

Effectiveness and side effects of macroprudential measures: First evidence from Austria

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1. Abstract:

We analyse the effectiveness and side effects of two macroprudential measures in Austria, which were first implemented in 2003 and 2012, respectively. First, we find that measures introduced to curb excessive foreign currency lending effectively reduced foreign currency loan growth in Austria, while banks simultaneously substituted these loans with euro loans as implied by our theoretical model. Second, by applying a difference-in-difference estimation approach, we note that the requirement for a maximum loan-to-local-stable-funding ratio (LLSFR) was successful in fostering the local refinancing of Austrian subsidiaries. For both measures, we do not observe significant unintended negative side effects.

2. Introduction

In recent years, many advanced and emerging countries have introduced macroprudential policies to mitigate systemic risks arising from both the structural and cyclical dimensions and to reduce the costs and probability of financial crises by internalizing negative externalities emanating from banks. The objective of macroprudential measures is to safeguard the stability of the whole financial system at lowest costs for the economy. The last financial crisis of 2008 has uncovered the need to establish a macroprudential policy framework alongside microprudential supervision (ESRB, 2013).

Our analysis builds on the growing body of literature that has examined the use as well as the effectiveness of macroprudential policies², while also focusing on the links between macroprudential policies and financial stability.

In 2003, without a legally binding framework, Austrian authorities took their first steps to implement macroprudential policy by addressing excessive foreign currency lending. Since the onset of the global financial crisis, further steps were taken to tighten the measures in 2008, 2010, 2013 and 2017. In 2012, the so-called sustainability package was introduced and also constitutes a predecessor to “modern” macroprudential measures in Austria. The sustainability package was established as a response to the increasing connectivity and complexity of the financial system and as a key lesson from the 2008 financial crisis, where interbank markets suddenly dried up, leaving huge funding gaps

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² Galati & Moessner (2014), Dimova et al. (2016) and Claessens (2014) provide an overview of macroprudential policy tools and a detailed review on the literature of the effectiveness of macroprudential policies.

at certain banks. The sustainability package set a legally non-binding maximum loan-to-local-stable-funding ratio (LLSFR) of 110% at the (foreign) subsidiary level of the three largest Austrian banks. The aim was to increase the risk-bearing capacity of banking groups and to reduce the likelihood of unsustainable credit growth fuelling boom-bust-cycles (FMA, 2012; FMA and OeNB, 2012).

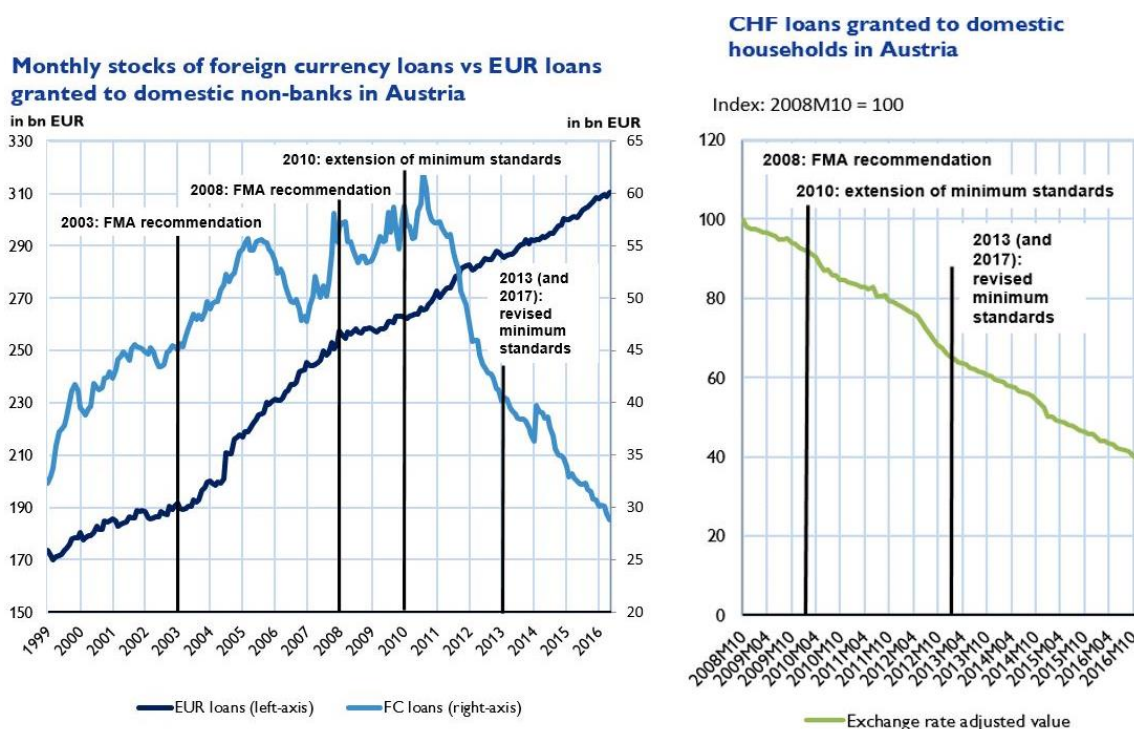
3. Measures to reduce excessive foreign currency lending show evidence for its effectiveness

