	(0.012)
Debt to income ratio	-0.0461**	-0.0304*	-0.0248
	(0.018)	(0.018)	(0.020)
Income inequality distribution (Gini index)	-0.0699	-0.0791*	-0.1417***
	(0.046)	(0.041)	(0.037)
Per capita households' deposits (log)	-0.0006	-0.0009	0.0076
	(0.004)	(0.005)	(0.006)
NPLs on total loans (log)	-0.0032	-0.0012	-0.0010
	(0.003)	(0.002)	(0.002)
Control variables at household-province level	Yes	Yes	Yes
Observations		234,061	
R-squared		0.400	
Provinces FE		Yes	
Bank x Time FE		Yes	

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