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Specialized Financial Intermediaries and the Impact of Savings and Loan Contracts on Real Estate Finance

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Abstract

Using several different datasets obtained from the German Central Bank (Deutsche Bundesbank) and the German Federal Statistical Office, we provide empirical evidence that savings and loan contracts (SLCs) are a macrosocial phenomenon that smooths housing demand by setting countercyclical incentive structures. Such contracts can thus serve theoretically as important stabilizers of housing (loan) demand. This idiosyncratic characteristic of the German real estate finance market, provided by German building societies („Bausparkassen"), may also explain the notorious stability of the country's housing market. The significant macroeconomic importance of housing market stability has been prominently highlighted in the context of the 2007/2008 financial crisis, which was triggered by the collapse of the U.S. subprime mortgage market. This research is particularly relevant for countries that experienced fragile housing markets with a high level of cyclicality in demand and nominal house prices.

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JEL Classification: E21, E43, E44, G21, G28, R21

I. Introduction

What are the determinants of stable housing markets? In light of the recent global financial crisis of 2007/2008, which originated in the U.S. subprime mortgage market, the importance of housing markets for financial stability became quite clear. In particular, it was argued that the specific contracts that are most prevalent in the U.S. market (e. g. types with interest-only mortgages, stated income loans, adjustable-rate mortgages) caused spillover effects into the real sector, which quickly spread to other countries.

During this crisis, the German housing market was famously stable in comparison to other developed nations. This is of particular interest for an empirical investigation, as contract types for real estate financing, institutional setting, and regulatory framework differ significantly between Germany and other industrialized countries. Recent research has not adequately addressed the aspect of specialized financial intermediaries offering non-standard financial contracts that are used to finance property in the private sector.[1] This paper aims to shed more light on an instrument used widely for real estate financing, especially in Germany: savings and loan contracts (SLCs), supplied by building societies.[2] Their basic mechanism consists of two primary structural components: 1) a savings plan with a predetermined interest rate on deposited savings contributions, and 2) an option to receive a fixed loan with a predetermined interest rate at a later point in time. The main advantages of these contracts are the guaranteed allocation of liquidity in the form of contract savings, and a loan at a fixed interest rate over a predefined time period. This puts contract holders in a position to access liquidity for real estate purposes at guaranteed terms independent of current market conditions.

Our main research question, emerging from such theoretical considerations, is whether the construction of these financing instruments and their contract forms, SLCs, set counter-cyclical incentive structures for contract holders to act against classical market stimuli in the housing market (referring predominantly to interest rates) thus stabilizing housing demand and markets over the long-run.

[1] However see our literature review in Chapter II for the few notable exceptions.

[2] In some academic and policy literature the term building and loan association is synonymously used to describe building societies.

A strong relationship between the stability of financial systems and the state of housing markets became apparent during the last crisis (*Koetter/Poghosyan* 2010; *Bates* et al. 2015). Housing markets exhibit an outsize effect on the stability and fragility of financial systems. Furthermore, large fluctuations in housing market demand and prices can destabilize entire economies (*Dam* et al. 2011). This phenomenon was highlighted prominently against the context of the significant housing bubble of 2007/2008, which featured write-downs of several hundred billion dollars of subprime loans. This had immense consequences for the worldwide economy – ultimately, approximately $8 trillion of U.S. stock market wealth was erased (*Brunnermeier* 2009). Furthermore, with a total volume of 77 % of net wealth concentrated in real estate investments,[3] the predominant role of real estate property as an asset class became clear (*Bezrukovs* 2013).

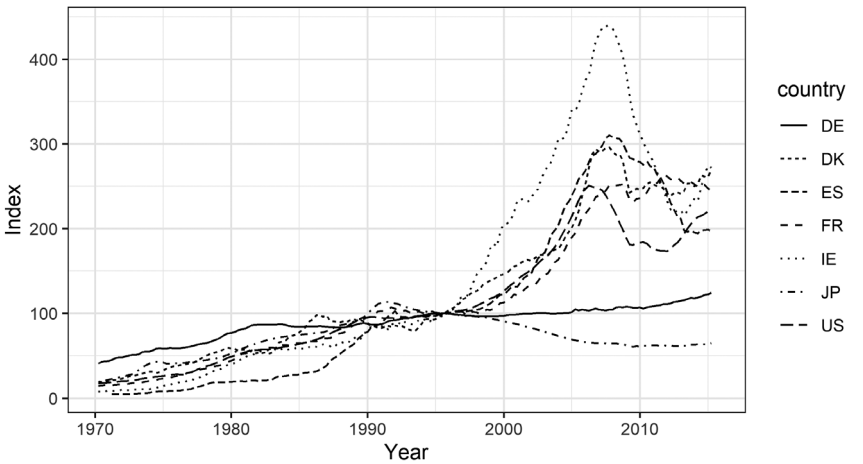
Thus, it is important to analyze which factors and structures lead to robust housing markets. The academic literature shows several studies that have explored this issue. Most focus on characteristics such as regulatory framework, (monetary) policy, general mortgage financing, and the institutional settings of real estate financing.[4] These studies show that various characteristics of housing markets have a lasting and notable impact on the stability of those markets, and can greatly affect the robustness of housing markets' ability to resist crises. The intensity of the differences caused by housing markets and financing characteristics varies across countries, as Figure 1 shows for residential property price development.

These data show that almost all countries in the EU, as well as in the U.S., experienced huge increases in nominal residential property prices in the run-up to the 2007/2008 crisis. In retrospect, the bursting of this subprime bubble was fully predictable. Interestingly, not all countries had experienced this massive increase in house prices beforehand. In Germany, for example, house prices remained relatively constant at comparably moderate levels. This may be attributable to the housing market's structure of financing institutions, regulatory and tax-related issues, as well as to the contractual underpinnings of real estate financing in general (*Koetter/Poghosyan* 2010).

A recent study by *Geiger* et al. (2016) illustrates significant differences in real estate financing and regulatory frameworks across countries. The German housing market is characterized by conservative lending standards, an absence of home equity withdrawals, and a stronger market balance between renters and home occupiers. Market liberalization is also more modest than in other coun-

[3] This analysis considers 15 EU countries: Belgium, Germany, Greece, Spain, France, Italy, Cyprus, Luxembourg, Malta, Netherlands, Austria, Portugal, Slovenia, Slovakia, Finland.

[4] A selection of recent studies is provided in Table 8.



Notes: This figure shows the development of nominal residential property prices in various EU countries, Japan, and the U.S. for the 1970–2015 period. Nominal housing prices are indexed 100 = 1995. The figure also shows the massive increase in housing prices in those countries where the bubble burst and led to the 2007/2008 economic and financial crisis, particularly Ireland, the U.S., and Spain. Other countries, such as Germany and Japan, experienced much smaller increases in real estate prices. Japan experienced a negative price slope due to their enduring economic downturn over the past few years, which also comprised deflationary tendencies.

Source: Graph based on figures provided by the Bank for International Settlements.

Figure 1: Nominal Residential Property Prices, Index (1995 = 100)

tries, such as the U.S., Spain, or Ireland, which all experienced a credit explosion in the years prior to the housing market collapse. These differences in regulatory framework, policy actions, and mortgage financing determined the stability of housing markets and the financial sector during the recent global financial crisis.

Our primary contribution to recent research is empirical evidence that SLCs offer countercyclical incentives to contract holders. We find strong support for countercyclical stimuli through our analyses. This provides an important mechanism that thwarts any tendency toward overheating in housing markets during low interest rate phases. During high interest rate phases, on the other hand, SLCs can stimulate demand by providing comparative advantages over market conditions. We show that agents in the market have countercyclical incentives versus their peers. As a result, their patterns of action regarding housing demand tend to be contrary to their non-contract-holding counterparts. We thus consider this contract form as a powerful instrument for balancing housing market demand and supply. Furthermore, against the background of the strong link between welfare loss of non-homeowners (renter) in comparison to homeowners (*Kaas* et al. 2019) it is of special relevance to consider financial contracts that provide chances to enter the market of homeownership. Considering the

notorious stability of the German housing market, as well as the fact that SLCs are particularly widespread as financing instruments throughout Germany, we believe this contract form may be suitable for preventing housing markets from overheating and preventing liquidity shortages. The remainder of this paper is organized as follows. Chapter II discusses the related literature and builds the hypotheses for our research. Chapter III describes the principles of savings and loan contracts, and provides a market overview. In chapter IV we introduce the data, and describe our empirical approach. Chapter V discusses our empirical results, while chapter VI concludes the paper.

II. Literature Review

The impact of housing markets on the state of financial markets and entire economies is undisputed (*Koetter/Poghosyan* 2010; *Jordá* et al. 2016; *Duca* et al. 2021). Moreover, academic discussions about the ultimate drivers of the 2007/2008 housing bubble abound. The true triggers of the subprime crisis include: the settings of financial intermediaries, regulations, owner occupation levels, and financing contract types, which vary from country to country. This literature review aims to establish which characteristics of housing markets lead to more stable or more fragile housing markets. We examine the drivers of volatility in real estate markets, the importance of housing markets within financial systems, and the policy actions in response to the deficits that were observed in real estate finance during and after the financial crisis.

1. Characteristics of Real Estate Markets

Housing market characteristics are a main topic of discussion when it comes to the stability of these markets. *Voigtländer* (2012) provides evidence that Germany differs significantly from other OECD countries with respect to house price development and housing market stability. *Koetter* and *Poghosyan* (2010) also show that Germany has experienced moderate price developments over an extended period of time, last but not least during the boom phase before the 2007/2008 crisis. Thus, the question arises: What makes the German housing market so resistant to crises, and so stable with respect to its financing structure?

A strand of research has explored which factors influence the stability of real estate markets and which actions may serve to reduce housing bubble formations. Most has focused on the regulatory framework, monetary policy, or institutional setting within the real estate financing markets. Research in this field has also concentrated on regulatory and monetary policy to explain the bursting of the subprime crisis (*Muller* et al. 2010; *Scanlon* et al. 2011b; *Bordo/Landon-Lane* 2013; *Campbell* 2013). However, *Tsatsaronis* and *Zhu* (2004), *Koetter*

and *Poghosyan* (2010) and *Kaufman* (2014) emphasize the structure of the mortgage financing market when it comes to the question of stability. Thus far, however, there has been little research on contract types and which characteristics are of paramount importance in the real estate financing market (*LaCour-Little/Yang* 2010).

As *Geiger* et al. (2016) note, the characteristics of housing markets differ significantly, especially when comparing the German economy with its Anglo-Saxon counterparts. For example, overcoming the entry barriers to owner occupation tends to be more difficult in Germany than in the Anglo-Saxon system. German households generally require higher down payments and, therefore, higher savings rates, to become owner-occupiers. This has been preserved, inter alia, by historically conservative lending standards, as well as by the prohibition of home equity withdrawals. In fact, mortgage equity withdrawals are considered one of the main drivers of the meltdown of the housing markets (*Duca* et al. 2010, 2021).

