

NBP Working Paper No. 212

Implementing Loan-To-Value and Debt-To-Income ratios: Learning from country experiences. The case of Poland

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This paper was written within the project of the International Monetary Fund “Implementing LTV and DTI Limits: Lessons from Country Experiences”. The summary of the findings of the project can be found in Jácome and Mitra (2015).

We are grateful to Marta Gołajewska, Piotr Kasprzak, Ryszard Kokoszczyński, Jacek Osiński, Andrzej Sławiński, Piotr Szpunar, the project participants, seminar participants at Narodowy Bank Polski, as well as anonymous referees for useful comments.

Published by:
Narodowy Bank Polski
Education & Publishing Department
ul. Świętokrzyska 11/21
00-919 Warszawa, Poland
phone +48 22 185 23 35
www.nbp.pl

ISSN 2084-624X

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ABSTRACT

Starting from the mid-2000s, Poland experienced a period of rapid growth in mortgage lending, with banks offering foreign-currency, high-LTV housing loans, which exposed the sector to rising credit risk and funding challenges. Later, a surge in consumer lending led to a threat of rising credit risk in this segment. These supervisory challenges were addressed through three main instruments: guidelines related to the assessment of a borrower's creditworthiness as well as LTV and DTI limits. The regulation has been successful from both microprudential and financial stability perspectives, as it has contributed to better risk management by banks and to the reduction of FX mortgage lending.

JEL Classification Numbers: E44, E58, G21, G28

Keywords: financial stability, macroprudential policy, loan-to-value ratios, debt-service-to-income ratios, house prices, credit growth.

I. EXECUTIVE SUMMARY

The implementation of macroprudential regulation in Poland is interesting for a number of reasons. First, it illustrates the challenges of implementing macroprudential regulation in a small open economy with a flexible exchange rate regime, experiencing real convergence. Secondly, it also illustrates the challenges of implementing macroprudential regulation under various external and internal restrictions regarding the scope and effectiveness of potential instruments (such as the ban on capital controls or ample liquidity and surplus capital in the banking sector).

Starting from the mid-2000s, Poland experienced a period of rapid growth in mortgage lending, with banks offering foreign-currency, high-LTV housing loans. This exposed the banking sector to rising credit risk and funding challenges. Later, a surge in consumer lending led to a threat of rising credit risk in this segment, because, for some households, debt repayments reached unsustainable levels, compared to their income. Given the character of the systemic risks and the restrictions on the scope and effectiveness of potential measures, these supervisory challenges were addressed through three main instruments: guidelines related to the assessment of borrower's creditworthiness (including stress-testing guidelines), LTV limits and DTI limits.¹

The objective of this paper is to provide a comprehensive description and assessment of the implementation of LTV and DTI limits in Poland, in order to distill guidelines and potential lessons that may be applicable elsewhere. The history of regulation introduced to curb foreign-currency mortgage lending in Poland shows that the efficiency of qualitative measures and soft limits in a booming economy could be limited. It took a combination of turbulence in financial markets, followed by an increase in risk aversion, the regulatory action in the form of strict DTI caps and strong regulatory pressure coordinated with home authorities to cause a slowdown, and a subsequent elimination, of foreign-currency lending.

The regulation was implemented by a microprudential regulator (albeit also with a view to macroprudential objectives). As regards purely microprudential aspects, the regulation has been successful. It has contributed to better risk management by banks, with no bank in Poland

¹ Throughout this paper, DTI refers to debt service-to-income ratio.

requiring public support due to the credit risk related to its loan portfolio. On the macro level, the regulation has also served financial stability, especially by contributing to the elimination of FX mortgage lending. Nevertheless, despite the successful elimination of new FX mortgage lending and the good performance of the portfolio to date, risks stemming from the housing loan portfolio remain on the radar of the authorities due to a high share of loans with high LTV and the rollover risk of hedging transactions.

The investigation of the risk profile of bank borrowers proves that it can differ substantially depending on the DTI ratio. This underscores the usefulness of DTI-based measures. As regards the LTV ratio, the relationship with the risk profile of borrowers is less visible in the historical data. This can be explained to some extent by “self-regulation” in the banking sector related to mortgage credit risk (banks granting higher LTV loans to borrowers with higher income). Moreover, it suggests that negative equity is not an important factor for default when the legal environment does not allow the mortgage borrower to “walk away” from the loan, as is the case in Poland. However, looking forward – given the improving macroeconomic outlook – LTV caps are likely to become an important macroprudential instrument in preventing the build-up of booms in real estate prices.

The rest of the paper is organized as follows. Section II presents stylized facts about the macroeconomic environment in Poland, the main concerns of the authorities and the specific purposes for introducing and modifying LTV and DTI ratios. Section III provides an overview of the framework for monitoring systemic risks employed by Narodowy Bank Polski. Section IV presents the details regarding the employment of LTV and DTI measures (timing, targeted loan segments, calibration, communication and enforcement). Section V describes the institutional framework for implementing macroprudential instruments in Poland and discusses the issues related to regulatory arbitrage and policy “leakages”. Section VI contains a comprehensive assessment of the effectiveness of LTV and DTI limits. Finally, section VII concludes with summary findings and potential lessons that may be applicable elsewhere.

II. SETTING THE STAGE

The implementation of macroprudential regulation in Poland is interesting for a number of reasons. LTV and DTI limits, as well as other measures,² were applied in a small open economy experiencing real convergence, with a flexible exchange rate regime and a direct inflation targeting monetary policy strategy. Opening of the capital account, culminating in membership in the European Union, resulted in an increase in cross-border capital inflows. At the same time, the EU membership removed the option of using capital controls. A high share of foreign ownership in the banking sector, together with the ease of conducting cross-border banking operations (including lending to households), reduced the importance of domestic resource constraints (e.g. the level of domestic savings). The possibility of cross-border activity for the EU banking groups present in Poland made the threat of regulatory arbitrage quite important, influencing the scope of viable policy actions.

This section tracks the developments related to two categories of loans that were the focus of macroprudential policy measures in Poland: mortgage and consumer loans to households.

Housing loans

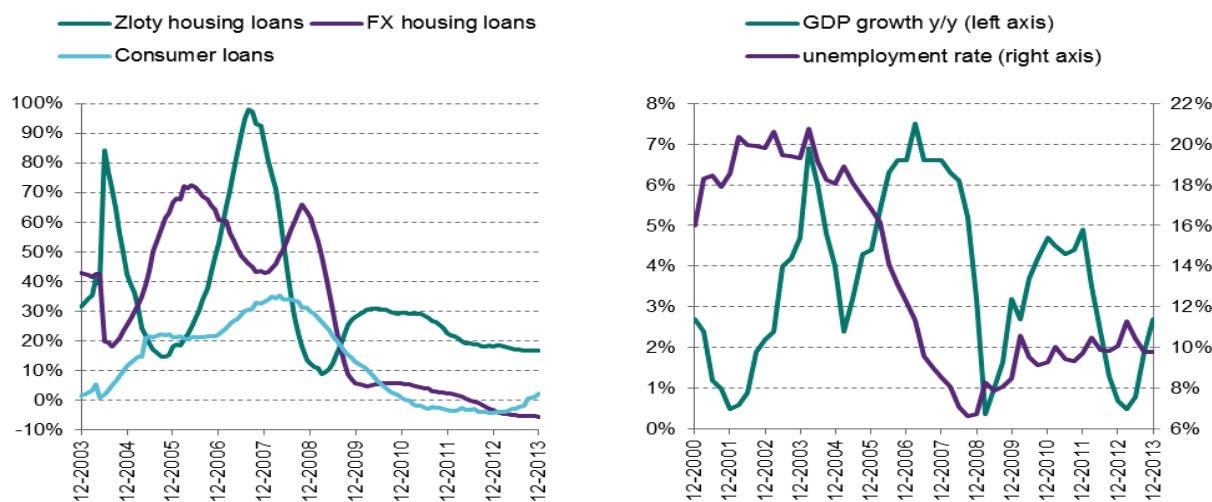
2004-2008 – rapid growth of FX loans and first responses

The real convergence of the Polish economy progressed parallel to financial deepening. Over the last 10 years, the share of households with a mortgage loan has increased substantially. This development partly originated from the poor quality of the existing housing stock. The limited flow in the supply of new housing during the high-growth period resulted in a situation where households took loans that financed construction of new housing by real estate developers. The demand for housing loans was quickly met by banks' supply. As a result, in the years 2004-2005 Poland experienced an acceleration in mortgage lending (see Figure 1). This increase was also supported by strong economic growth, improving labor market conditions, historically low interest rates (see Figure 1 and Figure 2), rising consumer confidence and easing

² The experiences of different countries with applying DTI and LTV limits and other measures to prevent real estate booms are described, for example, in Crowe et al. (2011), Lim et al. (2011), IMF (2013a) and IMF (2013b).

in banks' credit standards (see Figure 2). At the same time, the bank loan portfolio structure tilted very much towards lending to households, in particular towards mortgage lending (see Figure 3).³ A large portion of loan growth was due to the popularity of loans denominated in foreign currencies (predominantly in Swiss franc). The growth of FX loans was mainly fuelled by low interest rates abroad, translating into a significant interest rate difference between loans in złoty and in foreign currencies. This difference was often used by banks as a selling point (despite exposing households to risky FX positions). When the interest rate differential narrowed in 2007, FX lending slowed down, but it picked up pace a year later, as soon as the differential widened again. Another, but less important, factor fueling the demand for FX loans was borrowers' expectations of a further appreciation of the Polish złoty. However, as long as FX loans were popular and the open FX position of the household sector was increasing, the appreciation of the złoty became a self-fulfilling prophecy.

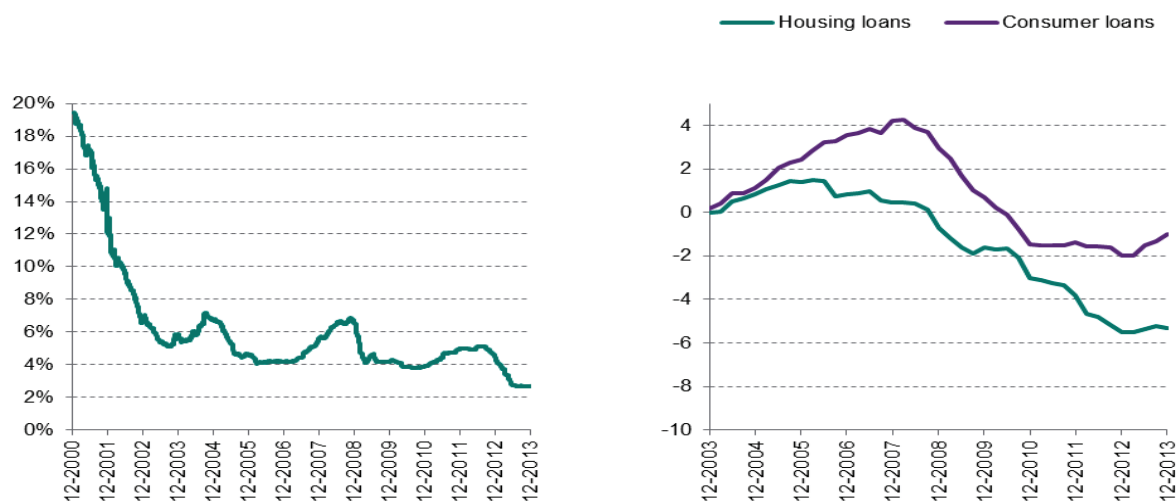
Figure 1. Growth rate (y-o-y) of housing and consumer loans (left-hand panel) and real GDP growth rate, unemployment rate (right-hand panel)



Source: NBP, Central Statistical Office.

³ It was a part of a wider global trend of universal banks' increasing involvement with mortgage lending (see e.g. Jordà et al. (2014)), related to attempts to diversify income sources and driven by IT developments (allowing for e.g. construction and maintenance of large databases and scoring models).

Figure 2. Interbank rate (WIBOR 3M – left-hand panel) and accumulated index of changes in banks' credit standards (right-hand panel)



Note: right panel – data after excluding effects of exchange rate changes. An increase in the index value (right panel) means an easing of credit standards, a decrease – a tightening.