In 2003, the OeNB together with the FMA turned to macroprudential policy to curb excessive foreign currency lending due to the very large portfolio of foreign currency loans (especially Swiss franc loans) held by Austrian banks (Waschiczek, 2002; Auer et al., 2012). Thus, the Financial Market Authority (FMA) issued so-called Minimum Standards (FMA, 2003a,b, 2010, 2013), which aimed at improving banks' risk management practices concerning foreign currency lending and loans with repayment vehicle.

In the pre-crisis period, foreign currency lending seemed to be an attractive offer for both consumers and borrowers. During the global financial crisis, the risks associated with foreign currency loans and loans with repayment vehicles for both banks and consumers became increasingly noticeable as they were both negatively affected by the related risks. These adverse developments have led to a heightened risk awareness and have prompted the FMA jointly with the OeNB to take further policy actions. Thus, they strongly recommended in 2008 that the banking sector should no longer extend foreign currency loans to households. The Minimum Standards were further extended in 2010, 2013 and 2017.

The aggregate data on foreign currency and euro loan developments to domestic non-banks in Austria do not indicate effectiveness of the 2003 macroprudential measure based on the stock of foreign currency loans. These developments could be level effects, since all loan stocks might have grown in this time span. In Figure 1, the volume of foreign currency loans extended to Austrian nonbanks increased constantly from 32 billion euro in December 1999 to 58 billion euro in October 2008. Only after the supervisory efforts in 2008, 2010 and 2013, we observe a drop in the stock of foreign currency loans extended to domestic non-banks. In exchange rate-adjusted terms, foreign currency loans and particularly Swiss franc-denominated loans extended to Austrian households decreased by over 60% since October 2008, as can be seen in the right panel of Figure 1. As the financial crisis of 2008 (including the appreciation of the Swiss franc against the euro and the losses associated with repayment vehicles) is likely to have had an impact on the demand and supply for foreign currency loans, assessing the effectiveness of the supervisory measures becomes more difficult.

Figure 1: Foreign currency loan developments in Austria



Source: OeNB.

Our empirical model to test the effectiveness of the foreign currency measures in Austria is based on a classical industrial organization approach, namely oligopoly theory. In particular, we set up a Cournot oligopoly game with multi-product banks and horizontal product differentiation, where banks simultaneously determine the optimal amount of foreign and euro loan growth. We estimate our theory by using a simultaneous equation approach to capture and test for the potential endogeneity and the indirect effects of euro and foreign currency loan growth. To this extent, we use quarterly supervisory bank-level data reported by all Austrian banks at the unconsolidated level from the beginning of 1998 until end-2016. As dependent variables, we apply the yearly growth rate of the stock of foreign currency loans (measured in euro) and loans denominated in euro to non-financial institutions and private households. To both equations, we add a set of variables to capture overall trends in loan growth as depicted in Table 1.

Table 1: Set of variables included to the equations

Foreign currency loan growth	Euro loan growth
Euro loan growth	Foreign currency loan growth
Interest rate differential: Euro – Swiss francs	
Exchange rate – Swiss francs per euro	
GDP growth	GDP growth
Time dummies for years 2003 to 2015	
Lagged euro interest rates	Lagged euro interest rates
Lagged foreign currency interest rates	Lagged foreign currency interest rates
Proxy refinancing costs	Proxy refinancing costs
Log of total assets	
Crisis dummy	Crisis dummy
	Tier 1 capital growth

Our aim is to identify the effectiveness of the measure by controlling for all potential effects that might reduce foreign currency loan growth. In case we do not observe the substitution effect of foreign currency for euro loans after the measure, we conclude that negative side effects of the measure are likely, as lending to the non-banking sector dropped indicating a potential negative effect on the growth of the real economy.

First, the model output suggests that the effect of foreign currency loan growth is significantly negative in the euro loan growth equation, such that a 1pp decrease in foreign currency loan growth leads to a significant rise of euro loan growth by 9bp. This indicates that there has been a substitution of foreign currency loans to euro loans. Most importantly, the time dummies capturing the effectiveness of the macroprudential measures are significantly negative from 2005 onwards, suggesting that the measures were effective in reducing foreign currency loan growth in Austria. The dynamics indicate that the latter more intrusive measures of 2008, 2010 and 2013 were more successful in decreasing foreign currency loan growth. However, in 2007, we observe the largest drop in foreign currency lending, indicating that the risks associated with foreign currency lending became apparent at the start of the global financial crisis. This might imply that the crisis did play a role in reducing foreign currency loan growth in Austria. Bank-specific variables and the corresponding interest rates are also highly significant in both equations and have the expected sign.³