According to a study of the European Central Bank (*Drudi* et al. 2009), other important country-to-country differences in the characteristics of housing markets are financial innovation, credit lending characteristics (e. g., interest rates, maturity, loan-to-value ratios, taxation rates), loan funding (funding of monetary financial institutions, mortgage-backed bonds, or securitization), and institutional cost structure (costs of funding versus costs of housing loans).

2. Volatility of Real Estate Markets

The stability of housing markets is a critical factor for economies and financial markets in general (*Case* et al. 2005). Considering that housing markets represent one of the largest risks for economies (*Shiller* 1993), the need to fully understand price fluctuations is key to controlling and stabilizing real estate markets (*Jones* et al. 2016). Several extant studies have also pinpointed housing market volatility as a main indicator of the persistence of real estate finance (see, e. g., *Karoglou* et al. 2013; *Bao/Ding* 2016).

Thus, it is important to determine what drives high volatility in housing prices and can lead to a destabilization of real estate markets. One strand of research has explored the links among monetary policy, interest rates, and housing prices (*Allen/Rogoff* 2011). Interesting results are provided by *Jordá* et al. (2015, 2016), who analyze 14 advanced economies over 140 years, and demonstrate that loose monetary conditions increase the risk of mortgage and house price boom-bust cycles. This effect has become much stronger since World War II. The sensitivity of housing markets with respect to changes in monetary policy (i. e., interest rate conditions) has increased substantially. *Schularick* and *Taylor* (2012) argue that the historically close connection between credit and money was impaired

by financial innovation and regulatory ease, which reinforced the sensitivity of real estate finance.

Besides monetary conditions, it also became obvious during the financial crisis that the debt service of private households is strongly significant for the stability of housing markets and the banking sector as a whole (*Boehm*/*Schlottmann* 2011). *Wang* and *Zhang* (2014) provide theoretical and empirical evidence that an adverse change in both the risk-free rate and the recovery rate for loans can cause financial crises. Further triggers for real estate market volatility are liberalization and innovation. *Nguyen* (2013) analyzes the levels of real estate market liberalization and innovation in OECD countries. He supports the hypothesis that real estate finance is highly volatile, especially in economies with more relaxed markets. He also finds that the Anglo-Saxon and Nordic economies tend to have more volatile housing markets, which were widely deregulated in the years leading up to the 2007/2008 financial crisis. The academic and political consensus that innovation in credit markets should lead to robust – and therefore less volatile – markets must hence be critically revised (*Nguyen* 2013).

The majority of research on the drivers of house price volatility is focusing on regulatory actions or monetary policy. We posit that almost no research regarding the structure of financial institutions has yet determined how to control housing market demand and supply in order to reduce volatility and risk for market instability. Just one very recent paper by *Braun* et al. (2022) investigates using a heterogeneous agent-based modelling approach, the implications of different financial intermediaries on housing market cycles. Based on simulations they show that the most stable housing market conditions can be achieved when two types of financial intermediaries, building societies and conventional commercial banks, are serving the mortgage lending market jointly. The reason is that building societies rely to a greater extent on endogenously created borrower information along the line analyzed in *Kirsch* and *Burghof* (2018). Therefore, they can buffer the house price volatility caused by procyclical mortgage lending behavior of commercial banks.

There has also been little research to date on the contract forms and instruments that are used to finance real estate property for private households (see however for an interesting cross-country study *Cerutti* et al. 2017), or on the kind of incentive structures they create in the market demand for housing (see, e. g., *LaCour-Little*/*Yang* 2010). An exception is the above already mentioned paper by *Kirsch* and *Burghof* (2018). They analyze from a contract-theoretical perspective whether SLCs – in the paper called "contractual saving for housing" – can be used as a screening device to detect customers with a high long-term capacity to save. By overcoming financial market failure due to adverse selection they show that in an environment where the financing volume is large relative to the household's income, contractual savings for housing is the second-best

contract. *Burghof* et al. (2017) confirm the prediction of the model by showing empirically that SLCs as a special relationship-based financial contract has particularly low default risks.

In this paper, we explore – complementary to *Burghof* and co-authors – the notion that contractual countercyclical incentive structures for investors (not financial intermediaries) can be a highly effective tool for overcoming overheating tendencies and high volatility, as well as for preventing recessions due to extraordinary low credit-driven housing demand in real estate markets. In addition to the regulatory approaches that aim to reduce risk for financial intermediaries, we propose establishing instruments that will allow for a continuous demand for housing and real estate finance regardless of market conditions (e. g. interest rate levels). Such a contract form could play a vital role in reducing volatility and smoothing markets, as the historical evidence from Germany suggests rather impressively.

3. Housing Markets and the Financial System

The reasons for the financial crisis and the resulting deep recession of 2008–2009 are manifold. They include loose credit standards, mortgage equity withdrawals, mortgage lending to households with poor creditworthiness, and the failure of rating agencies to properly assess mortgage-backed securities.

Roubini and *Mihm* (2010) argue that financial innovations such as mortgage-backed securities, which drove housing demand and price increases, were the underlying cause of the U.S. housing bubble. But a massive increase in liquidity and credit enhancement in the housing markets were also major contributing factors. The rise of "shadow banking", and the use of off-balance sheet entities such as structured investment vehicles (SIVs), are what enabled the unprecedented rise in leverage despite capital requirements.[5] *Pavlov* and *Wachter* (2011) as well as *Goodhart* and *Perotti* (2015) find that the enormous expansion of mortgage lending was also a main cause of the subprime crisis. They ascribe particular importance to the resulting high degree of maturity mismatches in banks' credit portfolios. *Pan* and *Wang* (2013) also cite this line of argumentation in providing evidence for a strong interrelation between housing prices and bank (in)stability.

According to *Hott* (2015), the underestimation of mortgage risk by financial institutions was also a critical reason for the 2007/2008 subprime crisis. Correcting these risk-incentives, *Benes* and *Kumhof* (2015) show based on a theoretical model that countercyclical capital buffers held by institutions can have a sizeable effect on financial stability and macroeconomic performance, especially

[5] For more information, see, e. g., Acharya and Schnabl (2009).

during downturns. Though *Hott* (2015) concludes that banks should build countercyclical capital buffers into their real estate financing methods in order to prevent potential bubbles. In accordance, we believe countercyclical incentives on the demand side are important as well.

Finally, *Shiller* (2008) recommends a comprehensive restructuring of the financial system's institutional foundations. We contribute to the discussion about the financial system and the institutions engaged in real estate finance by focusing on a special form of financial intermediaries, building societies. They differ from traditional mortgage banks in their funding, regulatory structure, and financing instruments. As theory suggests, we believe the benefits of such a collective system could help stabilize the financial system by establishing countercyclical incentives and providing capital buffers to strengthen overall health.

4. Policy Discussion

In the aftermath of the worldwide financial crisis, various strands of research concentrated on policy actions to better manage real estate booms (*Crowe* et al. 2013). Their primary focus was on the use of macroeconomic and regulatory policy actions to try to reactively adjust market conditions and stabilize housing markets (see also *Muellbauer* (2022) for a recent analysis). Examples are raising property taxes, limiting mortgage credit growth, strengthening macroprudential regulations by, e. g., mandating higher capital requirements, and reducing loan-to-value or debt-to-income ratios.

As *Crowe* et al. (2013) note, however, there are already sufficient policy options to deal with real estate booms. However, it is difficult to implement tools to stabilize housing markets without simultaneously affecting the macroeconomic and financial environment of an economy.[6] In this paper, we develop this idea further by examining an additional instrument to proactively install stabilizing market mechanisms. We thus focus on instruments that are anchored within the structure of the real estate financing market. Because external financing is so vital to housing markets, mortgage credit and lending conditions are the key determinants that drive housing market stability (*Tsatsaronis*/*Zhu* 2004). Considering the strong link between housing prices and the structure of real estate financing markets in particular, the importance of shedding light on the various contract forms offered to households thus becomes immediately apparent.

[6] *Crowe* et al. (2013) use the example of spillover effects that raise the capital requirements for housing loans. The resulting higher borrowing costs could lead to interest rate changes that may affect other loan types as well, and influence other segments of the real economy. *Muellbauer* (2022) states that most current central bank policy models still have an inadequate coverage of the monetary transmission channels involving housing and associated credit markets.

Most research has focused on actions that could prevent the risk of real estate crises. In this research paper, we propose establishing structural changes in the real estate financing market that could serve as stabilizing agents. We posit that such changes could effectively counteract the risks of overheating markets, as well as smooth overall market cyclicality. We note further that countercyclical incentives can be vital during financing and market downturns, because illiquidity in the housing markets is a key risk for the entire financial sector and its solvency (*Gjerstad/Smith* 2014).

This research will also contribute to the policy discussion by providing empirical evidence that specialized financial intermediation and, in particular, contract types such as savings and loan contracts – among other measures – offer commonsense academic characteristics for stabilizing housing markets.

III. Stability Aspects of Savings and Loan Contracts

1. Institutional Background: German Building Societies

SLCs are administered by what are referred to as building societies ("Bausparkassen"), the vital institutional background of this system. Building societies are generally comparable to rotating savings and credit associations (*Scholten* 2000). Furthermore, they share various similarities with credit unions with respect to the idea of a cooperative system in the finance industry. Credit unions are cooperative banks that intermediate between its members and allocate deposits of the savers to borrowers in form of loans.[7] The idea of a collective system in an overlapping generation logic is the central theoretical cornerstone of building societies. This "pay-as-you-go"-system guarantees a loan with fixed terms and conditions, after providing the collective system with a certain percentage of savings, contingent upon the loan being used for real estate financing.

Building societies will be considered as important and specialized credit institutions, and are therefore regulated by the German Banking Act and overseen by the Federal Financial Supervisory Authority. This regulatory framework is complemented by the German Building Society Act and the Building Society Decree. These institutions usually operate as public limited companies owned by private or public banks and insurance companies.[8] As of 2022, there were eighteen building societies in Germany, ten private and eight public institutions. The market for SLCs continues to evolve. Eight EU countries currently have

[7] A theoretical explanation of the mechanisms of credit unions is provided by *Smith* et al. (1981) and *Murray* and *White* (1980). *Smith* (1984) supplements their work with a formal theoretical analysis of interest rates on loans and savings deposits in credit unions.

[8] Both types are organized by associations: the "Verband der Privaten Bausparkassen" [www.bausparkassen.de] and the "Landesbausparkassen" [www.lbs.de].

some system of building societies.[9] However, SLCs are especially important in Germany, where approximately one-third of real estate-related loans by private households contain a SLC as part of the overall financing. Historically, the idea of building societies dates back to 1775 with the founding of the Kettleys Building Society in Birmingham, England. Members of this society collected money and structured the proceeds as a capital fund, which was used as the basis for residential construction.[10]

Unlike their private counterparts, public building societies are not in direct competition with each other. This is due to the intentional regional segregation of their activities, in accordance with the federal states. And, because of the boom in popularity of these contracts and the subsequent emergence of several new building societies after German reunification, the market has been in a constant consolidation phase since the mid-1990s. Figure 2 provides a graphical representation of their development.

