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July 2017

Discussion Paper

No. 61

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July 26, 2017

Abstract: This paper uses loan-level data from the National Credit Bureau to study household debt in Thailand. The wide coverage and the granularity of the data allow us to analyze prevalence, intensity, and distribution of debt and delinquency by loan product, lender, and borrower. We show that there are tremendous heterogeneities in debt and delinquency across these attributes. Overall, credit access in Thailand appears moderate and limited for housing loans. Thais begin to have debt earlier in their lives and hold debt until very old. Household debt is largely concentrated and plagued with high debt intensity and delinquency prevalence, especially among the young working age population, implying a potential increase in the vulnerability of the financial system and prolonged sluggish domestic spending. Our findings have important implications for policy design and targeting.

JEL Codes: D14, D30, G20, H31, J26, O16

Keywords: Household Debt, Financial Access, Financial Stability, Credit Bureau Data

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1. Introduction

Household debt is an important component of the financial system and the understanding of household debt is crucial for policymaking.¹ On the one hand, debt helps finance household consumption and investment as well as the operation of business enterprises; some debt instruments such as credit cards also serve as a mean of payment in the economy. Household debt is therefore undoubtedly relevant to the welfare of the households as well as to resource allocation, economic growth and inequality in the economy. On the other hand, high and rising household debt has raised concerns about the stability of the financial system. Thailand's household debt to GDP stands as high as 71.2% and is currently one of the highest among Asian countries. Undeniably, this issue has increasingly attracted attention from policymakers, researchers, and general public.²

The goal of this paper is to enrich our knowledge on household debt by using granular loan data from Thailand's National Credit Bureau (NCB) to analyze the development and the current situation of household debt in the country. Most studies and analyses of household debt rely on aggregate data, which have limited information on the distribution of debt and delinquency among heterogeneous households. Our paper contributes to the existing studies by offering a microscopic view of household debt and provides relevant implications for two of the most important economic policies: financial access and financial stability, both at the individual and the aggregate, macroeconomic levels.

Household debt reflects one aspect of financial access of households, namely, access to credit. Access to credits allows households to borrow to fund their asset accumulation and business. If a household has higher returns on its business enterprise than the costs of debt, the households will experience higher income and hence consumption. In aggregate, the economy where households have access to credit will experience more efficient allocation of capital, higher aggregate outputs, and consequently economic growth. An increase in access to credit of the poor

¹ Household debt is broadly defined as financial liabilities in the household sector. In the language of financial accounting, it reflects how households finance their savings and investment, which are presented as assets in the opposite side of the balance sheet. Equivalently, household debt could be considered as claims on household assets by outside lenders. For detailed discussion about household financial accounting, see Samphantharak and Townsend (2010). For a recent survey of studies on household finance, see Guiso and Sodini (2013).

² The Debt to GDP number was as of the third quarter of 2016 and taken from Bank for International Settlements (BIS) for cross-country comparison. The number from BIS is different from the Thai official number at 79.9% as of fourth quarter of 2016 due to differences of coverage.

further helps them expand production, become entrepreneurs, get out of the poverty trap, and ultimately reduce inequality between the rich and the poor in the country.³ Finally, ability to take loans allows households to smooth their consumption and prevents them from reducing consumption or selling productive assets in the event of adverse income or asset shocks. In this sense, being leveraged implies that households have access to credit and reflects the degree of financial development of the economy.⁴

Household debt could lead to financial instability. Although access to credit brings several benefits, highly leveraged households will likely have difficulty or be unable to service their debt, especially if their income is uncertain.⁵ Excessive debt, the situation known as debt overhang, could result in consumption reduction and business downsizing as well as less incentive to work.⁶ Insufficient income to service debt may force households to dispose their assets in fire sales where the assets are sold at extremely low prices. Defaulting on loans could result in losses of collaterals and being excluded from future borrowing. In the aggregate economy, if defaults on household debt are systemic, financial system as a whole is also at risk. The subprime mortgage crises in the U.S. and Europe that cascaded to become the global financial crisis in 2008-09 vividly exemplify this financial fragility. Other notables of financial crises in recent decades that were caused by debt in the household sector include the savings and loan crisis in the U.S. in the 1980s and 1990s and credit card distresses in Hong Kong, Korea, and Taiwan in the 2000s.⁷

For policymakers to be able to promote access among high-potential households and reduce financial instability among vulnerable households, the understanding of debt and delinquency distribution at a granular level is crucial. Promoting financial access through

³ For example, Heathcote et al. (2010) shows that access to the financial markets has reduced consumption inequalities in the U. S. since the 1980s.

⁴ Literature on the importance of access to credit to household behaviors and welfare is extensive. For a recent survey of literature, see Karlan and Morduch (2009). For a survey of studies on Thailand, see Townsend (2011). Recent studies on Thailand include Kaboski and Townsend (2011, 2012), and Karaivanov and Townsend (2014).

⁵ For example, Agarwal and Song (2015) studies the impact of housing credit on personal bankruptcy in Singapore. Linking housing transaction and personal bankruptcy datasets, they argue that an increase in housing credits led to an increase in personal bankruptcy.

⁶ Dynan (2012) uses household-level data to examine the impact of debt overhang on consumption and finds that highly leveraged homeowners have larger declines in spending during the global financial crisis between 2007 and 2009 than other homeowners, despite having smaller changes in net worth. Recently, Bernstein (2015) analyzes a transaction-level dataset with comprehensive information on assets, liabilities and deposits for all customers of a major U.S. financial institution from 2010-2014 and finds that negative equity causes a reduction in household labor supply.

⁷ In an influential paper, Mian and Sufi (2009) document that housing credit led to excessive household debt and mortgage defaults at the onset of the subprime crisis in the U.S. Kang and Ma (2007) argue that credit card boom in Korea led to a change in the composition of the cardholder base, leading to bigger and higher-risk card lending portfolios which eventually imploded in 2003.

credit expansion could result in higher risk of financial instability, especially when loans are made to households with insufficient income to service the debt.⁸ Productive households with capability in servicing their debt should be encouraged to gain access to credit while cautions should be placed on households with financial fragility. This targeting cannot be achieved by using a universal, one-policy-fit-all approach but requires different policies that can be used to target different groups of households. In particular, we need to identify what groups of borrowers and loan products that are financially healthy and which ones that are vulnerable. This in turn calls for a deeper understanding of the distribution of debt and delinquency across heterogeneous households.

Despite its importance, the understanding of household debt at a granular level has been limited, partly due to the lack of data. Current micro-level literature on Thailand usually rely on household survey which has the advantage of covering all types of household debt made from formal, semi-formal and informal financial sectors.⁹ However, studying household debt from household survey is subjected to misreporting, as households could under or over report their debt situation depending on incentives given by the surveyors. Household surveys are also often small and far from being representative of the entire households of the country.¹⁰ This in turn prevents policymakers and researchers from understanding the debt situation of the country.

Loan-level data from the National Credit Bureau open a new way to understand household debt from a microscopic perspective. This approach enriches our knowledge on household finance beyond what we would have otherwise if we had to rely merely on aggregate statistics. In particular, the uniqueness of the NCB data in granularity and in covering almost all household debt from the formal financial sector in Thailand allows us to examine prevalence, heterogeneity in intensity, and distribution of debt and delinquency across borrowers, products, and lenders in the economy across time and locations. Through the collaboration between NCB and Puey Ungphakorn Institute for Economic Research (PIER) at the Bank of Thailand, we use loan-level anonymized data from NCB to analyze recent development and current situation of household debt in Thailand. This paper reports key stylized facts identified by this collaborative study.

⁸ The global financial crisis in 2008-09 was originated from subprime lending, i.e., loans to borrowers with high chances of missing debt service payments. Related, Muthitachareon, Samphantharak, and Chantararat (2017) show that the first-car buyer tax rebate scheme encouraged individuals who were not financially ready to purchase cars with auto loans, resulting in higher subsequent delinquency on the loans.

⁹ For Thailand, see TDRI (2016), which uses the data from Socio Economic Surveys (SES).

¹⁰ Socio Economic Survey (SES), which is supposed to be Thailand's national representative survey, for example, has been criticized of underrepresenting the rich.

There are several interesting findings in this study that shed light on financial access and financial stability. (1) Household debt is concentrated among a small group of borrowers. Specifically, the top 10% borrowers account for over 62% of total debt and the concentration is high especially in urban areas of big cities and in housing loans. (2) 1 in 3 of Thai population has debt from formal financial sector. Overall, credit access is thus moderate relative to that of developed countries but low especially for housing and credit card loans. High debt headcounts, defined as fractions of population with debt, are found among working age population and in Bangkok and vicinity. (3) Debt intensity, proxied by the amount of debt per borrower, is high overall (with the median of 147,086 baht per borrower) and highest among the young working age population and in the North, Northeast, and the South. (4) An increase in household debt in recent years has come from both extensive margins, i.e., there are more individuals having debt over time, and intensive margins, i.e., each individual also accumulates more debt. (5) Although there is a clear accumulation and decumulation of debt over the age profile, Thais have debt since they are very young, for a prolonged period of time, and until very old. Also, over time individuals begin having debt earlier in their lives. (6) Delinquency headcount is high over all with 1 in 5 borrowers having delinquent loans. High delinquency headcounts are found among young working age population and in the South. (7) Over time, the fraction of borrowers with delinquent loans has declined since 2009 but the amount of delinquent debt per delinquent borrower has been on the rise during the same period. Finally, (8) comparing across different loan products, we find that personal loans raise the most concern as they involve a large number of population (with the highest debt headcounts at 17%), occupy the largest share of total loans, and have very high delinquency headcounts at 15% — and even higher among young working age borrowers.

The rest of the paper proceeds as follows. Section 2 provides an overview of the NCB data—their uniqueness in coverage and granularity as well as their limitations. It also presents a bird-eye view of the data. Section 3 reports the findings on recent development and situation of household debt and delinquency in a granular perspective. Finally, Section 4 concludes with a discussion on policy implications of our findings.

2. An Overview of the Credit Bureau Data

The NCB database accounts for a majority of total loans to individuals in Thailand's financial system. Since the establishment of NCB, several financial institutions have become its

members and provided account-level credit information to the bureau on a monthly basis.¹¹ As of July 2016, there are 90 members, including: (1) 19 banks—all 15 Thai commercial banks, four foreign bank branches, (2) 6 specialized financial institutions (SFIs), and (3) 65 non-bank financial institutions such as credit card, personal loan, insurance, and hire purchase/leasing companies. As a result, NCB maintains a rich database of loans to individuals (consumer database) and non-financial corporate sectors (commercial database). This paper studies household debt using consumer database, which covers almost all loans from the formal financial sector to individuals and 87% of the total loans to individuals in Thailand. The data, however, do not include loans from educational loans from the Student Loan Fund, cooperatives, village funds, and loans from informal financial sector such as money lenders or community-based institutions.

The NCB data cover the majority of loans to individuals nationwide at a granular level, thus helping us better understand various dimensions of debt situations of Thai households. First, the data cover a wide range of population, consisting of the majority of formal loans to individuals in the Thai economy and 87% of household debt in Thailand. This is one of the advantages of the NCB data over the data collected from surveys that tend to miss certain groups such as the very high income households. Second, the data contain account-level information that makes possible the analysis of household debt at a granular level and helps unveil the heterogeneity across households. Third, the coverage and the granularity of the data together allow us to study loan portfolios of individuals when they borrow from multiple financial institutions. This analysis would not be possible with the data from each lender separately. In this section, we first describe these unique features and discuss how they offer us new perspectives of household debt in Thailand. We end the section with cautions on the limitations of the data.

2.1 Coverage

This study uses annual NCB data from the end of 2009 to July 2016. Table 1 shows the coverage of the NCB data. As of July 2016, there are 60.51 million active loan accounts from 19.25

¹¹ The founding of a credit data center in Thailand has a long history. The concept began in 1961 but the progress was interrupted by the 1997 financial crisis when several financial institutes were shut down. Following the crisis, the establishment of the credit data center was divided into two sections, one set up by the Government Housing Bank that founded the Thai Credit Bureau Co., Ltd., and the other by the Bank of Thailand together with the Thai Banker's Association that established the Central Information Services Co., Ltd. Both companies were founded with the same objective—to gather clients' data that helped reduce the risk and increase the efficiency of loan making and prevent non-performing loan problems in the financial system. In 2005, the two companies merged and became the National Credit Bureau Co., Ltd. For detail, see https://www.ncb.co.th/Company_Profile_en.htm

million borrowers that contributes to the total loan outstanding of 9.80 trillion baht or 87% of the total household debt in the system. The NCB data also contain information on days past due for each loan account. This information allows us to study delinquent loans, which we define as loans with more than 90 days past due in this study. With this definition, the total delinquent loan is 0.64 trillion baht or 6.5% of the total loan outstanding at the end of July 2016.¹²

[Table 1: Overview of credit bureau data]

Over time, the number of accounts, the number of borrowers, and the total loan outstanding in the NCB data have increased. However, we must interpret this trend with caution because there has been an increase in the number of NCB members during this period as well. These additional financial institutions contribute to the increase in the coverage of the NCB data in addition to the growth of loans by existing members. Table 1 also shows a decrease in delinquent loan greater than 300 days past due from 2014 onwards. This is due to the change in data policy.¹³

2.2 Granularity

The NCB data provide loan information in detail at a granular level. The data contain information that reflects four dimensions at the account level: (1) *the information on the borrower* (age and postcode of mailing address); (2) *the information on loan product* in which we group into six categories: housing, automobile, motorcycle, credit card, business loans,¹⁴ and personal and other loans¹⁵; (3) *the information on lender* in which we group into three broad categories: commercial

¹² Our definition of a delinquent loan thus is more conservative than non-performing loan (NPL), with the possibly inclusion of write-off loans, of which we could not truly identify in the data due to different reporting standards across financial institutions.

¹³ Specifically, delinquent loan accounts of more than 90 days past due that had been reported to NCB for longer than 8 years were eliminated from the NCB database due to the Notification of Committee for the Protection of Credit Information, dated 5th September 2014.

¹⁴ Business loans include commercial loans and loans for agriculture.

¹⁵ Personal loans include secured loan (e.g. car for cash, home for cash) and unsecured loan or clean loan (e.g. cash card, multipurpose loans). The majority of other loan products include overdraft, other hire purchase and leasing.

banks¹⁶, SFIs¹⁷, and other (non-bank) financial institutions¹⁸ and (4) *quantitative information on credit line, loan outstanding, and days past due* (and hence utilization ratio and delinquency status) that we can use as outcome variables in our analysis.¹⁹ This granularity allows us to analyze the heterogeneity across loan accounts.

Before analyzing the data in further detail, we begin by broadly answering four big questions. Who are the borrowers? Where are loans allocated? What did the average loan look like in terms of credit line, outstanding, and delinquency of loans? And how have they evolved over time?

2.2.1 Who are the borrowers?

The granularity of the NCB data allows us to analyze the heterogeneous characteristics of the borrowers. Table 2 provides further details about these borrowers in July 2016 and shows that the median age of borrowers in July 2016 is 43 years. The majority of borrowers live in Bangkok and vicinity (29%) and the Northeast (15%) and half of the borrowers are in the urban areas.²⁰ A median borrower holds two loan accounts, one loan product and borrowed from one lender. The distributions of credit line and loan outstanding per borrower are very skewed, with the mean as high as 0.77 and 0.51 million baht and median only at 0.28 and 0.15. Similarly, the mean delinquent amount per borrower is 0.20 million baht while the median is 0.06. Approximately 7% of the borrowers in July 2016 are new clients. Utilization rate, defined as the ratio of current balance to credit line, averages at 0.65 per borrower. Figure A1 in the Appendix further shows the distribution of borrowers by key characteristics.

[Table 2: Summary statistics of borrowers (July 2016)]

¹⁶ Commercial bank is defined by the solo or stand-alone basis. That is, its subsidiaries such as credit card and hire purchase/leasing companies that are also members of NCB are categorized as separate entities under other financial institutions.

¹⁷ Specialized financial institutions include Government Savings Bank, Government Housing Bank, Export-Import Bank, SME Development Bank, Islamic Bank, and Bank for Agriculture and Agricultural Cooperatives.

¹⁸ Other financial institutions include non-bank financial institutions such as credit card companies, hire purchase/leasing companies, insurance companies and one cooperatives. We thus refer to other financial institution as non-bank financial institution.

¹⁹ A credit line from each borrower is computed as the aggregate of credit lines from all loan products held by the borrower. However, in case of borrowers with multiple credit cards from the same financial institution, all credit cards are collectively under the same credit line.

²⁰ Urban areas are defined by postcode i.e. if more than 50% of its area belong to municipality.

2.2.2 Where are loans allocated?

The NCB data can further reveal which pocket of products, from which lenders, and which groups of borrowers contributes to the aggregate debt and delinquency in the economy.

The top panel of Table 3 presents the allocation of accounts, outstanding, and delinquency across loan products and lenders in July 2016. The bottom panel presents the allocation of borrowers, loan outstanding, and delinquency across borrower's age groups and locations.

[Table 3: Dissecting aggregate debt and delinquency by loan product, lender and borrower (July 2016)]

Personal and other loans occupy the highest delinquency share among all loan products, while commercial banks account for the highest delinquency share among lenders.

Personal and other loans raise concern to financial system as they occupy the largest share of account (35.5%), the second largest share of debt (27.8%) and the largest share of delinquency (31.8%). Auto and housing loans also raise concern to financial system as they occupy the second and the third largest share of delinquency, even though housing loans are only 5.4% of the total number of accounts due to the large size of each loan.²¹ In contrast, credit card occupies the second largest share of account (30.7%), but they have small significance to the total debt and delinquency due to small sizes. By lender, we find commercial banks occupy the largest share of debt and delinquency, while non-bank financial institutions occupy the largest share of accounts.

Majority of borrowers, debt and delinquency belong to working age population, in Bangkok and vicinity and in urban areas. Share of borrowers, loan and delinquency are highest among the working age 46-60, followed by 36-45 and 25-35 respectively, and in Bangkok and vicinity followed by the Northeast.

[Figure 1: Share of aggregate debt and delinquency by loan product and lender (July 2016)]

We further dissect shares of debt and delinquency of each loan product by lenders and those of each lender by loan products. Figure 1A dissects shares of debt and delinquency of each loan product by lenders and shows that while commercial banks dominate debt and

²¹ For comparison, despite accounting for the largest share of total loan outstanding at 33.2%, the number is still lower than those of every G7 economy in which more than 50% of the outstanding household debt in 2012 was from mortgages. Other debt products of the 'Big Four' in the U.S. were student loans, vehicle loans, and credit cards. See Zinman (2015).

delinquency for most loan products, SFIs and non-bank financial institutions hold significantly shares in particular products, namely, housing, personal, and business loans for SFIs, and auto loans for non-bank financial institutions. Figure 1B illustrates similar findings in an alternative way, dissecting shares of debt and delinquency of each lender by loan products and shows that more than half of loans in the NCB data are made by SFIs and large commercial banks. Housing and personal loans dominate debt and delinquency of SFIs and large commercial banks, while auto and personal loans occupy more than half of debt and delinquency of non-bank financial institutions.

2.2.3 What do the average loans look like in terms of credit line, outstanding and delinquency of loans?

Housing loans, especially from commercial banks, have higher credit lines and outstanding delinquency per account than any other loan products by wide margins. Table 4 provides descriptive statistics of credit line, loan outstanding, and delinquency per loan account by product-lender as of July 2016. There are a small number of auto, motorcycle, and credit card accounts from SFIs. Non-bank financial institutions have the highest number of personal and other loan accounts but with the smallest credit line and outstanding per account relative to those from commercial banks and SFIs. Similarly, SFIs have the highest number of loan for business but with the smallest credit line and outstanding per account.

[Table 4: Summary statistics of loan accounts by product-lender (July 2016)]

For delinquency, motorcycle loans have the largest percentage of accounts with delinquent status at 38% while housing, credit card, and business loans have relatively low delinquency at around 4-6%. In terms of lenders, commercial banks have much lower shares of delinquent loans for all loan types than SFIs and non-bank financial institutions. Over half of the business loan accounts originated by non-bank financial institutions are delinquent, and so are approximately 40% of motorcycle loans from SFIs and non-bank financial institutions. Figures A2-A4 in the Appendix further show the distribution of these variables by product-lender.

2.2.4 How have loans evolved over time?

The 2009-2016 coverage of the NCB data helps us understand the evolution of the number of loan accounts, loan outstanding, and delinquency over time. Figure 2 shows trends for

the number of accounts (left column), total loan outstanding (middle column) and delinquency rate (right column), defined as the ratio of delinquent loans to total loan outstanding.²² The top row illustrates the time-series for all loans in the data while subsequent rows present the time-series by product, lender, borrower's age group, and location.

[Figure 2: Debt and delinquency over time by loan product, lender and borrower]

There is an upward trend of the total number of loan accounts and total loan outstanding while the delinquency rate has been largely in decline until recently. These information mimics what we report earlier in Table 1, but at a higher frequency, i.e., by quarter. There are two discontinuities in the trends. First, the jumps in the early 2016 for the total number of accounts and loan outstanding are largely driven by additional financial institutions becoming new NCB members. Second, there is a cleanup of nonperforming loans in the NCB database in the third quarter of 2014 which result in the large drop in the delinquency rate in that period. The rate has slightly increased after that.

Personal and credit card loans are the largest and fastest growing loan products by the number of accounts while housing, personal and auto loans are the largest and fastest growing in terms of loan outstanding; delinquency rates are highest for motorcycle loans, followed by credit cards, and all are in decline until recently except those of auto loans. The growth of auto loan from 2011-2013 is likely driven by the first-car buyer tax rebate scheme, which could further explain their rising delinquency rate from 2013 onward.²³ Note that a noticeable rise of business loans in 2016 and a large drop in delinquency rate for credit card loans in 2014 are likely from new members joining and the cleanup of nonperforming loans, respectively.

Most loan accounts are made by commercial banks and non-bank financial institutions with rising trends until recently; delinquency rates are highest for loans from non-bank financial institutions. We also observe relatively larger decline in the delinquency rate of loans from non-bank financial institutions with a slight upward trend since 2014.

²² Figure A5 in the Appendix illustrates debt by delinquency status in more detail, namely, by days past due.

²³ See Muthitacharoen, Samphantharak, and Chantarat (2017).

The working-age groups have a much larger number of accounts and loan outstanding than the young and the retirees, while delinquency rates are similar across age groups and with downward trends until recently. The trend of the delinquency rate of the retired and younger borrowers do not conform with others, although they have converged in recent years.

Loans are concentrated and growing fastest in Bangkok and vicinity, while the South has the highest and rising delinquency rate. Bangkok and vicinity use to have the highest delinquency rate until the title is taken over by the South. This is due to both the steady declining rate in Bangkok and vicinity over time as well as the drastic rise in the rate for the South since 2012. Loans are more concentrated in urban but has been increasing in all areas.

2.3 Limitations and Cautions

Although the NCB data provide us with wide coverage and fine granularity, they have some limitations that we need to keep in mind when analyzing and interpreting findings from this data.

First, loan information in the NCB data is still not inclusive of total household debt in the economy. NCB data include the majority of loans in the formal financial sector but not from all formal institutions. The data also exclude another sizable part of household debt, namely, education loans from the Student Loan Fund, loans from cooperatives, and informal loans.

Second, the number of members joining NCB have increased over time, raising concerns on dynamic analysis. Different members voluntarily join at different times. Therefore, when conducting an analysis over time we must be careful in interpreting the results as they could be driven by the change in members.

Third, the NCB's consumer database that we use in this study contains information on loans from ordinary individuals that are not registered juristic persons but loans can be used for both consumption, investment, and production activities. In this respect, the analysis in this study includes both consumer loans and business loans. Without stated loan purposes, it is difficult to disentangle the use of consumer loans and business loans apart from each other as money is fungible (exceptions are asset-based loans, e.g., mortgage and auto loans).²⁴

²⁴ In this respect, “households” in our study also include entrepreneurs and small unregistered business enterprises owned and operated by the households. See Samphantharak and Townsend (2010) and Zinman (2015: 253).

Fourth, interpretation of credit card debt includes both loans for transaction and financing purposes. Since credit cards also serve as a method of payment, the outstanding credit debt could reflect individual's regular payment transactions rather than debt financing. These two purposes of credit card use are indistinguishable in the data. In this respect, the interpretation of credit card debt must be done carefully.²⁵

Finally, the NCB data do not contain several information of the borrowers. Most importantly, income, occupation, asset, and interest rate are not in the data. This deficiency prevents us from analyzing debt to income ratio or debt service ratio, as well as possible liquidity mismatch in assets and liabilities of the household and the inefficiency arising from individuals unnecessarily holding both liquid assets and debt with high interest rate simultaneously.²⁶

3. Household Debt and Delinquency in Granular Perspectives

We analyze the distribution of household debt beyond the aggregate measures, taking the advantage of the granularity of the NCB data. Given that members of NCB change over time, when we analyze the evolution of debt and delinquency over time in this section we will restrict our analyses to financial institutions that have been NCB members since 2009 and omit from our study those that join NCB after 2009 or exit due to mergers, leaving us with 56 financial institutions that present throughout the period of our analysis.