4. “Sustainability package” to improve the sustainability and resilience of Austrian banks’ (foreign) business models

In 2011, Austrian authorities introduced another macroprudential measure – the so-called sustainability package – to address potential contagion effects emanating from Austrian banks’ CESEE subsidiaries, to improve the sustainability and resilience of Austrian banks’ (foreign) business models to secure financial market stability in the Austrian banks’ host countries and in Austria. These goals should be achieved by building up risk-adequate capital buffers, by proactively avoiding boom-bust-cycles in lending and by preparing recovery and resolution plans for potential crisis situations (FMA and OeNB, 2012). To improve the refinancing structure of selected subsidiaries, the Austrian supervisors agreed on using the LLSFR as a monitoring tool and an early warning indicator for non-sustainable, excessive credit growth.

According to Figure 2, the sustainability package has been effective in improving the local refinancing structure of Austrian banks’ subsidiaries in CESEE after the financial crisis. Their loan-to-deposit ratio (used as a proxy for the LLSFR) decreased from 117% in 2008 to 79% in the first quarter of 2017 due to the strong growth (by over 30%) of deposits of local non-banks in CESEE. In Figure 2, we record a substantial decline of the loan to deposit ratio since 2012 for all Austrian banks’ CESEE subsidiaries. According to the data, the addressed risk decreased after setting the measures.

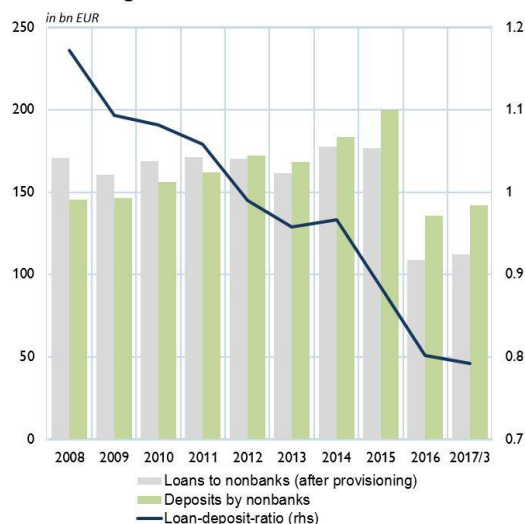
To estimate the effectiveness and potential negative side effects of the sustainability package, we proceed in two steps. In the first step, we evaluate the causal effect of the macroprudential measure on the loan-to-deposit ratio by using a counterfactual. The hypothesis we test is whether targeted banks with a loan-to-deposit ratio (LDR) above 120% were more effective in reducing their LDR compared to banks not exposed to the macroprudential measure. As the macroprudential policy shock across banks is not random, we test this hypothesis by using a difference-in-difference-in-

³ To strengthen our findings, we additionally estimate a panel vector autoregression model with a system GMM estimator with bank fixed effects by Sigmund & Ferstl (2016).

difference (DDD) approach, which identifies a causal relationship before and after the introduction of the macroprudential measure in 2012. In the second step, we study potential negative side effects of the measure – regarding Austrian subsidiaries’ profitability, market power and net interest margin – by employing a fixed effects panel model.

Figure 2: Loan-to-deposit ratio of Austrian subsidiaries

Local funding situation of Austrian subsidiaries in CESEE



Source: OeNB, variable bank sample (e.g. without Unicredit BA subsidiaries since 2016).

The model output indicates that banks exposed to the measure were significantly more effective in reducing their LDR after the measure became effective compared to banks not targeted by the measure. In addition, banks with a LDR above 120% were more successful in decreasing their LDR regardless of whether they were targeted by the measure. However, we observe positive LDR developments also for non-treated banks. A potential reason for why the treated banks, for which the measure was economically binding (i.e. a LDR above 120%) were not more successful in reducing their LDR might be that the remaining subsidiaries in CESEE expected to be sooner or later also targeted by the measure.

5. Policy conclusions

We observe that setting these measures increased financial market stability in Austria. For both measures, we find model-based evidence for their effectiveness and efficiency. However, evaluating the causal effects of the crisis is still difficult.

Loan growth is now considered to be more sustainable as it is mainly financed on a local basis, while we do not observe serious negative side effects with regard to bank’s profitability, market power and net interest margin. Furthermore, contagion risks resulting from liquidity transfers from the parent institute to their subsidiaries and vice versa have been reduced – especially as the LDR decreased substantially since the introduction of the sustainability package. Even though we control for the macroeconomic environment, the contribution of the sustainability package to improve Austrian banks’ CESEE subsidiaries’ business models is hard to assess. First, the financial crisis has led to a substantial decrease of current and capital account imbalances, and thus of capital imports in CESEE. Second, loan demand has declined as a result of the financial crisis. These two counter effects have likely contributed to the effectiveness and the efficiency of the sustainability package.

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