Source: NBP.

The authorities perceived the expansion of FX lending as risky, since a depreciation of the Polish zloty, a rise in interest rates for the Swiss franc and/or a deterioration in macroeconomic conditions would have undermined mortgage borrowers' repayment capacity. Moreover, since the growth of FX lending was partially financed by parent companies of banks operating in Poland, it also led to increasing liquidity risks for some Polish banks due to a growing dependence on foreign funding. On the other hand, those banks that extended FX loans on the basis of funding in local currency needed to hedge their FX positions in international markets (mostly using the FX swap market), exposing themselves to the rollover risk of the hedging transactions. Finally, the flow of FX lending also introduced a considerable disturbance into the monetary policy transmission mechanism, as a tightening of domestic monetary policy induced borrowers to substitute domestic currency loans for FX loans, rather than reducing the pace of lending activity (Brzoza-Brzezina et al., 2010). Therefore, attempts to limit FX lending could have been perceived as resulting in monetary tightening, without an increase in domestic interest rates.

Various options for tackling the problem of FX housing loans were considered. Higher loan provisioning requirements, for example, were not introduced due to a conflict with the relevant provisions of IFRS/IAS. An outright legal ban on FX loans was also considered, but was not implemented due to the need to introduce it through a parliamentary act. Additional capital requirements seemed unlikely to be very effective given significant surpluses in banks' regulatory capital. In general, the effectiveness of prudential measures could also be undermined by opportunities for regulatory arbitrage, i.e. the extension of FX loans by branches of credit institutions from other EU countries and/or cross-border lending. The principle of free flow of capital in the EU made it difficult to block these arbitrage channels.

The first measures were introduced by the Polish banking regulators in 2006 in the so-called Recommendation S (see Table 1 at the end of the Section). They were mostly of a qualitative character, in the form of a recommendation of a more conservative assessment of borrowers' creditworthiness in the case of FX loans. According to Recommendation S, borrowers' creditworthiness should be assessed under the assumption that the loan amount is 20% higher and the interest rate is not lower than for a similar loan in złoty. Other measures included the obligation to carry out regular stress tests assessing the impact of złoty depreciation on bank's credit risk, and some general provisions aimed at improving credit risk management in the case of mortgage loans. Recommendation S also referred to the LTV ratio as a part of the lending policy, by including the obligation for banks to establish their own LTV limits (with no absolute numerical cap in the Recommendation).

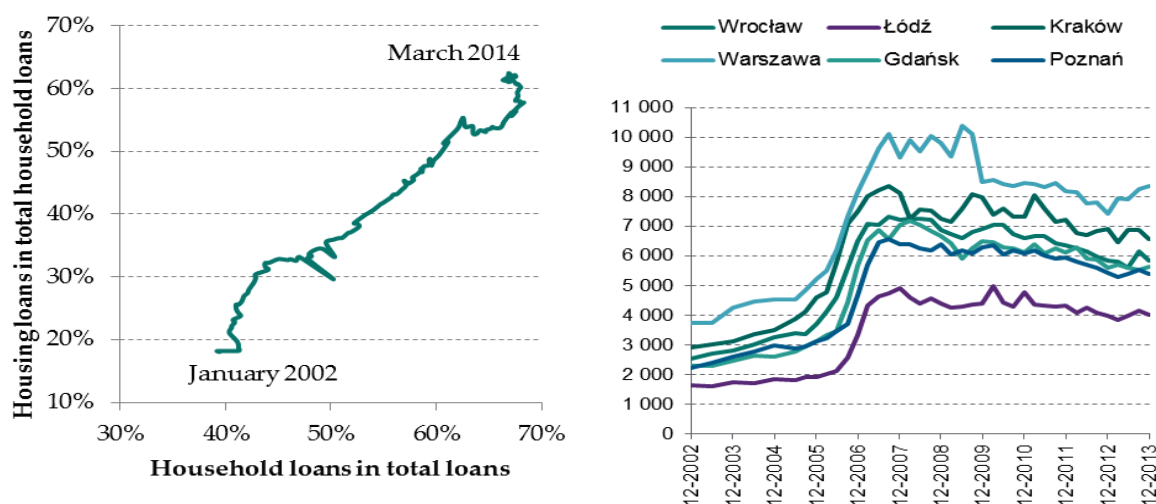
In 2007, the authorities took the next step in order to reduce the risk related to FX housing loans. Capital requirements for FX loans were increased in April 2007 when the CRD EU directive was implemented. Polish authorities took this opportunity to introduce stricter risk weights for FX loans (relative to the directive). The risk weight (for the part of the loan below 50% of the value of the real estate used as collateral) for FX mortgage loans was increased from 50% to 75%.⁴ At the same time, the risk weight for housing loans in złoty was lowered from 50% to 35%.

⁴ The standard 100% risk weight was applied to the rest of the loan.

The potential for policy leakages was the key driver behind the gradual tightening of the regulation. The gradual approach allowed the authorities to observe the effects of past policy actions and to respond accordingly. Policy leakages were perceived as a real threat due to the lack of any obligation on the part of home authorities to cooperate in preventing regulatory arbitrage. The experience of countries which introduced strict prudential tools to combat FX lending, only to see them being circumvented by banks with the help of their foreign parent companies, provided a vivid example of the potential for regulatory arbitrage.

Despite the regulation, the period 2006-2008 was characterized by strong growth in housing loans and lenient lending standards, resulting in an accumulation of FX loans and loans with high LTV ratios. This increased the vulnerability of banks to multiple types of risk, including indirect credit risk (due to FX exposure of borrowers – households that were not hedged against FX risk) and rollover risk related to the hedging of FX balance sheet exposures by derivatives (on an aggregate level Polish banks had an open FX balance sheet position, but closed it fully with derivatives). The strong growth of housing loans, and the availability of high-LTV loans and FX loans also contributed to significant increases in residential real estate prices (Figure 3).

Figure 3. Changes in the structure of the loan portfolio of the banking sector in Poland (left-hand panel) and average offer prices (per square meter) for flats on the secondary market in the biggest cities (right-hand panel)



Source: NBP (left-hand panel) and Pont Info (right-hand panel).

2009-2011 – resumption of lending after slowdown, regulatory response to end FX lending

After an initial strong tightening of lending policies in reaction to the global financial crisis and an economic slowdown, banks again increased the supply of high-LTV and FX-denominated loans towards the end of 2009 and in 2010, but on a smaller scale than before the crisis. The other difference was that, in the case of FX mortgages, banks offered mainly euro-denominated loans instead of more risky CHF loans, which dominated before the crisis.

The results of the measures introduced before the global financial crisis proved unsatisfactory for the authorities. In order to further reduce the flow of FX loans, to ensure prudent origination and to mitigate the potential negative impact on the real estate market, the Recommendation S was amended in January 2011, introducing tighter DTI caps for FX mortgage loans and “soft” LTV limits (see Table 1 at the end of the Section).⁵ The LTV limits were “soft” in the sense that banks could extend loans with LTV above the limit on condition that they had documented policies for addressing the relevant risks. Another step taken by the Polish Financial Supervision Authority (PFSA) to limit new FX lending was an increase in capital requirements for FX mortgage loans (an increase in the minimum risk weight from 75% to 100%) – the relevant PFSA resolution was issued in June 2011, entering into force in June 2012. Furthermore, the regulator used strong moral suasion, coordinated with home authorities where necessary, to persuade banks to end FX mortgage lending, which was achieved by mid-2012.

2012 onwards – focus on LTV and prudent origination going forward

After the amendment to Recommendation S in 2011, the risks stemming from the stock of housing loans were still a concern for the authorities due to a high share of loans with high LTV ratios and a high share of FX loans. The PFSA also pointed to risks related to the low liquidity in the real estate market and the potential impact of forced liquidation of collateral, which raised concerns about the effectiveness of collateral in mortgage lending. In contrast to the consumer loan sector, there were no concerns about a slowdown in lending; the rate of growth of housing

⁵ Explicit DTI caps (for all types of loans to households) were introduced in February 2010 in the so-called Recommendation T (see below).

loans remained positive and the share of housing loans in banks' assets kept rising (see Figure 1 and Figure 3).

To prevent the accumulation of risks and to ensure the high quality of lending going forward, Recommendation S was again amended in June 2013, introducing strict caps on LTV ratios and a requirement to extend FX housing loans only to customers with corresponding FX income (see Table 1 at the end of the Section). The ESRB Recommendation 2011/1 on lending in foreign currencies provided significant support for the new measures, especially as it advocated the principle of reciprocity, which translated into an obligation of supervisory authorities from all EU countries to respect the relevant measures introduced by any EU country and thus limited the scope for regulatory arbitrage. In line with the amendment to Recommendation T (see below), explicit DTI caps for mortgage borrowers were lifted and banks were obliged to establish their own DTI limits, which the PFSA was (and still is) able to challenge as part of the regular supervisory process. However, banks were also recommended to pay particular attention when extending loans with high a DTI (above 40% or 50%, depending on income).

Consumer loans

2006-2010 – high growth, loose lending policies and regulatory response

The period of rapid credit growth in 2006-2008 was characterized by overly loose lending standards and significant weaknesses in credit risk management by banks, especially in the case of consumer loans. The PFSA identified the following weaknesses (also confirmed by data from the Credit Information Bureau, BIK): (i) accepted DTI ratios were too high;⁶ (ii) the assumptions regarding basic living costs were too optimistic; and (iii) the assumptions regarding the level of utilization of credit limits (for such products as credit cards) in the process of assessing borrowers' creditworthiness were also too optimistic. More generally, when granting consumer loans, banks paid too little attention to a proper analysis of borrowers' ability to repay the loan on the basis of their financial standing while sometimes relying too much on the verification of a

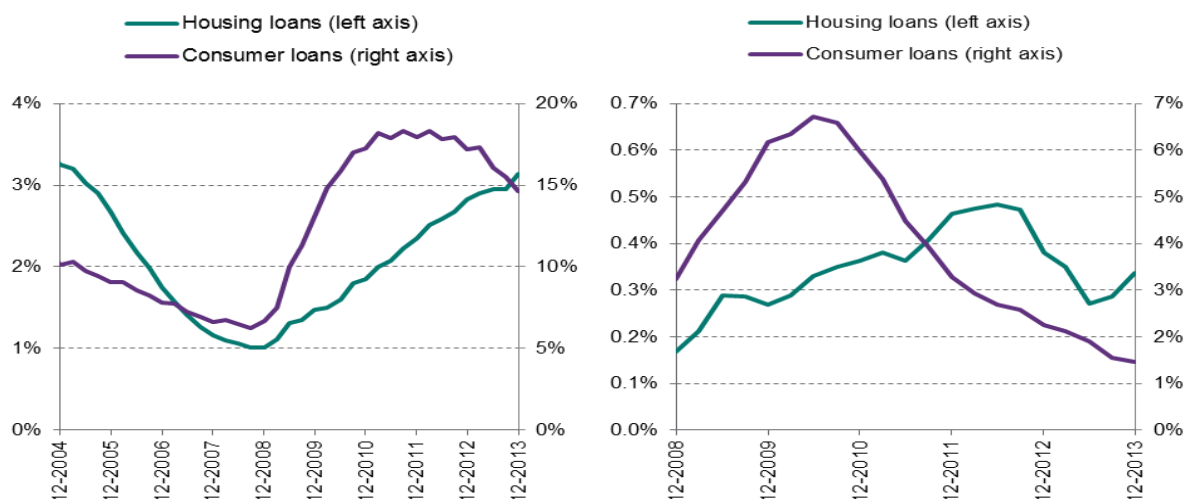
⁶ High DTI and LTV ratios are important determinants of a household's problems with servicing its debt (see e.g. May and Tudela (2005), FSA (2009)).

positive credit history. The overly optimistic credit risk assessment and too loose lending policy resulted in an accumulation of credit risk on banks' balance sheets.⁷

As a result, the quality of loans to households deteriorated and the value of credit losses increased following the economic slowdown in 2009 (see Figure 4). The deterioration in loan quality was stronger in the case of consumer loans due to the accumulated credit risk. Consequently, losses were particularly high for banks specializing in consumer finance. Starting in 2009, banks also strongly tightened their lending policies, demonstrating a typical pro-cyclical reaction.