Building societies in Germany can draw upon the remarkable popularity of their main product – the savings and loan contract – throughout the population. According to the German Associations of Building Societies (private and public), there were approximately 24 million contracts in both public and private institutions as of the end of 2021, totaling about EUR 913 billion.[11]

The attraction of low-risk assets in an extended low interest rate environment is certainly one of the major factors in the continued popularity of SLCs. Building societies combine strong financials with the incentive for disciplined savings. As our dataset obtained from the Deutsche Bundesbank shows, SLCs have thus emerged as the primary savings tool for many households (even those not intending to buy a house), which is reflected by the over EUR 184 billion in deposits as of September 2022. Total savings of domestic households otherwise amounted to EUR 532 billion – excluding deposits under SLCs.

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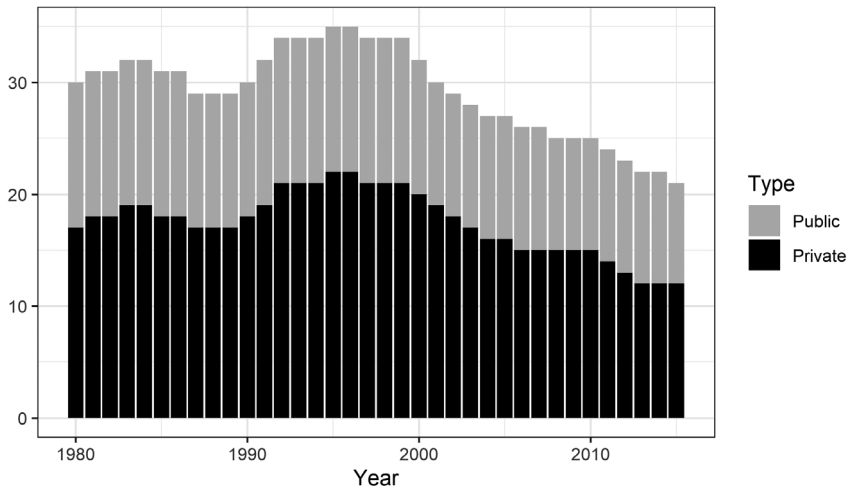
[9] Austria, Croatia, Czech Republic, Germany, Hungary, Luxemburg, Romania, Slovakia. For more information see: https://www.efbs.org/wp-content/uploads/2021/03/Bausparen_in_Europe_final_EN.pdf.

[10] The first documented activities of today's building societies date to 1885, when the so-called "Bausparkasse für Jedermann" (Building Society for Everyone) emerged. Such institutions subsequently gained popularity due to Georg Kropp, who established the "Gemeinschaft der Freunde" (Society of Friends) to promote homeownership by the organizational framework of Wüstenrot (one of the private building societies in Germany). The boom in building societies first occurred after 1931, when there was an acute housing shortage. After World War II, building societies were the main driver of reconstruction.

[11] For more information, see: https://www.bausparkassen.de/wp-content/uploads/2022/07/VPB_Gescha%CC%88ftsbericht-2021_web.pdf and https://www.lbs.de/media/unternehmen/suedwest_6/unternehmensberichte/LBS-Geschaeftsbericht_2021_Portal.pdf.



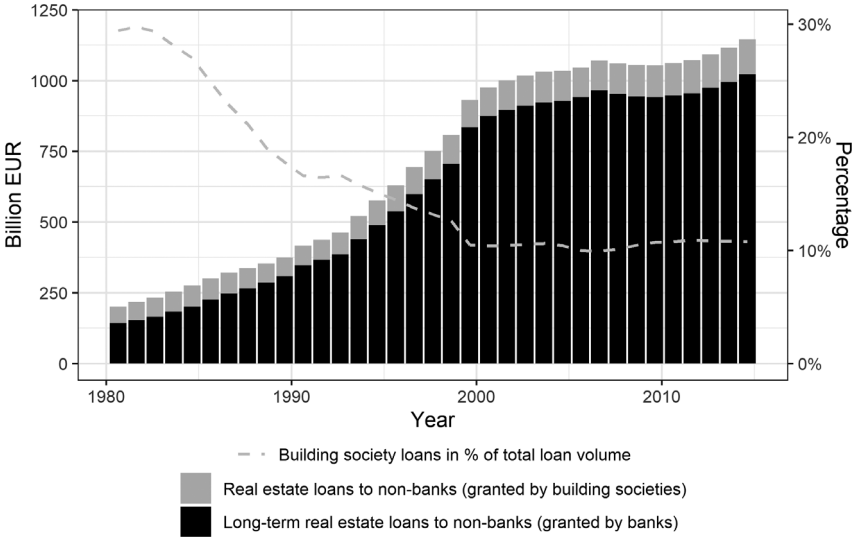
Notes: This figure shows the number of building societies in the German market between 1980 and 2015. The graph differentiates between private, legally independent institutions that operate all over Germany, and public institutions, which are incorporated under public law or in public ownership. These institutions operate in regionally defined markets. As the graph illustrates, the market has experienced a notable consolidation phase over time, with a substantial decrease in the number of building societies.

Source: Graphs based on figures provided by the Deutsche Bundesbank.

Figure 2: Number of Building Societies in Germany

The typical real estate finance mix for private households is a combination of a SLC loan and a classic mortgage credit.[12] According to the European Federation of Building Societies, the optimal real estate financing structure is 50 % classic mortgage credit with another 50 % share, where at least 20 % of equity is saved in the SLC, and the other 30 % is provided by the building society as an SLC loan. Building societies argue that real estate financing in Germany has continued to be extremely solid because of the strong equity base provided by SLCs. Integrating such a contract as a secondary loan into the financing structure tends to lower the interest rate for the primary loan, however, and, consequently, households have a particular incentive for doing so. As Figure 3 shows, SLCs provided by building societies are a vital element of mortgage loans in Germany.

[12] It is important to note that building societies treat their loans as junior loans. This means that classic mortgage credits from mortgage banks are ranked as senior credits (up to 60 %), and they take precedence over SLC loans.



Notes: This figure shows total real estate credit volume of the German market for housing granted to non-banks between 1980 and 2015. Total volume is divided between 1) long-term real estate loans to non-banks granted by banks, and 2) amount of SLC loans granted to non-banks by building societies. Today, SLC loans average about 10 % of total loan volume in the German real estate financing market.

Source: Graphs based on figures provided by the Deutsche Bundesbank.

Figure 3: Real Estate Credit Volume in Germany – Market Share of SLCs

2. Specific Contracts: Savings and Loan Contracts

SLCs are a specialized type of financing contract for real estate financing, and are used predominantly by private households.[13] They were created with the specific purpose of providing contractual savings for housing. A SLC combines a mortgage loan (debt) with the savings (equity) of the contract holder. The principle is similar to rules quite often seen in development finance. For example, consider a person who plans to build a house, but can only save one-tenth of the total amount needed per year. He would thus need ten years to save enough to build his house.[14] However, by combining with nine other persons with similar needs, the group can create a common fund used to issue loans to all participants. Consequently, after year one, the first person can build a house using his savings and the issued loan provided by the other nine persons. In the next year, the first person will begin repaying the loan (the same amount as the

[13] In Germany, this type of contract is referred to as a "Bausparvertrag".

[14] In this explanation, we exclude the aspect of interests on credits, and the fact that households have no ability to access the market for borrowing.

yearly savings) into the system, while all the other persons continue to save. Consequently, in the second year, a second person will receive a housing credit, in the third year a third person will receive one, and so on.

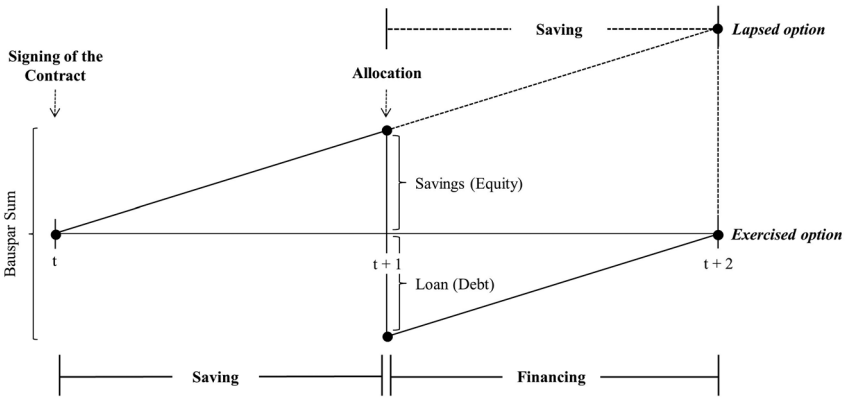
This notion is based on a self-enclosed, collective system, and follows the logic of an overlapping generations model. The main advantages are the independence from capital markets, a fixed interest rate on the issued loan, and a commitment to receive the loan after a predefined savings phase. Furthermore, in our example, no person in the system is worse of within the system than they would be by saving without it. The average time to receipt of the housing credit is 5.5 years, compared to ten years with saving individually. Thus, the economic sense behind an SLC is that a low credit interest in the savings phase (compared to market conditions) guarantees a low interest rate on debt (mortgage loan)[15] in the financing phase (debt repayment). Typically, savings and credit interest rates are below market conditions at the time of signing the contract. In a low interest rate environment there is a special incentive to secure favorable interest rates (credit) for a future mortgage loan. The contract holder gives up some return in the savings phase compared to investing in equivalent assets. In return, the contract holder might reduce credit costs at a later point of time due to lower and secured credit interest rates. In a high interest rate environment there is a special incentive to secure favorable interest rates for savings. At a later point of time, credit interest rates might not favorable and the incentive to postpone property purchase because of comparative advantage due to higher savings interest is high.

Each SLC can be divided into four phases: 1) signing of the contract, 2) savings period, 3) allocation and 4) repayment period (of the issued loan). After signing the contract and finishing the savings period, in which the contract holder saves a specific amount of equity, there is an option to receive the outpayment of the contractually stipulated sum (by exercising the contract option). This is called the "allocation" by the building society, phase (3). The exact point in time at which the corresponding SLC sum is allocated is decided on the basis of a valuation index, which follows the principle of "time x money". The long savings phase and achievement of the savings amount are the conditions for the loan allocation. The sum consists of the balance saved by the contract holder plus the loan.[16] In phase (4) the contract holder repays the issued loan including the interest on the credit. Another option at the point of allocation is to lapse the loan option and to continue saving on the SLC account.[17]

[15] This refers to the time of contract signing.

[16] The ratio of equity to contract sum depends on the contract type, and typically ranges between 30 % – 50 % equity and 50 % – 70 % debt.