3.1 Concentration

The granularity of the NCB data allows us to understand debt and delinquency situation at borrower level; we thus begin our analysis by looking at how debt and delinquency are distributed across borrowers in the economy. We see earlier in Table 4 that the distribution of debt is highly skewed, as reflected by the large discrepancies between the mean and the median of debt per borrower in all subgroups of the borrowers, implying that debt is very concentrated. This issue has important implications on macroeconomic and financial stability – if debt is highly

²⁵ There is no straightforward way to separate credit card uses into payment and financing (or revolving) purposes. Fulford and Schuh (2015) attempt to separate the convenience users of credit cards (those who use credit card as a payment mechanism and pay the bill in full every month) from the revolvers (those who hold debt from month to month) through a latent class model estimation.

²⁶ We are also unable to study the impacts of wealth on the choice of debt products. Using data from the U.S. Survey of Consumer Finance (SCF), Guiso and Sodini (2013) argue that different types of debt matter at different levels of wealth.

concentrated among a small group of borrowers, adverse shocks to this group will have more than proportionate impacts on the economy. In addition, debt concentration also reflects inequality in access to credit, which has consequences on misallocation of resources in the economy and makes income inequality wider across individuals.

3.1.1 Overall Concentration

Debt is profoundly concentrated, with a gradual upward trend since 2012. Figure 3 shows the concentration of household debt (Panel A) and delinquency (Panel B). The chart on the left of Panel A presents the Lorenz curve of debt as of July 2016 that ranks borrowers by the total amount of debt and plots the cumulative share of borrower's debt to total debt in the NCB data by ranked borrowers. This chart and the top row of Table 5 show that overall the top 10% borrowers accounted for 62.4% of the total household debt in the NCB data, i.e., debt is highly concentrated and not equally distributed across borrowers. The chart on the right shows the share of loans held by the top 10% and the bottom 10% of the borrowers over time. It shows that the share of debt held by the top 10% borrowers declines between 2010 and 2012 but is on an upward trend afterward. Meanwhile, the share for the bottom 10% increases only slightly throughout the period since 2009. These findings together suggest that debt become less concentrated until 2012 but slightly more concentrate in recent years.

[Figure 3: Concentration of household debt and delinquency]

Delinquency has slightly been more evenly distributed but remained immensely concentrated. Panel B of Figure 3 presents the information on delinquency. Similar to debt concentration, the Lorenz curve in the left chart and the top row of Table 9 show that the top 10% delinquent borrowers account for over 65.9% of delinquent debt, implying that the majority of delinquent loans are concentrated among a small group of delinquent borrowers. The chart on the right shows that the concentration seems to decline, with decreasing (increasing) share of delinquent debt held by the top (bottom) 10% delinquent borrowers.

3.1.2 Concentration by Loan Product, Lender and Borrower Groups

Debt is most concentrated among the following loan subcategories: personal and business loans, loans from commercial banks, loans held by borrowers outside the working age

groups, loans in urban areas and in Bangkok and vicinity. These findings are reported in Table 5, which provides detailed information on debt concentration as of July 2016. When comparing across loan products, personal and other loans are the most concentrated, followed by business and credit card loans. In particular, the top 10% borrowers in each of these three loan product categories account for 70.8%, 67.3% and 57.5% of the total debt, respectively, while the bottom 10% borrowers share only 0.1% of the total debt in each of the three products. Among lenders, loans from commercial banks are the most concentrated. We find higher loan concentration for the youngest and the oldest groups while the working-age groups have slightly lower concentration. Finally, loans seem to be more concentrated in Bangkok and vicinity and in urban areas.

[Table 5: Concentration of household debt by loan product, lender, and borrower group (July 2016)]

Delinquency is most concentrated among the similar loan subcategories with high debt concentration. These findings can be seen in Table 6, which presents detailed information on delinquency concentration. By loan product, business loans have the most concentrated delinquency, with the top 10% delinquent borrowers of business loans holding 74.7% of the total delinquent business debt. They are followed by personal and other loans, at 63.3%. Across lenders, we find that commercial banks and SFIs have similar delinquency concentration—their top 10% delinquent borrowers account for over 60% of their total delinquent debt. Finally, our findings show that delinquent concentration is not different much across age groups. Bangkok and vicinity have the most concentrated delinquency, with the top 10% delinquent borrowers holding 69.6% of total delinquent debt. This is consistent to another finding that the urban areas seem to have similar delinquency concentration, which is higher than that of the rural areas.

[Table 6: Concentration of delinquent debt by loan product, lender and borrower group (July 2016)]

3.1.3 The Geography of Concentration

Taking a closer look, we find a large variation across provinces: debt is more concentrated in Bangkok and vicinity and more developed provinces in other regions such as Chiangmai, Khon Kaen, Chonburi and Phuket. Figure 4 illustrates these findings with a map of debt concentration across provinces in July 2016. The map presents the share of total debt held by the top 10% borrowers in each province, i.e., debt concentration within each province. Overall

what the map shows is consistent with what we see in Table 5 earlier, but at a more disaggregate level. It also displays that the South has more provinces with high debt concentration than other regions.

[Figure 4: Variation of debt concentration across provinces (July 2016)]

Debt concentration is strikingly distinct between urban and rural areas: borrowers with large debt tend to live in urban areas, especially around Bangkok and the Eastern Seaboard, while borrowers with small debt reside in the rural areas. This finding is shown in Figure 5, which exploits the granularity of debt location in the NCB data beyond a broad regional classification, and presents debt concentration across high-resolution locations. Each blue dot represents 100 borrowers in the bottom 10%, i.e., those with debt below 6,921 baht. Each red dot represents 100 borrowers in the top 10%, i.e., those with debt 1,167,123 baht or more. And each grey dot represents 100 borrowers in the middle 80%. As seen in the figure, the blue dots tend to spread throughout the maps, while the red dots tend to cluster around the urban centers.

[Figure 5: Distribution of household debt across and within region (July 2016)]

There are large variations of debt concentration within province: large loans tend to be in the city centers while small loans in the suburbs. Zooming further to explore within-province distribution of borrowers with large versus small debt, Figure 6 presents maps of five selected provinces that have high degrees of debt concentration as shown earlier in Figure 4: Bangkok, Chonburi, Chiangmai, Phuket, and Khon Kaen. The figure reveals that even within the provinces where debt is highly concentrated, there are spatial variations. Borrowers with large debt (those represented by the red dots) tend to cluster in the city center while borrowers with small debt (the blue dots) live in the suburbs or outside the city center.

[Figure 6: Distribution of household debt across and within province (July 2016)]

With the exception of provinces in the South, delinquency concentration is generally higher than debt concentration, but they are positively correlated. Figure 7 presents a scattered plot of the share of debt held by the top 10% borrowers against the share of delinquent debt held by the top 10% delinquent borrowers in each province. The figure reveals several interesting patterns. First, there seems to be a positive correlation between debt concentration and

delinquency concentration. Second, most of the provinces are located above the 45-degree line, implying the higher degree of delinquency concentration than debt concentration, with the exception of the Southern provinces that lied below the 45-degree line. Finally, Bangkok and vicinity are scattered near the top-right corner, reflecting their higher degree of both debt concentration and delinquency concentration than other regions.

[Figure 7: Concentration of debt and delinquency by province (July 2016)]

3.1.4 Who are the top and the bottom borrowers?

Given that debt and delinquency are highly concentrated, we next explore who the top and the bottom borrowers are and whether they are different. Table 7 reports descriptive statistics of selected characteristics of the bottom 10% (B), the middle 80% (M), and the top 10% (T) borrowers. The last two columns present the test for differences in the means between the bottom and the middle groups (B-M) and the top and the middle groups (T-M), respectively. The results in the last two columns show that borrowers in the top and in the bottom groups are significantly different from each other and also different from those in the middle groups in terms of the number of loan products, the composition of loan products, and borrower's characteristics.

[Table 7: Who are the top 10% and bottom 10% borrowers? (July 2016)]

The top 10% borrowers tend to be homeowner and live in urban areas and in Bangkok and vicinity; as expected, the bottom group has fewer accounts and fewer distinct products than the middle group, which in turn has fewer accounts and products than the top group. The composition of loan products is also different across the two groups. The top group tends to have higher share of housing debt in their portfolio; the middle group tends to have higher shares of auto and business loans; and the bottom group tends to have higher shares of motorcycle, credit card, and personal and other loans than the other two groups. Also, the top group has higher shares of loans from commercial banks and SFIs than the middle group, which in turn has higher shares than the bottom group. Finally, there are some characteristics that the top and the bottom groups shared. We find that both groups tend to be slightly older and are more likely to live in urban areas and in Bangkok and vicinity than the middle group. These two groups are also less likely to include new borrowers and also have worse credit history.

Interestingly, the borrowers in the bottom group are not always those who face limited access to credit but include those who have low credit utilization. This is reflected by the findings on credit line and utilization rate presented in Table 7. Although by definition the borrowers in the bottom group has small debt, the median credit line is higher than that of the middle group, something unexpected. This finding is also consistent with the report in the last row that the bottom group has the lowest utilization rate when compared with the other two groups while the top group has the highest utilization.

[Table 8: Who are defaulters and top defaulters? (July 2016)]

Borrowers with varying degree of delinquency are also different from each other in terms of characteristics, composition of loans, credit line, and credit utilization. Table 8 reports descriptive statistics and test of mean differences of selected characteristics of borrowers with no delinquent loan (N), borrowers with some delinquent loans (D), and borrowers with top 10% delinquent loans. The borrowers with top 10% delinquent loans have much smaller credit lines and higher utilization rate than the other two groups. Although personal and other loans occupy the largest share of total loans for all three categories of borrowers, the share is lower for the non-default group. When compared with the other two groups, the non-defaulters also have the smallest share of motorcycle loans and the highest share of housing loans.

3.2 Prevalence and Intensity of Household Debt and Delinquency

3.2.1 Prevalence and Intensity of debt

The granular NCB data allow us to understand debt situation at the borrower level and measure debt prevalence (by debt headcount) and debt intensity (by debt per borrower).

Debt headcount is defined as the number of individuals with debt divided by the total number of population. This is a measure of the extensive margin that provides information on the prevalence of debt across individuals in the economy, i.e., what fraction of population is indebted.²⁷ *Debt per borrower*, is defined as the total loan outstanding of each indebted individuals. This is an intensive-margin measure of debt intensity that each indebted individual experiences. These two micro-level measures thus give us more insights, as they decompose the commonly used, aggregate *debt per*

²⁷ In household finance literature, this measure is also known as penetration rate or participation rate.

capita into two parts: (1) debt prevalence or extensive margin and (2) debt intensity or intensive margin. Table 9 presents these measures of household debt based on the data as of July 2016.

[Table 9: Three perspectives of household debt (July 2016)]

Less than one third of the Thai population have formal debt as of July 2016, but debt intensity is high among those who have debt. Table 9 shows that debt per capita in Thailand is at 149,126 baht. The debt headcount is at 29%, i.e., less than one third of the Thai population have loans. For those who are indebted, the mean amount of loan is 509,311 baht while the median is 147,068 baht. The skewness in debt per borrower distribution confirms the earlier finding that debt is highly concentrated. We note, though, that the debt prevalence and intensity measures reported here underestimate the actual measures of household debt, since they do not include formal loans from non-NCB members and loans from informal financial sectors.

Personal loans are highly prevalent, while housing loans appears very limited, relative to developed economies. Specifically, the debt headcount for personal and other loans is as high as 17%, followed by auto and credit card loans, at 9% each. Prevalence of credit card in Thailand is considered small, comparing to the U.S. where 63% of population have at least one credit card.²⁸ Only 4% of population have housing loans. This finding suggests that access to and/or utilization of housing loans in Thailand seem limited, comparing to the U.S. where at least 40% of their working age population have housing loans.²⁹ However, debt intensity is by far highest for housing loans, followed by auto and business loans. Note that the debt headcount for motorcycle loans is only 2% despite their relatively small debt per borrower, reflecting that this type of loans is clustered among niche borrowers.

Our findings highlight a flaw of simply using an aggregate measure, debt per capita, as a measure of household debt especially in the economy with highly skewed debt distribution. In particular, we find that despite much higher debt per borrower, housing loans have similar debt per capita to personal and other loans. This would lead to a misinterpretation of

²⁸ See Consumer Financial Protection Bureau (2015). It also shows that almost half of the U.S. credit card user has multiple cards, with an average of four cards per person. In contrast, the majority of Thais have one to two cards and only 30% of those with credit cards have more than two cards based on the NCB data.

²⁹ Fulford and Schuh (2015)

the severity of housing debts in the economy. Likewise, debt per capita for motorcycle is very low but its debt per borrower is much higher.

SFIs loans are less prevalence relative to those of commercial banks and other institutions with larger outreach, but the average SFI loan size is larger when compared to other types of lenders. As Table 9 shows, debt headcount is only one third for SFIs when compared to commercial banks while median debt per borrower of loans from SFIs is almost double of those from commercial banks. This is sensible because SFIs are state-owned financial institutions, established with each specific law, so each SFI has their own mandates and offers certain type of loans whereas commercial banks offer a wider range of loan products.

Household debt in Thailand follow the expected early leveraging and later deleveraging pattern over the life cycle, but many individuals are still highly indebted after retirement. Table 9 shows that debt headcount and debt per borrower are low for the younger (less than 25) and the older (more than 60) groups, while they are higher for working-age population. In other words, individuals become more leveraged as they enter labor markets and deleverage as they retired. Note that 19% of the individuals aged 60 or older are still indebted, with the median debt per borrower at 114,303 baht, only slightly less than the median for those aged 46-60. This finding raises concerns about the ability of retirees to service their debt. We will return to this point in more detail in Section 3.3, where we take a closer look at the age profile of debt and delinquency.

Urban areas and Bangkok and vicinity have higher debt headcounts, but debt is less evenly distributed among those who have loans and live in these areas. Specifically, Table 9 also shows that debt headcount is highest in Bangkok and vicinity, at 44%, reflecting better access to credit for individuals living there. On the other side of the spectrum, the Northeast has the lowest debt headcount, only at 19%, while the North and the South also have low headcount, at 20% each. In general, the headcounts in urban and rural areas are strikingly different, at 33% versus 20% respectively. However, the median debt per borrower gives us an interesting picture—the number is lowest in Bangkok and vicinity (101,977) and highest in the North (183,822) followed by the Northeast (159,263) while the mean is highest in Bangkok (616,760) and lowest in the Northeast (412,794) followed by the North (444,264). This pattern is also observed when we look at urban versus rural areas—the median debt per borrower is lower in the urban than in the rural areas while the mean is higher. An implication from this observation confirms earlier

findings of the geographical variations in debt concentration. We will return to this point in Section 3.4, where we take a closer look at geographical distribution of debt and delinquency.

[Figure 8: Three perspectives of household debt over time]

A recent rise in aggregate debt per capita has been a result of both an increase in debt headcount (extensive margin) and an increase in debt per borrower (intensive margin).

There has been an overall increase in debt per borrower until 2015, although debt headcounts begin to level off since 2013. Figure 8 presents these findings in the top row and also illustrates the evolution of debt across financial institutions, loan products and borrower groups, allowing us to see whether large debt growth take place in more vulnerable products (e.g., unsecured loans) and borrower groups (e.g., the young).

Debt headcounts exhibit an overall upward trend for all loan subcategories, especially before 2013; the fastest rise is in auto loans and young working-age population. As we see earlier, the prevalence of personal loans is the highest throughout the period, followed by credit card and auto loans. Auto loans, however, exhibit a rapid increase during 2011-13, largely due to the first-car buyer tax rebate scheme. Comparing across lenders, we find that debt headcount is highest for non-bank financial institutions, and lowest for SFIs although it slightly increases over time. Comparing across borrower groups, we find that debt headcounts for the young working-age group are highest throughout the period and also grow at the fastest rate, at least until 2013. Interestingly, we see a downward trend of debt headcount for individual aged below 25 since 2013. Finally, the findings show that there are upward trends in debt headcount in all regions, although the increases slow down since 2013.

Debt per borrower also exhibits an upward trend for all loan subcategories, except for auto loans, loans from SFIs, and loans in the South. The median debt per borrower for auto loan also peaks during 2012-13, again, around the time of the first-car program. More strikingly, debt per borrower for SFIs has been in decline since 2011 while the opposite trend is observed for commercial banks. Debt per borrower also increases at the fastest rate for two young working-age groups (25-35 and 36-45 years old), until recently. Debt per borrower exhibits similar upward trend for all regions and both urban and rural areas until 2015, with the exception of the South that observes a slowdown and then significant decline since 2013.

3.2.2 Prevalence and Intensity of Delinquency

Parallel to debt, we study delinquency at the borrower level and disaggregate the commonly used aggregate measure, *delinquency rate*, into two components: (1) delinquency headcount and (2) delinquent debt per delinquent borrower. *Delinquency headcount* is defined as the number of borrowers with delinquent loans divided by the total number of borrowers. This measure represents prevalence of delinquency among borrowers. And *delinquent debt per delinquent borrower* is defined as total delinquent loan that each borrower with delinquent loans has. This measure thus tells us about the intensity, or severity, of delinquency faced by delinquent borrowers. We then compare these micro-level measures with the aggregate measure, *delinquency rate*, defined as the percentage of loan outstanding in the economy that is delinquent. This measure provides us with no information on the distribution of delinquent loans and the burden on borrowers.

[Table 10: Three perspectives of delinquency (July 2016)]

One sixth of the borrowers have delinquent loans as of July 2016. These findings are shown in the top row of Table 10. Among the borrowers with delinquent loans, the median delinquency amount is 56,529 baht. The table also reports in the last column the median of the percentage of delinquent loan in the borrower's portfolio, which is 100%. In other words, the median delinquent household has all of his or her loans delinquent.

Motorcycle loans have the highest delinquency headcount (more than one third), followed by personal loan and auto loans, while housing loans have the lowest delinquency headcount. When we consider these measures by loan product, motorcycle loans stand out as they have the largest delinquency rate, at 33.4%, and also delinquency headcount, at 37.2%. In other words, by both measures more than one third of motorcycle loans are delinquent. However, delinquency per delinquent borrower for motorcycle loans is the smallest one when compared to other products. The opposite case is housing loans—while the delinquency rate and the headcount are the lowest, delinquency per delinquent borrower is the highest, higher than any other loan products by several times. Finally, one may ask whether high delinquency of motorcycle loans would post significant impacts on the aggregate economy. Considering prevalence and intensity of debt and delinquency together, we find that although delinquency is high for motorcycle, debt headcount and debt per borrower are relatively small so high delinquency of motorcycle loans may

have limited effects on the economy, and only have significant effects on specific groups of borrowers. In contrast, personal and other loans have 15% delinquency headcount, as shown in Table 10, and also has high debt headcount at 17%, the highest among all loan products as shown in Table 9. In this respect, delinquency of personal and other loans could raise more concerns than motorcycle loans.

Commercial banks appear to have a higher-quality pool of borrowers as reflected by the lowest delinquency headcount, while non-bank financial institutions have the highest delinquency headcount as of July 2016. Table 10 shows that banks have the lowest delinquency headcount, at 9.7%, but highest debt per delinquent. In contrast, non-bank financial institutions have the highest delinquency headcount, at 17.7%, and the lowest delinquency debt per delinquency borrower. Meanwhile, SFIs lie in between these two types of lenders, and consequently have the lowest overall delinquency rate.

Delinquency headcounts are higher among borrowers in the younger age groups and borrowers living in the Southern and Central regions. Table 10 shows that delinquency headcount decline with age, although the peak is at the 25-35 age group rather than the youngest one. The amount of delinquent debt per delinquent borrower increases and then decreases with the life cycle, mirroring the pattern we see earlier for debt. The table also reveals that delinquency headcount is highest in the Southern region, at 18.5%, followed by the Central areas (17.8%), although delinquent loan per delinquent borrower is similar across regions. Finally, delinquent borrowers in the rural areas have lower delinquent loan than those in the urban areas, although both areas have similar delinquent headcounts.

[Figure 9: Three perspectives of delinquency over time]

There is a decline in delinquency headcount over time, while there is an upward trend in delinquent debt per delinquent borrower; the net overall result is a declining trend of aggregate delinquency rate, until recently. Figure 9 presents these findings in the top row and also illustrates the evolution of delinquency across financial institutions (where we further divide commercial banks into small, medium, and large based on their asset), loan products, and borrower groups. These patterns are also observed in most of the loan subcategories.

There is heterogeneity in the trends of delinquency, with a contrasting upward trend of delinquency headcounts in business and auto loans, loans from medium banks, and loans among the youngest borrowers; and a relatively faster rise of delinquent debt per delinquent borrower among small and medium banks. Delinquency headcounts gradually decrease for most loan products except for business and auto loans, which experience increasing headcounts since 2012—the latter is due to the first-car program. Comparing across lenders, we find that the delinquency headcount is highest and declines fastest for non-bank financial institutions. For commercial banks, delinquency headcount is highest and with fastest decline for small banks. Delinquent debt per delinquent borrower increase steadily since 2010 especially small and medium commercial banks, and since 2014 for loans from SFIs. With the exception for borrowers aged 25 or younger, delinquency headcounts observe a downward trend since 2013 and start an upward trend in 2015. There seems to be a downward trend (until 2015) and a convergence in delinquency headcount across regions, with the notable exception of the South where delinquency headcount has been rising since 2012. Finally, delinquent debt per delinquent borrower has been increasing significantly in all groups, especially since 2014.

Finally, delinquency rate of credit card loans is among the highest, despite the fact that their delinquency headcount is not so high; our findings thus again highlight the potential flaw of simply using an aggregate measure of delinquency. The high delinquency rate could overly raise concerns to policy makers-- while the delinquent loan per delinquent borrower appear to be quite large, delinquency is in fact not so prevalent among credit card borrowers.

3.3 Debt and Delinquency by Age and Birth Cohort

Economic theories and empirical evidence elsewhere suggest that debt level and composition change substantially over the life cycle. This life cycle theory predicts that an individual begins accumulating debt at the young age and then decumulates debt subsequently, especially after retirement.³⁰ This section examines the granularity of debt and delinquency by borrower's age and birth cohort. How do debt and delinquency prevalence and intensity vary

³⁰ Using data from the Equifax/NY Fed Consumer Credit Panel (CCP), Fulford and Schuh (2015) document strong life-cycle patterns of various types of debt. First, *credit card debt* begin to increase earlier in the life cycle until the age of 50 and start falling after the age of 60. Second, few young people have *mortgage* but mortgage headcount increases with age until 40 and then begin to decline after the age of 60. Third, individuals start having *auto loans* at younger ages and by 30 years old almost 40% of individuals have auto loans after that auto loan headcounts gradually decline and then sharply drop after the age of 60. Finally, *student loan debt* presents a distinct downward trend with age as individuals take it early in the life cycle and repay over time as they age.

across borrowers with different ages? How do these age profiles vary across products and lenders and over time? What are the implications of changing demographic structure, especially aging society, on household debt and delinquency?

3.3.1 Debt by Age

Although there is a clear accumulation and decumulation pattern of debt over the age profile, Thais have debt since they are very young (with half of the Thai population in the young working ages having loans) and continue to hold debt for a prolonged period of time and until they become very old. Figure 10 explores the age profile of debt prevalence (top panel) and debt intensity (bottom panel) as of July 2016. The top-left chart shows that the debt headcount increases with age, peaks at 50% around an early age of 30 years old, and remains at 40-50% until reaching retirement ages. The debt headcount then sharply declines afterwards. The bottom-left chart gives us additional information about debt over the life cycle from the perspective of debt intensity, i.e., debt per borrower. Overall, we observe the expected debt accumulation when individuals are young and enter the labor force, and debt decumulation when borrowers retire. However, their debt intensity remains high well past retirement age, raising a concern over the indebtedness of aging population.

[Figure 10: Debt prevalence and intensity by borrower's age (July 2016)]

Personal loans are especially prevalent and peak among the young working-age population; we find similar patterns for auto, credit card, and motorcycle loans as well as loans from non-bank financial institutions. The top panel of Figure 10 also presents age profiles of debt prevalence by loan product. Personal, auto, and credit card debt peaks at 30%, 20%, and 20% at young working ages (around 28-35 years old), respectively. Individuals thus begin having credit card, auto, and especially personal loans at the early age. These patterns perhaps explain the large access to loans from non-bank institutions, which also peaks at 40% among the young working age group. Moreover, motorcycle loans are also concentrated among younger borrowers. The bottom panel of Figure 10 also presents age profiles of debt intensity by loan product, and further shows high intensity of housing, auto, and motorcycle loans among the young working age group. The median housing debt per borrower is high for the very young working age group and gradually declines for the older borrowers. This pattern likely reflects the repayment of mortgage for each individual as well as a general increase in housing price over time. Though

individuals begin to have high intensity of housing debt at a lot younger ages than those in the U.S.³¹ Auto loans exhibit a different pattern, with relatively stable median debt per borrower across all working ages, although the median is higher for the young and declining for the old. For motorcycle loans, we find that the median debt per borrower peaks at 20 years old, then quickly decreases, and becomes unchanged throughout the working ages. Credit cards and business loans, however, show the expected patterns, where we find an increase in debt per borrower among young borrowers and a decrease for the elderly.

Personal, credit card, and business loans remain largely prevalent among the retirees; there are also high debt intensity of personal loans among the retirees. Figure 10 further shows that prevalence of personal, credit card, and business loans among the retirees remains quite high, starting at the headcount as high as 18%, 15%, and 10% for each of these loan products respectively, and declines as they age. One potential explanation of the high headcount of credit card debt among the retirees could be due to the use of credit cards as a payment mechanism. The amount of personal loan per borrower also peak at post-retirement ages. The high debt prevalence and intensity of personal loans after retirement could also reflect limited loan choices of the retirees.