In February 2010, the so-called Recommendation T was introduced, aimed at addressing the weaknesses in credit risk management by, *inter alia*, imposing explicit DTI caps for all types of loans to households, as well as requiring banks to perform a full creditworthiness analysis, including income verification, for all consumer loans, regardless of their size (see Table 1 at the end of the Section).

Figure 4. Impaired loan ratio (left-hand panel) and net charges to provisions for impaired loans expressed as percentage of balance sheet value of loans (right-hand panel) for housing and consumer loans



Note: net charges to provisions for impaired loans expressed as percentage of balance sheet value of loans – annualized data.

Source: NBP.

⁷ In some cases, loans were granted to clients who were already unable to repay their existing loans from their current income but kept a positive credit track record by taking new loans to repay previous ones.

2011 onwards – strong slowdown, regulatory arbitrage and loosening of regulations

A slowdown in economic growth after 2008 coupled with a strong tightening of banks' lending policies led to a significant decrease in the rate of growth of consumer loans, which even turned negative in 2011 and 2012 (see Figure 1). The strongest slowdown in credit growth (albeit from high levels) took place in 2009 and 2010. At the same time, tighter bank lending policies contributed to a significant improvement in credit risk management, reflected in the relatively good quality of newly extended consumer loans and a decrease in credit losses (see Figure 4).

The banking sector pointed out that Recommendation T could have had an undesirable side effect, as it could stimulate growth in the segment of non-regulated companies specialized in providing consumer finance. Moreover, in order to avoid regulatory requirements, some banks also transferred their activity in the consumer loan segment to non-bank entities within their capital groups (a form of regulatory arbitrage).

In February 2013, the PFSA amended Recommendation T, abolishing the strict DTI caps (see Table 1 at the end of the Section). Instead, banks were obliged to establish their own DTI limits, which the PFSA is able to challenge as part of the regular supervisory process. Some other requirements were also relaxed. The primary motivation for the change was to counteract the fall in consumer credit and its migration to shadow banking entities. Taking into account the phase of the economic cycle, this was a counter-cyclical action and supported consumer demand by reviving consumer credit.⁸

The key trade-off that authorities faced in considering the relaxation of Recommendation T could be summarized as follows. Keeping the Recommendation unchanged could ensure high origination standards for new consumer loans extended by banks, but at the cost of limiting credit supply in a pro-cyclical manner and entrenching regulatory arbitrage, which would also decrease the transparency of the market, leading to consumer protection concerns. Loosening the requirements of the Recommendation would support the supply of credit in a counter-cyclical fashion and limit the incentives for regulatory arbitrage, while the increase in the riskiness of the portfolio would be moderate, as banks were already pursuing more cautious policies and credit margins were providing a cushion against an increase in credit risk costs.

⁸ The PFSA also argued that such an instrument as explicit DTI caps was rarely used in other countries.

Monetary policy provided a supportive environment for reviving consumer credit. Before the issuance of Recommendation T and during its implementation, monetary policy-makers cut interest rates. Before the series of cuts, the main policy interest rate was 4.75%, which was lowered to 2.5% between November 2012 and July 2013.

Table 1 presents an overview of the introduced Recommendations. More details regarding the Recommendations can be found in Section IV.

Table 1. Timeline and main provisions of the Recommendations implementing/lifting LTV/DTI ratios

Recommendation	S	T	S (updated)	T (updated)	S (updated)
Issuance date	02.2006	02.2010	01.2011	02.2013	06.2013
Implementation date	07.2006	08.2010-12.2010	07.2011-12.2011	07.2013	01.2014-07.2014
Main provisions	1. More conservative assessment of creditworthiness in case of FX mortgage loans. 2. The obligation for banks to establish their own LTV limits.	Explicit DTI caps for all exposures towards private individuals (50% or 65%, depending on borrowers' income).	1. "Soft" LTV limits for mortgage loans. 2. Lower DTI cap for FX mortgage loans (42%).	Lifting explicit DTI caps for consumer loans, instead: DTI limits set by banks.	1. Strict LTV caps for mortgage loans (80% or 90%, depending on the collateral). 2. Lifting explicit DTI caps for mortgage borrowers, DTI limits set by banks.

III. MONITORING SYSTEMIC RISK

The practical definition of systemic risk, as employed in the financial stability analysis conducted by Narodowy Bank Polski (NBP), states that a systemic risk is identified when three components are present:

- a vulnerability in the financial system,
- a plausible source of shock which can crystallize the vulnerability,
- if the vulnerability crystallizes, it leads to a substantial negative impact on the financial system and the real economy.⁹

The analysis of systemic risks that are relevant for the use of LTV and DTI limits as policy tools is focused on risks arising from the credit cycle and, more specifically, the lending activity of banks.

Since policy decisions were taken by the PFSA, the role of the NBP was mainly advisory (apart from the participation of the representative of the NBP in the PFSA as one of the seven voting members) and the framework described below forms only a part of the actual analysis that underpinned the policy actions.

The analysis relevant for the use of LTV and DTI limits as policy tools has in particular been focused on lending to the household sector. This is natural as these two tools are in practice most often used in the context of lending to households, with the exception of LTV limits, which are also used in relation to commercial real estate lending. As the scale of indebtedness of the corporate sector in Poland has been relatively low and stable (between 2004 and 2013, the ratio of loans to non-financial corporations to GDP fluctuated between 12% and 17%), the risk analysis was naturally focused on lending to the household sector.

The NBP's framework for monitoring systemic risks linked to the credit cycle has evolved over the years, but it always covered three main areas: (i) developments in the credit market (in order to identify vulnerabilities in banks' loan portfolios); (ii) the resilience of banks, or their ability to withstand negative shocks; and (iii) the current financial situation and the outlook for

⁹ See e.g. NBP (2013b).

the real sector and financial markets, as potential sources of shocks relevant for the quality of loan portfolios.

Monitoring developments in the credit market

In the first area of analysis – monitoring developments in the credit market – the following indicators are monitored on an ongoing basis:¹⁰

- indicators related to credit policy and credit growth: growth rates of the main loan categories, changes in the currency structure of newly extended loans, survey data on LTV and DTI of newly extended loans: average values of DTI and LTV – quarterly (due to the availability of data), distributions (the number and value of loans with DTI and LTV in a given interval) – annual data;
- changes in bank credit policies for the main loan categories (including housing and consumer loans): credit standards, loan terms (including credit margins and collateral requirements) and factors influencing banks' credit policy.

These indicators (their levels, trends and forecasts) underpin a forward-looking analysis and the assessment of a build-up of risks in loan portfolios. They are supplemented by the analysis of residential real estate prices and housing affordability indicators.

The analysis of credit market developments also includes indicators that are more backward-looking in nature and are used to gauge both the extent to which credit risks have materialized and the effectiveness of policy measures taken in the past. These indicators include changes in impaired loans and credit losses for the main loan categories as well as vintage analysis for consumer and housing loans (changes in percentage of loans in arrears for loans extended in different months/years). The vintage curves are particularly useful for monitoring the effects of changes in bank credit policies (either as a result of regulatory actions or changes in risk appetite).

¹⁰ See e.g. chapters 3.1-3.2 and 2.3 in NBP (2014).

Banks' resilience to shocks

In the second area – the analysis of banks' resilience to shocks – the monitoring is focused on two topics. The first one is the current financial situation of banks, as profit generation provides the “first line of defense” against unfavorable developments. The second topic covers capital position of banks as well as simulations and stress tests used to assess the capacity of banks to withstand negative shocks. The indicators and models used in the second area include:¹¹

- profitability indicators: components of banks' profit statements, changes, decomposition and distribution of ROA and ROE, profitability of main loan categories;
- indicators related to capital position: the value and composition of regulatory capital, distributions of capital adequacy and leverage ratios;
- simulations of the ability to absorb credit losses in different scenarios, including: an increase in impaired loans, an increase in the coverage of impaired loans by provisions, defaults of large borrowers;
- credit risk and net interest margin econometric models assessing the impact of baseline and stress-test scenarios on banks' profits and capital ratios.

Current financial situation and the outlook for the real sector and financial markets

In the third area, standard macroeconomic (unemployment rate, corporate profitability and liquidity indicators) and financial market (interest rates, bond yields, volatility indicators and market expectations) variables are monitored.¹²

The link between the analysis of systemic risks and policy actions is not based on specific thresholds (for tightening or loosening the macroprudential policy stance). The analysis is conducted in a holistic manner, based on a broad set of information assessed by experts and presented to policy-makers in order to inform policy decisions.

¹¹ See e.g. chapters 3.5-3.7 in NBP (2014).

¹² See e.g. chapters 2.1-2.2 in NBP (2014).

Apart from the areas mentioned above, the NBP also monitors, *inter alia*, the liquidity risk of the banking sector¹³ and conducts liquidity stress tests.

¹³ See e.g. chapter 3.4 in NBP (2014).

IV. USING THE TOOLS

A. Calibration

The comments below focus on policy measures implemented from 2010 onwards, as earlier policy measures did not involve explicit requirements (limits, caps) regarding LTV or DTI ratios.

Recommendation T – DTI limits, February 2010

Type of financial institutions: banks.

Loan segment targeted: all exposures towards private individuals, excluding those financing business activity or farming.

Limits: a 50% DTI cap in the case of borrowers with income below the average salary in the national economy and a 65% cap for other borrowers. During the process of establishing the DTI caps for FX loans (or, more precisely, for borrowers receiving their income in currency other than the currency of the loan) banks should take into account an additional buffer, calculated on the assumption that foreign currency exchange rate would increase by 10% or 20%, depending on loan maturity.

The choice of the DTI caps was discretionary, although an analysis was made using data on household incomes and living costs to determine safe levels of DTI.

Along with imposing the cap, the Recommendation introduced other measures, such as an obligation for banks to set internal DTI limits for different types of loans and multiple requirements concerning the process of assessing a client's creditworthiness and measuring, documenting and managing credit risk. Banks were required to perform a full creditworthiness analysis, including income verification, for all consumer loans, regardless of their size. These measures to some extent limited the ability of banks to rely on scoring models in extending consumer loans.

The main side-effect considered was a potential negative impact on credit growth. To evaluate this effect, a survey was carried out among banks in which they were asked to estimate

the decrease in new lending due to the introduction of the new regulation. Additionally, the PFSA carried out its own assessment on the basis of banks' answers to the question about the share of loans with DTI ratios exceeding the proposed limits. On the basis of the results from the survey, the PSFA judged that the decrease in new lending should be moderate and would be limited to the most risky loans (i.e. loans extended to highly indebted borrowers). On the other hand, the Recommendation was expected to have a positive impact on risk-adjusted credit margins and thus was considered to have a positive effect on loan availability.

Additionally, banks were surveyed about the costs of implementing the recommendation. Banks' answers suggested that those costs would not be substantial (marginal in comparison to banks' credit losses).

The amendment to Recommendation S – “soft” LTV limits, DTI limits for FX real estate loans, January 2011

Type of financial institutions: banks.

Loan segment targeted: loans collateralized by real estate and loans with other collateral used to finance the purchase of real estate (further referred to as “real estate loans”).

Limits:

- A 42% cap on DTI ratios for FX real estate loans taken by private persons, excluding loans that finance business activity or farming (in effect, the cap applied to FX housing loans).
- A “soft” LTV limit: 80% for real estate loans with maturity above 5 years and 90% for other loans. The limit was considered “soft” in the sense that banks could establish higher LTV limits, provided that they proved the correctness of such an approach on the basis of a sufficiently thorough analysis, taking into account the level of recoveries and historical changes in real estate prices.

The 42% DTI cap corresponded to the 50% limit in Recommendation T (for borrowers with income below the average salary in the national economy), taking into account a 20% depreciation of złoty (i.e. the scale of depreciation that should be assumed in the process of assessing a borrower's creditworthiness in the case of FX real estate loans in the original version

of Recommendation S). A higher DTI cap, corresponding to the 65% limit applied in Recommendation T to high-income borrowers, was not applied here, despite the fact that most borrowers applying for FX real estate loans had incomes significantly above the national average. This shows the determination of the PFSA to reduce the flow of new FX housing loans.