[17] Typically, in low interest rate environments, this option is the dominant strategy followed by contract holders. This is a consequence of high interest rates on deposits rela-



Notes: This figure shows a standard savings and loan contract by building societies. The contract can be divided into four periods: 1) signing of the contract, 2) savings period, 3) allocation, and 4) financing period (repayment of issued loan). "Exercising" the option means making use of the SLC's loan provision. "Lapsing" the contract option means the loan option remains unclaimed and the contract holder ceases or continues to save on the SLC account. If the contract holder rejects the loan option at the point of allocation, the opportunity to use the loan at a later time typically remains valid, given that the allocation is made by the building society.

Source: Authors' own illustrations.

Figure 4: Structure of a Savings and Loan Contract With the Two Options at Point of Allocation

Because of their specific statutory purpose for building, buying, or modernizing real estate, SLCs are considered an "earmarked" contract form. The building societies emphasize the various advantages of SLCs, such as having both the savings and credit interest rates fixed at the time of contract signing for the entire savings period, and the optional repayment period.[18] Thus, SLCs operate relatively independently of capital market developments, and long-term planning with respect to owner occupation is therefore simplified. A second advantage is that, upon contract signing, the SLC owner attains the legal right to take out an SLC loan with predetermined conditions at a later stage. Moreover, there is an incentive for contract holders to build a solid equity base before financing their property, especially with respect to various government subsidies that can

tive to current market conditions. In such an environment, households face lower incentives to take the loan option due to the potential for more favorable interest rate conditions on the market (with creditworthiness as a prerequisite). In the alternate scenario, with an increasing interest rate level (compared to the level at the time of contract signing), the option is "in-the-money", and the dominant strategy, given a desire to take out a loan, would be to make use of the issued loan.

[18] The interest rates (for deposits and on the loan) are usually lower than the market conditions at the point of contract signing. Therefore, this contract form is somewhat comparable to a futures contract because it fixes future interest rates.

be included in this contract form.[19] Thus, these contracts are attractive to investors because of: 1) the independence from capital markets, enabled through the participation in a closed system, and 2) the safety of the investments, due to building societies' infamously strict regulatory framework and the repayment flexibility of SLCs. However, we note there are certain disadvantages as well, relating mainly to contract costs,[20] as well as to the earmarked contract form, which cannot be altered to allow for changing investment goals.

Because of the independence from capital market conditions, the strong institutional regulations provided by the building societies, various government subsidies for SLCs, and their inherent planning reliability, they are an extremely popular option among German savers. The contract constitutes tangible support for building a strong and reliable equity stake for real estate financing at a later stage in life. According to various studies, SLC savings are one of the three most important instruments for financial wealth creation in Germany, and are a critical factor in the strength of equity capital stock in German real estate financing.[21] Thereby, SLCs are a macrosocial phenomenon, meaning that this contract is popular within all social groups in society, independent of net income, savings ratio, employment status, etc. Furthermore, the countercyclical contract mechanisms and incentives are the main aspects that contribute to the stabilization of housing markets.

3. Countercyclical Market Mechanisms and Stabilizing Moments

In Germany, SLCs are a common and popular instrument for real estate financing by private households. Next, we explore the role of SLCs in the remarkable long-term stability of German real estate markets, which have shown greater resistance to economic and financial crises than housing markets in other European countries or in the U.S.

We note several cross-country differences among real estate financing markets. In Germany, real estate financing is typically based on fixed interest rates (with fixed interest periods of up to 25 years). In contrast, in Spain and the U.S.,

[19] In this context the most important government subsidies are the "Wohnungsbauprämie" (housing subsidy) and the "Vermögenswirksame Leistungen" (capital-forming benefits).

[20] Contract costs arise only as a one-off payment at the beginning of the contract term, and vary between 1.0 % and 1.6 % of the agreed upon contract sum.

[21] According to the German Association of Private Building Societies, 35 % of Germans save equity via an SLC, and it ranks third in wealth creation methods. The two most popular sources of wealth creation in Germany are a classic savings account (42 %) and the checking account (41 %). For more information, see: http://www.bausparkassen.de/fileadmin/user_upload/Schaubilder/vdpb-Geldanlagen-2017.pdf.

variable interest rates are common in housing finance. Another aspect refers to a less strict use of loan funds by mortgage equity withdrawals that are used to finance consumption at the expense of higher real estate loans. This kind of misappropriation is not permitted in Germany. Furthermore, lending limits and loan-to-value ratios tend to be lower in Germany than in countries in which the housing market boom created a bubble that burst during the 2007/2008 financial crisis (e. g., in Spain, Ireland, and the U.S.). The valuation methods used by banks for real estate also differ quite significantly. In the U.S., Great Britain, and Spain, for example, the fair value of the property generally determines the credit lending volume. In Germany, safety "haircuts" are higher, and real estate values are determined by historical values in order to exclude the risk of short-term overvaluations.

These differences, rooted in the setup of the German banking system, a stricter regulatory body, and more reluctant bank lending, tend to foster greater stability and prevent long-term instability in real estate markets. However, the main market differences also arise from the notable divergences in the institutional setting in the markets, and from the types of financing contracts used by private households and banks to finance real estate. A primary distinction are the SLCs. This contract type is not commonly used in any of the countries in which housing bubbles burst in 2007/2008. This does not necessary imply that SLCs are the single or even the predominant reason for stable housing markets. However, due to their countercyclical incentive structure, SLC owners do enjoy incentive structures that are fundamentally opposite from those of non-SLC savers. Thus, we may expect to observe contrary patterns of action in housing markets as well.

From a macroeconomic perspective, and, as we noted earlier, SLCs' incentive structure does not follow capital market conditions. *Crowe* et al. (2013) emphasize the risk of increasing interest rate environments that lead to increasing costs of borrowing, which could also spill over to other loan types. Particularly during times of continued low interest rates and a resulting increase in the risk of an interest rate turnaround, a hedge against rising financing costs is essential for healthy housing markets and a stable banking system.[22] The previously de-

[22] The changing interest rate environment, starting with an increase of interest rates at the end of 2021, gave rise to a huge increase of signing SLCs. For instance, the German building societies reported recently that the number of new contracts signed between January and September 2022 increased by more than 25 % relative to the same period in 2021. The contract volume signed in 2022 increased by even more than 45 %. See e. g. https://www.handelsblatt.com/dpa/finanzen-nachfrage-nach-bausparvertraegen-weiter-hoch/29270930.html. Also, in the first quarter of the year 2023 a significant further increase was observable. See for the volume https://www.bundesbank.de/resource/blob/804008/b56ea86112c9b99cb161c41d67ac662d/mL/iii-bausparkassen-mfis-in-deutschland-data.pdf.

scribed countercyclical incentives interwoven into the design of SLCs make housing financing attractive when current market conditions worsen for investors. In other words, because mortgage financing costs rise within high interest rate environments, the SLC option becomes more valuable because of its predefined interest rate condition fixed at the time of contract closure.

Figure 5 (5a and 5b) illustrates this countercyclical market mechanism. It shows that the interim and bridging loan business of building societies closely track the development of the total amount of housing loans in the German real estate market (left-hand-graph of Figure 5a). Taking into account that interim and bridging loans granted by building societies are comparable to classical bank lending, since for both loan categories credit conditions are fixed at the moment of demand for a housing loan, one can see the typical pattern of procyclical behavior: Outstanding amount of loans increase strongly in the time period between 1990 and 2004 and between 2010 and 2015, both period depicted by a strong decrease of 10-year mortgage rates as shown by the thin line of the right-hand-graph of Figure 5b. However, the SLC loans paid out decrease with a fall of

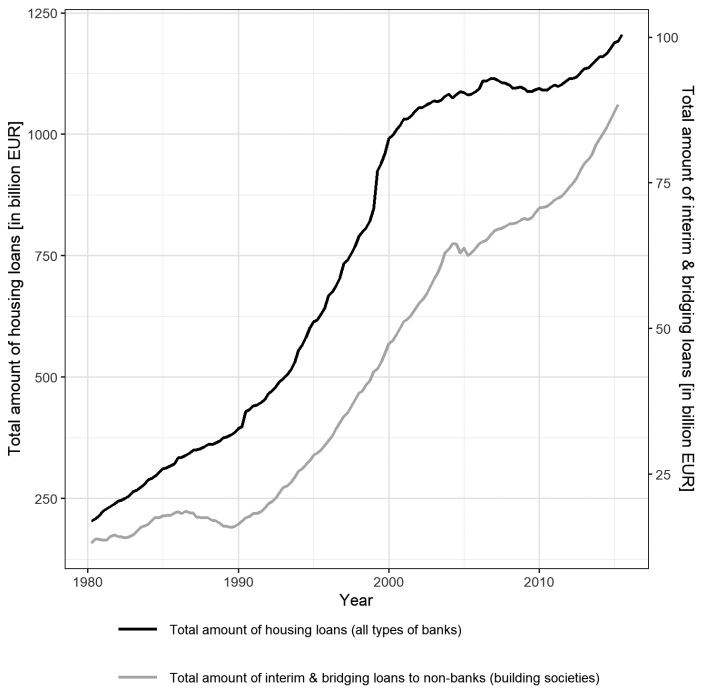


Figure 5a

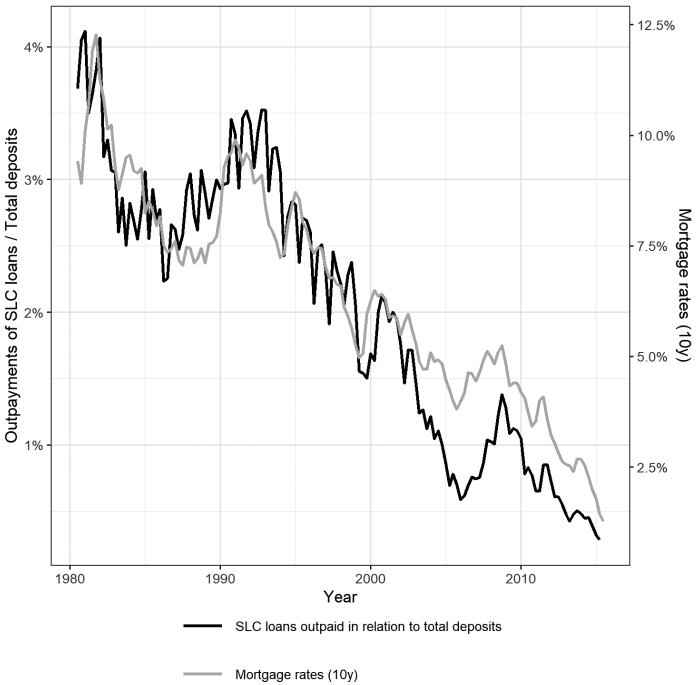


Figure 5b

Notes: This figure shows the countercyclical development of SLC lending compared to total bank lending for private housing purposes.

Source: Graphs based on figures provided by the Deutsche Bundesbank and FMH.