The age profiles of debt further echo the limited housing debt, with only one in ten of working age population having housing loans in July 2016. Housing loans are made to individuals in the working age with debt headcounts peaked at 10% among the working age populations in the 40s. This is considered very low relative to those in the U.S., where around 40% of borrowers in the 40s have housing debt.³² Apart from housing loans, access to credit card also appears limited. The credit card debt prevalence peaks at 20%, which again is a lot lower than those in the U.S. where 63% of population have at least one credit card.³³ Figure 10 further shows that access to business loans appears quite late and so peaks among retiring ages.

Debt intensity over the age profile is vastly diverse across lenders, reflecting different roles of commercial banks, SFIs, and non-bank financial institutions in the economy.

³¹ See Fulford and Schuh (2015). The age profile of housing loans from the NCB data was slightly different from that of the U.S. as presented in Fulford and Schuh (2015) where debt per borrower peaked later in the mid of the working ages. One explanation could be that housing loan data in the NCB include loans with joint accounts, where the very young take up the loans jointly with their parents. However, after cleaning those joint accounts, we still find similar patterns.

³² Fulford and Schuh (2015)

³³ Consumer Financial Protection Bureau (2015)

Individuals have access to loans from non-bank financial institutions at younger ages, followed by access to loans from commercial banks. The headcount of debt from SFIs is higher for working age individuals, who are also closed to retirement. The median debt per borrower of loans from commercial banks is much higher for the very young borrowers, peaks at 21 years old, and declines afterwards. The median peaks later around the age of 35 years old for loans from SFIs.

[Figure 11: Age profile of debt over time]

Over time from 2009 to 2016, there are more borrowers (extensive margin) and larger debt per borrower (intensive margin) at every age, especially among the younger generation. Figure 11 presents the age profiles of debt prevalence and debt intensity by year. Generally speaking, these age profiles are similar to what we see in Figure 10 for 2016. However, Figure 11 reveals additional insights. First, it shows that household debt in Thailand has expanded during 2009-2016, as evident from the shift of the curves to the right over time. Second, debt accumulation is not proportionate across ages but we see the most expansion for the younger group. More precisely, the overall debt headcount and debt per borrower increase most for individuals aged around 30 years old. This finding implies that the younger generation has accumulated debt earlier in their lives than the older ones.

There is heterogeneity in debt accumulation by loan category, with a remarkable increase in debt headcount of personal, auto, and credit card loans among the young generation. Figure 11 shows that the expansion of debt headcount for auto loans takes place during 2011-13, and is likely due to the first-car tax rebate scheme. Debt headcounts for housing and business loans increase over the period of our study, but the magnitudes are relatively small when compared to other loan products. The debt headcounts of loans from commercial banks and non-bank financial institutions increase most for borrowers around 30 years old, while that from SFIs expand most for those around 40 years old. For debt intensity, we find that debt per borrower for housing loans rise tremendously for young borrowers while that for credit card loans increase most for individuals aged 40-60.

3.3.2 Delinquency by Age

Delinquency headcount is especially high for young working age population with one in five young working-age borrowers having delinquent debt. Figure 12 presents age profiles of

delinquency headcount and median delinquent debt per delinquent borrower. The top-left chart shows that the delinquency headcount is highest at 21% for borrowers aged 29 and declines as age increases. The bottom-left chart shows that with the exception of high delinquent debt per delinquent borrower for the very young borrowers, the overall delinquency intensity increases with age and remains relatively constant around 0.6 million baht for the working age population, and then decline for those older than 60 years old.

[Figure 12: Prevalence and intensity of delinquency by age (July 2016)]

Delinquency headcounts for personal, auto, credit card, and business loans also peak at the young working ages. For personal, auto, credit card, and business loans, the delinquency headcounts are high for the younger borrowers and later decline, with the highest headcounts at around 30 years old for personal, credit card and business loans, and at 23 years old for auto loans.³⁴ About 20% of the early working age borrowers have delinquent personal loans. Overall, delinquency headcounts show a stable or downward trend over the age profile for most loan products. Housing debt appears to have low delinquency headcount and uniform across ages.

There are vastly mixed patterns of delinquency intensity over the age profiles for different loan products, with a concern over increasing and persistently high delinquency intensity for personal, credit card, and auto loans by the working age and retired borrowers. Housing, motorcycle, and business loans exhibit a decreasing delinquent debt per delinquent borrower as age increases. This finding mirrors what we discuss earlier about debt intensity in Figure 10. In contrast, auto, credit card, and to some extent personal loans show the opposite pattern, i.e., increasing with age. Delinquent debt per delinquent borrower for personal loans deserves a special attention because the intensity increases with age and remains high after retirement while the delinquency headcounts persistently remain high as well. Also alarming is credit card debt—the delinquency intensity continues to stay high past the retirement age (although the decline in their delinquency headcount makes the situation less worrisome than personal loans). These findings raise a concern about debt burden of the retirees.³⁵

³⁴ Unlike other loan products, motorcycle loans exhibit a somewhat unexpected finding—the delinquency headcount increases with age and becomes significantly high for the retirees, but this result could be driven by the much smaller number of motorcycle loans held by older borrowers (very low headcount shown in Figure 10).

³⁵ We also found high delinquent debt per delinquent borrower for the elderly, while the delinquency headcount was low in the case of auto loans, implying that the defaults were likely on expensive cars.

Across lenders, we find large delinquency headcounts of loans from non-bank financial institutions (which also peak at the young working ages), while delinquency headcounts of loans from SFIs remain stable over the age profile and do not decline after retirement. More explicitly, Figure 12 shows that the delinquency headcounts of debt from commercial banks and non-bank financial institutions peak at the borrowers aged 30 (at around 12% and 20% respectively), while that of SFIs seems to be similar for all borrowers aged 30 and above, at around 10-15%. Delinquent debt per delinquent borrower for non-bank financial institutions is also high among old borrowers, while the delinquency headcount declines with age. This finding is likely driven by high delinquency intensity of credit card debt, which exhibits similar pattern.

[Figure 13: Age profile of delinquency over time]

The overall delinquency headcounts have decreased during 2009-2016 for most products, especially for the young borrowers in personal and credit card loans; however, delinquency headcounts increase in auto and business loans, especially for the young group. Figure 13 presents age profiles of delinquency headcounts by year, and further shows that the drop in the delinquency headcount is evident for housing, credit card, and personal loans. However, auto and business loans experience an increase in delinquency prevalence during the same period, especially among young borrowers. If we compare across lenders, we find that delinquency headcounts decrease over time for loans from non-bank financial institutions. Delinquency headcounts, however, increase over time for loans from commercial banks and SFIs among the young working age population. They decline over time among the older population.

3.3.3 A Cohort Analysis of Debt and Delinquency

Given the age of each borrower in the NCB data, we can analyze debt and delinquency by birth cohort. The findings are displayed in Figure 14, where each of the lines represents a unique birth cohort of borrowers over different ages during the period of 8 years from 2009 to 2016 in the NCB data. The advantage of this cohort analysis is that it allows us to examine prevalence and intensity of debt and delinquency from two different approaches. First, for a given age, we can compare debt and delinquency across different cohorts or generations, while controlling for a particular position in their life cycle. This is similar to what we see in Figures 11 and 13 earlier; however, different cohorts could be very different. Second, for a given cohort, we can further

trace its line over time and examine debt and delinquency over the life cycle of the same cohort, while controlling for cohort specific effects.

[Figure 14: Life cycle view of debt and delinquency through age profile by birth cohort]

Over the life cycle, debt accumulation implied by debt headcounts follows a hump-shape pattern; over time, individuals start having debt earlier in their lives. First, for a given age, the top chart in Figure 14 shows that the debt headcount of a younger generation is uniformly above that of an older generation. For example, at the age of 30, the cohort born in 1985 has the debt headcount of almost 50%, while the cohort born in 1981 has less than 40% headcount. This result suggests that the younger generations seem to have more access to credit than the older ones, when they are at the same age. Alternatively, for each level of debt headcounts, we can see that the younger cohorts arrive at that debt level faster than the older cohorts. For example, the cohort born in 1975 reaches the debt headcount of 40% when they are about 38 years old, while the cohort born in 1980 and 1990 achieve that same level of debt headcount when they are only 31 and 25 years old. Again, this finding confirms that over time individuals become leveraged earlier in their lives. Second, for a given cohort, the chart shows that the lines have positive slopes at the younger ages and become negative for the older ages. This finding suggests the hump-shape dynamic of leveraging and deleveraging over the life cycle. The chart also shows that the peaks of the debt headcounts appear at earlier ages and at higher levels for younger cohorts, further confirming that the younger generations have access to debt faster and earlier than the older generations. Finally, the chart reveals that the cohort-age with the highest debt headcount in the NCB data is the cohort of the borrowers born in 1981 when they are 33 years old. More precisely, this cohort has the highest debt headcount in the entire data, in 2014 at over 50%.

Debt accumulation and decumulation over the life cycle and over time implied by debt intensity mimic the pattern found in debt headcounts, but the highest debt intensity is reached later than the highest headcount. The middle chart of Figure 14 shows the median debt per borrower. Again, we see the overall hump-shape debt intensity over the life cycle. The younger cohorts seem to have higher median debt per borrower than the older cohorts when they are at the same age, and the difference is highest at the young ages. Alternatively, the younger cohorts achieve a given median debt per borrower earlier in their lives than the older cohorts.

Over the life cycle, delinquency headcounts decline with age; over time, delinquency headcount decline for all ages. These findings are shown in the bottom chart for Figure 14. For each cohort, we observe a general downward sloping line until 2015, implying that delinquency headcount decrease when borrowers age. For each age, the delinquency headcounts of the younger cohorts are lower than the older ones, suggesting that delinquency headcounts have declined over time for all ages. This finding is consistent to what we present in Figure 13.

[Figure 15: Life cycle view of debt and delinquency by birth cohort, loan product and lender (July 2016)]

Over time, individuals can access to each and every type of loan and from every type of lender earlier in their lives. Figure 15 further plots age profiles of debt and delinquency by cohort, loan product and lender during 2009-2016. The left panel shows that for a given age, debt headcounts are higher among younger generations than the older ones. This pattern is similar for each and every loan and lender types. Comparing within the same cohort, we find that at very young ages, debt headcounts for personal loans are the highest, followed by auto and credit card loans. By lender, the result further confirms earlier finding that at very young ages debt headcounts are the highest for loans from non-bank financial institutions. Figure 15 also presents the life cycle view of debt intensity (right panel) and delinquency (following page) by cohort.

3.4 Geographical Distribution of Debt and Delinquency

The next dimension of debt and delinquency that we can explore with granular data from the NCB is their geographical distribution. How do prevalence and intensity of debt and delinquency vary across regions? Are they different between the urban and the rural areas?

3.4.1 Debt and Delinquency by Province

Debt prevalence is highest in Bangkok and vicinity, but debt intensity is high in the North, Northeast, and South. The left panel of Figure 16 illustrates debt headcount and median debt per borrower by province as of July 2016. Debt headcount is highest in Bangkok at 49%, following by Nonthaburi at 46% and Samut Prakarn at 44%. There are also some provinces in other regions that have high debt headcounts as well, namely, Chonburi (42%) and Rayong (41%) in the industrial corridor of the Eastern Seaboard and Phuket (39%) in the South. Among provinces with the highest median debt per borrower are Kamphaengphet, Pichit, and Pitsanulok in the North,

Amnat Charoen in the Northeast, and Phatthalung in the South. The median debt per borrower in these provinces is as high as 200,000 baht.

[Figure 16: Debt prevalence and intensity by province and urban vs. rural]

All provinces experience an increase in both debt prevalence and debt intensity during 2009-2016, with the exception of some provinces in the South that instead observe a decline. Specifically, the right panel of Figure 16 shows the changes of debt prevalence and intensity by province. During this period, all provinces experience higher debt headcounts, consistent with the increase in access to credit of the Thai population at large. The debt headcount has increased most in Chonburi, Rayong, Bangkok, and Phuket. The figure also shows that most provinces have seen an increase in the median debt per borrowers, with the exceptions of some provinces in the South, namely, Krabi, Trang, Yala, Satun, and Narathiwat.

[Figure 17: Prevalence and intensity of delinquency by province and urban vs. rural]

Delinquency headcount and intensity are higher in the South than the rest of the country.

In particular, the left panel of Figure 17 shows that half of the provinces in the South and Central have debt headcount higher than the overall country level. Satun is ranked as the province with the highest delinquency headcount (26%) in Thailand in July 2016, followed by Phra Nakhon Si Ayutthaya (23%). Delinquency headcounts are among the lowest in the Northern provinces. For delinquency intensity, we find that provinces in the South and the North appear to have higher median debt per borrower than other regions, with Ranong, Krabi, and Chumporn ranked top among all provinces in the country.

Most strikingly, the majority of provinces in Thailand experience a decline in delinquency headcounts during 2009-2016, with the notable exception of a significant increase in most provinces in the South. These provinces include those in the deep South with continuing insurgency, namely, Narathiwat, Pattani, and Yala as well as others such as Satun, Trang, and Krabi. The right panel of Figure 17 also shows that, although delinquency headcounts decline in most provinces, median delinquent debt per delinquent borrower increase during the same period, with the largest increase in Loei.

3.4.2 Debt and Delinquency in Urban vs. Rural Areas

Urban areas have higher debt prevalence but lower debt intensity than rural areas; however, delinquency prevalence and delinquency intensity are similar in both areas. These findings are reported in the bottom of Figures 16 and 17. Figure 16 shows that the urban areas experience a larger increase in the debt headcount than the rural, while an increase in the median debt per borrower seems to be similar for urban and rural areas from 2009-2017. Figure 17 further shows that delinquency headcount in the urban areas declines more than that in the rural areas, despite the comparable rises in delinquency intensity in both areas.

3.4.3 Debt and Delinquency at the Postcode Level

The granularity of the NCB data allows us to analyze debt and delinquency in a very fine geographic location, namely, at the postcode level. In particular, the next four figures present maps of prevalence and intensity of debt and delinquency at the postcode level. In each figure, we present the overall finding as well as the findings by lender and by loan product. Overall, this exercise shows that debt and delinquency are not equally distributed geographically with large variations across postcodes even within the same province and region. In other words, there is geographic heterogeneity in the prevalence and the intensity of both debt and delinquency.

[Figure 18: Debt prevalence by postcode, product and lender (July 2016)]

Debt headcounts are higher around Bangkok in most of loan categories, except for loans from SFIs and business loans, which have higher headcounts in the North and Northeast. In particular, Figure 18 reveals several stylized facts about debt headcounts by postcode. First, the overall map shows that debt headcounts are higher around Bangkok and the Eastern Seaboard. Debt headcounts also exceed 20% for most parts of the country, except for those provinces along the border with Myanmar and in the deep South. Second, we see drastic contrasts of debt prevalence across different types of lenders. In particular, debt headcounts for commercial banks and to some extent for non-bank financial institution are highly concentrated in Bangkok and vicinity and in the Eastern Seaboard. In contrast, SFIs are prevalent in the upcountry, especially the North and the Northeast. Finally, when we look at debt prevalence by loan product, various patterns emerge. Although the housing loan headcount is concentrated around Bangkok, most areas in the country also has relatively high housing debt prevalence. A similar pattern is found

for auto loans. The map for motorcycle loans shows more prevalence in the Northeast, Bangkok and vicinity, and the South, but less in the North. Prevalence of credit card and personal loans is high in Bangkok and other city centers but is very sparse elsewhere. Unlike other loan products, the debt headcount for business loans is higher in the upcountry, especially in the North and the Northeast, reflecting loans used for agricultural activities.

[Figure 19: Debt intensity by postcode, product and lender (July 2016)]

Debt intensity by postcode varies largely across lenders and products—notable examples include high intensity around Bangkok and vicinity for housing and credit card loans and low intensity in the South for most of loan products. Figure 19 depicts these variations. The median debt per borrower is lower in Bangkok and vicinity, while it is much higher in the upcountry, especially in the North and the South. The median debt per borrower for loans from commercial banks is high in the Northeast, while the median for loans from SFIs is high in Bangkok and nearby areas. Debt intensity is more equally distributed throughout the country in the case of loans from non-bank financial institutions. In terms of debt intensity, the median housing debt per borrower is relatively high in Bangkok, the Central, and the South as well as big cities in the North and Northeast. This likely reflects the higher real estate prices in those areas in comparison to the rest of the country. The median debt per borrower for auto and personal loans however are higher in the upcountry in the North and the Northeast. Credit card debt intensity is high in the urban areas throughout the country. In contrast to the debt headcount for business loans, which is evidently high in the Northeast, business debt intensity is generally lower in that region than the rest of the country, implying that although many households in the Northeast have access to business loans, the loan sizes are relatively small.

[Figure 20: Prevalence of delinquency by postcode (July 2016)]

High delinquency headcounts are observed across all types of lenders and loan products. Specifically, Figure 20 depicts delinquency headcounts by postcode, and shows this striking pattern, which calls for attention from policymakers and lenders. Note that high delinquency prevalence is also observed in Bangkok and vicinity and the Eastern Seaboard for most of the lenders and loan products as well, with exceptions of credit card loan and loans from SFIs. Generally, when we compare the delinquency headcount across different types of lenders, we find that there are larger variations in postcode-level delinquency headcounts throughout the country

for loans from SFIs (ranging from 1.9%-35.5%) and non-bank financial institutions (ranging from 3.5%-34.9%) than that of commercial banks (only ranging from 3.8%-21.9%). Delinquency headcount for commercial banks is high in the South and Central and uniformly low in the North. Delinquency headcount for non-bank financial institutions is also concentrated in the Northeast and South, while the headcount for SFIs is spread throughout the country relatively more evenly. With the exception of the Southern region that we mention earlier, delinquency headcounts for different loan products are concentrated in different geographical areas. Roughly speaking, while the delinquency headcount of housing debt is more equally distributed across the country, the delinquency headcounts for most of other loan products, e.g., auto loan and business loan are low in the North, the delinquency headcounts for motorcycle loans and business loans are also high in the Central and the Northeast, and the headcount for credit card and personal loan is also disproportionately high in some postcodes the Central and the Northeast.

[Figure 21: Intensity of delinquency by postcode (July 2016)]

Delinquency intensity varies considerably across lenders and loan products, with high delinquency intensity in the South for auto loans and personal loans as well as loans from commercial banks. Figure 21 displays maps of postcode-level median delinquent debt per delinquent borrower. The overall map shows that delinquency intensity is uniformly high in the North and the upper South, while it is relatively (and uniformly) low in the Northeast. Considering delinquency intensity by lender, we find that in the case of commercial banks, the intensity is more concentrated in the upcountry areas outside Bangkok and vicinity. The delinquency intensity is more evenly distributed across postcodes for SFI loans, with slightly higher intensity around Bangkok area. We also find that delinquency intensity also varies across different loan products with large postcode-level variations for housing, credit card and personal loans. Overall, the distributional patterns mirror those of debt intensity in Figure 19. The delinquency intensity around the Bangkok areas is high for housing, credit card and business loans, while it is low for auto and personal loans.

3.5 Debt and Delinquency by Credit History

The last dimension of debt and delinquency that we explore in this section is by credit history. Our goal is to understand how debt and delinquency prevalence and intensity vary across borrowers with different credit history. We simply define borrower's credit history from each

borrower's past history since entering into the NCB data and categorize the borrowers into two groups: (1) those with no history of delinquency, and (2) those with some history of delinquency.³⁶

[Figure 22: Debt prevalence and intensity by borrower's credit history]

Almost 80% of debt are held by borrowers with no delinquency history and over 80% of all borrowers are those without delinquency history. These findings are evident in Figure 21, which presents share of total debt, share of total borrower and median debt per borrower by borrower's credit history as of July 2016. The shares of debt held by borrowers without delinquency history are also higher than those with delinquency history in all categories of loan products and lenders. The difference is smallest for motorcycle loans. Comparing across lenders, we find that the share of debt made to borrowers with delinquent history is highest for SFIs, followed by non-bank financial institutions and small commercial banks. Similar patterns emerge when we look at the share of borrowers by delinquency history, as shown in the middle panel. Finally, the right panel presents the median debt per borrower. Although we find that borrowers with no delinquency history receive larger loans than those with delinquency history, the differences are not very large. Surprisingly, the median loan size to borrowers with delinquency history is slightly larger in the case of credit card and personal loans and loans from large banks, small banks, and non-bank financial institutions.

[Figure 23: Age profiles of debt by credit history (July 2016)]

While debt intensity of the borrowers without delinquency history declines after their retirement, the intensity remains high for the borrowers with delinquency history, reflecting the difficulty in deleveraging of the latter as they age. Figure 23 illustrates the age profile of debt by credit history. The left panel shows the shares of total debt held by borrowers without and with delinquent history. For the younger borrowers, almost all debt is held by those without delinquency history. This is probably because the younger borrowers are still relatively new in the loan markets and therefore less likely to have delinquency history. The share of debt held by borrowers with delinquency history increases with age until it reaches the level of 20% when borrowers are approximately 35 years old, remains steady around that level and begins to decline for the borrowers in the mid-60 and older. The right panel shows the contrast between

³⁶ By this definition, we categorize new borrowers that just enter the NCB data in 2016 and have no credit history from previous years by their 2016 delinquency status. Therefore, those with delinquency in July 2016 are classified as borrowers with some history of delinquency.

the median debt per borrower over the age profile of those without and with delinquency history. For borrowers with no delinquency history, we observe an expected pattern of leveraging and deleveraging over the life cycle. However, for the borrowers with delinquency history, the median debt per borrower increases with age and never declines even for those in the post-retirement ages. One potential explanation is that this group of borrowers might have more difficulty in paying back debt and continued to accumulate a large amount of debt for the rest of their lives.

4. Conclusions and Policy Implications

This paper uses loan-level data from the National Credit Bureau to study household debt in Thailand. The wide coverage and the granularity of the data allow us to analyze prevalence, intensity and distribution of debt and delinquency by loan product, lender, borrower's age and location. Our findings have important policy implications in various dimensions.

Implications on financial access. First, we find that about one third of the Thai population have formal debt. Although this overall number is not very low, the fractions of the population that have certain loan products such as housing and credit card loans are very low when compared to developed countries. Second, our findings show that Thais become indebted earlier in their lives. Delinquency headcounts are also highest among early working age borrowers. This raises a concern that these individuals may face difficulty in getting loans in the future. Finally, debt remain high for many of borrowers after retirement.

Policies that enhance access to necessary credit, such as for housing and for business investment, are thus critical, but such policies need to target individuals with potential to repay. In this respect, the data revolution and financial innovations have already opened up new opportunities in resolving information asymmetry and other inefficiencies in credit market – necessary for unlocking access to credit especially among the underbanked population. Policies that promote access to savings in preparation for retirement are also critical, as well as policies that enhance access to necessary credit for high-potential retirees, such as reversed mortgage. These policies are crucial as the country is becoming an aging society. Financial literacy and planning programs that can effectively raise both financial awareness and discipline among households are especially

critical.³⁷ These programs should target the young population in school before entering labor and credit markets.

Implications on financial stability. First, we find that Thai borrowers have high and rising debt intensity with median debt per borrower as high as 147,068 baht as of July 2016 – doubled from 2009. High debt burden could thus imply increase vulnerability and adverse shocks could easily trigger delinquency, forcing households to accumulate more debt and enter into a vicious cycle of debt. Second, we find that household debt is highly concentrated, and especially in urban areas of big cities as well as in particular type of loans, e.g., housing. Adverse shocks to these small group of top borrowers would thus have more than proportionate impacts on financial system and the economy. Third, we show that about one fifth of borrowers have delinquent loan. And this current level of delinquency headcount is relatively high when compared to developed countries. Fourth, our study helps identify the groups of borrowers with delinquency vulnerability. In particular, we raise concerns over (1) the young working-age population with high delinquency headcount and intensity especially in personal loans, and (2) borrowers in the South, the region that experiences the highest and rising delinquency headcounts. Finally, we also raise concerns on the personal loans, which have the highest prevalence among Thai households, at 17%, as well as the highest delinquency headcounts. Personal loans are also very relevant to the high and rising prevalence and intensity of debt and delinquency among the early working-ages, as 30% of this group has personal loan with high delinquency headcount at 20% as well as high delinquency intensity.

These evidence raises the importance of macro-prudential policies and regulations in preventing the accumulation of debt and delinquency among the vulnerable groups. The evident heterogeneity in delinquency further calls for policies with better targeting rather than the universal ones. Policy design thus needs to be based on solid understanding of debt and delinquency situation at the micro level drawing from granular data linked with other necessary information. The promotion of responsible lending among financial institutions is also crucial in reducing overly indebtedness among the vulnerable groups from rising competition.

Implications on the macroeconomy. First, we find that debt headcounts have increased while delinquency headcounts have been in decline, suggesting that credit seem to reach broader population without much sacrifice on the quality of borrowers. This finding implies potential

³⁷ Diaz and Achavanuntakul (2013) provides a great review, analysis and ways forward on financial literacy programs in Thailand

benefits of financial access at the macro level. However, the finding that loans are more concentrated in the urban centers may undermine the benefits and could result in widening income inequality between urban and rural areas. Second, the high debt intensity among Thai households, especially among the young working ages with the largest propensity to spend and those in the South, the North, and the Northeast could suggest a prolonged sluggish consumption and investment spending among these groups and regions, deteriorating the domestic aggregate demand—one of the main growth engines of the Thai economy. High debt burden once again implies increasing vulnerability to household and so to overall financial system and economy. These macroeconomic implications thus amplify the importance of policies that balance out access and stability goals.

