

## Essays in Relationship Banking: The Efficiency of Savings-linked Relationship Lending and Credit Information Sharing - Kurzfassung

Informational asymmetries are considered to be the major cause of inefficiencies in commercial banking. Contemporary research in the field of financial intermediation identifies relationship lending to be elementary for reducing these inefficiencies (for a comprehensive survey see Boot, 2000; Elyasiani and Goldberg, 2004). The key tool of relationship lending to mitigate informational asymmetries is to produce private information about a customer while in a banking relationship with that customer. Repeated interaction with a customer is an approved way to produce useful information for relationship banking. The most direct approach is to engage in repeated lending to build a relationship with the customer that allows to produce credit-relevant private information (Boot and Thakor, 1994; Greenbaum et al., 1989; Sharpe, 1990; Petersen and Rajan, 1995). While this approach seems to work for firm lending, it often promises very limited learning potential when it comes to household lending. Households usually do not at all engage in substantial lending as frequently and numerous as firms. Hence, households may never possess extensive credit track records, especially for high volume loans like in housing finance, and numerous loan demanding households actually do not possess credit records at all. For relationship lending to households, banks are therefore often limited to learn about borrowers by interacting with them in different products prior to lending. Hence, previous research about relationship lending to firms cannot be transferred to household lending without restrictions.

I argue that saving relationships prior to lending exceedingly qualify as source of private information for the purpose of identifying households' borrower qualities for two reasons. First, saving track records are possible to build with most households and, second, saving behavior is an excellent proxy for borrower quality. The latter is true because saving substantially requires the same personal characteristic as repaying a loan: the ability to regularly abstain from consumption. This view is supported by empirical research. Recent work by Puri et al. (2017) presents evidence that saving relationships prior to lending provide information that help to reduce loan defaults of households. Mester et al. (2007) find that transaction accounts help financial intermediaries monitor borrowers. Brown et al. (2014) show that the inability to save on a regular basis is positively associated with the likelihood of experiencing financial problems. And personal characteristics like lack of self-control are connected to irregular savings (Biljanovska and Palligkinis, 2016) as well as to financial distress (McCarthy, 2011; Gathergood, 2012).

Such savings-linked relationship lending can generally be identified in the concept of *Bausparen* (in English: Contractual Saving for Housing, CSH): in a contractual saving stage, households regularly transfer savings to the contract-providing institution over a particular time span before a housing loan (usually with contractually fixed interest rate) is made contingent on the saving behavior. Contractual Saving for Housing is a widespread, popular, and important concept of housing finance in Continental Europe<sup>1</sup> that accounts for a substantial share of housing finance in several European economies with 30-60 percent

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<sup>1</sup> CSH can also be found in Belgium, Croatia, Hungary, Italy, Luxembourg, Poland, Romania, Slovakia, and has also been considered to be implemented in further European countries, e.g. the Netherlands and Belarus. Inspired by the extensive and successful use of CSH in Europe, China and India experiment with Contractual Saving for Housing since 2003/2004.

market penetration in countries like Germany, Austria, France, and the Czech Republic.<sup>2</sup> Despite being a highly relevant product of housing finance in Europe that enjoys subsidy in several states and exists since about a century, research about CSH is utterly scarce and the available economic explanations are insufficient. Existing research mainly concentrates on explaining the economic value of CSH in terms of hedging effects that it provides towards future interest rate changes (Cieleback, 2002; Plaut and Plaut, 2004).<sup>3</sup> These works, however, fail to explain the specific savings-linked design of CSH since this is not required for effective hedging. My work is capable of filling this gap and provides, to my best knowledge, the first rigorous theoretical relationship lending explanation for Contractual Saving for Housing.

In the first part of my thesis I develop a multi-period partial equilibrium model to analyze savings-linked relationship lending to private households. The model shows that savings-linked relationship lending leads to a Pareto improvement or an increase in allocative efficiency of the financing market compared to arm's-length lending in markets of low time preference or low average borrower quality. In these markets, savings-linked relationship lending can overcome financing market failure due to adverse selection, which is especially true for financing volumes that are large in comparison to households' incomes. Hence, savings-linked relationship lending is especially well suited and economically beneficial for housing finance. It can in particular support housing purchase of low-income households and is able to increase home ownership rates. Since savings-linked relationship lending, as derived in the model, shares major characteristics with Contractual Saving for Housing, CSH shares the efficiency that is found for savings-linked relationship lending.

Like several other theoretical approaches in the literature, the model developed in the first part of my thesis generally shows that producing and possessing proprietary information about borrowers is advantageous for banks. *Prima facie*, it seems contradictory that in most countries and markets banks actually engage in sharing some of this information with competitors by using publicly regulated or private credit registries (Jappelli and Pagano, 2002; Djankov et al., 2007). One explanation is that credit information sharing between lenders can have a disciplinary effect on borrowers because defaulting with one lender ruins the reputation with every other lender and therefore can induce incentives to perform (Vercammen, 1995; Padilla and Pagano, 2000). This reputation effect is in line with the definition of Diamond (1989): "Reputation effects on decisions arise when an agent adjusts his or her behavior to influence data others use in learning about him". Hence, by this definition, the reputation effects should decline if there is less to learn about agents. That is exactly what Vercammen (1995) and Padilla and Pagano (2000) find in their theoretical work and Brown and Zehnder (2007) confirm by studying a laboratory credit market: the more comprehensive the credit registry, the weaker the reputation effects of information sharing. To solve the problem of diminishing reputation effects, it is suggested to restrict credit information sharing by, for instance, partially preventing access to credit histories (Vercammen, 1995) or a policy to randomize credit information sharing in order to control the informativeness of the registries (Padilla and Pagano, 2000).

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<sup>2</sup> In Germany CSH substantially exists since the 1920s and about 36 percent of the population owned a CSH contract in the year 2015; in Austria and the Czech Republic the market penetration in 2015 reached about 59 and 40 percent, respectively, and was even greater in the past (data sources: Verband der Privaten Bausparkassen, OeNB, EFBS, eurostat).

<sup>3</sup> Zietemann (1987) and Scholten (1999) evaluate CSH from a capital budgeting perspective, which is not capable of explaining an inherent economic value of CSH.

In the second part of my thesis I develop a model to study credit information sharing between lenders. I show in a multi-period model of repeated lending that credit information sharing can induce borrower discipline beyond “passive” reputation effects if banks apply classical disciplining, that is, if failure to pay inevitably provokes consequences. I find that such disciplining can Pareto improve the efficiency of the financing market and reduce defaults by overcoming market failure and mitigating underinvestment in projects and in effort, even for comprehensive and unrestricted credit information sharing. I further show that disciplining borrowers by pro rata rationing credit after default is more promising than tightening credit rates. Hence, my model provides a rare case of efficient equilibrium credit rationing: disciplining by credit rationing enhances the efficiency of the market while constituting aggregate equilibrium credit rationing in the sense of Stiglitz and Weiss (1981). Contrary to the previous literature that suggests to restrict and randomize credit reporting in order to prevent diminishing reputation effects, the policy implications following from my work are, first, to rather restrict access to credit registries than their content and, second, to enhance transparency of information sharing.

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