Figure 5a and 5b: Counter-Cyclical Mechanisms of Savings and Loan Contracts in the Real Estate Financing Market

the interest rates (bold line of Figure 5b). This shows that demand for SLCs behaves contrary to classic loan demand for housing and is counter-cyclical.[23]

We explain the market mechanisms and investor incentives as follows. With a decreasing interest rate environment, financing costs for real estate are lower, which makes property acquisition more attractive. Given that interest rates had been at record lows, the business outside the collective system has grown rapidly, manifesting in a notable surge in interim and bridging loans, the building society equivalent to traditional mortgages. At the same time, with SLC loan op-

[23] Interim and bridging loans feature the same market structure and mechanisms as standard housing loans. These can be granted by building societies as well, with conditions determined by the market at the time of the loan outpayment.

tions being unattractive in low interest rate environments, the business for classic SLC loans has decreased significantly since the 2000s. This is because households who hold "mature" contracts (e. g., which have reached the required savings amount), tend to have signed those contracts several years earlier during times of (on average) higher interest rates. Thus, their options are not "in-the-money" today, and the credit conditions of SLC loans may not be competitive with today's market conditions.

To summarize, an SLC is most attractive at times of low interest rates. Savers desire to lock in attractive lending conditions to hedge against future increases in interest rates. This course of action is extremely rational because the lower the interest rate level, the higher the probability it will rise in the future. Especially, in times when the base rate is zero, the stimulus to enter into an SLC is very high since the savers expect the interest rate level to be higher in the future when the SLC will be allocated and the committed loan will be granted, something we observed in the last 15 months after the change of the interest rate environment. We thus posit that SLC holders have a comparative advantage (with respect to financing costs) over their non-SLC peers.

Such theoretical considerations support the line of argumentation that SLC owners follow a countercyclical strategy: They tend not to enter the housing market during low interest rate environments, when they do not have any comparative advantage in terms of financing costs and when real estate property tends to be overvalued. The reasoning here is that SLC owners will always have a greater incentive to enter the market when interest rates are higher because of the comparative advantage of cheaper financing costs (on average and when expectations about the interest rate are fulfilled). Furthermore, in these environments, real estate prices tend to be lower because of higher financing costs and reduced demand for housing as an investment. Given a population split equally between SLC and non-SLC savers, we posit that the risk of a real estate bubble (similar to what occurred during the crisis of 2007/2008) could be prevented, as long as SLC owners behave according to the countercyclical incentives that the option-like SLC structure would theoretically suggest.

We attribute this to the fact that, in such a world, there will always be market participants who have an incentive to obtain housing loans regardless of current financing conditions, interest rates, or other costs. In other words, due to the countercyclical incentive mechanisms of this type of contract, the market for housing does not dry up during times of high interest rates. And they prevent bubbles during times of low interest rates, because the financing instruments provide different incentive structures for market participants, regardless of interest rate levels. This has a stabilizing effect on housing markets, and prevents upward or downward overreactions.

IV. Sample Selection and Methodology

Having introduced the basic contractual mechanisms of SLCs, their institutional background, and the hypotheses regarding their countercyclical incentive mechanisms and the resulting stabilizing effect on housing markets, we next conduct an empirical investigation of these notions. We aim to deliver solid evidence that the interest option-like structure of SLCs incentivizes countercyclical loan and housing demand behavior by contract holders. Such evidence would serve as an important and – to the best of our knowledge – academically novel link between theoretical and empirical considerations. To this end, we use several linear regression models.

1. Sample Construction and Summary Statistic

Main data sources for our examination of the macroeconomic dynamics underlying German building societies and SLCs are time series data from the German central bank, which publishes detailed information monthly on the current state of building societies. We thus construct a dataset for the January 1980 – March 2015 period (T = 423) containing aggregate high-level information on balance sheet items (such as deposits and loans under SLCs), as well as business trends (such as capital promised and disbursed).

The countercyclical development of such variables and the substitutional logic regarding traditional savings deposits and housing loans are examined by means of our econometric analyses. CAPDIS_LOAN_WOIB measures total outpayments of allocated SLC loans to contract holders (excluding settlements of interim and bridging loans), CAPDIS_IBOUT_TOTAL denotes total outpayments of mortgage loans not covered by allocated SLCs (i. e., interim, bridging, or other building loans), SLC_DEP_NB denotes current level of SLC deposits from non-banks, and LENDING_NB_BL_IB quantifies the current level of existing interim and bridging loans granted to non-banks. Table 1 provides detailed variable descriptions.

Table 1

Variable Description

Variable	Description	Unit	Source	Quarter Calculation*
BAL_TOTAL	Total sum of balance sheet of all operative building and loan associations (institutions) in Germany.	EUR bn	Deutsche Bundesbank	Quarter-End
CAPDIS_IBOUT_TOTAL_RATIO	Total outpayments of mortgage loans not covered by allocated SLCs, i.e. interim and bridging loans or other building loans, as a percentage of total SLC deposits.	%	Deutsche Bundesbank	Sum/Quarter-End
CAPDIS_LOAN_WOIB	Total outpayment of allocated contract loans to SLC holders without outpayments applied to settlement of interim and bridging loans.	EUR bn	Deutsche Bundesbank	Sum
GDP	Real quarterly growth of the German GDP (seasonality and calendar adjusted).	%	German Federal Statistical Office	n/a (quarterly availability only)
HOUSINGLOANS_MT	Total amount of medium-term housing loans from all types of banks to domestic enterprises and households.	EUR bn	Deutsche Bundesbank	n/a (quarterly availability only)
HOUSINGLOANS_TOTAL	Total amount of housing loans from all types of banks to domestic enterprises and households.	EUR bn	Deutsche Bundesbank	n/a (quarterly availability only)
IFO_CLIMATE_IND	Seasonally adjusted Index of Business Climate for Trade and Industry.	Index (2005=100)	Ifo Institute Munich	Average
LENDING_NB_BL_IB	Total amount of currently existing interim and bridging loans granted to non-banks (non-MFIs).	EUR bn	Deutsche Bundesbank	Quarter-End

MORTGAGERATES_10	Representative average of mortgage rates of banks in Germany providing mortgage credits.	%	FMH-Finanzberatung	Average
ORDERS_CONSTRUCT_IND	Monthly index of the orders received by the construction sector, created based on construction reports of construction companies with at least 20 employees.	Index (1980 = 100)	Deutsche Bundesbank	Average
RESIDENTIAL_PRIC_IND	Nominal quarterly index for the price development of residential property prices.	Index (1995 = 100)	Bank of International Settlements	n/a (quarterly availability only)
SAVDEP_TOTAL	Sum of all savings deposits of domestic households, companies and non-profit institutions. Excluding deposits under SLCs.	EUR bn	Deutsche Bundesbank	Quarter-End
SLC_AMOUNTSPAIDIN	Changes in deposits under savings and loan contracts invoked by amounts paid into SLC accounts.	EUR bn	Deutsche Bundesbank	Sum
SLC_DEP_NB	Total current amount of savings deposits of non-banks under SLCs in building and loan associations.	EUR bn	Deutsche Bundesbank	Quarter-End
SLC_HB_RECEIVED	Total amount of housing bonuses/subsidies received by SLC contract holders from the German government.	EUR bn	Deutsche Bundesbank	Sum

* The variables available at monthly frequency were reduced in frequency for the quarterly models. This was done by either calculating a sum or an average of the three monthly values in this quarter (sum/average), or by taking the value of the last month in the quarter (quarter-end).

This dataset on the economic state of building societies is supplemented by two further categories of control variables related to housing and overall macroeconomic development. They come from either the German central bank or the German Federal Statistical Office (Destatis). Housing variables are comprised of quantitative information on the general evolution of the German housing market, for example, mortgage interest rates (from FMH Finanzberatung, a leading provider of interest rate-level data in Germany), total volume of housing loans (i. e., SLC and non-SLC), and a price index for the entire market. Macro-level controls consist of variables for general economic prosperity (e. g., GDP and the ifo Business Climate Index) and for overall private savings activity (e. g., development of total savings deposits). Note that most of the variables are available on a monthly basis, but some were only available quarterly. We therefore reduced some models to a quarterly frequency, spanning Q1 1980 through Q1 2015 (T = 141). Table 2 and 3 provide detailed descriptive statistics.

Table 2

Descriptive Statistics (Monthly Basis)

Variable	Obs	Mean	Std. Dev.	Min	Max
BAL_TOTAL	424	133,569	49,878	62,139	213,167
CAPDIS_IBOUT_TOTAL_RATIO	423	1,991	0,585	1,065	4,159
CAPDIS_LOAN_WOIB	423	0,518	0,170	0,136	0,890
IFO_CLIMATE	424	101,009	7,453	82,032	116,117
LENDING_NB_BL_IB	423	41,912	23,973	12,875	88,456
MORTAGERATES_10	424	6,505	2,401	1,270	12,470
ORDERS_CONSTRUCT_IND	424	98,732	39,351	33,700	240,585
SAVDEP_TOTAL	423	473,014	134,299	228,677	620,653
SLC_AMOUNTSPAIDIN	423	1,726	0,592	0,650	3,299
SLC_DEP_NB	423	90,132	30,223	51,936	158,225
SLC_HB_RECEIVED	423	0,039	0,022	0,007	0,132

Table 3

Descriptive Statistics (Quarterly Basis)

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	141	1,704	2,180	–6,924	6,776
HOUSINGLOANS_MT	142	26,736	9,353	12,010	49,425
HOUSINGLOANS_TOTAL	142	743,981	349,964	202,969	1205,105
RESIDENTIAL_PRIC_IND	141	97,423	10,411	78,170	124,490

For the countercyclical incentive mechanisms of SLCs to have any noticeable effect on the overall stability of housing markets in Germany, an important and necessary condition is that the number of people who follow the countercyclical incentives of SLCs[24] and the number of people that behave cyclically[25] must be approximately equal across the overall population. As we noted earlier, the economic phenomenon of "Bausparen", i. e., saving money in the form of an SLC, is surprisingly pervasive in Germany, especially versus other European countries. To validate this statement on a more quantitative level, we supplement our macroeconomic analyses with some micro-level data. We use a dataset consisting of eight cross-sections of the German Sample Survey of Income and Expenditure ("Einkommens- und Verbrauchsstichprobe", EVS), which is surveyed, administered, and distributed by the German Federal Statistical Office (FSO). With tens of thousands of households interviewed every five years, this survey is the largest of its kind within the European Union, and represents the main data source on the savings behavior of German households.[26] The cross-sectional datasets have been surveyed in five-year intervals from 1978 through 2013, and thus contain representative and high-quality household-level information on income, assets, stocks, and consumption. These data can be exploited for a detailed micro-level examination of the importance of savings and loan contracts in individual asset allocation behavior under different interest rate regimes. It is important to note, however, that the EVS cross-sections are independent from one another (in time), i. e., they do not constitute a genuine panel dataset. Therefore, we use detailed descriptive analyses that highlight the overall persistence of SLCs across various socioeconomic characteristics to illustrate that SLCs are a macrosocial phenomenon, by which we refer to a financial instrument that finds

[24] In other words, those who obtain loans in a high interest rate environment.