In conclusion, this study illustrates that debt is very heterogeneous in many dimensions. In order to understand the situation of household debt and design appropriate policies, aggregate data are not sufficient and granular data that cover the majority of the financial system are needed. This paper exemplifies the potential of the NCB data in generating new knowledge about household debt that could help policymakers better design and implement policies on financial access and financial stability that targets the right groups of population. The key limitation of NCB data is the lack of informal and semi-formal debt, e.g., loans from cooperatives, educational loans from the Student Loan Fund, as well as borrower's income data. Augmenting NCB data to cover these necessary information, which are already collected systematically, will open up new opportunities for researchers and policymakers in using this dataset to answer relevant policy questions necessary for effective policy design and targeting.

References

- Agarwal, Sumit and Changcheng Song. "The Impact of Housing Credit on Personal Bankruptcy." Working Paper, National University of Singapore, 2016.
- Bernstein, Asaf. "Household Debt Overhang and Labor Supply," Working Paper, Massachusetts Institute of Technology, 2015.
- Consumer Financial Protection Bureau (2015) The Consumer Credit Card Market.
- Diaz, Lillian and Sarinee Achavanuntakul. "Financial Literacy: Findings and Recommendation." *Asian Development Bank Technical Assistance Report*, August 2013.
- Dynan, Karen. "Is a Household Debt Overhang Holding Back Consumption?" *Brookings Papers on Economic Activity*, Spring 2012.

- Fulford, Scott L. and Scott Schuh. "Consumer Revolving Credit and Debt over the Life Cycle and Business Cycle." Federal Reserve Bank of Boston Working Paper No. 15-17, October 2015.
- Guiso, Luigi, and Paolo Sodini. "Household Finance: An Emerging Field." *Handbook of the Economic of Finance*, Elsevier, 201, 1397-1532.
- Heathcote, J.; Perri, F.; Violante, G.L. "Unequal We Stand: An Empirical Analysis of Economic Inequality in the United States, 1967–2006." *Review of Economic Dynamics* 13, January 2010. 15–51.
- Kaboski, Joseph and Robert M. Townsend. "A Structural Evaluation of a Large-Scale Quasi-Experimental Microfinance Initiative." *Econometrica* 79(5), September 2011: 1357-1406.
- Kaboski, Joseph and Robert M. Townsend. "The Impact of Credit on Village Economies." *American Economic Journal: Applied Economics* 4(2), April 2012: 98-133.
- Kang, Taesoo and Guonan Ma. "Credit Card Lending Distress in Korea in 2003." Bank for International Settlements Papers No. 46, 2007.
- Karaivanov, Alexander and Robert M. Townsend. "Dynamic Financial Constraints: Distinguishing Mechanism Design from Exogenously Incomplete Regimes." *Econometrica*, 82 (3) 2014: 887–959.
- Karlan, Dean and Jonathan Morduch. "Access to Finance: Credit Markets, Insurance, and Saving." Chapter 71 in *Handbook of Development Economics*, Volume 5, **Edited by** Dani Rodrick and M.R. Rosenzweig, Elsevier-North Holland, 2009.
- Mian, Atif and Amir Sufi. "The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis." *Quarterly Journal of Economics*, 124(4), 2009, 1449-1496.
- Mian, Atif and Amir Sufi. "Household Debt and Defaults from 2000 to 2010: Facts from Credit Bureau Data." *Kreisman Working Paper Series in Housing Law and Policy*. Paper 33, 2015.
- Muthitacharoen, Athiphat; Krislert Samphantharak; and Sommarat Chantararat. "Fiscal Stimulus and Household Debt: Evidence from Thailand's First-Car Buyer Tax Rebate." Puey Ungphakorn Institute for Economic Research Discussion Paper No. 60, June 2017.
- Samphantharak, Krislert and Robert M. Townsend. *Household as Corporate Firms: An Analysis of Household Finance Using Integrated Household Surveys and Corporate Financial Accounting*. Cambridge University Press, 2010.
- Thailand Development Research Institute (TDRI). *Report of the Study of Farmers' Debt and Guideline to Improve the Operation of Funds Under the Ministry of Agriculture and Agricultural Cooperatives*. September 2015. (In Thai)
- Townsend, Robert M. *Financial Systems in Developing Economies: Growth, Inequality, and Policy Evaluation in Thailand*. Oxford/New York: Oxford University Press, 2011

Table 1: Overview of Credit Bureau Data

Coverage	Year							
	2009	2010	2011	2012	2013	2014	2015	July 2016
Number of financial institution members	68	69	75	78	78	80	86	90
Number of account (million)	32.63	33.93	37.86	41.99	46.63	47.63	48.47	60.51
Number of borrowers (million)	11.65	12.29	13.36	14.73	15.98	16.07	15.94	19.25
Total loan outstanding (trillion baht)	4.39	4.92	6.05	7.14	8.11	8.44	8.69	9.80
- Less than 30 days past due	3.85	4.39	5.32	6.40	7.24	7.63	7.86	8.78
- 31-60 days past due	0.08	0.08	0.10	0.12	0.16	0.20	0.26	0.28
- 61-90 days past due	0.04	0.03	0.05	0.05	0.08	0.08	0.07	0.11
- 91-120 days past due	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.04
-121-300 days past due	0.11	0.09	0.10	0.12	0.14	0.12	0.13	0.18
- Greater than 300 days past due	0.30	0.31	0.45	0.44	0.44	0.37	0.32	0.42
Total delinquent loan * (trillion baht)	0.42	0.42	0.57	0.57	0.62	0.53	0.50	0.64

* Delinquent loans are loans with more than 90 days past due.

Table 2: Summary Statistics of Borrowers (July 2016)

	Mean	Median	SD	Min	Max	N
<i>Borrower characteristics</i>						
Age (years)	44.16	43.00	12.36	20.00	80.00	18,813,985
Region - Bangkok and vicinity (=1)	0.29	na	na	0.00	1.00	16,039,856
- Central (=1)	0.18	na	na	0.00	1.00	16,039,856
- North (=1)	0.15	na	na	0.00	1.00	16,039,856
- Northeast (=1)	0.25	na	na	0.00	1.00	16,039,856
- South (=1)	0.11	na	na	0.00	1.00	16,039,856
Urban (=1)*	0.51	na	na	0.00	1.00	16,039,856
<i>Portfolio characteristics</i>						
Number of accounts	3.14	2.00	3.11	1.00	167.00	19,245,461
Number of distinct loan products	1.60	1.00	0.81	1.00	6.00	19,245,461
Number of financial institutions used	2.08	1.00	1.66	1.00	8.00	19,245,461
Total credit line (million baht)	0.77	0.28	3.84	0.00	4220.00	19,245,461
Total loan outstanding (million baht)	0.51	0.15	3.07	0.00	8990.00	19,245,461
Total delinquent loan (million baht)	0.20	0.06	1.10	0.00	973.00	3,189,527
<i>Credit history and utilization</i>						
Number of years in NCB data	5.02	5.00	2.73	1.00	8.00	19,245,461
New borrower (=1)	0.07	na	na	0.00	1.00	19,245,461
Have delinquent loan this year (=1)	0.17	na	na	0.00	1.00	19,245,461
Have delinquent loan in the past year (=1)	0.16	na	na	0.00	1.00	15,252,626
Utilization rate** (%)	0.65	0.71	0.36	0.00	1.00	19,245,461

* A postcode is defined as urban area if more than 50% of its area belong to municipalities.

** Utilization rate is defined as a ratio of current balance to credit line.

Data for age and location have some missing, hence the drop of sample with these identifiers.

Table 3: Dissecting Aggregate Debt and Delinquency by Loan Product, Lender and Borrower (July 2016)

By loan product and lender	Share of account (%)	Share of loan outstanding (%)	Share of delinquent loan (%)
	July 2016	July 2016	July 2016
<i>By Loan product</i>			
- Housing	5.4%	33.2%	19.8%
- Auto	11.2%	20.8%	23.4%
- Motorcycle	2.2%	0.5%	2.7%
- Credit card	30.7%	3.8%	8.1%
- Personal loan and others	35.5%	27.8%	31.8%
- Loan for business	15.0%	13.9%	14.0%
<i>By Lender</i>			
Commercial banks	35.2%	51.7%	45.6%
Specialized financial institutions (SFIs)	26.6%	33.9%	29.4%
Other financial institutions *	38.2%	14.4%	25.0%
By borrowers	Share of borrowers (%)	Share of loan outstanding (%)	Share of delinquent loan (%)
	July 2016	July 2016	July 2016
<i>By Age</i>			
- Younger than 25	3.2%	1.1%	1.3%
- Between 25-35	27.6%	22.6%	24.8%
- Between 36-45	27.9%	33.0%	34.2%
- Between 46-60	32.2%	36.1%	34.0%
- Older than 60	9.1%	7.2%	5.7%
<i>By Region</i>			
- Bangkok and vicinity	29.4%	36.4%	35.4%
- Central	18.3%	17.2%	18.1%
- North	15.4%	13.7%	13.7%
- Northeast	25.4%	21.0%	18.7%
- South	11.4%	11.7%	14.1%
<i>Urban</i>	51.0%	58.8%	58.1%

* Other financial institutions include credit card companies, hire purchase companies, insurance companies and co-operative.

Table 4: Summary Statistics of Loan Accounts by Loan Product and Lender (July 2016)

	Total				Commercial banks				SFIs				Others			
	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median	SD	N
<i>Credit line per account (million baht)</i>																
- Housing	1.28	1.80	1.72	3,264,661	2.28	1.84	2.45	1,079,775	0.78	1.63	0.84	2,163,824	1.35	0.37	1.65	21,062
- Auto	0.53	0.60	0.53	6,788,314	0.55	0.57	0.31	3,512,562	1.39	1.17	1.04	3,119	0.51	0.63	0.69	3,272,633
- Motorcycle	0.07	0.07	0.05	1,308,621	0.21	0.19	0.13	1,234	0.05	0.04	0.01	203	0.07	0.06	0.05	1,307,184
- Credit card	0.11	0.19	4.11	18,324,096	0.09	0.26	0.14	10,326,310	0.12	0.15	0.32	26,397	4.37	0.12	6.23	8,005,253
- Personal loan and others*	0.19	0.20	0.78	20,129,248	0.32	0.22	1.34	5,807,285	0.30	0.14	0.54	4,969,128	0.04	0.06	0.10	9,352,835
- Loan for business**	0.19	0.14	1.95	9,011,527	2.02	0.16	8.95	399,123	0.11	0.05	0.34	8,612,310	4.08	3.33	15.76	94
<i>Loan outstanding per account (million baht)</i>																
- Housing	1.00	1.05	1.43	3,252,410	1.77	1.41	2.03	1,085,753	0.61	0.64	0.73	2,145,696	1.20	0.50	1.50	20,961
- Auto	0.31	0.46	0.47	6,653,878	0.33	0.40	0.25	3,432,196	0.50	0.40	0.70	3,059	0.28	0.39	0.63	3,218,623
- Motorcycle	0.04	0.06	0.04	1,256,498	0.17	0.15	0.12	1,210	0.02	0.03	0.02	203	0.04	0.06	0.04	1,255,085
- Credit card	0.02	0.17	0.07	18,581,760	0.02	0.15	0.08	10,341,985	0.01	0.01	0.03	26,397	0.02	0.11	0.04	8,213,378
- Personal loan and others	0.13	0.66	0.54	21,488,600	0.21	0.47	0.93	5,912,556	0.23	0.53	0.44	5,287,154	0.03	0.11	0.09	10,288,890
- Loan for business	0.15	0.34	1.90	9,050,662	1.28	0.46	8.49	433,872	0.09	0.20	0.29	8,616,696	3.95	1.04	16.34	94
<i>Delinquent loan per delinquent account (million baht)***</i>																
- Housing	0.95	0.54	1.58	4%	1.93	1.23	2.71	3%	0.69	0.46	0.93	5%	1.71	0.80	2.16	4%
- Auto	0.19	0.21	1.11	12%	0.25	0.22	0.23	9%	0.76	0.60	0.96	28%	0.14	0.14	1.39	16%
- Motorcycle	0.04	0.04	0.02	38%	0.08	0.05	0.08	3%	0.03	0.03	0.01	43%	0.04	0.04	0.02	38%
- Credit card	0.06	0.09	0.15	5%	0.07	0.08	0.21	4%	na	na	na	na	0.05	0.07	0.07	6%
- Personal loan and others	0.08	0.17	0.42	12%	0.17	0.00	0.84	9%	0.13	0.00	0.27	10%	0.03	0.07	0.07	14%
- Loan for business	0.16	0.11	1.09	6%	0.94	0.20	3.34	10%	0.09	0.09	0.46	6%	1.13	0.93	0.83	54%

* Majority of other loan products include overdraft, other hire purchase and leasing.

** Loan for business include commercial loan and loan for agriculture.

*** In the last column of each financial institution panel, N reflects percentage of loan accounts with delinquency status.

Table 5: Concentration of Household Debt by Loan Product, Lender and Borrower (July 2016)

	Share of total household debt (%) occupied by	
	Bottom 10% borrowers	Top 10% borrowers
Overall	0.1%	62.4%
<i>By loan product</i>		
- Housing	0.6%	43.2%
- Auto	0.9%	33.2%
- Motorcycle	0.7%	32.9%
- Credit card	0.1%	57.5%
- Personal loan and others	0.1%	70.8%
- Loan for business	0.1%	67.3%
<i>By lender</i>		
Commercial banks	0.1%	66.2%
Specialized financial institutions (SFIs)	0.3%	49.3%
Other financial institutions	0.1%	57.1%
<i>By borrower</i>		
By Age		
- Younger than 25	0.1%	64.1%
- Between 25-35	0.1%	60.7%
- Between 36-45	0.1%	60.9%
- Between 46-60	0.1%	61.9%
- Older than 60	0.1%	65.2%
By Region		
- Bangkok and vicinity	0.1%	67.8%
- Central	0.1%	60.9%
- North	0.1%	56.0%
- Northeast	0.1%	57.1%
- South	0.1%	62.4%
- Urban	0.1%	66.3%
- Rural	0.1%	57.1%

Table 6: Concentration of Delinquent Debt by Loan Product, Lender and Borrower (July 2016)

	Share of total delinquent debt (%) occupied by	
	Bottom 10% delinquent borrowers	Top 10% delinquent borrowers
Overall	0.2%	65.9%
<i>By loan product</i>		
- Housing	0.7%	44.5%
- Auto	1.0%	42.8%
- Motorcycle	1.2%	23.9%
- Credit card	0.6%	50.6%
- Personal loan and others	0.3%	63.3%
- Loan for business	0.2%	74.7%
<i>By lender</i>		
Commercial banks	0.4%	64.2%
Specialized Financial Institutions (SFI)	0.2%	61.7%
Other financial institutions	0.5%	52.3%
<i>By borrower</i>		
<i>By Age</i>		
- Younger than 25	0.6%	53.1%
- Between 25-35	0.3%	62.1%
- Between 36-45	0.2%	66.2%
- Between 46-60	0.2%	66.1%
- Older than 60	0.2%	65.9%
<i>By Region</i>		
- Bangkok and vicinity	0.2%	69.6%
- Central	0.3%	63.4%
- North	0.2%	60.9%
- Northeast	0.3%	62.4%
- South	0.3%	63.1%
- Urban	0.2%	68.1%
- Rural	0.3%	61.2%

Table 7: Who are the Top 10% and Bottom 10% Borrowers?

Mean/Mean differences	Total (Mean)	Bottom 10% (B)	Middle 80% (M)	Top 10% (T)	Differences	
					(B-M)	(T-M)
<i>Borrower characteristics</i>						
Age (years)	43.31	44.48	43.06	43.90	1.429***	0.846***
Region						
- Bangkok and vicinity (=1)	0.25	0.33	0.22	0.31	0.112***	0.091***
- Central (=1)	0.15	0.16	0.15	0.14	0.002*	-0.013***
- North (=1)	0.13	0.11	0.13	0.10	-0.026***	-0.033***
- Northeast (=1)	0.21	0.16	0.23	0.16	-0.066***	-0.065***
- South (=1)	0.10	0.09	0.10	0.09	-0.012***	-0.003***
- Urban (=1)	0.51	0.60	0.48	0.62	0.121***	0.133***
<i>Loan portfolio characteristics</i>						
Total credit line (Baht)	2,512,733	3,630,348	1,451,864	8,917,637	2,178,484***	7,465,773***
Number of accounts	3.15	1.65	2.86	6.69	-1.216***	3.831***
Number of distinct loan products	1.60	1.12	1.52	2.63	-0.403***	1.113***
Share of housing loan (%)	10%	0%	6%	45%	-0.062***	0.382***
Share of auto loan (%)	25%	3%	28%	13%	-0.255***	-0.152***
Share of motorcycle loan (%)	5%	7%	5%	0%	0.017***	-0.051***
Share of credit card loan (%)	12%	39%	11%	3%	0.277***	-0.079***
Share of personal loan and others (%)	33%	44%	33%	32%	0.109***	-0.006***
Share of loan for business (%)	15%	8%	17%	7%	-0.086***	-0.093***
Number of financial institutions used	2.08	1.31	1.91	4.04	-0.600***	2.129***
Share of commercial bank loan (%)	30%	23%	28%	48%	-0.048***	0.207***
Share of SFI loan (%)	33%	12%	34%	42%	-0.218***	0.087***
Share of loan from other financial institutions (%)	37%	65%	39%	9%	0.266***	-0.294***
<i>Credit history and utilization</i>						
New borrower (=1)	0.21	0.19	0.23	0.04	-0.043***	-0.197***
Have delinquent loan this year (=1)	0.16	0.09	0.18	0.13	-0.086***	-0.045***
Have delinquent loan in the past year (=1)	0.16	0.10	0.17	0.11	-0.076***	-0.068***
Utilization rate (%)	62%	12%	67%	78%	-0.547***	0.115***

Note: *, **, *** represent 90%, 95% and 99% significant level.

Table 8: Who are Defaulters and Top Defaulters?

	No delinquent loan (N)	Some delinquent loan (D)	Top 10% delinquent loan (TD)		Differences	
				(D-N)	(TD-N)	(TD-D)
<i>Borrower characteristics</i>						
Age (years)	43.73	42.31	41.15	-1.425***	-2.578***	-1.154***
Region						
- Bangkok and vicinity	0.25	0.23	0.22	-0.019***	-0.0343***	-0.0153***
- Central	0.15	0.15	0.16	0.002	0.014***	0.012***
- North	0.13	0.09	0.10	-0.044***	-0.034***	0.010***
- Northeast	0.21	0.19	0.19	-0.022***	-0.023***	-0.001
- South	0.09	0.08	0.11	-0.009***	0.013***	0.022***
- Urban	0.51	0.53	0.50	0.019***	-0.009***	-0.028***
<i>Portfolio characteristics</i>						
Total credit line (Baht)	2,866,083	2,236,670	795,218	-629,413	-2,070,865***	1,441,452***
Number of accounts	3.17	2.74	3.01	-0.428***	-0.158***	0.271***
Number of distinct loan products	1.60	1.50	1.59	-0.094***	-0.006***	0.088***
Share of housing loan (%)	11%	6%	6%	-0.056***	-0.056***	-0.001
Share of auto loan (%)	25%	13%	25%	-0.121***	0.001*	0.122***
Share of motorcycle loan (%)	3%	10%	12%	0.068***	0.092***	0.023***
Share of credit card loan (%)	13%	13%	6%	0.005	-0.066***	-0.072***
Share of personal loan and others (%)	32%	54%	40%	0.216***	0.082***	-0.134***
Share of loan for business (%)	16%	5%	11%	-0.113***	-0.0527***	0.060***
Number of financial institutions used	2.07	2.02	2.11	-0.048**	0.039***	0.088***
Share of commercial bank loan (%)	31%	20%	22%	-0.113***	-0.097***	0.017***
Share of SFI loan (%)	35%	26%	29%	-0.082***	-0.060***	0.022***
Share of loan from other financial insitutions (%)	34%	54%	50%	0.196***	0.157***	-0.039***
<i>Credit history and utilization</i>						
New borrower (=1)	0.23	0.13	0.11	-0.092***	-0.113***	-0.022***
Have delinquent loan in the past year (=1)	0.01	0.78	0.80	0.766***	0.784***	0.018***
Utilization rate (%)	61%	40%	71%	-0.209***	0.106***	0.315***

Table 9: Three Perspectives of Household Debt (July 2016)

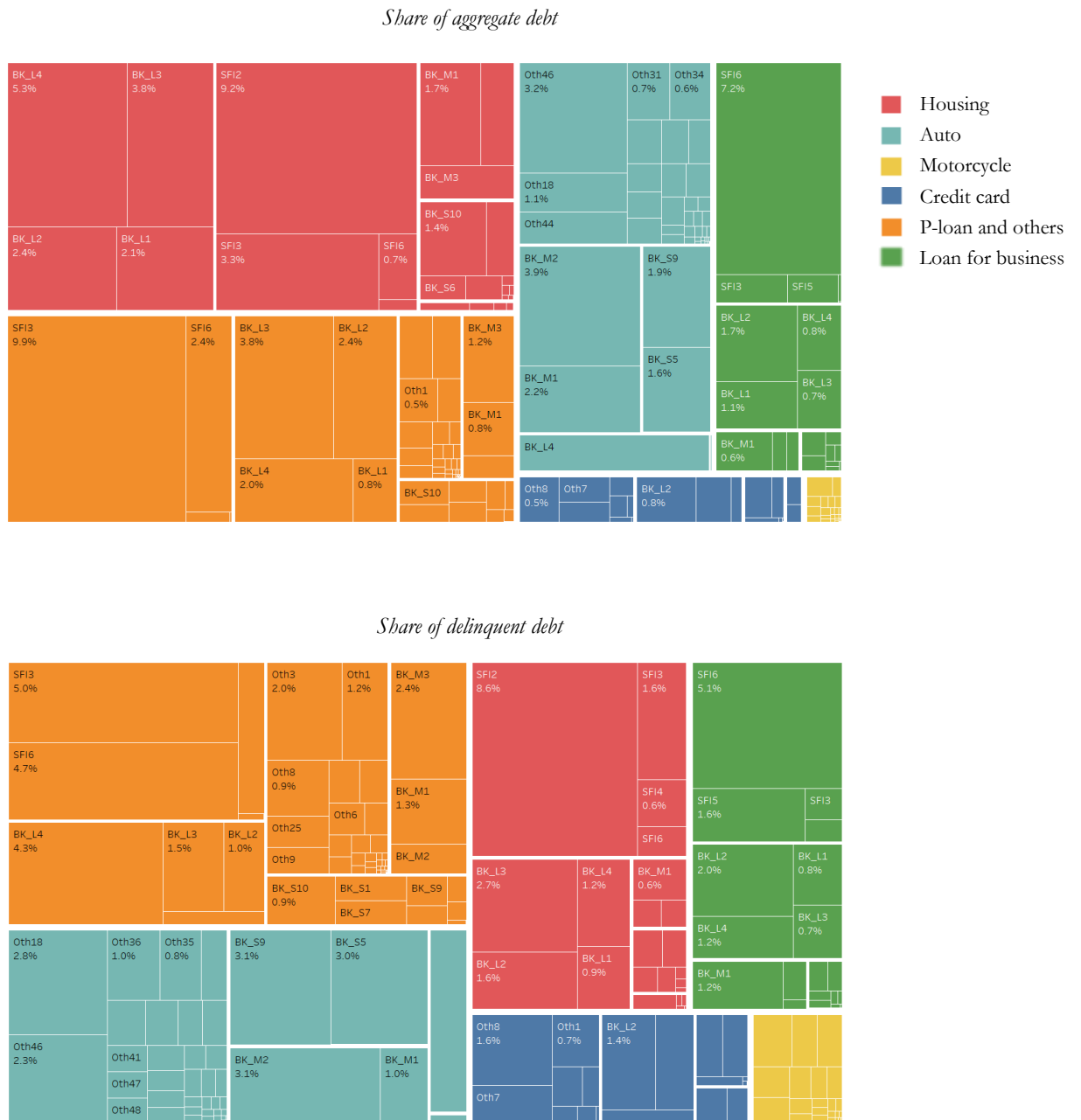
	Debt per capita (baht) (Aggregate measures)	Debt headcount (%) (Prevalence)	Debt per borrower (baht) (Intensity)	
			Mean	Median
Overall	149,126	29%	509,311	147,068
<i>By loan product</i>				
- Housing	49,458	4%	1,273,049	723,264
- Auto	31,065	9%	335,695	263,289
- Motorcycle	793	2%	41,327	32,640
- Credit card	5,631	9%	60,346	23,480
- Personal loan and others	41,471	17%	250,076	50,000
- Loan for business	20,708	6%	355,569	120,000
<i>By lender</i>				
Commercial banks	92,467	18%	510,739	167,714
Specialized financial institutions (SFIs)	35,156	6%	617,845	300,798
Other financial institutions	21,503	17%	126,194	41,556
<i>By borrower</i>				
By Age				
- Younger than 25	19,075	10%	183,276	49,420
- Between 25-35	208,481	49%	422,927	112,751
- Between 36-45	305,561	50%	610,785	185,031
- Between 46-60	259,417	45%	578,281	181,972
- Older than 60	79,453	19%	408,366	114,303
By Region				
- Bangkok and vicinity	271,958	44%	616,760	101,977
- Central	117,216	25%	467,825	137,423
- North	90,913	20%	444,264	183,822
- Northeast	76,651	19%	412,794	159,263
- South	101,201	20%	512,088	151,614
- Urban	191,510	33%	574,990	122,762
- Rural	82,656	20%	420,122	161,073