The choice of the LTV limits was discretionary, although the 80% threshold is commonly used to identify transactions in the real estate market that are overly financed with debt.

In the PFSA's opinion presented with the draft of the recommendation, both DTI and LTV caps would reduce banks' credit risk. A relatively low DTI cap for FX real estate loans would reduce borrowers' ability to take out such loans and thus decrease the flow of new FX loans. The PFSA argued that the new DTI cap should contribute to a reduction in credit losses and reduce the risk of borrowers' over-indebtedness. Another positive impact considered was an increase in the effectiveness of monetary policy due to the reduction in the ability of borrowers to take FX real estate loans.

The PFSA judged that the negative impact of both LTV and DTI limits on the economy should be limited.

The amendment to Recommendation T – DTI limits set by banks (no caps in the recommendation), February 2013

Type of financial institutions: banks and branches of foreign credit institutions.

Loan segment targeted: exposures towards private individuals, excluding mortgages and some other types of loans (financing the purchase of securities, business activity or farming as well as some highly collateralized loans).

Limits: the amendment removed the existing DTI caps. Instead, DTI limits were to be set individually by banks, taking into account several factors, including loan quality, the structure of the loan portfolio, risk appetite, targeted clients and loan maturity. DTI limits for FX loans were to be established taking into account an additional buffer as a result of a rise in loan service costs due to an assumed 20% depreciation of the Polish złoty. The PFSA retained the right to challenge banks' choice of DTI limits as part of the regular supervisory process.

The removal of explicit DTI caps was one of the measures taken by the PFSA in order to revive credit growth in the segment of consumer loans. Another measure with the same objective, included in the amended Recommendation, was the introduction of simplified criteria for the assessment of borrowers' creditworthiness in the case of small consumer loans (allowing banks to use automated scoring models more extensively).¹⁴ Another positive effect expected by the PFSA was an improvement in the competitive position of banks in relation to non-regulated entities and, in the case of banking groups that had transferred their consumer lending to such entities, incentives to return this activity to the banking entity.

The PFSA judged (in the draft of the recommendation) that loosening DTI limits would not lead to a significant increase in risk-taking by banks, as it noted a significant improvement in credit risk management by banks, mainly as a result of "self-regulation" after incurring high credit losses on the most risky clients in the period 2008-2010.

The amendment to Recommendation S – explicit LTV limits, June 2013

Type of financial institutions: banks and branches of foreign credit institutions.

Loan segment targeted: loans collateralized by real estate.

Limits:

1. LTV limits for residential real estate mortgage loans:

- 90% – if part of the loan exceeding the 80% limit was insured or backed by high quality collateral (funds on bank account, government or NBP securities),
- 80% in other cases.

A transition period was provided during which the limits would be gradually reduced from the initial level of 95%, which was to come into force at the beginning of 2014, to the target levels in 2017 (a decrease of 5 pp. every year).

2. LTV limits for commercial real estate mortgage loans:

¹⁴ The maximum value of an individual loan in case of which such criteria could be applied was higher for clients who had a longer relationship with the bank.

- 80% – if part of the loan exceeding the 75% limit was insured or backed by high quality collateral,
 - 75% in other cases.
3. The existing caps on DTI ratios were removed. Instead, as in the case of consumer loans, DTI limits would be established by banks themselves. The PFSA retained the right to challenge banks' choice of DTI limits as part of the regular supervisory process. Banks should pay particular attention to loans for which DTI ratios exceed 40% (for borrowers with incomes below the average salary in the region) and 50% (for other borrowers). In such cases the customer should be informed about the heightened risk of such a transaction.

Unlike the previous version of Recommendation S, the LTV caps were “strict” – they could not be exceeded under any circumstances. The choice of the LTV caps was discretionary, meaning they were not a result of calculations made on the basis of a specific methodology. However, 80% threshold is commonly used in many countries to identify transactions in the real estate market that are overly financed with debt.

Another important provision of the Recommendation was a requirement to extend new FX mortgage loans only to borrowers receiving income in the same currency as the currency of the loan.

Some concerns were raised about the impact of the new regulation, especially the “strict” LTV caps, on credit growth. However, the PFSA judged that a slowdown in the growth of mortgage loans was mainly due to reasons other than regulatory requirements, including:

- low availability of flats (because of high prices in comparison to the average salary),
- weak demand, mainly as a result of a deterioration in the economic outlook and a large number of transactions in the real estate market in the preceding years,
- a tightening of lending policies by some banks (due to reasons other than regulatory requirements),
- falling real estate prices (motivating some households to postpone their purchases hoping for more attractive prices).

The negative impact of the Recommendation on credit growth may be reduced by a new housing subsidy program addressed to young people buying their first apartment (“Home for the Young”), which entered into force in January 2014. According to the program, under certain conditions, the state subsidizes 10%-15% of the total price of the residential property for young first-time buyers. The subsidy can be used as a mortgage down-payment.

Additionally, a relatively long transition period should reduce the risk of a significant slowdown in the growth of mortgage credit in the initial years of the implementation of the Recommendation. At first, a shorter transition period (until the end of 2014) for residential real estate mortgages was planned; however, the period was extended and the path leading to the targeted values of LTV limits was smoothened (a decrease in LTV caps by 5 pp. yearly, instead of 10 pp. as originally planned).

B. Application and Enforcement

DTI and LTV limits have been introduced in recommendations issued by the Polish Financial Supervision Authority. The PFSA is the microprudential supervisor of the financial services industry in Poland, including banks and other credit institutions, insurance firms, pension funds and investment companies.

Recommendations for banks are issued on the basis of article 137, par. 5 of the Banking Act, which states that the PFSA can “issue recommendations related to good practices of sound and prudent bank management”. According to article 48k of the Banking Act, article 137 should be applied accordingly to branches of foreign credit institutions. Theoretically, recommendations are “soft” measures – in the legal sense they are not binding for banks. However, in practice they are implemented and followed by the banking sector. The PFSA can also check compliance with the recommendations as part of the regular supervisory process. In case the PFSA assesses non-compliance with the recommendations to be detrimental to the safety of a bank’s operations, the PFSA could call for changes in its practices. If there are no adequate changes in the bank’s operations and policies, the PFSA could issue a negative opinion on its CEO or board members.

The PFSA can issue similar recommendations for credit unions; however, so far this tool has never been used. It should be noted that the sector of credit unions is very small in comparison to the banking sector (its assets are equal to only 1.3% of banking sector assets).

C. Communication

In general, new regulations issued by the PFSA are always put forward for consultations with the representatives of the banking industry, even at the technical drafting stage. Resolutions and recommendations are published on the PFSA's website, including draft regulations under public consultation. The PFSA also prepares explanatory notes for individual banks on specific regulatory provisions, which, in some cases, are broadly disseminated within the industry. Moreover, the PFSA holds meetings with industry representatives and organizations representing various interest groups to present the supervisory standpoint and to hear the industry's and the interest groups' views.

As regards Recommendations S and T specifically, their drafts (as well as draft amendments) were broadly distributed for public consultations. The drafts were sent to banks, industry chambers and consumer protection NGOs.

The Recommendations were particularly criticized as regards the possible negative impact of DTI limits on aggregate credit provision (i.e. potential credit crunch and recession) and on credit distribution (i.e. potential exclusion of a substantial number of customers from the credit market). Recommendation T received the worst criticism from the banking industry. In October 2009 the Polish Bank Association (an organization that groups together all the main commercial banks, PBA) expressed concerns regarding the possibility that the implementation of the Recommendation would hamper activity in the credit market, and submitted proposals for changes to the PFSA. The PBA claimed that the Recommendation should be more flexible and should refrain from setting strict requirements and limits. The PBA also suggested that implementation should be postponed by 12 months. In the end, the regulations were indeed relaxed, but only in 2013.

V. TAKING DECISIONS

A. Institutions

Banks' credit policies are regulated by two main Recommendations issued by the microprudential supervisor – the PFSA. The PFSA uses recommendations (and not regulations), as its powers to issue regulations is limited by the Banking Act to specific issues, while broader powers are granted to the PFSA to issue recommendations on prudent management practices for banks. The recommendations are not explicitly legally binding, but are observed by banks, and the PFSA can check compliance with the recommendations as part of its regular supervisory process.

The PFSA consists of 7 members: the chairman, two vice-chairmen and representatives of the Minister of Finance, Minister of Labor and Social Policy, the NBP and the President of the Republic of Poland. Draft recommendations are prepared by the Office of the PFSA, governed by the chairman and vice-chairmen, and are usually discussed with the NBP, the PBA, the Association of Cooperative Banks, the Ministry of Finance and some other institutions and organizations.

Coordination with other policies related to the financial sector is achieved through the participation of the representative of the NBP in the PFSA, as well as the membership of representatives of the NBP, the PFSA, the Ministry of Finance and the Bank Guarantee Fund (which operates the deposit guarantee scheme in Poland and will soon become the bank resolution authority) in the Financial Stability Committee (FSC). The FSC is mainly responsible for the coordination of the actions of member institutions in ensuring and supporting the stability of the financial system. It is chaired by the Minister of Finance and its decisions are taken by consensus.

Currently, a draft law is being prepared by the government, which will create an authority with an explicit macroprudential mandate that, as of today, is not ascribed to any institution in Poland. New European regulations (the Directive 2013/36/EU and the Regulation 575/2013, commonly referred to as the “CRD IV / CRR package”, implementing Basel III in the EU law)

require certain macroprudential instruments (notably the countercyclical capital buffer) to be used by a designated macroprudential authority. The guiding principles for the mandate of the macroprudential authority, which the draft law respects, were set by the ESRB in the Recommendation ESRB/2011/3. Thus, the creation of the new body will also allow macroprudential instruments defined in the EU legislation to be used in Poland.

The decisions to impose macroprudential measures will be reserved for the FSC, which, according to the draft law, will have new macroprudential powers. When the FSC considers macroprudential matters, it will have a different structure: the President of the NBP will have the leading role, even if the FSC membership does not change.¹⁵ The leading role of the NBP will take three forms: (i) the President of the NBP will chair the FSC in its macroprudential capacity; (ii) the President of the NBP will have the casting vote in the FSC; and (iii) the NBP will run the FSC secretariat when dealing with macroprudential matters. Furthermore, the NBP has the strongest analytical capacity of all the institutions involved in the FSC and thus will have a key role in the analysis and formulation of policy.

B. Dealing with Policy “Leakages”

An important consideration for Poland is the regulatory framework of the European Union, which allows banking activities to be conducted in other EU countries (on a purely cross-border basis or via branches) on the basis of the domestic banking license. Therefore, branches of foreign banks (incorporated in other EU countries) that were active in the mortgage loan market could not be directly obliged to adopt the regulations and recommendations issued by the PFSA, thus carrying the risk of regulatory arbitrage. In such cases, the foreign bank was requested to declare that the lending activity within Poland’s jurisdiction was being conducted in accordance with the PFSA’s regulations. The respective home supervisor was informed and asked to support the PFSA’s request.

The ESRB Recommendation 2011/1 on lending in foreign currencies provided significant support for limiting the scope for regulatory arbitrage, as it advocated the principle of

¹⁵ Here we describe the draft law of January 2015. As the final version of the government project has not been agreed, some provisions of the new law may change.

reciprocity, which translated into an obligation of supervisory authorities from all EU countries to respect the relevant measures introduced by any EU country.

As regards the activity of non-bank entities in loan provision in Poland, in 2012 the FSC appointed a working group to develop recommendations to improve the effectiveness of the identification, monitoring and supervision of such entities. The working group recommended, *inter alia*, that: (i) additional powers should be granted to the PFSA allowing it to request information from non-supervised entities to assess their activities; (ii) non-bank lenders should be obliged to register to facilitate the enforcement of consumer protection measures; and (iii) a limit on the total cost of a loan extended by any entity should be introduced. These recommendations were aimed at limiting the problems related to the excessive indebtedness of borrowers as well as at improving consumer protection. Work on implementing these recommendations is ongoing.