[25] In other words, those who have stronger incentives to obtain a mortgage in a low interest rate environment.

[26] For more information, see: http://www.forschungsdatenzentrum.de/bestand/evs/index.asp.

high levels of popularity in the population across a wide range of different socioeconomic backgrounds.

2. Methodology

To examine whether SLCs do contain the countercyclical incentive mechanisms that their option-like structure suggests, we perform various OLS regressions. We divide them broadly into two categories: 1) countercyclical behavior on the savings side of the building societies' business (i. e., SLC deposits that depend on the interest rate environment), and 2) similar countercyclical incentive patterns on the credit side of the business (i. e., the development and distribution of SLC loans under different interest rate regimes).

Since our data set comprises time series data, we performed several econometric steps on each of the variables before feeding them into the OLS regression models. As virtually all variables in the data set contain a unit root, the first step involved taking year-over-year log differences of all variables and subsequently verifying the induced stationarity via Augmented Dickey-Fuller tests. The only exception to this procedure was the 10-year mortgage rate, whose behavior over the sample period comes very close to a linear (downward) trend. To avoid spurious correlations, we therefore regressed this variable on a linear trend and then included the residuals from this regression in the subsequent OLS models.

Second of all, in order to eliminate any remaining autocorrelation from all other time series variables, we estimated several autoregressive models, where the lag order was decided on the basis of the Akaike Information Criterion (*Akaike* 1973). Therefore, instead of using the year-over-year log differences directly as regressors in our structural OLS regressions, we included the residuals from these individual AR models. We found this procedure to generate models with very reasonable econometric properties, because they have only stationary variables and their residuals do not exhibit any significant autocorrelation (see regression diagnostics). In the upcoming result section, all presented coefficients hence relate the decorrelated year-over-year log differences of the regressors to the same transformation of the regressand, again with the notable exception of mortgage rates, for which the coefficient is to be interpreted in terms of the detrended fluctuations. Finally, we also control for time-fixed effects by including monthly dummy variables.

V. Empirical Results

To provide empirical evidence for our research question, we consider both perspectives of the SLC: 1) allocated credits and loans granted by building soci-

eties to their collective system, as well as deposits or savings by contract owners, and 2) deposit savings in the collective system.

1. Perspective of Allocated Credits

Based on our literature review, we expect a significant degree of co-movement between interest rates and SLC loan demand. This is because we expect SLC loans to gain in popularity countercyclically, i. e., in rising interest rate environments. This is reasonable given their comparative advantage to market conditions (financing costs are lower due to better credit conditions). On the other hand, we expect credit options and allocated credits, respectively, to be decreasing during low interest rate environments. Table 4 shows our OLS results based on the monthly dataset; Table 5 shows our results for the quarterly dataset.

Note that the variables that are available at only a quarterly frequency, yet significantly enhance the economic rigor of the models, refer specifically to the exogenous control variables: HOUSINGLOANS_MT (total amount of medium-term housing loans from all types of banks to domestic enterprises and households), HOUSINGLOANS_TOTAL (total amount of housing loans from all types of banks to domestic enterprises and households), RESIDENTIAL_PRIC_IND (quarterly index of nominal residential property prices in Germany, 1995 = 100) and GDP (GDP growth-, price-, seasonally, and calendar-adjusted – compared to pre-year quarter).

In the models based on monthly data (see Table 4), we observe a strong positive and highly significant effect of MORTGAGERATES_10[27] (mortgage rates, ten-year fixed interest rate) on CAPDIS_LOAN_WOIB (total outpayments of allocated loans to contract holders without interim and bridging loans – subject to the use of the disbursed amount of real estate investments). This provides the first evidence for the hypothesis of the countercyclical mechanisms of SLC credit provisions. Increasing interest rate levels (and higher mortgage rates, respectively) increase demand for SLC housing credits, although loans are allocated and could be retrieved. A high demand for SLC credits can be traced back to the high option value within the SLC, because credit conditions worsen with increasing interest rates.

The relative share of newly granted interim and bridging loans plus allocated SLC loans to the total amount of loans under savings contracts (CAPDIS_IBOUT_TOTAL_RATIO) has a negative and significant effect on the total amount of allocated SLC credits. Interim and bridging loans increase in attrac-

[27] We choose this variable, with a fixed interest rate of ten years, because its maturity is similar to that of SLC credits.

Table 4

Regression Analysis – Demand for Allocated SLC Credits (Monthly Basis)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	CAPDIS_LOAN_WOIB					
Housing Finance						
MORTGAGERATES_10	0.0170***	0.0153***	0.0162***	0.0160***	0.0173***	0.0173***
	(0.00293)	(0.00291)	(0.00290)	(0.00285)	(0.00283)	(0.00285)
Contract Variables / Controls						
CAPDIS_IBOUT_TOTAL_RATIO		−0.0315**	−0.0394***	−0.0412***	−0.0481***	−0.0483***
		(0.0125)	(0.0130)	(0.0132)	(0.0135)	(0.0135)
SLC_AMOUNTSPAIDIN					0.0939***	0.0938***
					(0.0225)	(0.0227)
Macro-level Controls						
ORDERS_CONSTRUCT_IND			0.000899***	0.000827**	0.000745**	0.000740**
			(0.000342)	(0.000336)	(0.000332)	(0.000331)
IFO_CLIMATE_IND				0.00411*	0.00424*	0.00426*
				(0.00228)	(0.00225)	(0.00226)

Institutional Controls						
BAL_TOTAL						−0.00149
						(0.00250)
Constant	0.00174	0.00141	0.00138	0.00258	−6.84e-05	5.77e-06
	(0.0112)	(0.0112)	(0.0111)	(0.0109)	(0.0105)	(0.0106)
# Obs.	403	403	403	403	403	403
R-squared	0.078	0.091	0.112	0.122	0.166	0.166
Adjusted R-squared	0.0500	0.0609	0.0802	0.0875	0.131	0.130
F-statistic	2.995***	3.194***	3.440***	3.793***	4.986***	4.686***
Mean VIF	1.75	1.70	1.66	1.63	1.60	1.56

Notes: Robust standard errors in parentheses. ***, ** and * denote significance at the 1%, 5% and 10%, levels, respectively. This table shows the results of the linear regressions of CAPDIS_LOAN_WOIB on several SLC-specific variables, various macroeconomic control variables, and monthly fixed-effects. The regressand and all regressors (except for MORTGAGERATES_10) contain decorrelated year-over-year log differences of the original time series obtained from the respective sources. For the MORTGAGERATES_10-variable, the regressor contains the residuals from the regression of the original mortgage rates time series on a linear trend. Most notable in the context of our theoretical groundwork is the highly significant impact of ten-year fixed mortgage rates on the distribution of new SLC loans, i.e. the higher the interest rate, the more SLC loans are distributed, ceteris paribus. This holds regardless of how many control variables are included. Together with the equally consistent, negative influence of CAPDIS_IBOUT_TOTAL_RATIO, indicating the distribution of interim and bridging loans, this provides strong empirical evidence in favor of the hypothesized countercyclical incentive mechanisms provided my SLC contracts.

Table 5

Regression Analysis – Demand for Allocated SLC Credits (Quarterly Basis)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	CAPDIS_LOAN_WOIB									
Housing Finance										
MORTGAGERATES_10	0.0682***	0.0652***	0.0657***	0.0441***	0.0442***	0.0442***	0.0342***	0.0416***	0.0348***	0.0422***
	(0.0123)	(0.0122)	(0.0123)	(0.0106)	(0.0107)	(0.0107)	(0.00988)	(0.0105)	(0.0102)	(0.0107)
HOUSINGLOANS_MT		−0.00733***		−0.00705***	−0.00704***	−0.00703***	−0.00736***	−0.00730***		
		(0.00213)		(0.00156)	(0.00155)	(0.00154)	(0.00134)	(0.00165)		
HOUSINGLOANS_TOTAL			−0.00159**						−0.00160**	−0.00159**
			(0.000689)						(0.000801)	(0.000698)
Contract Variables / Controls										
CAPDIS_IBOUT_TOTAL_RATIO				−0.316***	−0.315***	−0.317***	−0.313***	−0.325***	−0.311***	−0.323***
				(0.0656)	(0.0693)	(0.0698)	(0.0628)	(0.0686)	(0.0630)	(0.0688)
Macro-level Controls										
RESIDENTIAL_PRIC_IND						−0.00411	−0.00596	−0.00630	−0.00779	−0.00815
						(0.0110)	(0.0111)	(0.0108)	(0.0110)	(0.0108)
GDP							0.0335***		0.0335***	
							(0.00835)		(0.00862)	

IFO_CLIMATE_IND								0.00833*		0.00844*
								(0.00472)		(0.00484)
Institutional Controls										
BAL_TOTAL					–0.000637	–0.000187	0.00103	–0.00115	0.000132	–0.00206
					(0.00876)	(0.00883)	(0.00807)	(0.00920)	(0.00817)	(0.00933)
Constant	0.0183	0.0179	0.0179	0.0131	0.0132	0.0132	0.0129	0.0144	0.0131	0.0145
	(0.0198)	(0.0189)	(0.0195)	(0.0191)	(0.0193)	(0.0194)	(0.0179)	(0.0187)	(0.0185)	(0.0193)
# Obs.	132	132	132	132	132	132	132	132	132	132
R-squared	0.167	0.199	0.180	0.317	0.317	0.317	0.387	0.334	0.368	0.316
Adjusted R-squared	0.141	0.167	0.147	0.284	0.278	0.273	0.341	0.285	0.321	0.265
F-statistic	8.537***	10.60***	10.25***	16.16***	13.84***	12.26***	16.81***	12.52***	11.44***	10.56***
Mean VIF	1.38	1.30	1.31	1.30	1.27	1.25	1.23	1.23	1.24	1.23

Notes: Robust standard errors in parentheses. ***, ** and * denote significance at the 1%, 5% and 10%, levels, respectively. This table shows the results of the linear regressions of *CAPDIS_LOAN_WOIB* on several SLC-specific variables, various macroeconomic control variables, and quarterly fixed-effects. The regressand and all regressors (except for *MORTGAGERATES_10*) contain decorrelated year-over-year log differences of the original time series obtained from the respective sources. For the *MORTGAGERATES_10*-variable, the regressor contains the residuals from the regression of the original mortgage rates time series on a linear trend. In addition to the variables already included in the models constructed on the basis of monthly data, these models include some variables available on only a quarterly basis, such as two *HOUSINGLOANS*-variables, *GDP* and *RESIDENTIAL_PRIC_IND*. The conclusions from monthly data regarding the highly significant impact of *MORTGAGERATES_10* and *CAPDIS_IBOUT_TOTAL_RATIO* hold true on a quarterly basis as well, thus providing further evidence in favor of the coexistence of countercyclical incentive structures of SLC contracts. However, additional favorable evidence can be derived from the consistently negative and significant influence of *HOUSINGLOANS_MT*. This indicates the substitutional logic of SLC loans becoming highly attractive in interest rate environments, where standard mortgage loans are least attractive.

tiveness during times of lower interest rates – similarly to classic banking loans. A low interest rate environment fosters demand for credits because of low financing costs. Finally, this analysis provides evidence in favor of the inherent dichotomy between these two types of credits with respect to customer incentives.