Table 10: Three Perspectives of Delinquency (July 2016)

	Delinquency rate (Aggregate measures) (% of aggregate loan)	Delinquency headcount (Prevalence) (% of borrower)	Delinquent debt per delinquent borrower (Intensity)	
			Median (Baht)	(Median % of loan port)
Overall	6.5%	16.6%	56,529	100.0%
<i>By loan product</i>				
- Housing	3.9%	4.2%	708,013	100.0%
- Auto	7.3%	12.5%	98,205	100.0%
- Motorcycle	33.4%	37.2%	34,203	100.0%
- Credit card	14.0%	8.6%	47,888	100.0%
- Personal loan and others	7.4%	15.0%	42,745	100.0%
- Loan for business	6.6%	10.6%	51,479	100.0%
<i>By lender</i>				
Commercial banks	12.6%	9.7%	122,645	100.0%
Specialized financial institutions (SFIs)	5.6%	11.6%	61,248	100.0%
Other financial insitutions	11.2%	17.7%	41,886	100.0%
<i>By borrower</i>				
By Age				
- Younger than 25	7.4%	17.7%	43,183	100.0%
- Between 25-35	7.1%	20.2%	52,177	100.0%
- Between 36-45	6.7%	17.5%	61,824	100.0%
- Between 46-60	6.1%	14.5%	62,515	94.4%
- Older than 60	5.1%	10.6%	54,548	89.7%
By Region				
- Bangkok and vicinity	6.1%	14.7%	63,190	100.0%
- Central	6.6%	17.8%	56,290	100.0%
- North	6.3%	13.0%	66,698	79.9%
- Northeast	5.6%	15.0%	50,449	93.5%
- South	7.6%	18.5%	60,947	100.0%
- Urban	6.2%	15.3%	61,260	100.0%
- Rural	6.4%	15.7%	55,162	100.0%

Figure 1: Share of aggregate debt and delinquency by product and lender (July 2016)

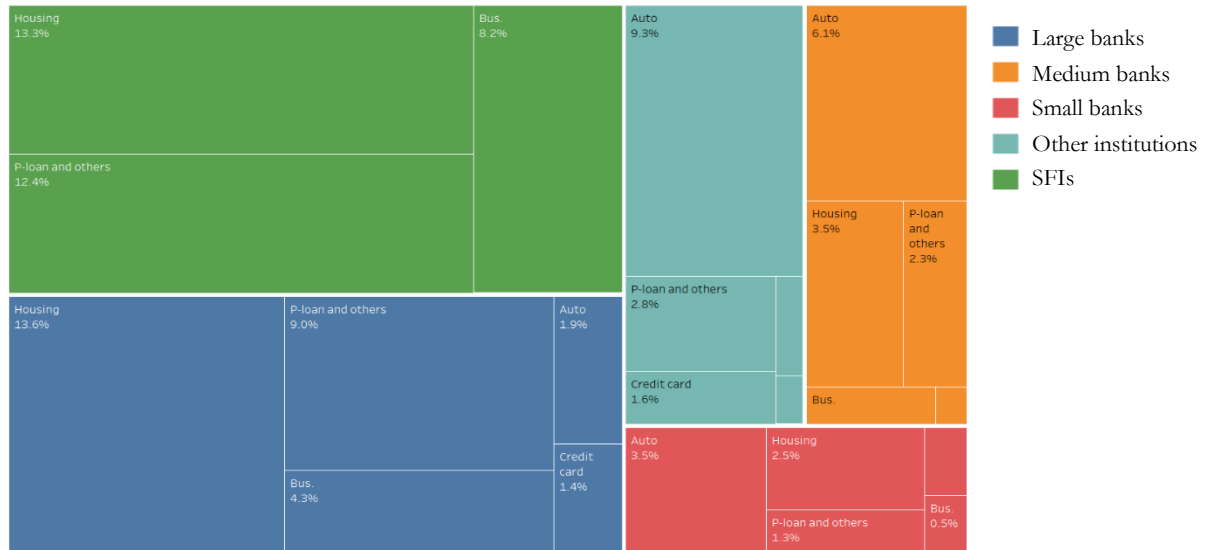
A. By loan product and lender*



* Lender types include large banks (BK_L), medium banks (BK_M), small banks (BK_S), SFIs and other financial institutions (OTH).

B. By lender and loan product

Share of aggregate debt



Share of delinquent debt

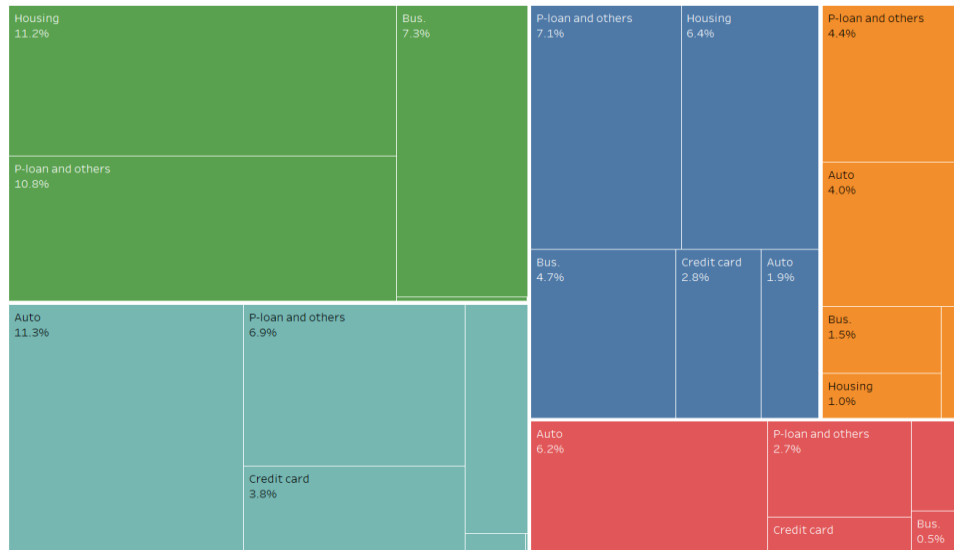


Figure 2: Debt and delinquency over time by loan product, lender and borrower

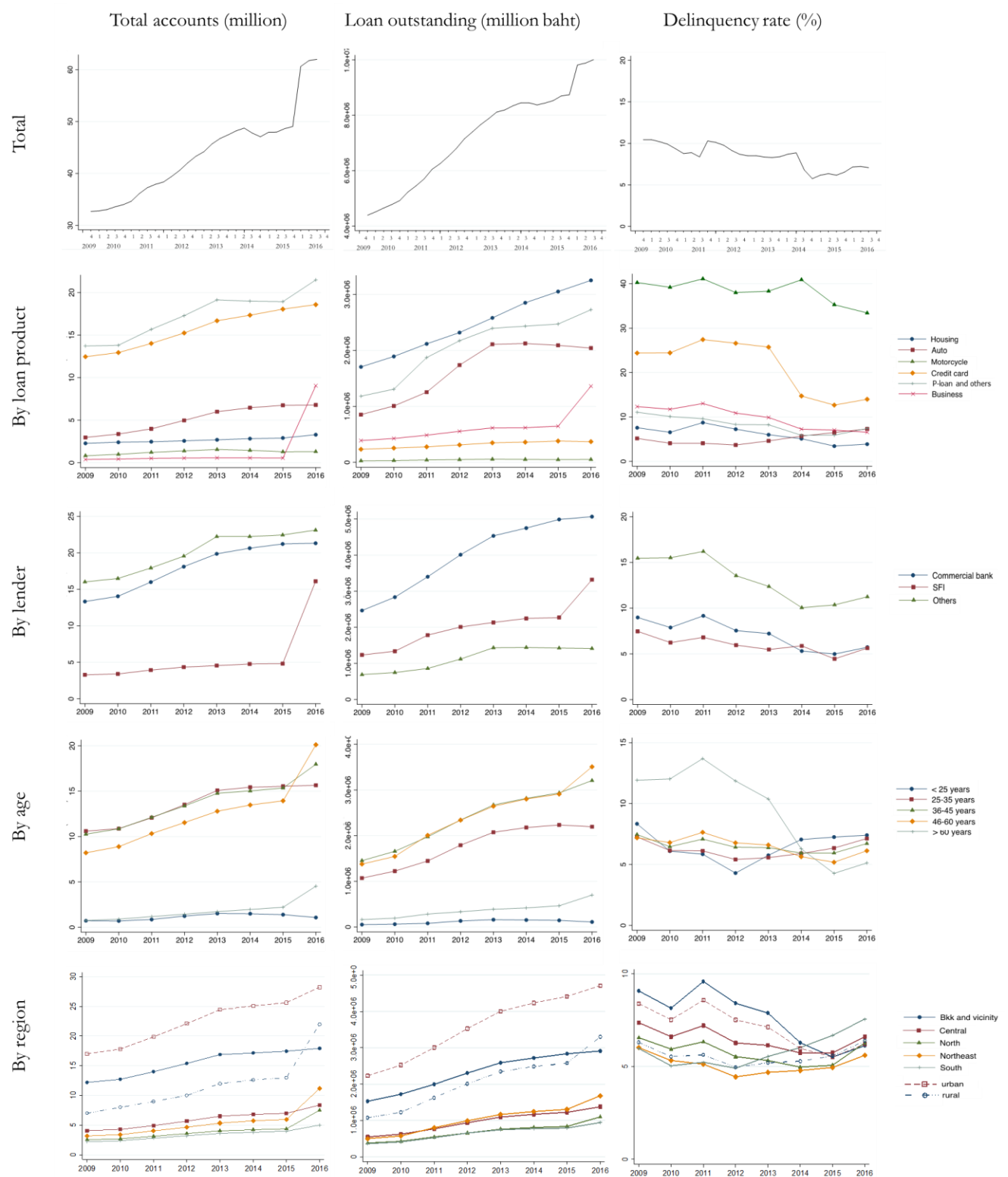
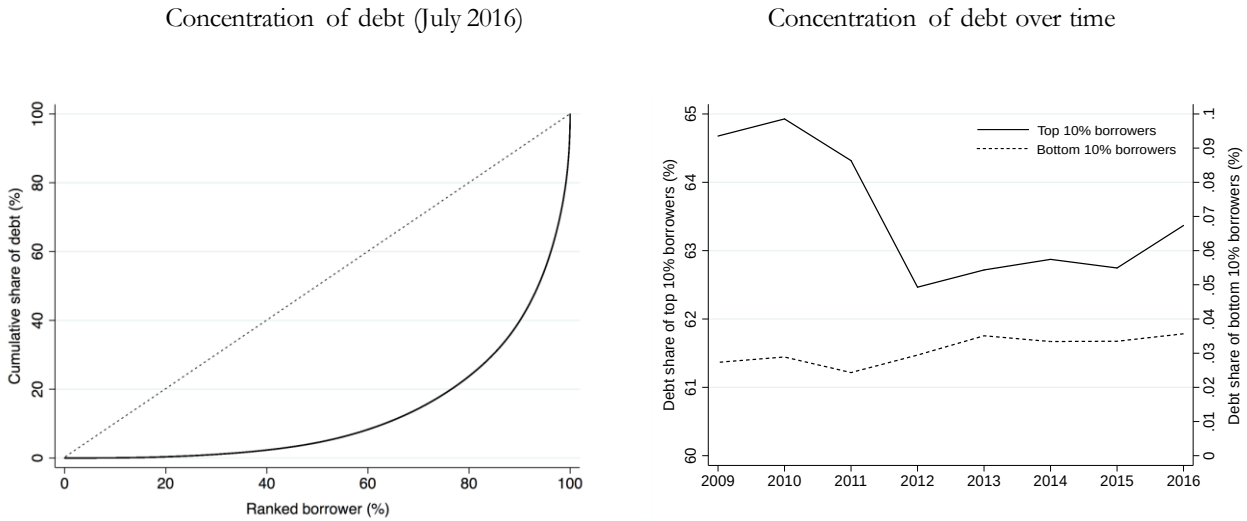


Figure 3: Concentration of household debt and delinquency

A. Debt



B. Delinquent debt

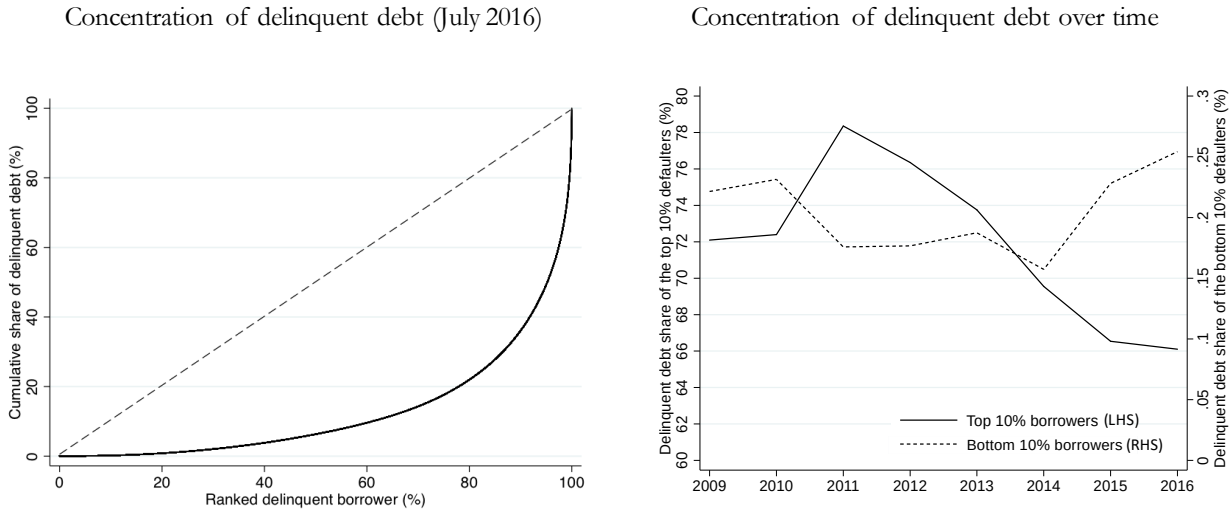




Figure 5: Distribution of household debt across and within region (July 2016)

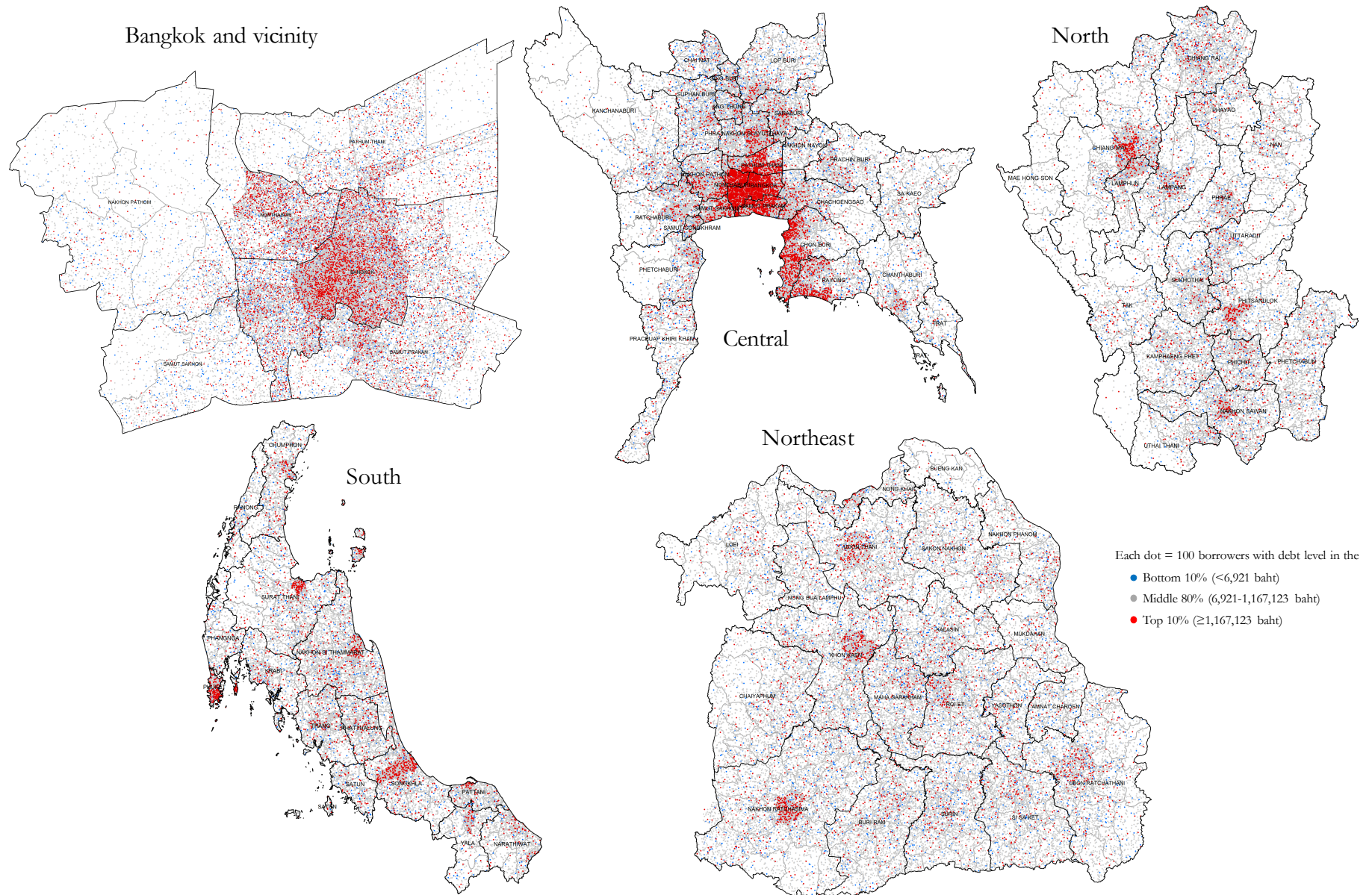


Figure 6: Distribution of household debt across and within province (July 2016)

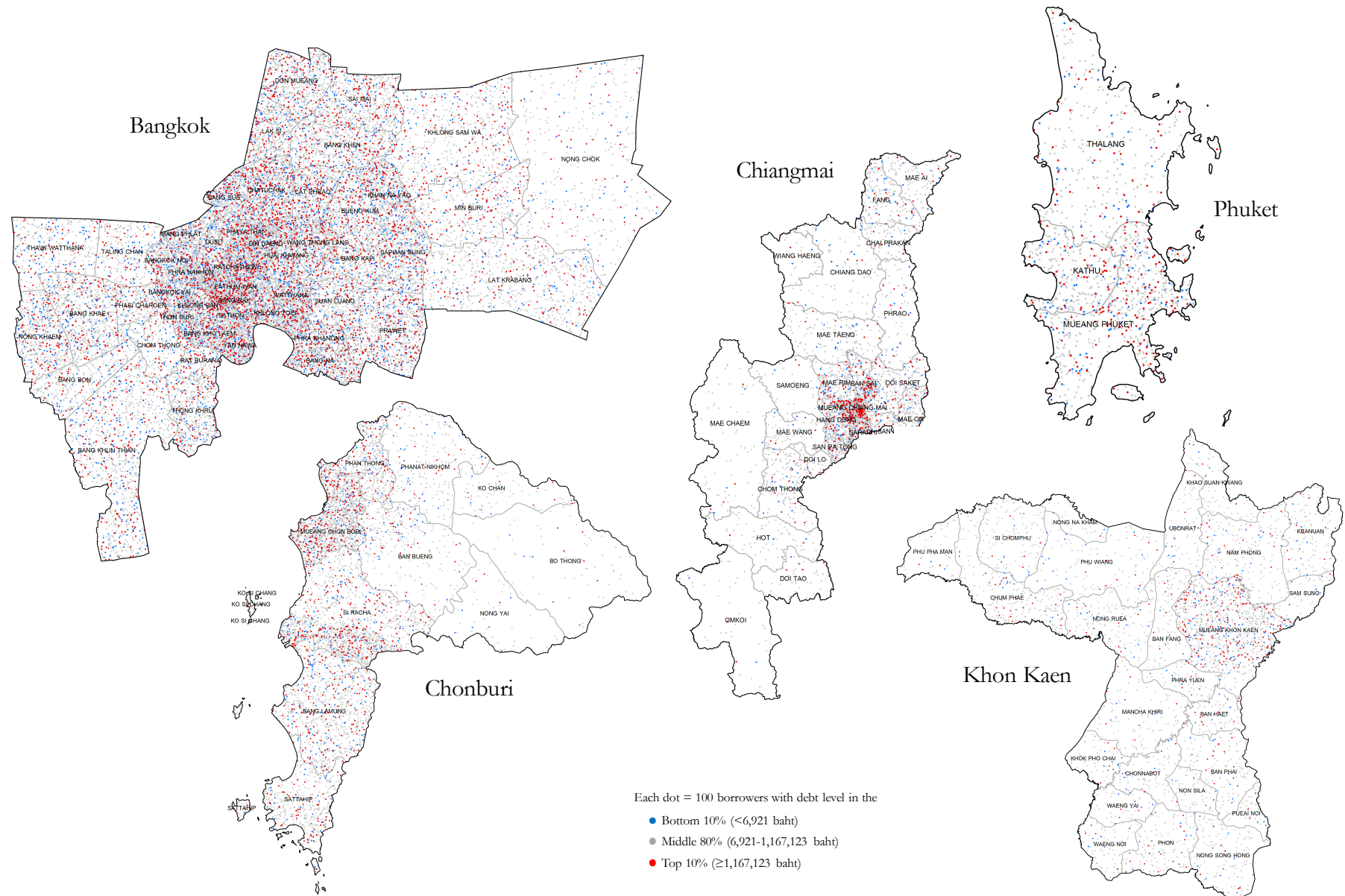


Figure 7: Concentration of debt and delinquency by province (July 2016)