VI. EVALUATING EFFECTIVENESS

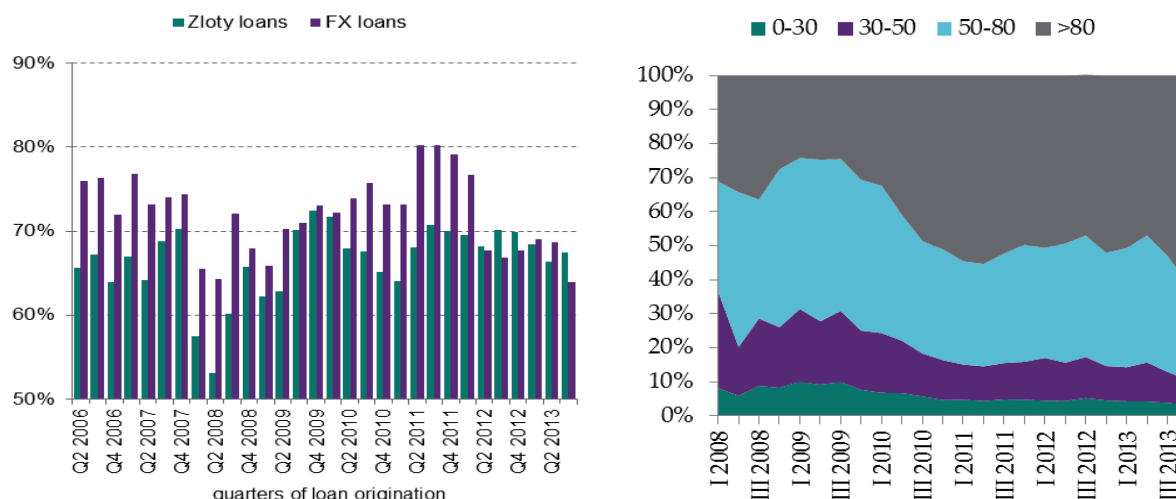
The Recommendations were implemented by a microprudential regulator, the PFSA, albeit also with a view to macroprudential objectives. As regards purely microprudential aspects, the recommendations have been successful. They have contributed to better risk management by banks; no bank in Poland needed public support due to the credit risk of its loan portfolio. On the macro level, the regulation has also served financial stability, especially by contributing to the elimination of FX mortgage lending. In the paragraphs below, we will discuss the effects of the regulation in more detail.

a) Impact of the regulation on the targeted ratios

As regards the LTV ratio, the soft limits introduced in 2011 seem to have had some effect. The average LTV for new FX mortgage loans declined from 78% in 2011 to 67% in 2013 (see Figure 5¹⁶). At the same time, the share of new high-LTV mortgage loans (with LTV>80%) declined slightly, from 53% on average in 2011 to 50% in 2012. The announcement of the second amendment to Recommendation S triggered front-loading of high-LTV borrowing. As a result, the share of new high-LTV mortgage loans increased to 61% in the fourth quarter of 2013. The effectiveness of the strict LTV caps remains to be assessed, due to the gradual tightening foreseen by the Recommendation. However, banks are expected to comply with its provisions, given the supervisory powers of the PFSA.

¹⁶ Increased volatility in LTV series for FX mortgages as of 2011 is due to banks gradually withdrawing from offering this product.

Figure 5. Average LTV (left-hand panel) and LTV structure for new mortgage loans (right-hand panel)



Note: A drop in LTV values in the first half of 2008 on the left-hand panel is due to a decrease in numbers reported by one of the large banks. Increased volatility in LTV series for FX mortgages as of 2011 is caused by banks gradually withdrawing from offering this product.

Source: NBP surveys (left-hand panel) and PBA (right-hand panel).

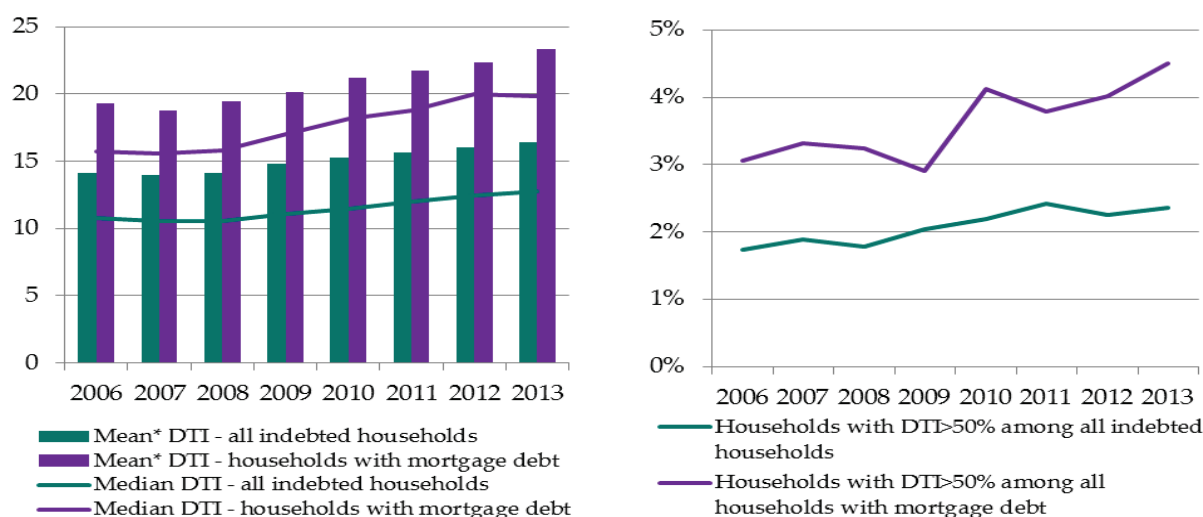
The explicit DTI caps introduced in 2010 and 2011 seem to have been effective to some extent, mainly as regards the situation of most indebted households. The average¹⁷ household DTI ratio increased slightly, from around 14% in 2006-2008 to 16.5% in 2013. The average DTI ratio for households with mortgage loans also increased, from around 19% to 23%. However, at the same time, the share of highly indebted households (with DTI>50%) changed only slightly: from 1.8% to 2.4% among all indebted households and from 3.2% to 4.5% among households with mortgage debt (see Figure 6).^{18 19}

¹⁷ All means are calculated on data trimmed for extreme outliers. In this case we have removed households with income below the 0.1th percentile, DTI above the 99.9th percentile and income buffer below the 0.1th percentile and above the 99.9th percentile (at most 0.32% weighted observations).

¹⁸ The statistics related to household DTI are calculated on the basis of data from the Polish Household Budget Survey. The data refer to DTI ratios for all households with bank debt.

The Polish Household Budget Survey (PHBS) is an annual survey providing detailed information on income and expenditure of around 37,000 households (for detailed information about methodology of the survey, see e.g. GUS (2011) and GUS (2013)). The survey includes data on debt repayment cash flows. Hence, the value of the loan was calculated using these flows and the information on the interest rate for the month when the household was surveyed and a general assumption about loan maturity (based on

Figure 6. Average DTI for indebted households (in %, left-hand panel) and share of households with high DTI (right-hand panel)



Note: means calculated on data trimmed for extreme outliers.

Source: NBP calculations based on PHBS data.

b) Impact on credit growth and real estate prices

It is important to keep in mind, that the main objective of policies discussed in this paper was to limit only *certain categories* of credit, i.e. those that were perceived as particularly risky by

banking statistics). The value of the property was calculated using the reported information on its size and the residential real estate price (per square meter) in the region.

Until 2012, the PHBS did not contain information about the currency of loans repaid by households. Hence, in order to calculate the total distribution of LTV for mortgage loans, a bootstrap procedure was adopted, randomly allocating households as having loans in domestic or foreign currency, with the probability corresponding to the proportion of FX and złoty loans calculated based on banking statistics. The procedure was repeated 150 times for each household.

For more results based on the PHBS, see Bierut and Chmielewski (2015).

¹⁹ The PHBS is constructed to inform the analysis of general living standards of the population, not specifically to analyze financial issues. Hence, although survey results are weighted, the weights are not chosen to match the characteristics and distribution of borrowers. Instead, the results are weighted with the National Census data broken down by the number of persons living in urban and rural areas. As a result, the PHBS suffers from the problem of under-representation of households with higher incomes (which is additionally exacerbated by a higher non-response rate of such households). Other issues are related to potential inaccuracies in survey answers, especially concerning debt repayments and income. Hence, specific numerical results should be taken with some caution. On the other hand, comparison with the data obtained from independent sources based on the information from banks gives support to the usefulness of the data.

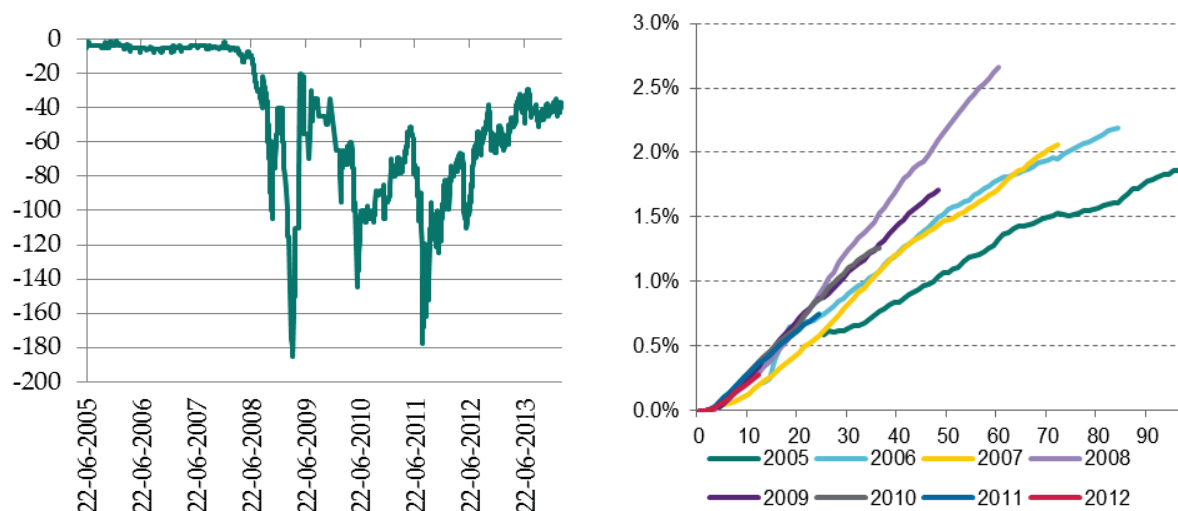
regulators and supervisors (e.g. due to potential credit losses, risks related to long-term or FX financing, etc.).

The original Recommendation S was intended to mitigate risks associated with FX housing loans. However, the growth rate of FX loans remained elevated until the outbreak of the global financial crisis (see Figure 1). The strong growth of housing loans before 2008 and the availability of high-LTV loans and FX loans contributed to the strong growth of residential real estate prices (see Figure 3). The persistently strong growth in FX mortgage lending prompted further action by the PFSA, which was more successful. The growth rate of FX housing loans declined substantially (below 10% y-o-y) in the third quarter of 2009 and turned negative in mid-2012. Consequently, the share of FX mortgage credit in the total mortgage portfolio fell from 60% in 2008 to 48% in May 2014.

The elimination of FX mortgage lending was due both to supervisory actions and other important factors that reduced bank incentives to supply such products. Banks used FX swap and cross-currency swap markets to hedge²⁰ their FX balance sheet exposures (related to FX loans). Before the Lehman Brothers' failure, the additional cost in the form of the basis swap spread was practically zero. However, after the markets' disruption in the fourth quarter of 2008, the relevant basis swap spreads increased and stayed at elevated levels for a long time, sometimes reaching well above 100-150 bps (see Figure 7). This raised the costs of FX lending for banks, which they transferred to new customers (as both FX and local currency loans in Poland have predominantly fully floating interest rates, set as the relevant interbank rate plus a fixed margin, banks were unable to pass these costs through to existing customers). At the same, due to the abovementioned reasons, banks limited the supply of the most risky CHF mortgage loans. Additionally, as the domestic yield curve shifted downward at the same time, FX borrowing became much less attractive relative to borrowing in złoty.