Interestingly, our results indicate that an increasing amount of savings paid into the savings and loan accounts of SLCs, SLC_AMOUNTSPAIDIN, increases demand for SLC credits. SLC owners can influence the time of credit allocation by adapting their savings to when they intend to reach the minimum amount of savings. Therefore, the attractiveness of saving during high interest rate environments in expectation of a potential change is high. Furthermore, a better economic climate, as measured by the ifo Business Climate Index for Trade and Industry (IFO_CLIMATE_IND), has a positive impact on SLC credit demand. This overall economic environment tends to go hand-in-hand with stronger household financial situations. Thus, we may observe a generally higher willingness to incur debt. As expected, the institutional controls do not impact the endogenous variable (BAL_TOTAL).

As can be seen from all results, the signs and levels of the coefficients remain consistent in all models, and the variance inflation factors (VIFs) reveal no multicollinearity. All VIFs are rather low, and below the critical value of 5 (*Kutner* et al. 2004).

In the models based on quarterly data (see Table 5), we note that the results from our first analysis are broadly corroborated. We expand our analysis by including a variable that measures total housing loan development in Germany. According to our hypothesis, we expect a countercyclical development of the market for real estate financing and SLC credit demand. Once again, the key variable MORTGAGERATES_10 remains strongly positively significant in all models analyzed. To strengthen our argumentation, we also include HOUSINGLOANS_MT and HOUSINGLOANS_TOTAL. Both variables have a strong negative and significant effect on SLC credit demand, which holds for all models. This is particularly noteworthy because it again supports the countercyclical line of argumentation. When the real estate financing market declines and recessional tendencies become apparent, SLC owners with a credit commitment (allocation of SLC loan) are likely to expand their market activities. On the other hand, however, boom tendencies may be reduced in intensity by SLC owners because they have no incentive to enter the housing market during times of low interest rates. All other control variables remain stable as in the models with monthly data. One further notable extension refers to the inclusion of another viable macroeconomic control variable, GDP. As expected, GDP exhibits a similar (positive and significant) impact on SLC demand as the ifo Business Climate Index (IFO_CLIMATE_IND).

To summarize our results from the perspective of SLC credits, we find empirical evidence that this contract type does provide countercyclical incentives for contract holders. SLCs provided by building societies set incentive structures in the market to reduce boom tendencies during times of low interest rates (when financing costs are low), and boost demand for housing during times of higher interest rates. Considering the inherent risk of market collapse due to the comparative advantages, this may support the hypothesis that SLCs smooth demand in housing markets. Overheating tendencies are mitigated, as is the risk of markets drying up because of increasing and ultimately unaffordable financing costs.

2. Deposits in Savings and Loan Contract Accounts

The second perspective of our analysis refers to the examination of savings deposits in SLC accounts. Based on the results for SLC loan demand (see Tables 4 and 5), we expect savings activities in SLC accounts within the collective system to be diametrically contrary to those of loan demand. When interest rates are low, the attractiveness of SLCs increases. This is attributable to the fact that the point of entrance for a SLC is highly relevant, because the terms and conditions of the contract are based on the interest rate level at that moment. Thus, if interest rate levels are low, the SLC owner can "lock in" the market conditions for future needs. Furthermore, although deposit interest on SLC savings tends to be lower than returns on comparable investments, the difference virtually disappears in low interest rate environments. The incentive for SLC owners to increase savings activities is higher due to decreasing opportunity costs. In addition, the objective to reach the minimum volume needed to qualify for possible SLC loan allocation is important, because SLC owners expect increasing interest rates during low interest rate environments.

Table 6

Regression Analysis – SLC Deposit Savings (Monthly Basis)

	(1)	(2)	(3)	(4)	(5)
VARIABLES	SLC_DEP_NB				
Housing Finance					
MORTGAGERATES_10	−0.0277***	−0.0235***	−0.0221***	−0.0216***	−0.0216***
	(0.00782)	(0.00761)	(0.00746)	(0.00749)	(0.00750)
Contract Variables / Controls					
SLC_HB_RECEIVED	2.227**	2.106**	2.165**	2.232***	2.228***
	(0.870)	(0.854)	(0.854)	(0.858)	(0.860)
LENDING_NB_BL_IB		0.112***	0.113***	0.118***	0.119***
		(0.0318)	(0.0320)	(0.0312)	(0.0313)
Macro-level Controls					
SAVDEP_TOTAL			0.00218*	0.00223*	0.00221*
			(0.00132)	(0.00132)	(0.00132)
IFO_CLIMATE_IND					−0.000867
					(0.00596)
Institutional Controls					
BAL_TOTAL				0.0113	0.0113
				(0.00841)	(0.00846)
Constant	0.0286	0.0290	0.0288	0.0282	0.0280
	(0.0293)	(0.0283)	(0.0281)	(0.0287)	(0.0290)
# Obs.	403	403	403	403	403
R-squared	0.054	0.086	0.092	0.096	0.096
Adjusted R-squared	0.0223	0.0533	0.0564	0.0581	0.0557
F-statistic	2.287***	3.335***	3.239***	3.359***	3.175***
Mean VIF	1.70	1.65	1.61	1.58	1.55

Notes: Robust standard errors in parentheses. ***, ** and * denote significance at the 1 %, 5 % and 10 %, levels, respectively. This table shows the results of the linear regressions of *SLC_DEP_NB* on several SLC-specific variables, various macroeconomic control variables, and monthly fixed-effects, thereby examining the deposit-related aspect of countercyclical SLC incentives. The regressand and all regressors (except for *MORTGAGERATES_10*) contain decorrelated year-over-year log differences of the original time series obtained from the respective sources. For the *MORTGAGERATES_10* variable, the regressor contains the residuals from the regression of the original mortgage rates time series on a linear trend. Most noteworthy is again the highly significant negative impact of *MORTGAGERATES_10*, which serves here as a proxy for savings interest rates. The empirical finding of SLC deposits

rising in times of lower interest rates, ceteris paribus, corresponds neatly to the underlying theoretical argument of SLC-driven countercyclical savings behavior of households. The only contrary finding concerns the positive impact of traditional savings deposits (*SAVDEP_TOTAL*), for which the economic expectation would have been a negative sign, indicating the substitutional logic on the deposit side. However, this coefficient is barely significant at the 10 % level. The consistently positive impact of *SLC_HB_RECEIVED* indicates that government subsidies for SLC savings may indeed enhance existing saving efforts.

Our main result highlights the influence of the interest rate level on the savings activities of SLC accounts. The results of our model (see Table 6), based on monthly data, show a strongly negative and highly significant effect of MORTGAGERATES_10 on SLC_DEP_NB (savings deposits and borrowing from nonbanks on SLC accounts). The results remain stable for all models in our analysis, which supports our hypothesis about the countercyclical mechanisms of this contract type with respect to deposits. Low interest rate environments – in which conventional savings activity loses its attractiveness – incentivize an increase in total underlying SLC contracts for contract holders as well as SLC-based savings efforts. There is a strong incentive to obtain the fixed loan option with a low interest rate.

As expected, the procyclical part of the building societies' business (LENDING_NB_BL_IB) increases with a decreasing interest rate level. This is because the incentives are identical to those seen in classic bank lending: Low interest rate levels indicate low financing costs. Results show a positive and highly significant impact on SLC savings intensity.

Another aspect of the SLC system is that government subsidies effectively stabilize savings activities in SLC accounts. SLC_HB_RECEIVED has a positive and highly significant effect on SLC deposit savings for all models. State and regulatory institutions can thus influence and stabilize the housing market by using government subsidies to provide additional support for SLC housing finance. This in turn promotes a consistent liquidity provision in housing markets that is unrelated to current market or financing conditions. Note that *Schlueter* et al. (2015) find similar effects. Government subsidies, besides other contractual rewards, can influence the savings behavior of non-maturing deposits, which can consequently stabilize bank funding. Just as before, all results, signs, and approximate coefficient levels remain consistent throughout the models. VIFs show that multicollinearity is no apparent issue in the models, as the values remain below 5.

In conclusion, the results confirm the aforementioned insights gained with respect to loan demand. SLCs establish countercyclical incentive structures – not only on the side of loans but also on the side of deposit savings. These results provide the first evidence of how effective this system can be in practice, and may be useful to export to other countries in order to stabilize housing markets and counterbalance capital markets.

Table 7

Savings and Loan Contracts as Macrosocial Phenomenon

Owners of SLC (in quartiles) [%]	1st Quartile								2nd Quartile							
	1978	1983	1988	1993	1998	2003	2008	2013	1978	1983	1988	1993	1998	2003	2008	2013
Age	62,5	61,9	60,8	57,5	60,4	55,9	54,9	51,6	56,6	65,6	62,0	59,1	59,5	55,4	54,4	50,5
Employment status[28]	58,4	61,1	9,3	51,1	47,7	43,3	42,5	41,2	66,8	71,1	70,9	68,5	72,3	69,1	71,0	68,3
Net income	17,0	20,6	21,2	22,1	27,2	28,4	25,0	21,4	40,9	46,2	46,4	44,7	48,6	47,1	46,6	41,1
Savings ratio (of net income)	–	37,4	35,6	35,8	37,1	37,9	47,2	42,8	–	39,4	39,9	40,7	46,8	46,0	35,0	30,0
Percentage of total savings invested in common stock	–	51,6	58,0	52,7[29]	61,8	63,2	63,1	57,2	–	64,1	67,1	58,6	65,4	66,5	70,2	68,9
Percentage of total savings in savings accounts	–	43,6	42,9	43,6[29]	60,3	57,1	58,5	53,4	–	68,4	64,1	60,5	67,8	64,4	66,0	65,1
Total savings deposits	43,2	47,6	40,9	42,7	38,8	37,3	42,0	37,3[30]	46,4	53,1	51,6	48,6	55,6	52,9	42,0[30]	37,3[30]
Market value of owned housing	–	–	–	52,8	55,5	55,8	54,1	51,1	–	–	–	58,2	63,2	61,7	63,3	59,3
	3rd Quartile								4th Quartile							
Continuing	1978	1983	1988	1993	1998	2003	2008	2013	1978	1983	1988	1993	1998	2003	2008	2013
Age	42,0	51,8	50,5	50,4	56,8	53,4	50,9	46,4	18,7	22,1	23,4	22,6	29,0	33,9	37,1	33,1
Employment status	52,8	58,6	57,0	57,3	61,2	57,7	57,1	52,8	20,4	22,6	21,1	23,4	27,1	32,8	33,4	30,2
Net income	54,1	62,1	61,2	59,0	62,3	60,7	61,0	55,5	65,8	71,0	67,1	62,1	66,6	62,0	64,3	62,7