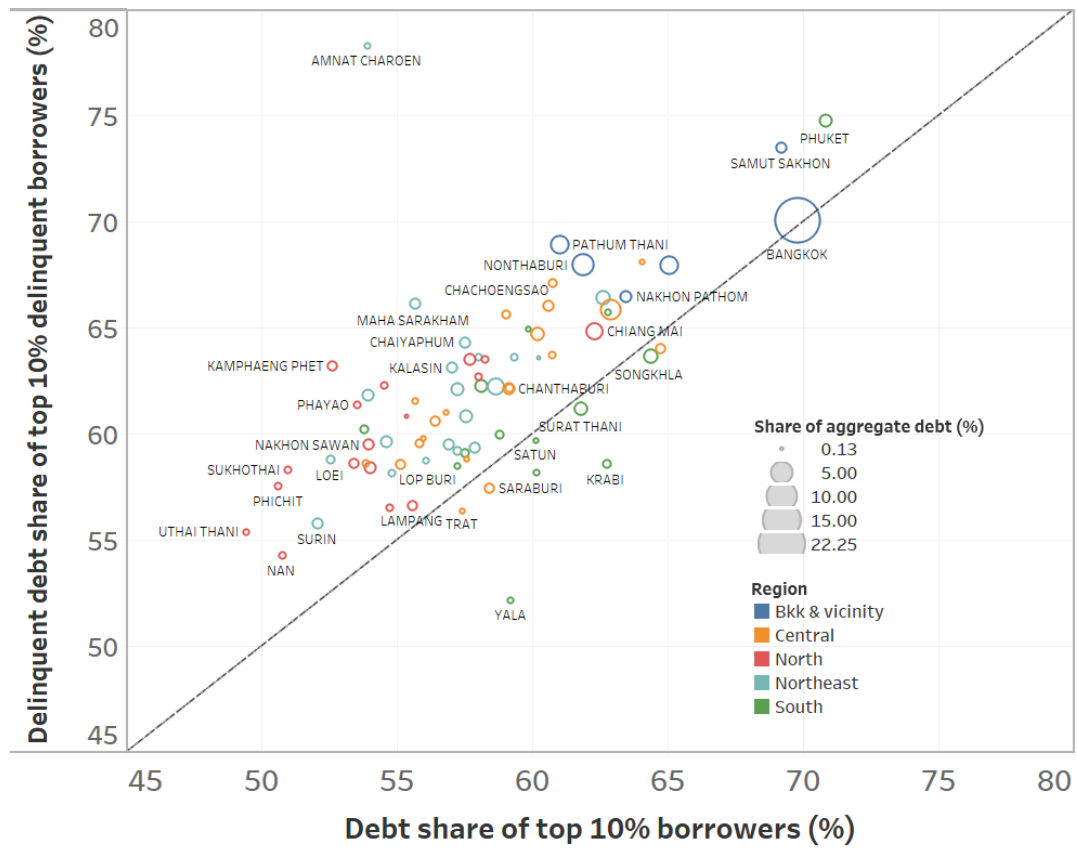


Figure 8: Three perspectives of household debt over time

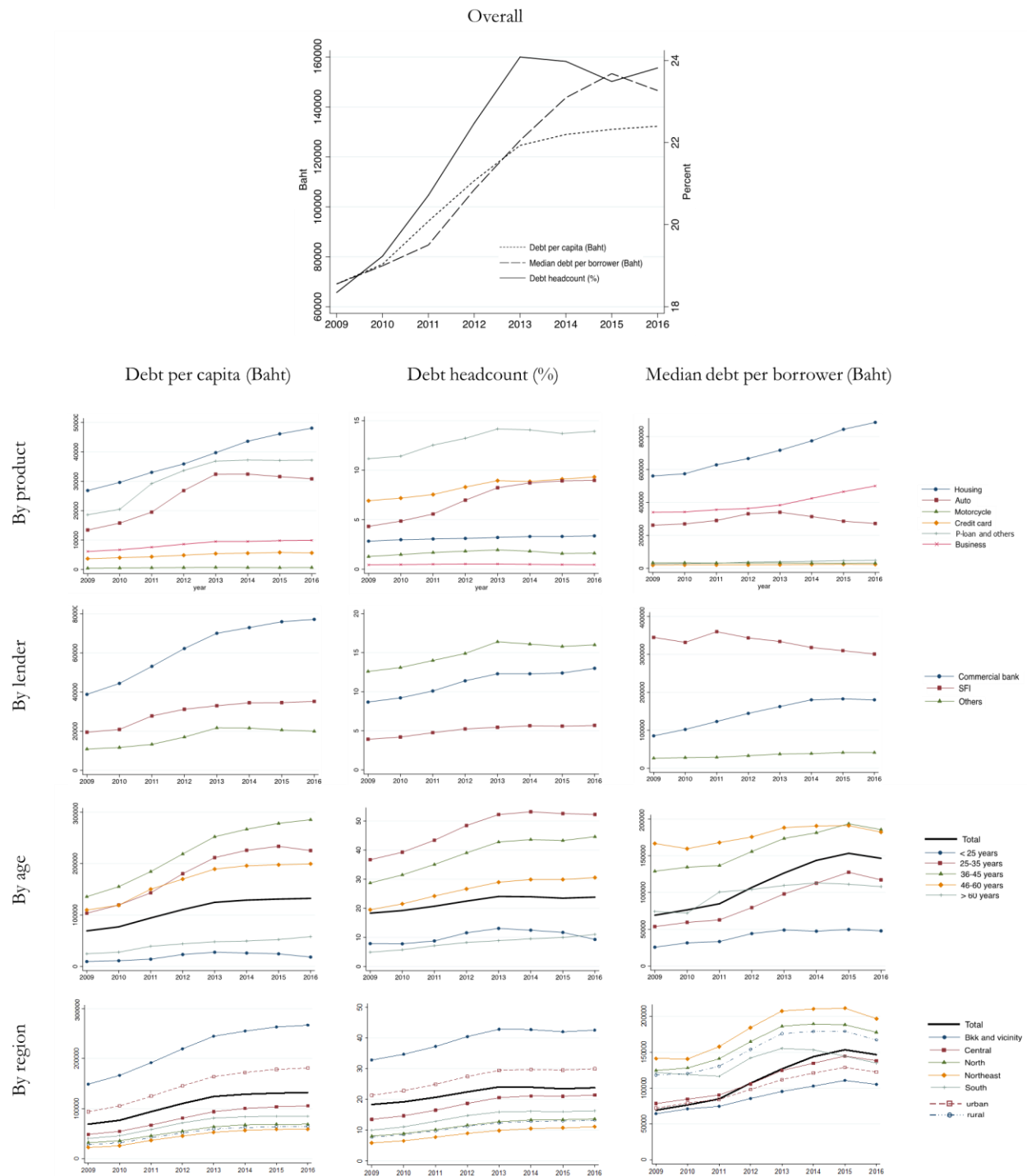


Figure 9: Three perspectives of delinquency over time

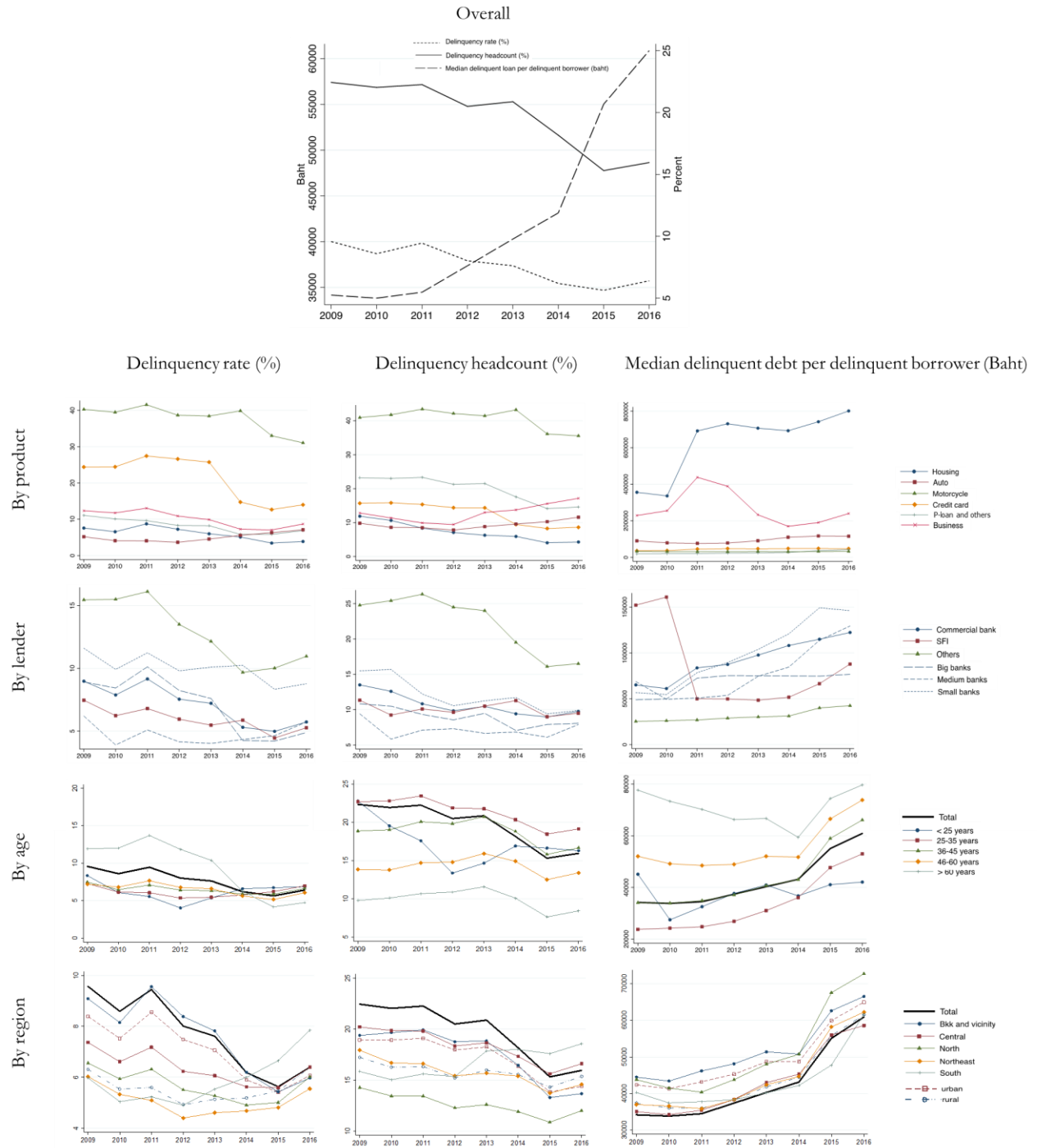
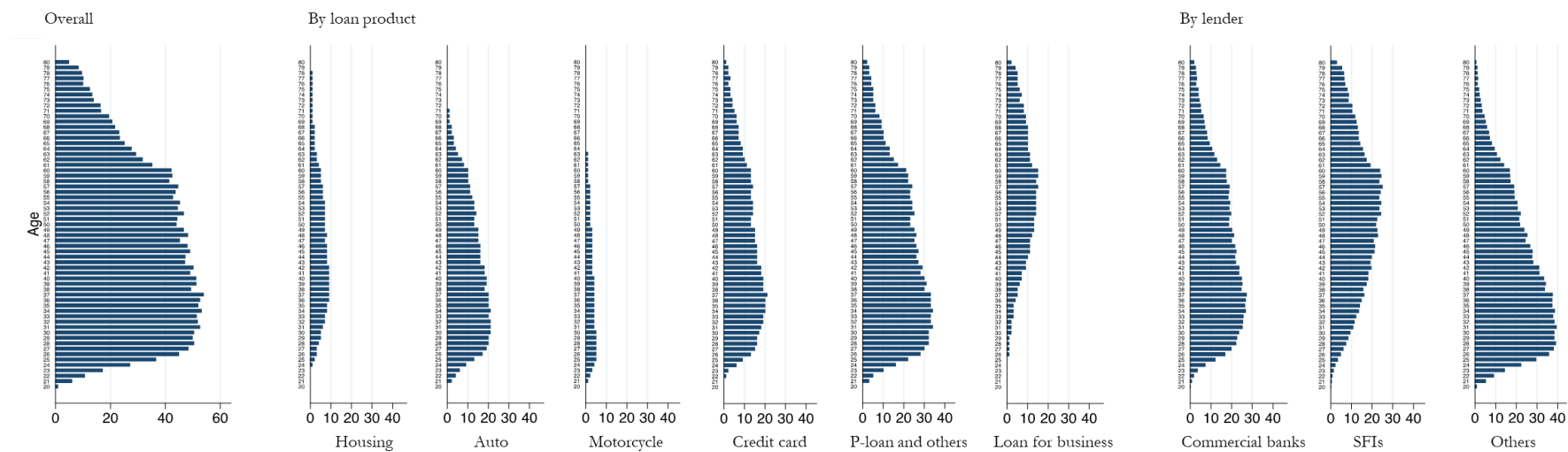


Figure 10: Debt prevalence and intensity by age (July 2016)

Debt headcount (%) by age



Median debt per borrower (million Baht) by age

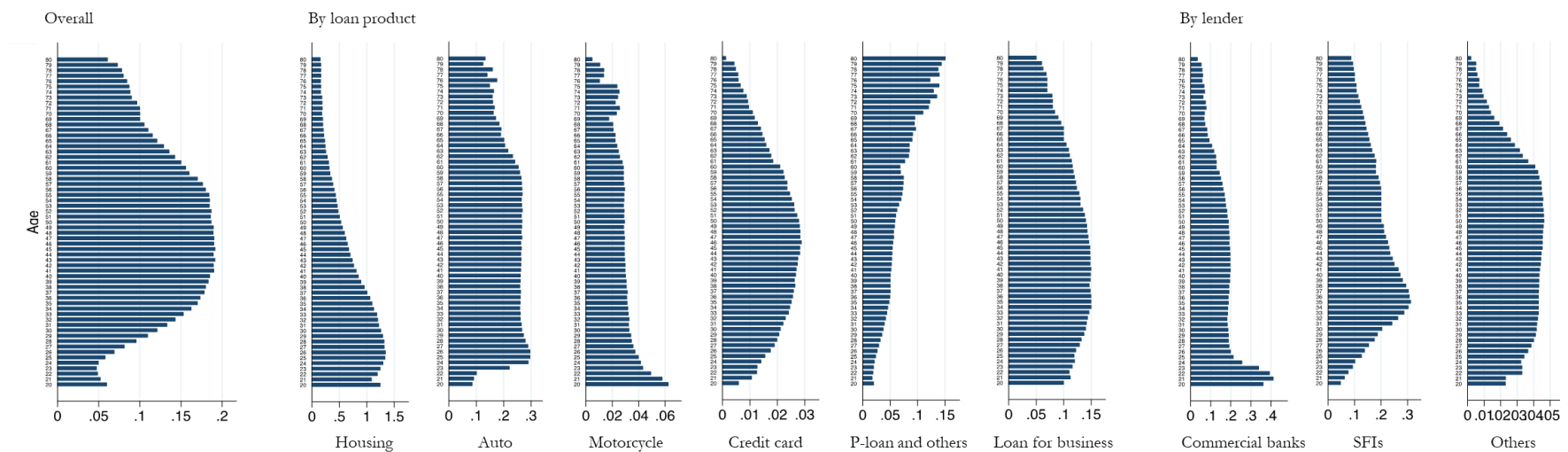


Figure 11: Age profile of debt over time

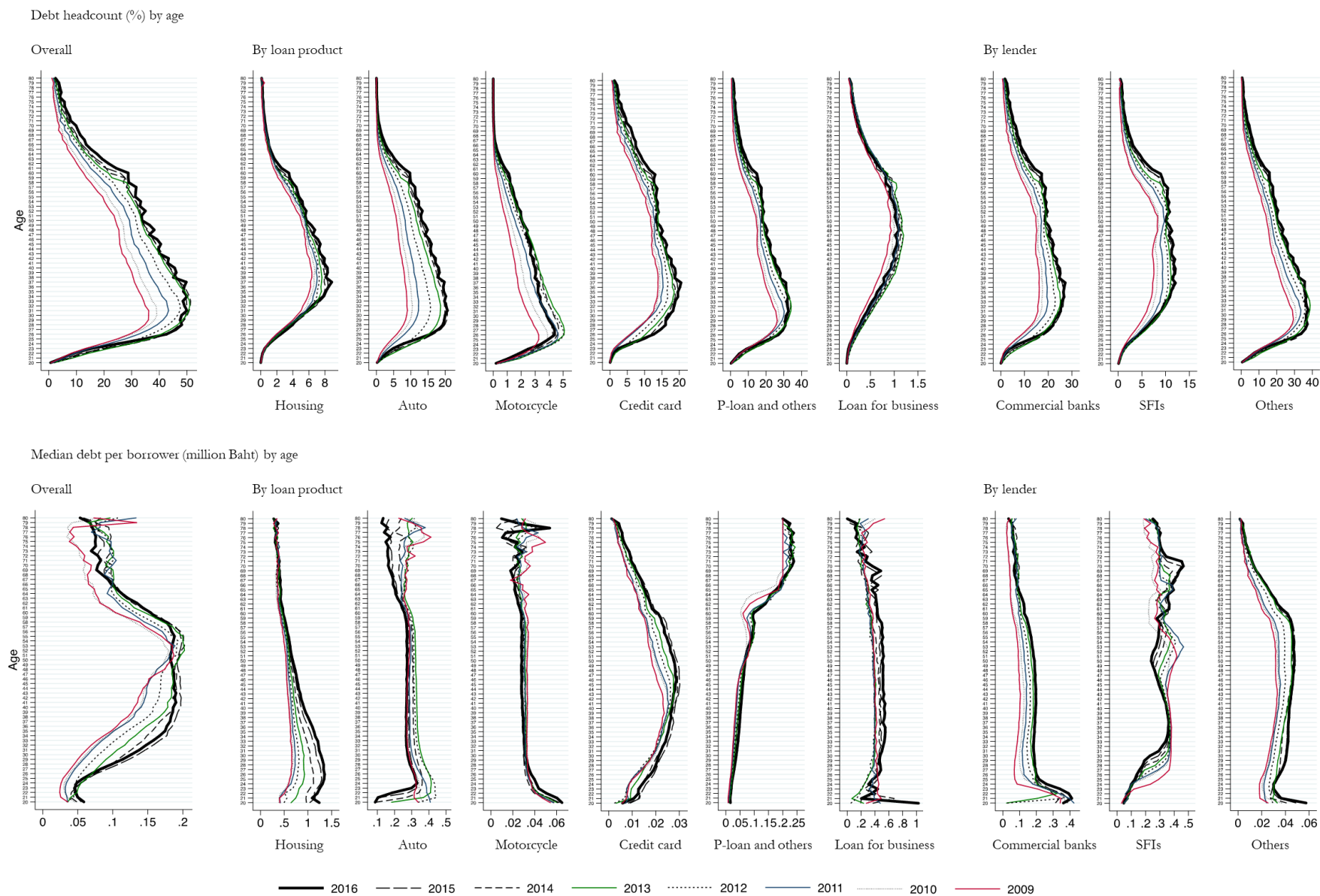


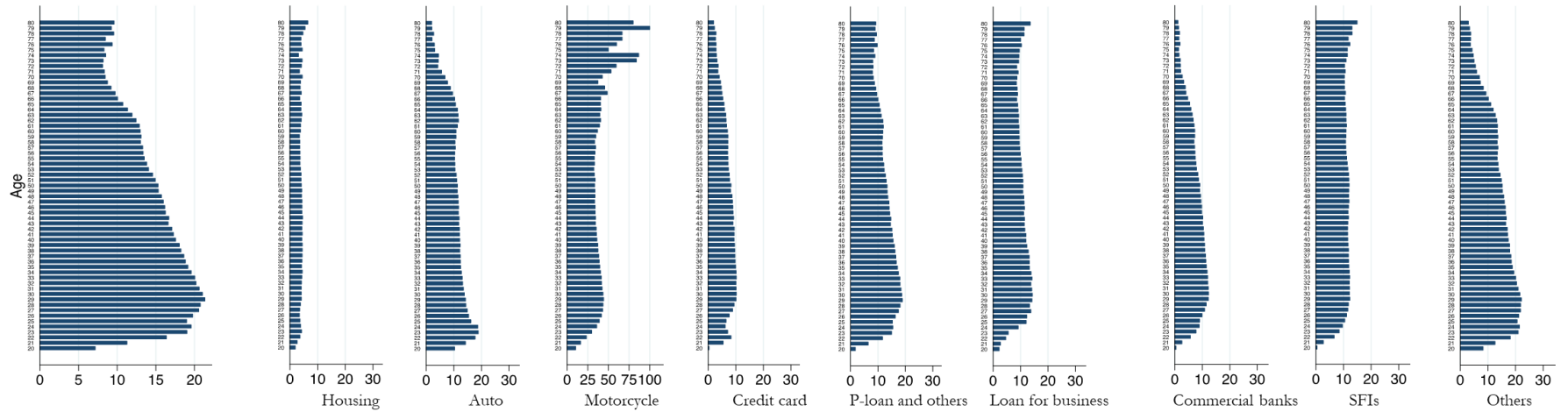
Figure 12: Delinquency by age (July 2016)