²⁰ These instruments were used to engineer synthetic FX forward contracts that offset the balance sheet FX exposure.

Figure 7. EURPLN 5Y basis swap spread (left panel) and a number of housing loans in arrears of more than 90 days in relation to total number of loans extended in a given year (right panel)



Note: vintage lines for loans extended in successive years at the end of consecutive months from loan origination.

Source: Bloomberg (left panel); BIK (right panel).

As regards consumer credit, the largest fall in credit growth took place in 2009 and 2010, i.e. before the key provisions of the Recommendation T were implemented (see Figure 1). The slowdown in consumer credit growth at that point is more likely to have been caused by lower economic growth after 2008, coupled with a strong tightening of banks' lending policies. The introduction of DTI caps in 2010 and strict requirements regarding the assessment of the creditworthiness of customers may have contributed to a fall in consumer credit in 2011 and 2012 (as well as to some migration to non-bank entities). Anecdotal evidence suggests that the requirements regarding the assessment of creditworthiness had a stronger influence. The loosening of regulatory requirements regarding the assessment of borrowers' creditworthiness and DTI ratios for consumer loans introduced in 2013 had the desired effect of stimulating consumer credit (although the effect is again mixed with the impact of an improved macroeconomic outlook). The growth rate of consumer credit has gradually recovered in the course of 2013 and turned positive again in September 2013.

c) Impact on the risk profile of the credit portfolio and bank borrowers

The period of rapid credit growth in 2006-2008 was characterized by overly loose lending standards and significant weaknesses in credit risk management by banks, especially in the case of consumer loans. As a result, the quality of household loans deteriorated and the value of credit losses increased following the economic slowdown in 2009, especially in the consumer loan portfolio. The implementation of DTI caps seems to have contributed to stabilizing, and then lowering, the credit risk costs on the consumer loan portfolio over 2011-2013 (see Figure 4). As for housing loans, the profile of vintage curves for the years 2010-2012 suggests better loan quality compared to loans extended in previous years (see Figure 7).

As regards the risk profile of bank borrowers, LTV and DTI regulations do not seem to have been successful in reducing the share of the most indebted households. However, the regulation was also aimed at improving the credit risk management practices of banks, which would, among others, lead to an improvement in the risk profile of the most indebted households.²¹ We will examine that aspect by looking at the financial standing of the borrowers on the basis of the Polish Household Budget Survey.

A household's financial standing can be measured by the size of an income buffer, defined as the difference between the household's disposable income (as reported in the PBHS) and its minimum required income (covering basic living costs and bank debt repayments).²² A negative income buffer means that household's disposable income is not sufficient to cover both basic living costs and debt repayments and can signal potential problems with servicing debt in the future.

²¹ An important issue in the assessment of the effectiveness of the policies is that supervisors can in principle only target new lending. However, the intention is that the policies should have an effect also later on – over the whole life of the loan contract. Therefore, we will look at all borrowers, not only those taking new loans.

²² Basic living costs are calculated on the basis of consumption units per household (using the OECD's adjusted consumption unit scale) and minimum existence costs per person specified by the Polish Institute of Labor and Social Studies. Bank debt repayments are reported by households. As a robustness check, the analysis was replicated with an income buffer calculated using a subjective measure of a household's minimum required income (a self-reported insufficient income). The results were virtually identical. A household's income buffer was subsequently scaled by the average national salary for a given year, in order to allow for a more appropriate historical comparison. For an earlier study on the topic, see Zajączkowski and Żochowski (2007a).

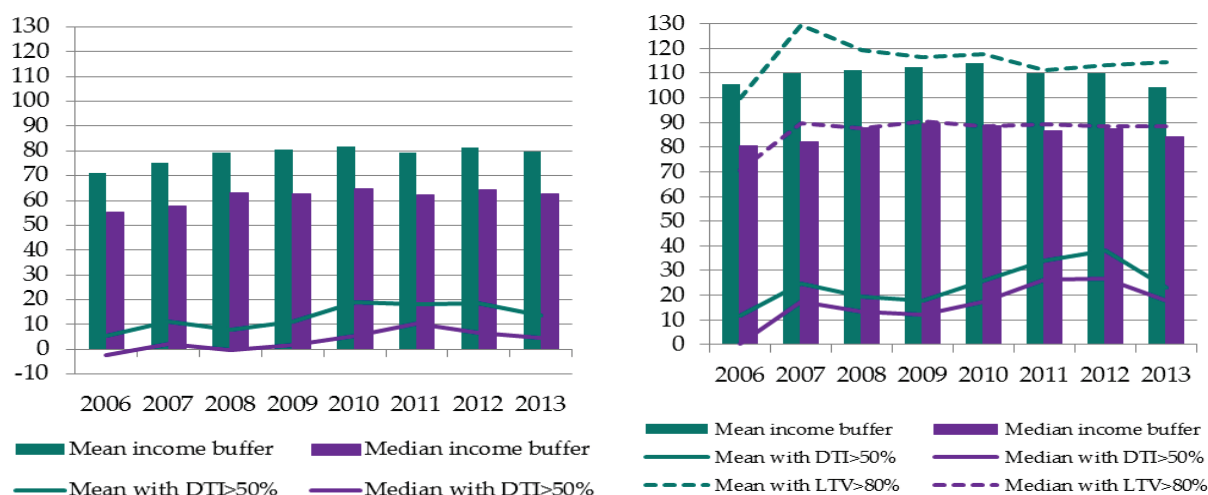
The income buffer is used as a proxy for credit risk.²³ It should be stressed, however, that the data available do not allow for establishing a relationship between the income buffer and the probability of default. Hence, a negative income buffer should not be interpreted as synonymous with default.²⁴ Changes in the share of loans extended to households with a negative income buffer in total loans to households should, nevertheless, provide a good indication of changes in credit risk related to the household sector. Moreover, a closer look at the changes in its distribution could inform about potential future vulnerabilities among borrowers. The data from the survey allow only for an estimation of current DTI and LTV ratios (not values at origination) and these values are used in the analysis below.

The survey data show that the financial standing of bank borrowers has improved relative to 2006, which would suggest that the regulations were to some extent effective in improving credit risk management by banks. The median income buffer (relative to the average national salary) for all indebted households increased to 63% on average in 2011-2013, from 55.5% in 2006. Households with mortgage loans have typically had much higher income buffers when compared to the total population of borrowers (see Figure 8). For households with DTI ratios above 50%, the median income buffer increased from values close to zero (or negative) observed until 2009 to reach the peak of 10.2% in 2011, but subsequently declined to 4.5% in 2013. Households with high-LTV mortgage loans (LTV>80%) are characterized by high average income buffers (89% on average in 2011-2013). Looking at the three-way relationship between DTI, LTV and income buffers, it turns out that that borrowers with higher LTV loans tend to have higher DTI ratios but at the same time also higher income buffers. This would suggest that banks were careful in providing high-LTV mortgage loans to households with higher income levels (see Figure 14).

²³ See e.g. Johansson and Persson (2006), Albacete and Fessler (2010), Lindquist et al. (2014), Ampudia et al. (2014) and Galuscak et al. (2014).

²⁴ For example, households may be unwilling to report their full income, or they may receive support from family members.

Figure 8. Average income buffer for all indebted households (left-hand panel) and households with mortgage debt (right-hand panel), % of the average national salary



Note: means calculated on data trimmed for extreme outliers.

Source: NBP calculations based on PHBS data.

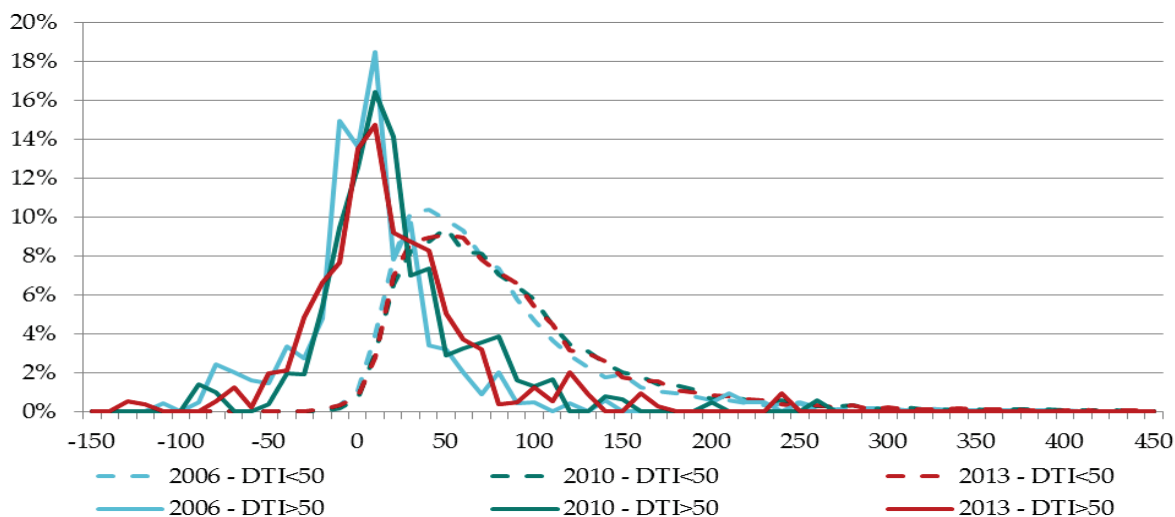
The effectiveness of LTV and DTI measures (in differentiating borrowers by credit risk) can be seen in the fact that conditional distributions of income buffers are different for households above and below certain cut-off values. This is especially visible for the DTI ratio, where the distribution clearly shifts from right to left with a higher DTI cut-off value (see Figure 9). This shows that curbing the extension of loans to overly-indebted households is crucial for the risk profile of the credit portfolio. The distributions of income buffers depending on LTV ratios for mortgage loans do not show such stark differences (see Figure 10).²⁵ This can be explained to some extent by “self-regulation” in the banking sector related to mortgage credit risk (banks allowing higher LTV loans to borrowers with higher income). Moreover, FX mortgage loans (whose LTV increased as a result of złoty depreciation) were extended, especially before 2008, to households with higher income.²⁶ Hence, although the popularity of high-LTV mortgages is

²⁵ However, given the fact that the share of households with DTI above 50% is very low (below 2.5% in the total indebted population and below 4.5% among mortgage borrowers), the DTI limit of 50% cuts off a much more “extreme” part of the distribution than the LTV limit of 80% (27% of mortgage borrowers in 2013).

²⁶ See also Box 4 in NBP (2013a).

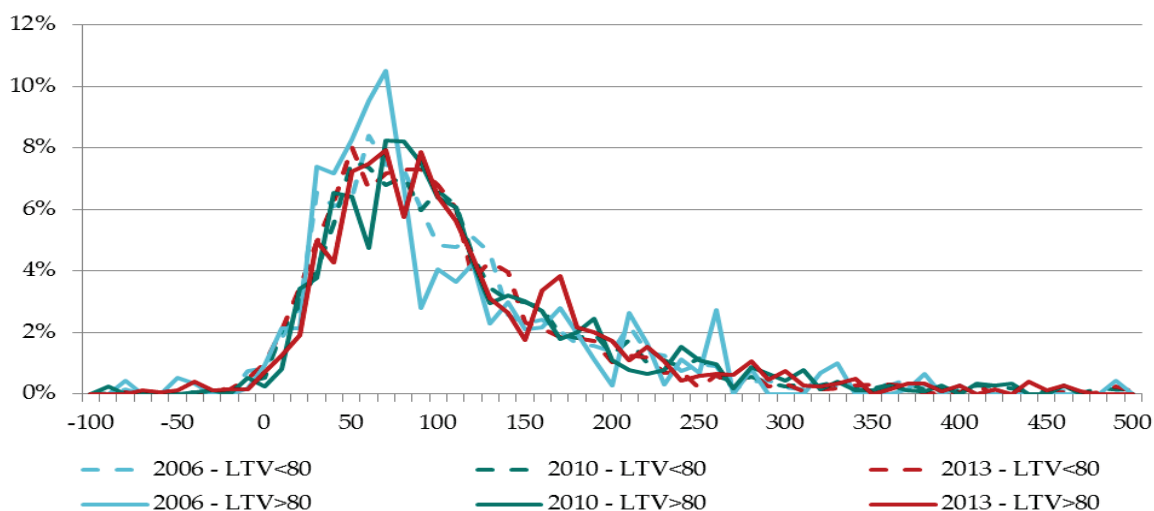
unwelcome, the weak relationship between LTV levels and income buffers should limit the associated relative increase in the riskiness of the mortgage portfolio.