Delinquency headcount (%) by age

Overall

By loan product

By lender



Median delinquent debt (million baht) by age

Overall

By loan product

By lender

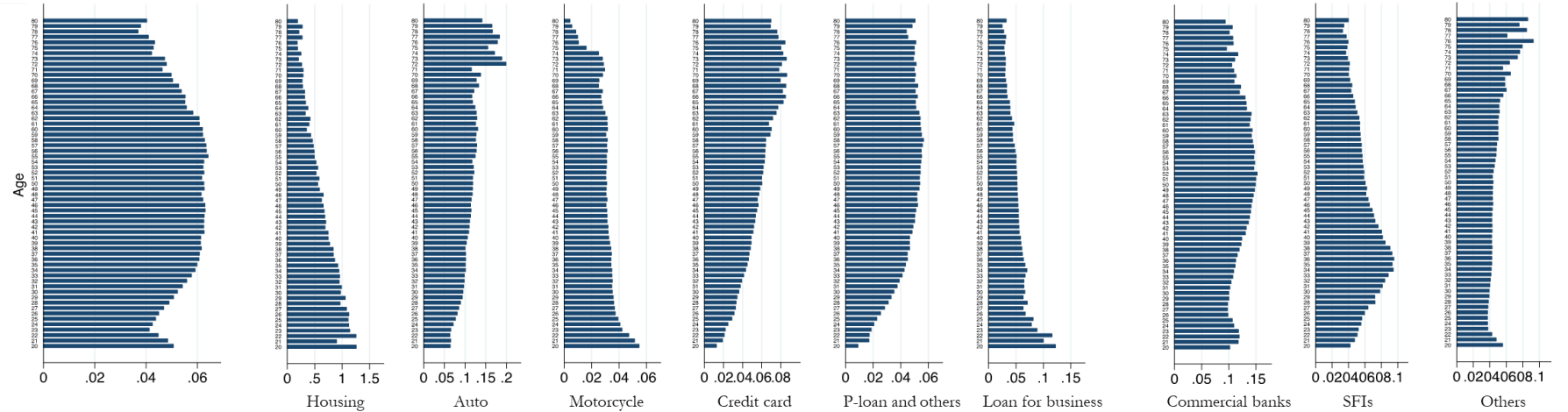


Figure 13: Age profile of delinquency over time

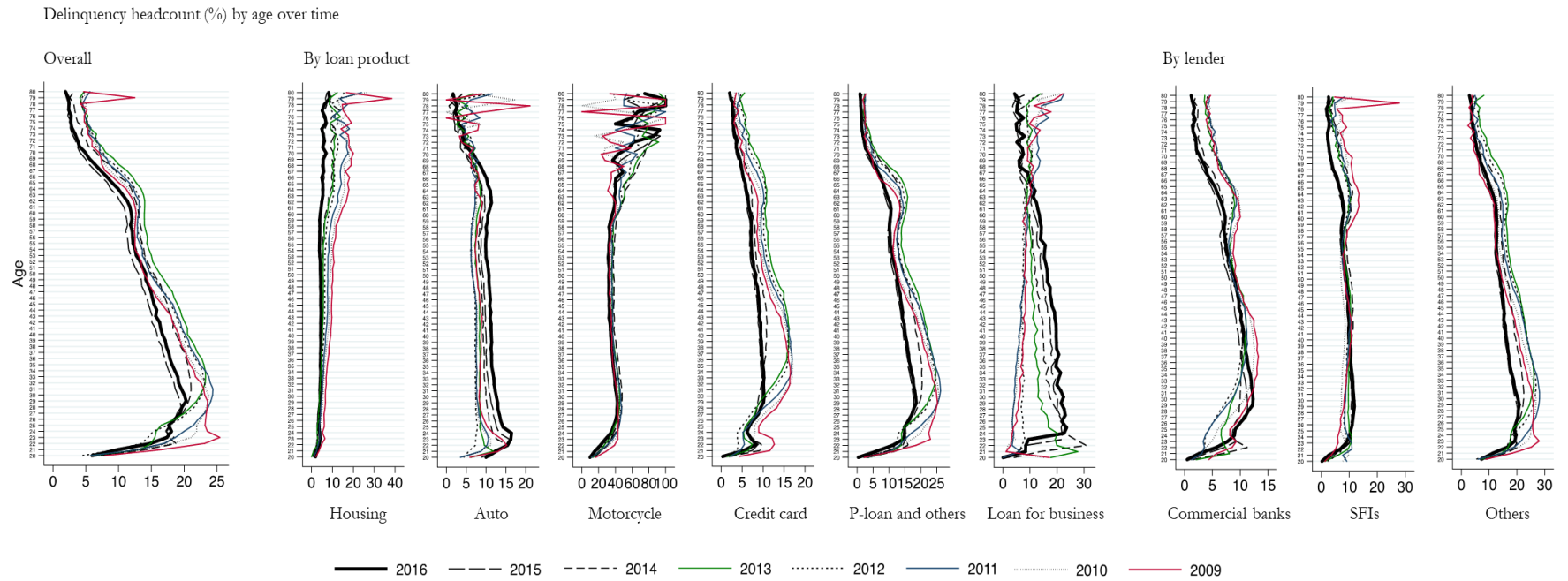


Figure 14: Life cycle view of debt and delinquency by birth cohort

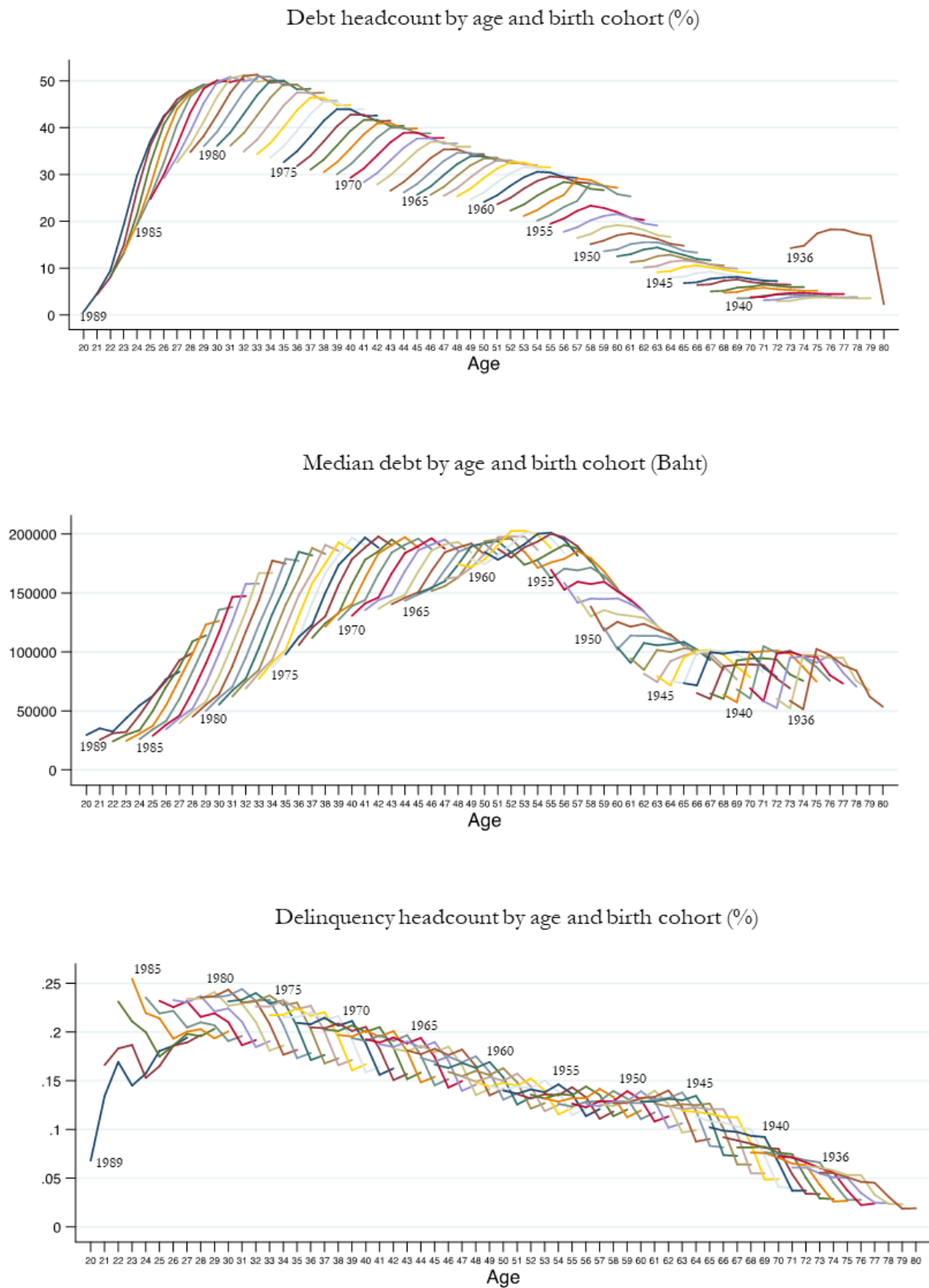


Figure 15: Life cycle view of debt by birth cohort, loan product and lender

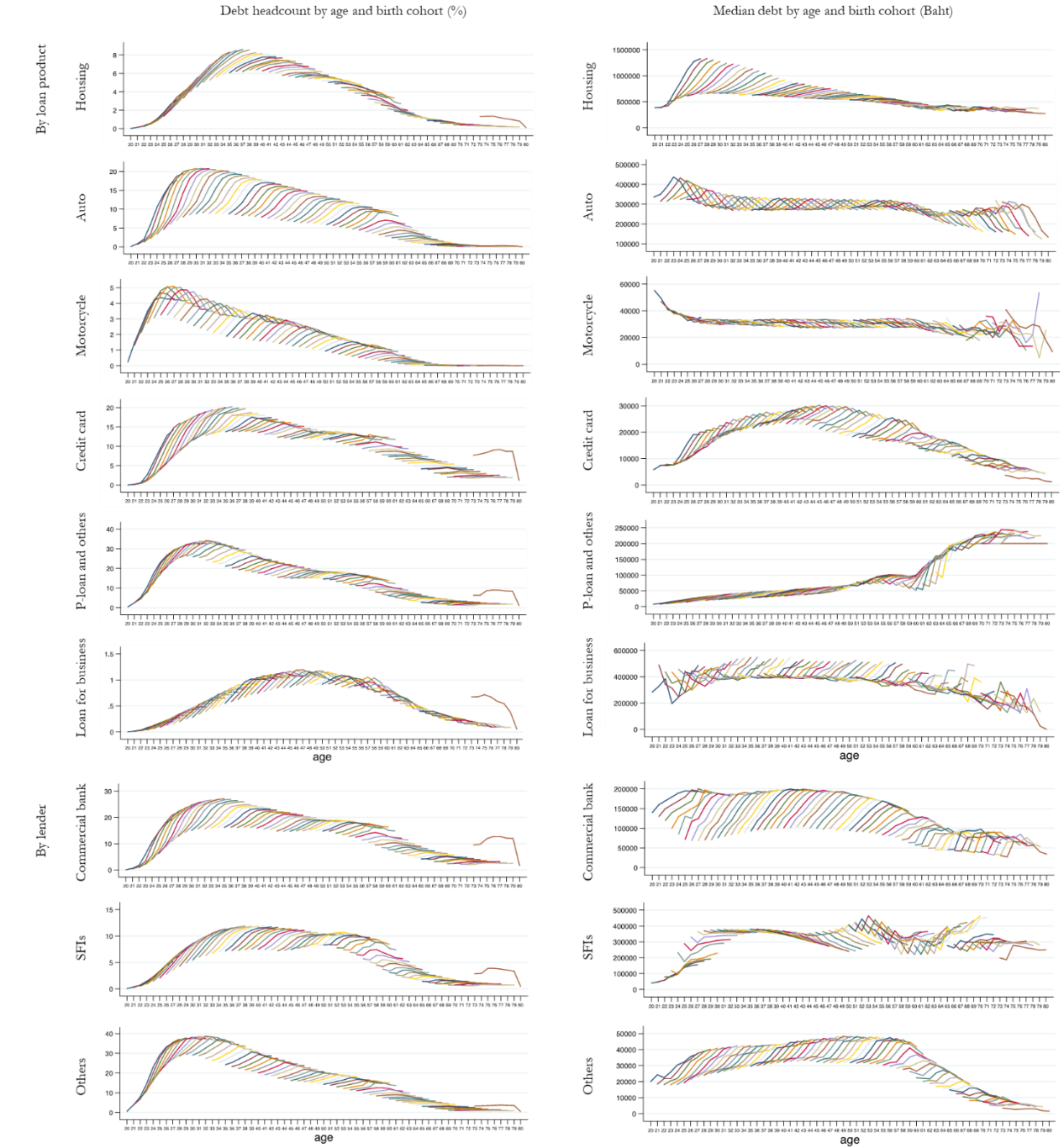


Figure 15: Life cycle view of debt by birth cohort, loan product and lender (continued)

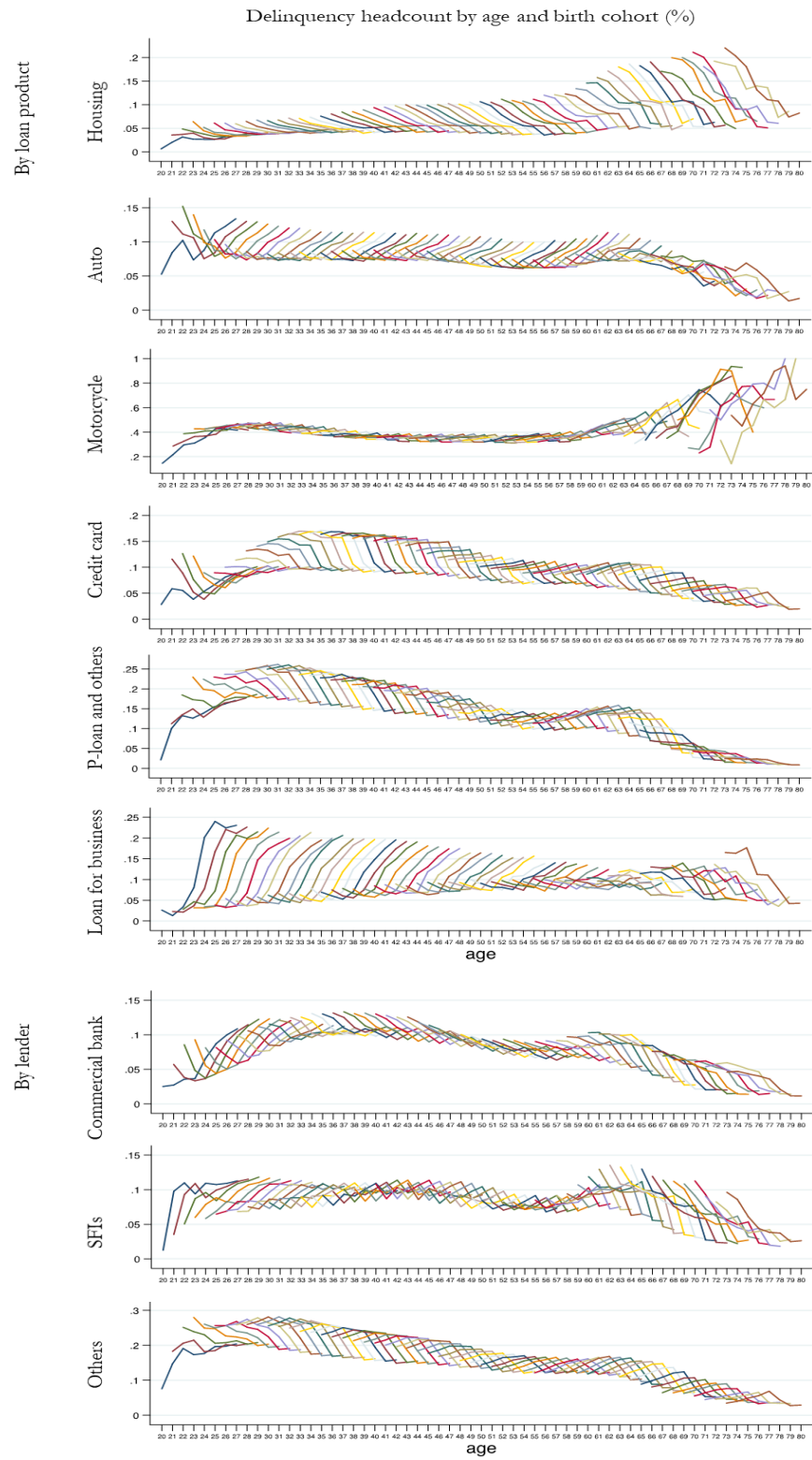


Figure 16: Debt prevalence and intensity by province and urban vs. rural

July 2016

Changes from 2009-2016

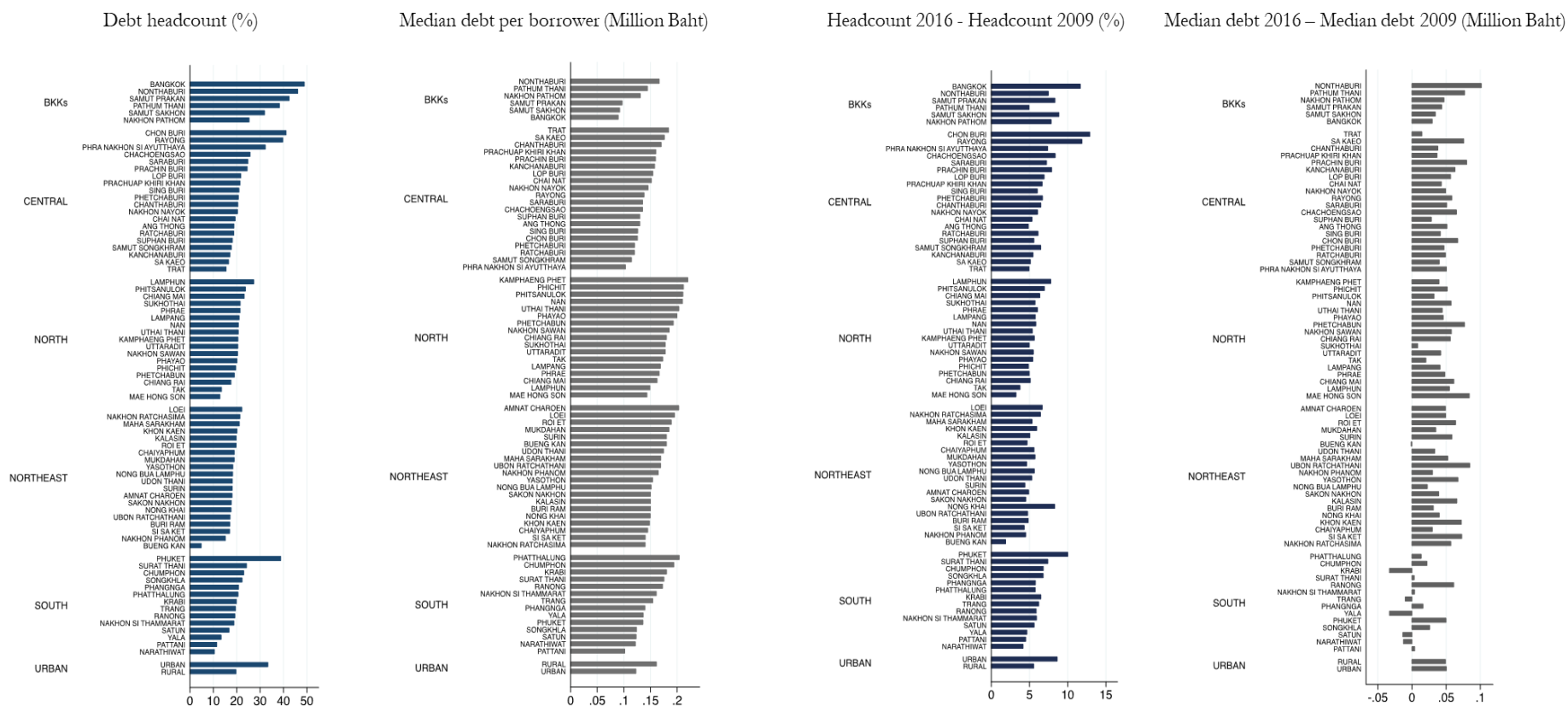


Figure 17: Prevalence and intensity of delinquency by province and urban vs. rural

July 2016

Changes from 2009-2016



Figure 18: Debt prevalence by postcode, product and lender (July 2016)

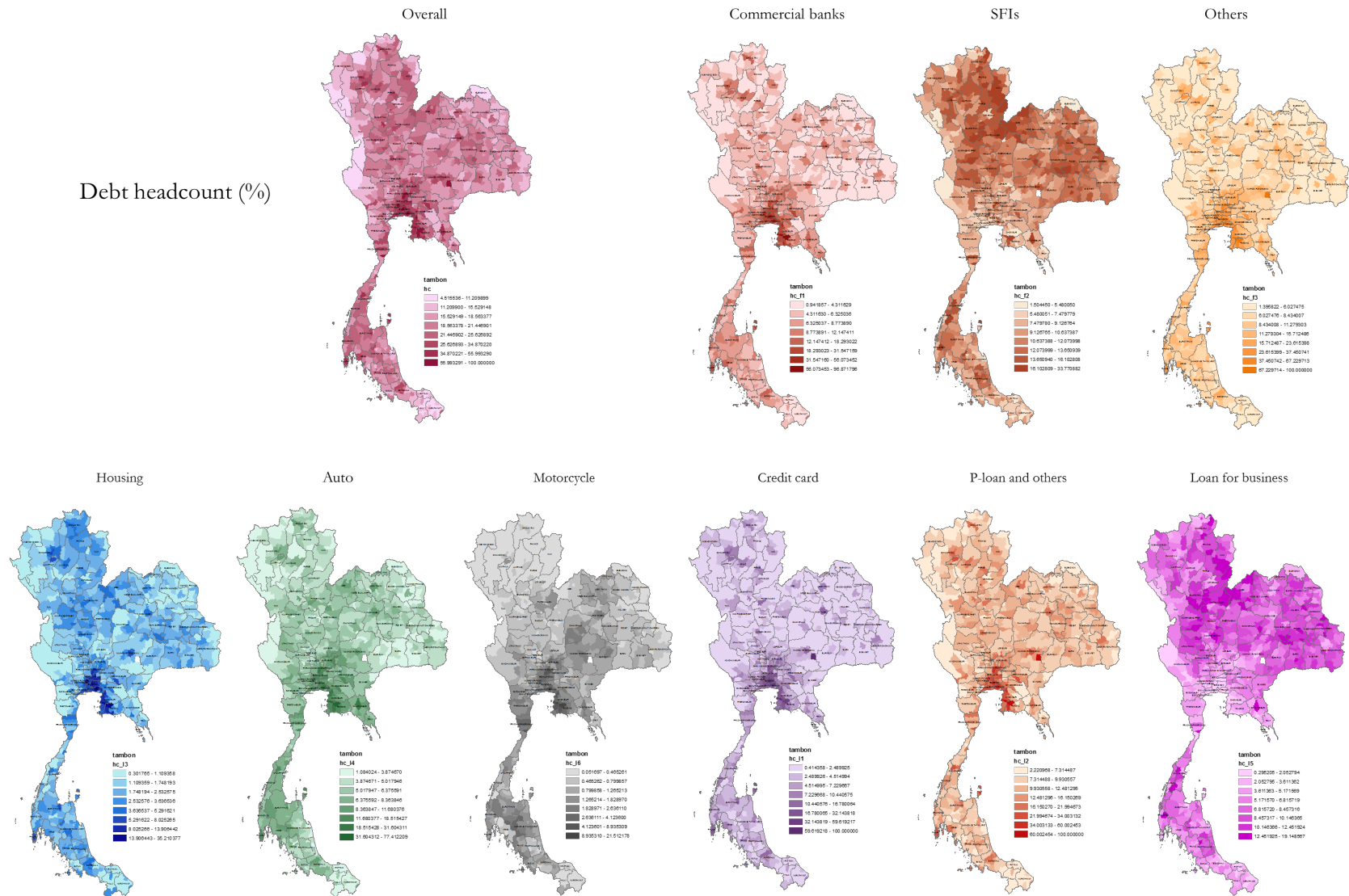


Figure 19: Debt intensity by postcode, product and lender (July 2016)

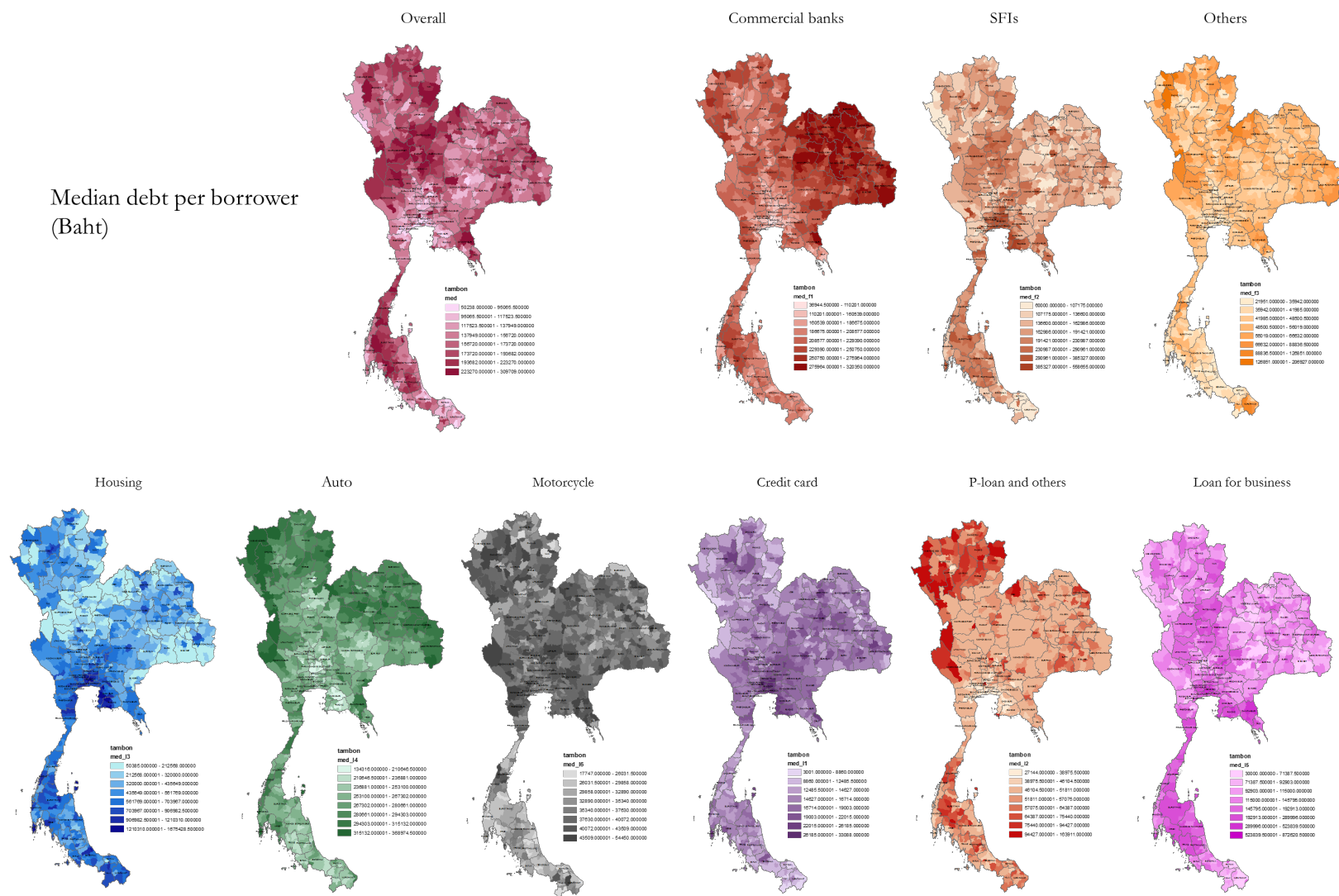


Figure 20: Prevalence of delinquency by postcode (July 2016)

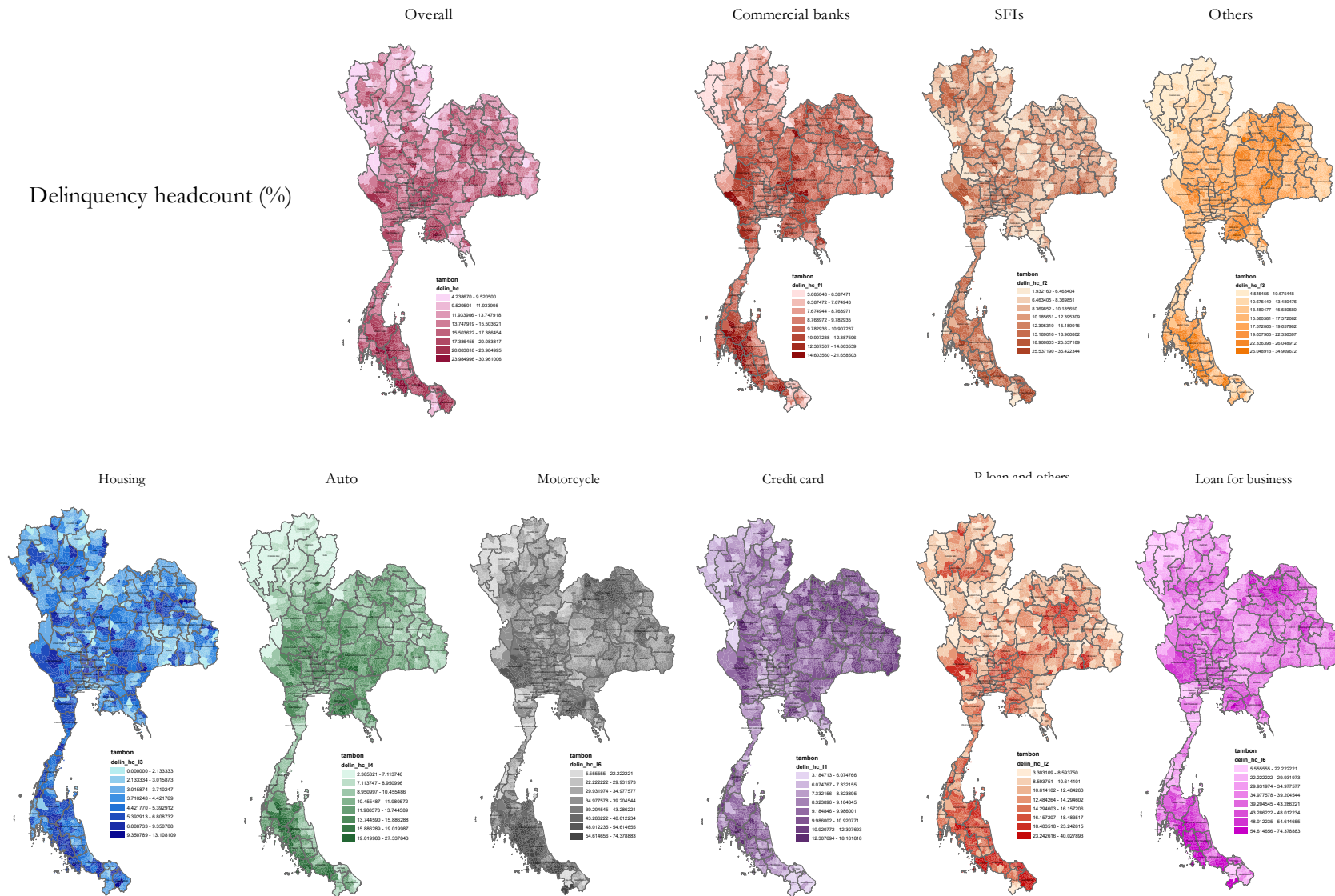


Figure 21: Intensity of delinquency by postcode (July 2016)

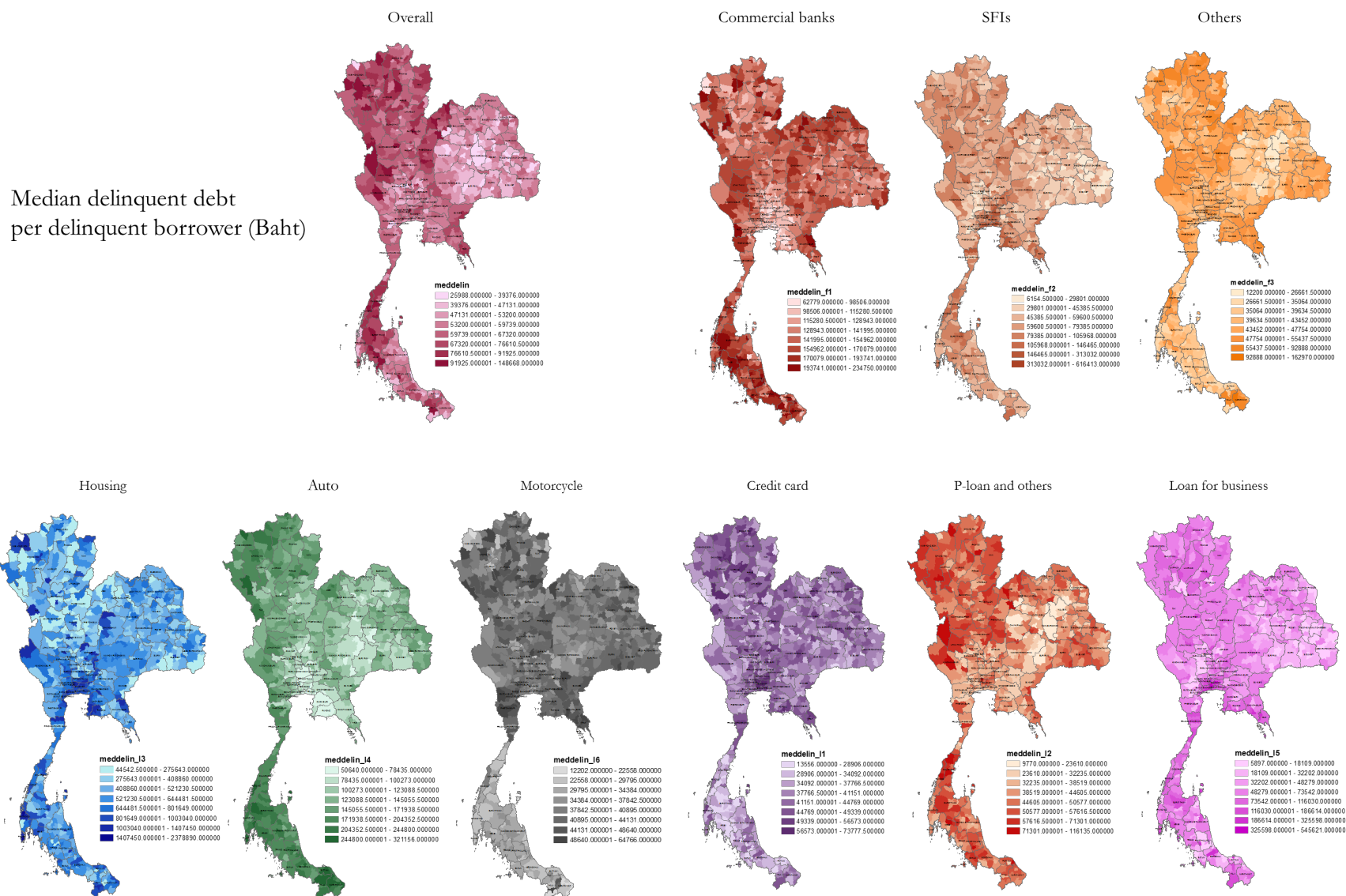


Figure 22: Debt prevalence and intensity by borrower's credit history (July 2016)

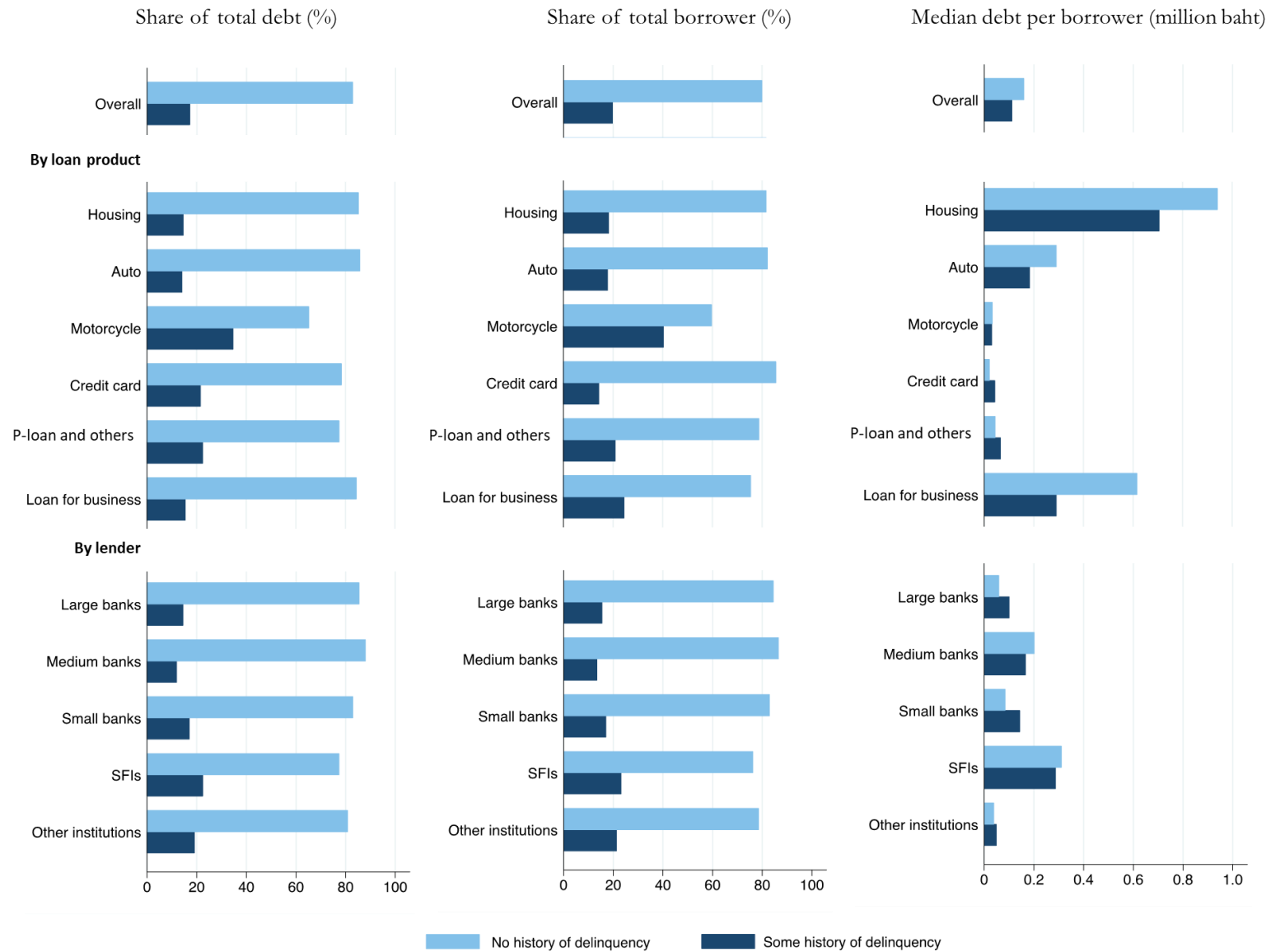
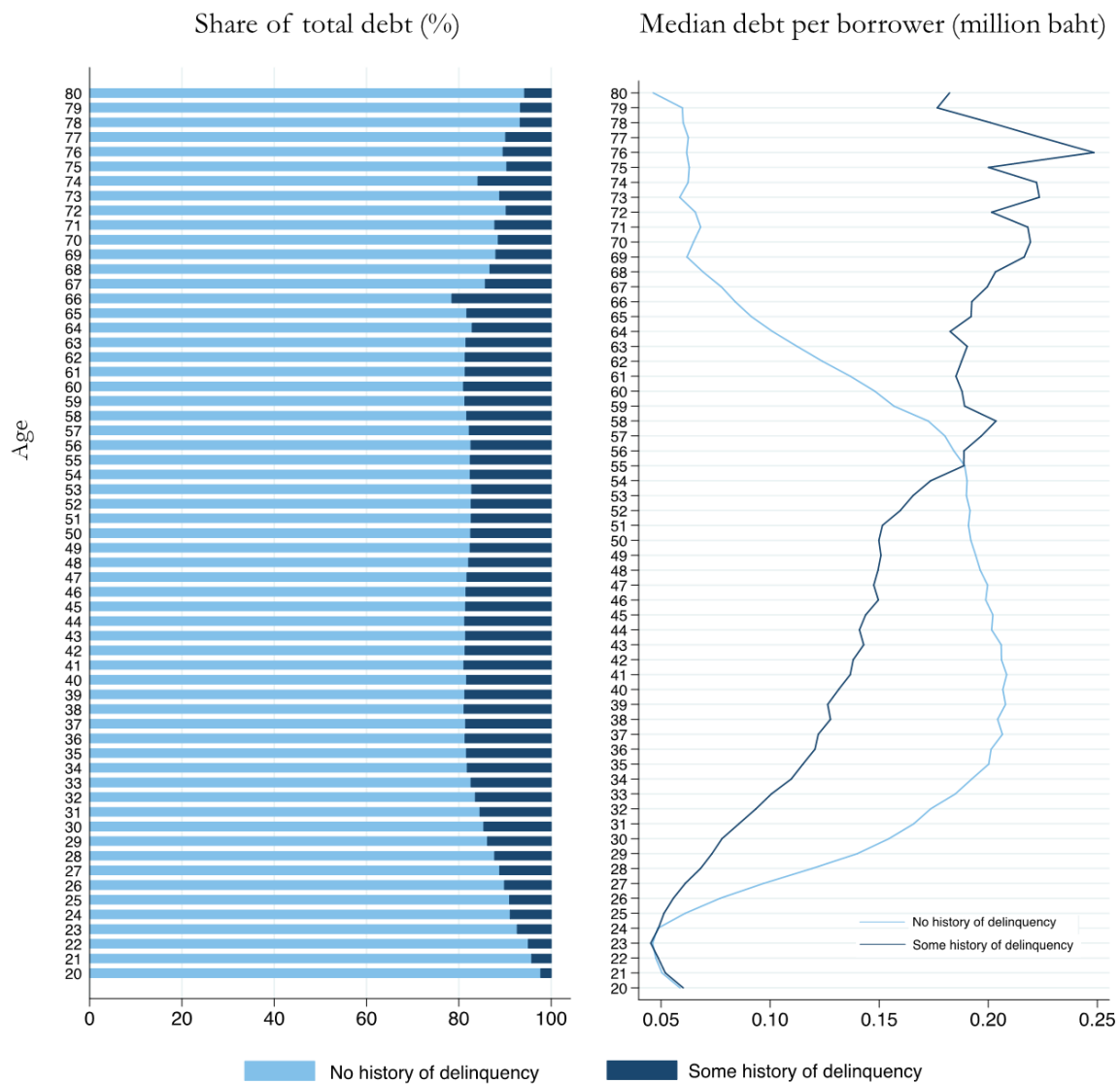
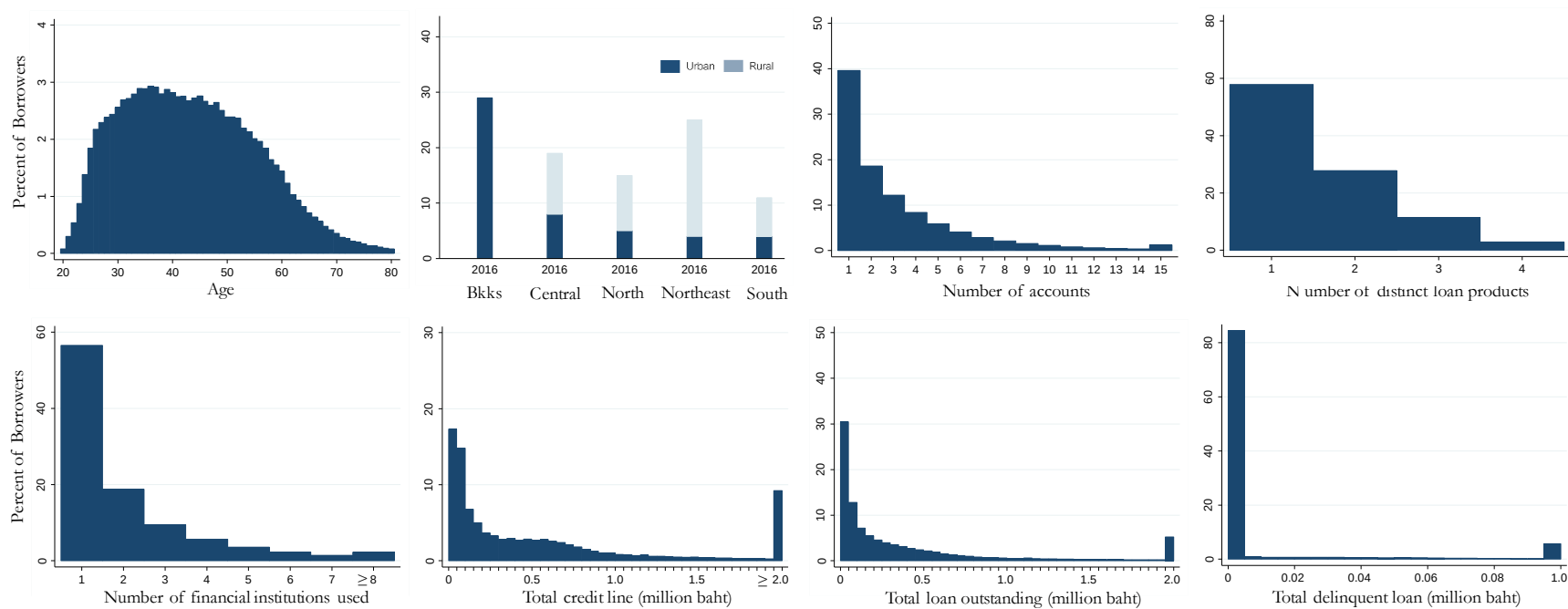


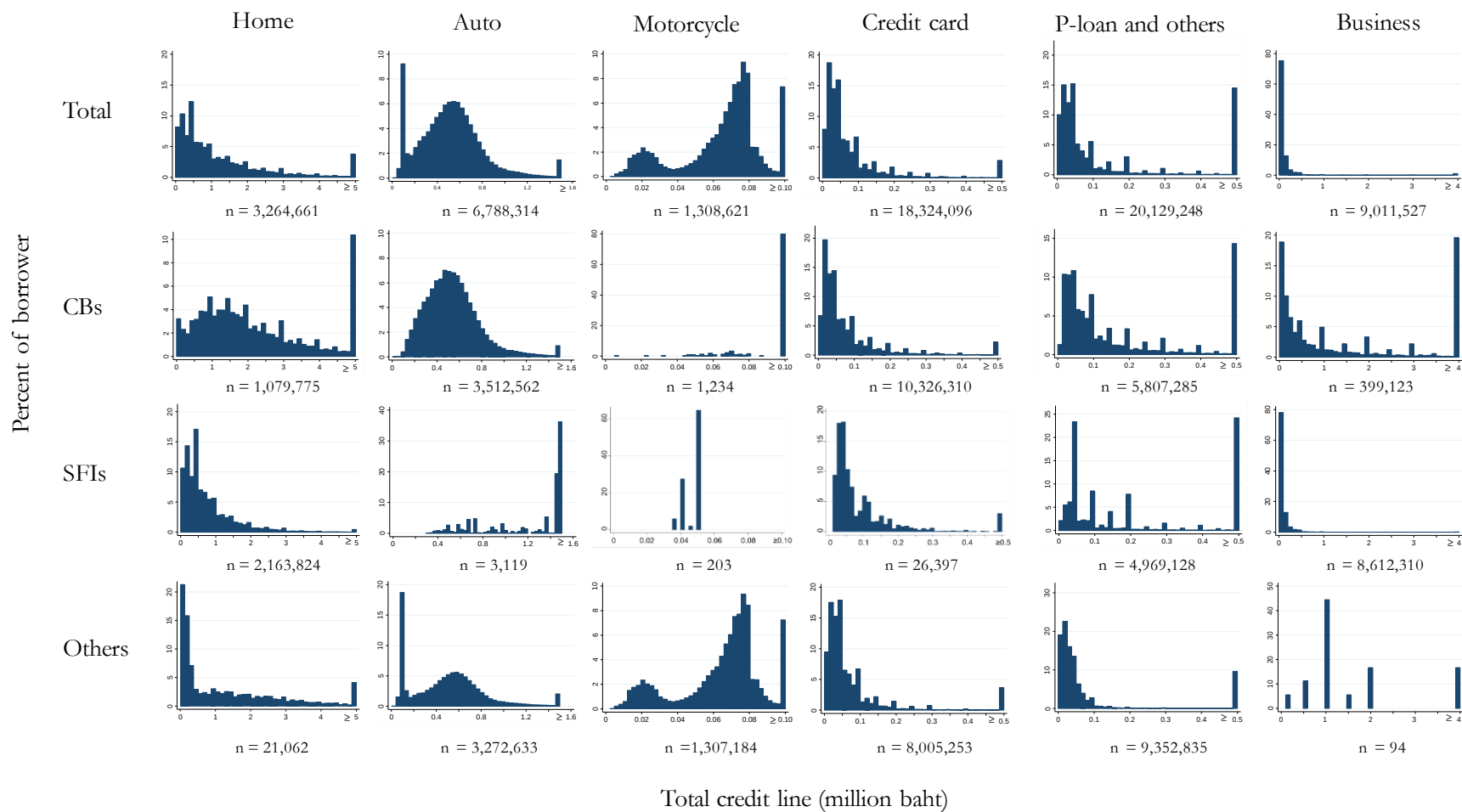
Figure 23: Age profile of debt by credit history (July 2016)



Appendix A1: Distribution of borrowers by key characteristics

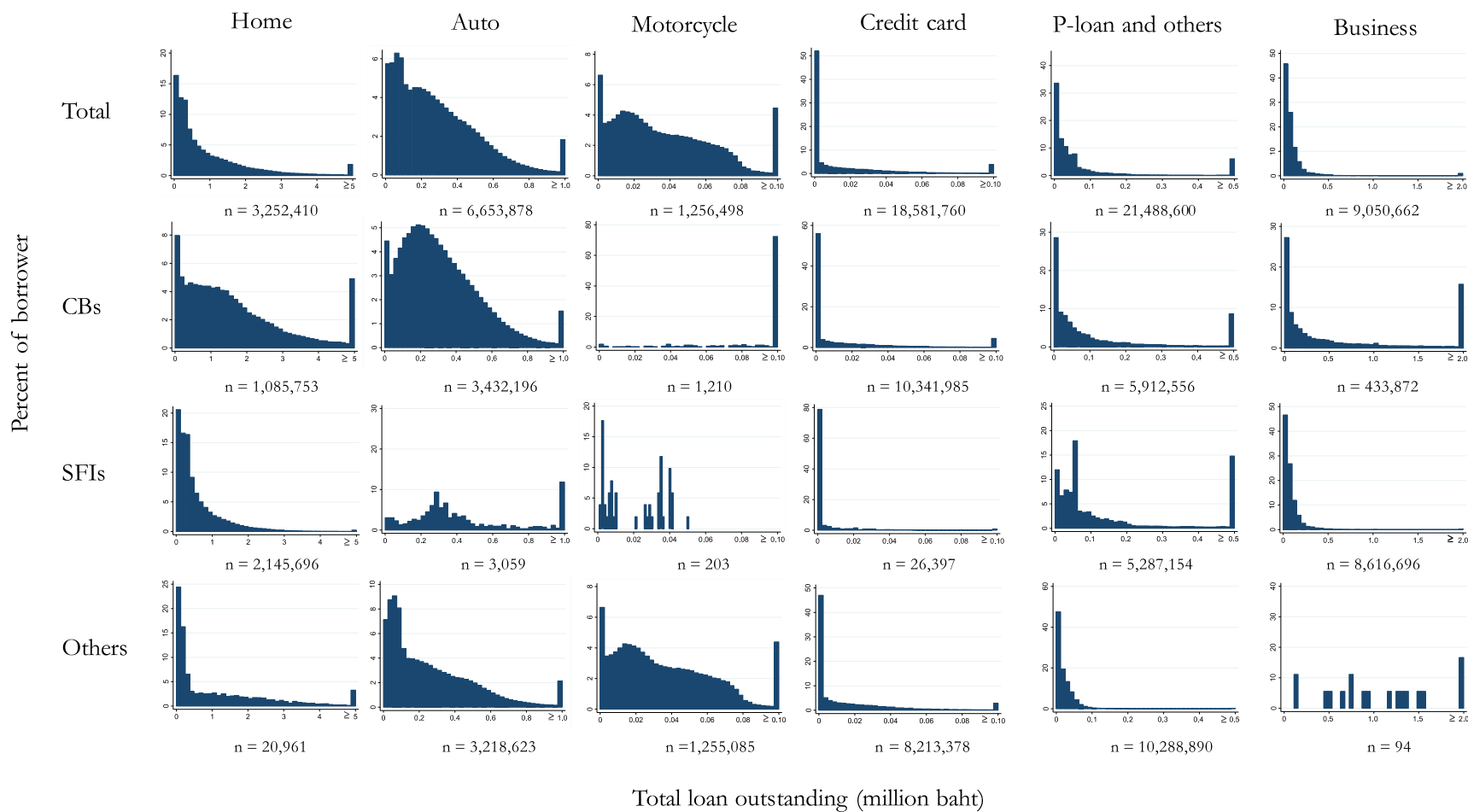


Appendix A2: Distribution of (account-level) credit line by product and lender



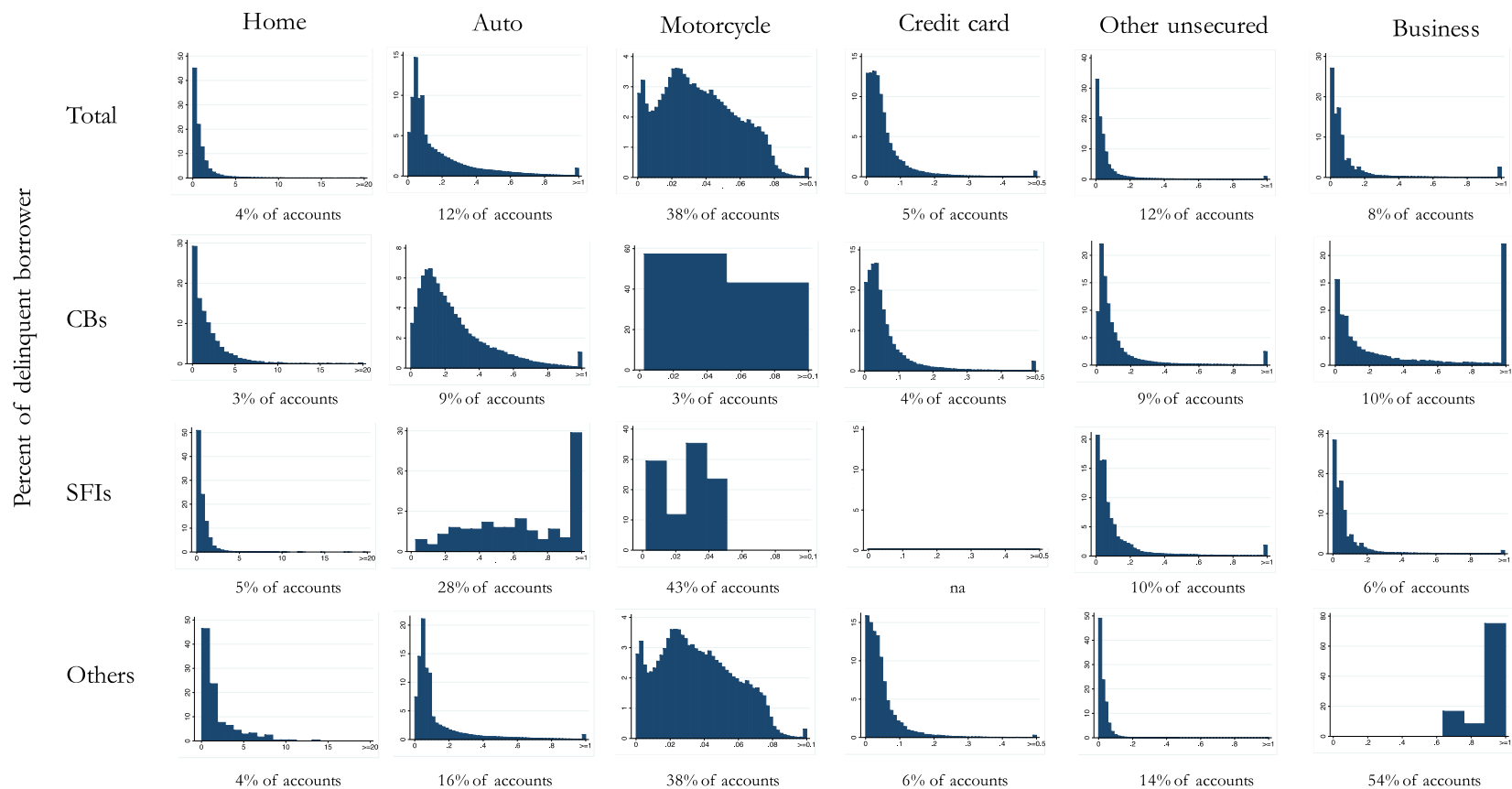
Note: CBs are commercial banks. SFIs are specialized financial institutions.

Appendix A3: Distribution of (account-level) loan outstanding by product and lender



Note: CBs are commercial banks. SFIs are specialized financial institutions.

Appendix A4: Distribution of (account-level) delinquent loan by product and lender



Note: CBs are commercial banks. SFIs are specialized financial institutions.

Appendix A5: Debt by delinquency status