Figure 9. Distribution of the income buffer for low- and highly-indebted households (measured by DTI)



Source: NBP calculations based on PHBS data.

Figure 10. Distribution of the income buffer for low- and highly-indebted households (measured by LTV)



Source: NBP calculations based on PHBS data.

From the risk management perspective, it is also important to have a closer look at the most risky borrowers, i.e. those with negative income buffers. Luckily, the share of households with negative income buffers in the total indebted population is very low. As can be expected, these borrowers have significantly higher DTI ratios.

d) Policy “leakages” such as direct cross-border loans and migration of financial activity to other financial institutions

The survey data do not show growth in the segment of non-regulated companies specialized in providing consumer finance (see Table 2). Additionally, in order to avoid regulatory requirements, some banks transferred their activity in the consumer loan segment to non-bank entities belonging to their capital groups. This process has had two effects. First, lending recorded on the books of non-bank subsidiary entities would not be visible in bank financial statements prepared on a solo (stand-alone) basis. Second, in cases where banks and their consumer finance subsidiaries used similar branding, borrowers answering the questionnaire could report formally non-bank debt as bank debt. This effect is hard to quantify, however.

Table 2. Structure of debt service payments – banks and non-bank financial institutions

	Bank debt service payments to total debt service payments	Non-bank debt service payments to total debt service payments	Non-bank debt service payments to total debt service payments due to non-housing debt
2006	78.5%	17.3%	19.5%
2007	83.9%	13.3%	15.8%
2008	86.4%	11.0%	14.0%
2009	88.6%	8.9%	12.1%
2010	89.4%	8.4%	11.7%
2011	90.4%	7.7%	11.7%
2012	91.1%	7.1%	11.7%
2013	92.8%	5.4%	9.3%

Source: NBP calculations based on PHBS data.

VII. DISTILLING MESSAGES

The implementation of macroprudential regulation in Poland is interesting for a number of reasons. It illustrates very well the challenges of carrying out macroprudential policy in a small open economy with fully liberalized capital flows, experiencing real convergence and a (related) macroeconomic upswing.

The real convergence and the rising household income have been paralleled by financial deepening. The growing demand for loans was quickly met by banks' supply. Joining the European Union in 2004 additionally reduced the importance of domestic resource constraints (e.g. the level of domestic savings), opening the Polish economy to higher cross-border capital inflows, foreign bank ownership and cross-border banking operations. At the same time, the EU membership affected the scope of possible policy actions, by removing the option of using capital controls and raising the threat of regulatory arbitrage. On top of that, significant surpluses in banks' capital and liquidity made an introduction of capital and/or liquidity requirements aimed at curbing credit growth rather ineffective. Hence, despite little experience (and even incomplete data), the authorities were forced to use instruments operating at the customer's end: recommendations setting guidelines related to the assessment of creditworthiness, DTI and LTV limits.

The first concern of the authorities was the rise of FX lending to households (especially in the mortgage segment). The growth of FX loans was fuelled by lower interest rates abroad and expectations of further appreciation of the Polish złoty. However, FX borrowing exposed the banking system to an increased credit risk in the case of adverse macroeconomic developments. The expansion of FX lending was seen as particularly risky also because it increased liquidity risks for the Polish banking sector and the importance of foreign funding. It also generated macroeconomic risks, related for example to lower effectiveness of monetary policy due to substitution effects and the fact that capital inflows related to FX lending were ultimately channeled into the residential real estate market, contributing to a strong increase in prices, which in the longer run would have been unsustainable. An adverse scenario materialized in 2008-2009, contributing to a steady, although slow, increase in the impaired loan ratio for mortgage loans.

The second supervisory concern was the consumer credit segment, which boomed in 2006-2008, stimulated by the thriving economy, overly loose lending standards and significant weaknesses in credit risk management by banks. This led to the accumulation of credit risk, which materialized in credit losses following the economic slowdown in 2009.

The analysis of the effectiveness of the regulatory measures shows that the efficiency of qualitative measures and soft limits in a booming economy could be limited. Despite the introduction of Recommendation S as early as 2006, the growth rate of FX mortgage loans remained elevated until the outbreak of the global financial crisis, contributing to a significant increase in residential real estate prices. The successful elimination of FX lending was achieved only by mid-2012 and required the introduction of strict DTI caps and strong regulatory pressure coordinated with home authorities.

Still, the successful elimination of FX lending cannot be attributed to the supervisory action alone. The developments in international markets following the Lehman Brothers' failure reversed the tradeoff between FX borrowing and borrowing in złoty in favor of the latter, reducing the supply of and the demand for FX mortgage loans. The effect of the regulation is further mixed with the impact of a slowdown in economic growth after 2008, which brought about a strong tightening of banks' lending policies and the more general problem with the effectiveness of real estate as collateral in mortgage lending in Poland.

The assessment of the efficiency of regulatory measures in restraining consumer credit growth is similarly complicated. The largest fall in consumer credit growth took place in 2009 and 2010, i.e. rather in response to a gradual tightening of banks' lending policies that started in 2008 than to policy measures. A further slowdown of consumer credit in 2011-2012 could have been caused both by the introduction of strict DTI caps and more stringent requirements for the assessment of creditworthiness. The loosening of regulatory requirements on consumer loans introduced in 2013 had the desired effect of stimulating consumer credit (although the effect is again mixed with the impact of an improved macroeconomic outlook).

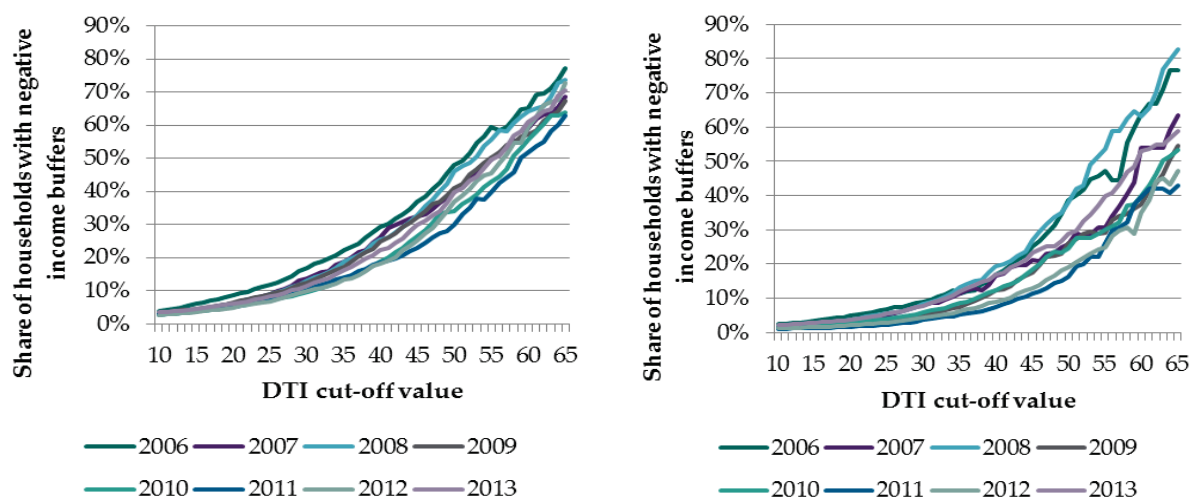
The analysis of the effectiveness of the regulatory measures also indicates that they may have contributed to better credit risk management practices of banks and a better risk profile of the credit portfolio. Household survey data show that the financial standing of indebted

households, including the highly-indebted ones (i.e. households with DTI ratios above 50%), has gradually improved relative to 2006, pointing to an improvement in the risk profile of bank borrowers. The data also show that households with high-LTV mortgage loans ($LTV > 80\%$) are characterized by high average income buffers. It seems that banks have endogenously limited the credit risk by adjusting the value of the mortgage loan to the financial standing of the borrower, potentially in response to regulatory incentives. As regards the risk profile of the credit portfolio, the implementation of DTI caps seems to have contributed to stabilizing, and then lowering, credit risk costs on the consumer loan portfolio over 2011-2013. For housing loans, the profile of vintage curves for the years 2010-2012 also suggests better loan quality compared to loans extended in previous years.

The investigation of the risk profile of bank borrowers proves the existence of differences in their riskiness depending on the DTI ratio (in particular, a significant deterioration in the financial standing, and thus an increase in the credit risk, of households with DTI ratios above 50%). This underscores the usefulness of DTI-based measures. Figure 11 shows the share of borrowers with negative income buffers when DTI exceeds various cut-off values. These results can be used to tentatively assess the impact of certain DTI cut-off values on the credit risk of the loan portfolio.²⁷ For example, according to the data from the PBHS, if the DTI cap were used to limit the share of borrowers with negative income buffers to 10% (in the population of borrowers with DTI above the cap), the DTI cap should have been gradually increased between 2006 and 2012 (from 22% to 30%); it could have been reduced somewhat again in 2013 (to 27%). A similar pattern holds for mortgage borrowers. Figure 6 illustrates that the level of 50% (or higher) could have been set too high, cutting off a very small, and perhaps too “extreme,” part of the distribution. Figure 12 shows that distributions of income buffers can differ substantially already at the DTI cut-off level of 30% (in this case: given the data for 2010).

²⁷ A number of studies (e.g. the references in footnote 23 as well as Zajączkowski and Żochowski (2007b)) provide an illustration of another interesting approach, where micro-level household data are used to evaluate the impact of macroeconomic shocks on households (stress-testing).

Figure 11. Share of households with negative income buffers, depending on DTI cut-off values



Note: left-hand panel: all borrowers with bank debt; right-hand panel: only borrowers with housing loans.

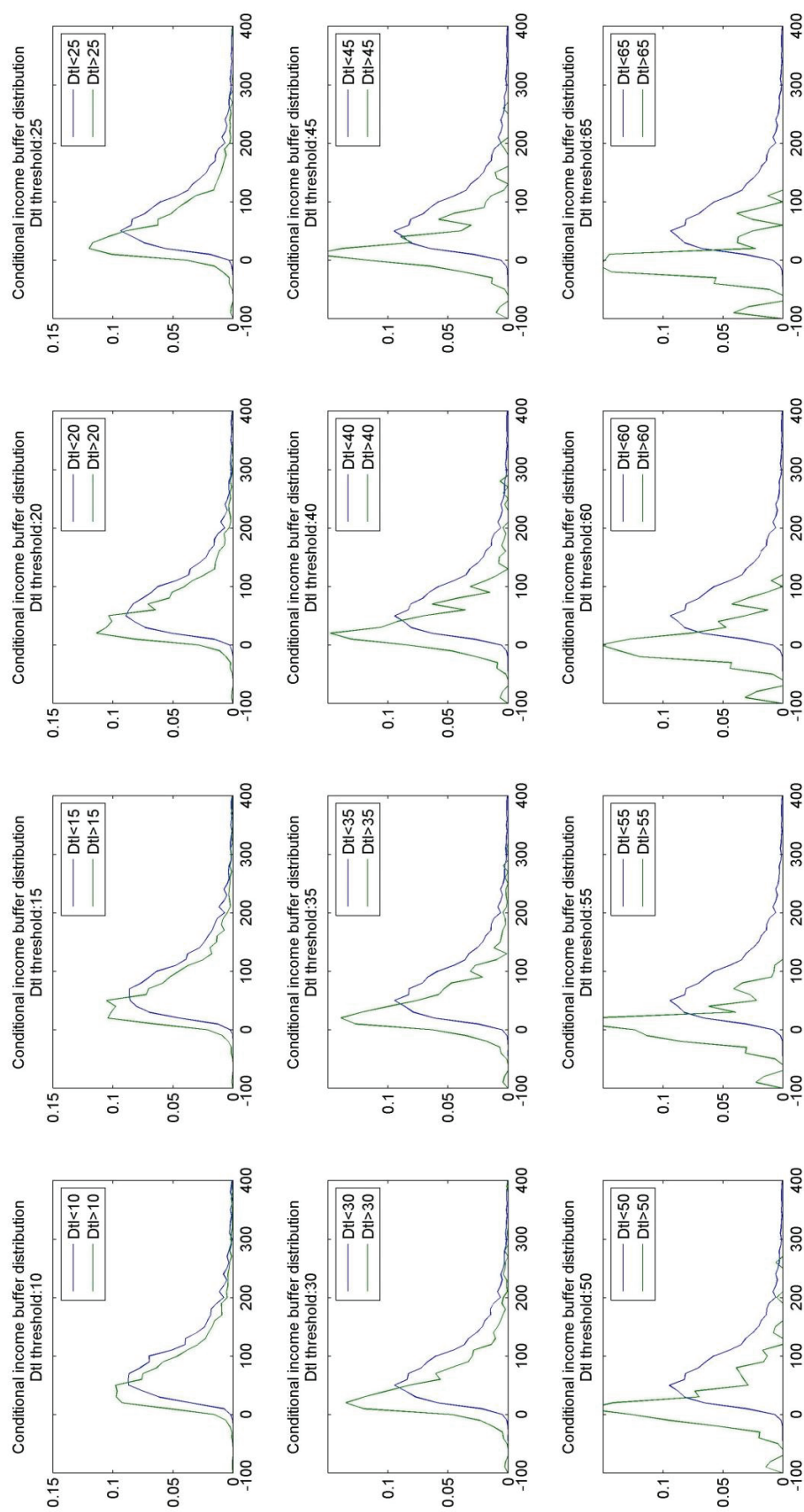
Source: NBP calculations based on PHBS data.

Despite the successful elimination of new FX mortgage lending, some risks stemming from the FX housing loan portfolios remain on the radar of the authorities, notwithstanding the good performance of the portfolio to date. The main legacy issues are: the increased credit risk of unhedged borrowers (the risk of a rise in loan servicing costs in case of zloty depreciation or a rise in foreign interest rates) and the need to hedge the FX risk stemming from the FX mortgage portfolio. Only part of FX mortgage lending is financed with FX liabilities, so the large FX mortgage portfolio is the main source of the open balance sheet position of some Polish banks, which has to be hedged with derivatives. The maturity of these derivatives transactions is typically shorter than the maturity of the mortgage portfolio. Banks therefore have to roll over the hedging transactions periodically. Due to underdeveloped domestic interbank markets for such instruments, banks must rely on foreign financial markets. The liquidity of markets for such instruments may decrease significantly in times of market turbulences, which is the source of rollover risk. The risk materialized to some extent at the beginning of global financial crisis, when liquidity decreased and the cost of such hedging rose significantly. However, Polish banks managed to continue these transactions, partly with foreign parent companies as counterparties.

Additionally, banks extended the maturity of their hedging transactions, which reduced the rollover risk.

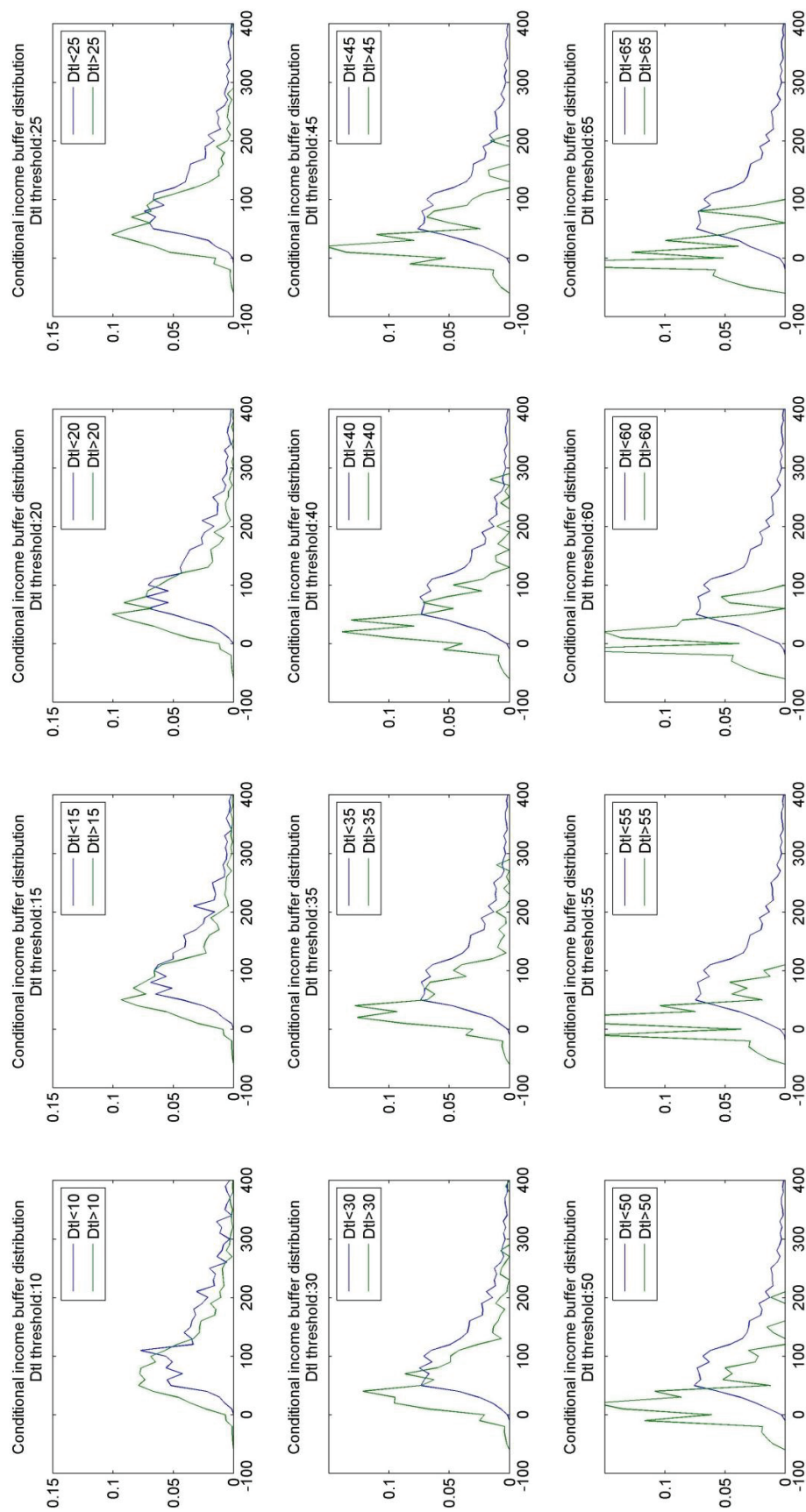
Due to, *inter alia*, a high share of loans with high LTV, in 2013 the authorities introduced strict caps on LTV ratios to prevent further accumulation of risks. Their effectiveness remains to be assessed, due to the gradual tightening of the caps. Moreover, the impact of LTV ratios on the risk profile of borrowers is less visible in the historical data (see Figure 14). However, looking forward – given the improving macroeconomic outlook – LTV regulation is likely to become an important macroprudential instrument in preventing the build-up of booms in real estate prices. Mortgage market trends will also need to be observed in order to counteract attempts to “soften” the strict LTV caps through unsecured lending (i.e. taking unsecured loans to finance the necessary down-payment to comply with the LTV caps). If such trends emerge, strict LTV and DTI caps may need to be used together.

Figure 12. Conditional distributions of income buffers depending on DTL, all households with bank debt, data for 2010.



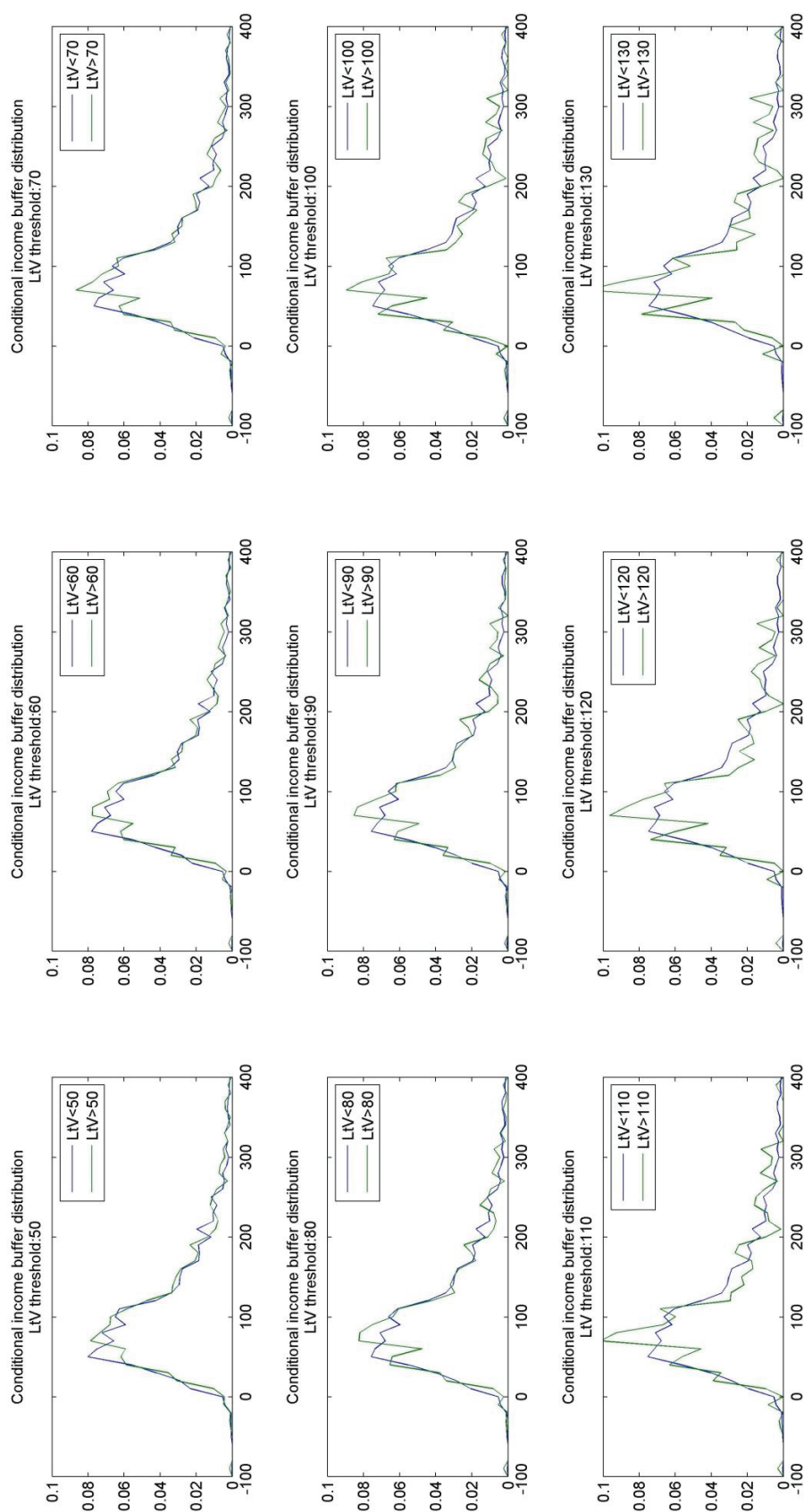
Source: NBP calculations based on PHBS data.

Figure 13. Conditional distributions of income buffers depending on DTI, mortgage borrowers only, data for 2010.



Source: NBP calculations based on PHBS data.

Figure 14. Conditional distributions of income buffers depending on LTV, data for 2010, based on a bootstrap procedure.



Source: NBP calculations based on PHBS data.

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