[28] 1st Quartile = self-employed; 2nd Quartile = civil servants; 3rd Quartile = blue-/white-collar; 4th Quartile = not employed

[29] includes capital-forming benefits

[30] 1st and 2nd Quartile identical (equal to zero)

Savings ratio (of net income)	–	57,8	55,7	53,8	60,0	57,1	57,6	53,5	–	65,2	64,5	57,6	61,7	57,2	59,9	56,5
Percentage of total savings invested in common stock	–	52,8	56,6	48,9	63,5	63,1	61,4	61,5	–	43,1	49,1	41,5	58,6	51,5	53,4	46,8
Percentage of total savings in savings accounts	–	57,4	59,0	55,0	63,0	57,5	60,3	56,0	–	33,6	34,3	33,6	38,4	38,0	43,0	36,1
Total savings deposits	44,5	50,8	52,4	49,3	56,0	54,4	56,2	52,3	43,7	48,2	50,5	47,3	54,3	53,4	56,6	53,6
Market value of owned housing	–	–	–	60,6	64,3	62,3	64,1	59,5	–	–	–	59,9	62,7	59,5	61,2	57,5

Owners of SLC (binary variables) [%]	**Dummy = 0**								**Dummy = 1**							
	1978	1983	1988	1993	1998	2003	2008	2013	1978	1983	1988	1993	1998	2003	2008	2013
Marital status (0 = unmarried; 1 = married)	24,3	28,1	29,4	31,6	38,4	39,2	38,1	36,8	49,9	57,1	56,1	54,2	57,7	55,7	57,1	52,8
Tenure status (0 = tenant; 1 = home ownership)	34,3	36,3	34,5	37,9	40,5	37,2	35,2	32,6	56,6	63,9	61,8	57,8	62,3	59,9	61,1	57,0
Investment securities (0 = no; 1 = yes)	42,2	47,6	44,8	43,0	48,6	42,6	42,5	40,0	49,8	54,7	55,5	51,0	61,2	57,2	58,9	55,1
Life Insurance (0 = no; 1 = yes)	32,6	36,1	50,4	36,2	37,3	35,1	34,3	31,0	48,6	55,1	43,5	53,1	58,9	57,4	57,9	55,5
Housing Assets[31] (0 = no; 1 = yes)	30,7	32,9	31,3	34,9	38,4	35,1	33,4	30,9	59,1	65,1	62,7	58,0	61,7	59,0	60,1	56,4
Rental Income (0 = no; 1 = yes)	58,9	64,8	62,6	57,9	61,0	58,9	59,5	55,4	59,7	65,9	63,0	58,4	63,4	59,3	61,9	59,4
Residual mortgage debt (0 = no; 1 = yes)	34,5	36,8	36,9	38,1	42,2	41,0	40,8	37,4	66,5	73,5	70,4	67,2	68,6	64,7	66,4	63,6
Consumer credit debt (0 = no; 1 = yes)	43,6	48,9	47,7	45,4	49,6	47,7	46,6	42,6	48,6	54,6	53,4	53,8	57,0	53,0	53,3	49,8

[31] ownership of apartment(s), building(s) and/or property/estate

Notes: In order for the countercyclical incentive mechanisms of SLCs to have any meaningful effect on the housing market, the population should ideally be equally divided between SLC owners and non-owners. This is because demand is stabilized by the mutually substitutional demand in interest rate cycles. This table therefore investigates the percentage of SLC ownership across a wide spectrum of quantitative and qualitative socioeconomic indicators. The data were obtained from the EVS survey over eight different years. For the quantitative indicators (namely age, net income, savings ratio, percentage of total savings invested in common stock, percentage of total savings in savings accounts, total savings deposits and market value of owned housing), the cells in the table indicate percentage of SLC ownership in each quartile of the respective distribution in each EVS year. For example, in the second youngest age quartile in the year 2003, 55.4 % of participants possessed an SLC. For the (qualitative) variable of employment status, the quartiles indicate the four levels of self-employed, civil servants, blue-/white-collar and not employed instead. For example, among civil servants in the year 2003, 69.1 % had an SLC. Finally, all other variables are binary, so the percentages indicate SLC ownership rates for both levels. For example, among participants with life insurance in the year 2003, 57.4 % were SLC owners. The table is color-coded, so that darker backgrounds denote values that are further away from the theoretically "ideal" value of 50 %.

Source: Calculation based on figures provided by the German Federal Statistical Office (German Sample Survey of Income and Expenditure).

3. Robustness Checks

Next, we run several analyses to explore whether the SLC phenomenon consists of special socioeconomic characteristics. The stabilizing mechanisms of SLCs only hold if their use for real estate financing is a macrosocial phenomenon, i. e. a widespread reality among many different socioeconomic substrata of the population and not just among certain fringe minorities. To examine this question in-depth, we use data from the representative survey on income and consumption (Einkommens- und Verbrauchsstichprobe, EVS) published by the German FSO. This dataset provides details on the income and asset allocation of each household surveyed, thereby enabling a thorough investigation of SLC pervasiveness. We analyzed the most important characteristics with respect to SLC ownership. The results are shown in Table 7.

A first noteworthy finding is that the socioeconomic structure of SLC owners does not change fundamentally over time. With respect to age, net income, and savings ratio, the share of SLC owners in each quartile remains relatively constant. The lowest ownership rates are found mainly in the fourth age quartile, which makes sense, as pensioners are altogether less likely to start saving for a new housing investment. However, even there, ownership rates reach up to 37 % in 2008. Furthermore, SLC ownership is a phenomenon that crosses all employment groups, including the self-employed, civil servants, and salaried employees. Most importantly, SLC ownership does not depend on whether the corresponding household is wealthy or not. Indeed, in 2013, regardless of the choice of socioeconomic characteristic or quartile, ownership ratios are never lower than 30 %. Therefore, although SLC ownership rates vary somewhat across income and wealth quartiles, there is ample evidence that the phenomenon is exceptionally widespread. Moreover, the value of real estate financed does not appear to impact the use of SLCs in Germany.

This overall conclusion also holds for various binary variables that reflect additional socioeconomic household characteristics. For example, regardless of tenure, choice of investment securities, or existence of life insurance, the households surveyed split into remarkably similarly sized groups of SLC owners and non-owners. We do note slight differences, however, in the existence of residual mortgage debt. This implies that those who use residual mortgage debt are also more likely to have an SLC contract. But, due to the "earmarked" function of SLCs, this tendency is logical. The results of this analysis show that SLC ownership is a macrosocial phenomenon, and it is not influenced in principle by employment, wealth, or investment behavior effects. Consequently, our research results are confirmed. SLC ownership is not a marginal phenomenon.

From a regulatory perspective, this constitutes vital information. SLCs, with their inherent incentive structure, attract not only specific groups in society or particular investor types, but are accessible to and, more importantly, used, by a wide segment of the overall population. Indeed, on the basis of these empirical insights, we believe SLCs are attractive additions to the overhauling policy "toolbox", and stand out particularly for their potential as preemptive stabilizing agents.

VI. Conclusion

This paper empirically examines whether SLCs, as a special type of real estate financing instrument, create the countercyclical incentive mechanisms that their specific option-like structure would theoretically suggest. More specifically, we investigate whether SLC holders have a higher propensity to borrow under increasing interest rate regimes, thereby serving as an important stabilizer of housing market liquidity in declining credit environments. Controlling for important macroeconomic variables, we show that both SLC savings deposits and loans precisely reflect this countercyclical mechanism to interest rate changes. Also the current interest rate environment shaped by the expectation of increasing interest rates seems to support our findings. We did observe a boom in the market for newly signed SLCs in recent months. By concluding new contracts, private households are hedging possible future real investments in residential estate against rising financing costs. Thereby, they are creating again a countercyclical mechanism, however now in an increasing interest rate environment. These findings broadly corroborate the notion that SLCs are fundamental to German mortgage financing, and are important contributors to the overall stability of the German housing market.

As per *Schularick* and *Wachtel* (2014) we observe a dramatic change in the savings rate and behavior of households over the decades prior to the financial crisis. American households became net borrowers, with a decreasing equity

base when it came to housing financing. As a result, the "haircuts" that took place over the course of the crisis almost became losses. We therefore argue that financing instruments that incentivize households to build a solid equity base for real estate financing are essential for stability. We confirm the results by *Börsch-Supan* and *Stahl* (1991) that savings activity in SLCs – which is mandated to be used for real estate purposes – is highly sensitive to government subsidies. Hence, SLCs may be an effective stabilizer with respect to a strong equity base by supporting the accumulation of capital, especially for low-income households. This is also true because a high loan-to-value ratio is considered a main contributor to both foreclosures and re-defaults (*Schmeiser/Gross* 2016).

The study of *Chiang* and *Sa-Aadu* (2014) on optimal mortgage contract choice supports our results. They emphasize the high relevance of liquidity and affordability constraints in the choice of real estate finance instruments. The need for a continuous debt servicing capacity is essential for the stability of real estate financing markets and ultimately for housing markets. Furthermore, building societies provide capital buffers and liquidity within their collective system. This supports the line of reasoning by *Benes* and *Kumhof* (2015) that capital buffers during times of shortages are essential for financial stability.

In summary, this paper makes three primary contributions to the literature. First, it provides empirical evidence that building societies, along with their special and unique mortgage financing product, SLCs, are an integral part of the German financial system. We illustrate their overall importance to the country's housing market stability. Countercyclical incentive structures, as provided by SLCs, can be a major factor in smoothing housing demand and mitigating overheating tendencies and high volatility in the real estate market. The significance of the housing market for the state of financial systems was demonstrated impressively during the last financial crisis. It is thus vital for regulatory and state authorities to understand that stable housing markets come not only from regulations and credit supply, but also from incentive structures on the demand side.

Second, we contribute to the existing literature on the relevance of state subsidies for real estate financing by showing they are key for the accumulation of a strong equity base for financing housing. Such a strong base could reduce loan-to-value ratios in housing finance, while stabilizing real estate finance in general. SLCs are highly sensitive to state subsidies, and thereby assist regulatory efforts to strengthen equity accumulation, particularly with respect to low-income households.

Third, many of the inherent characteristics of SLCs are considered stabilizing forces for housing markets in the literature. For example, they smooth housing demand, provide liquidity during credit crunches, and support household equity accumulation to strengthen the equity base for real estate financing from state subsidies.

We note that this paper is particularly relevant because of recent political actions in Germany that have relaxed the strict regulations of building societies that exclusively offer SLCs. During the financial crisis of 2007/2008, building societies were viewed as vital to the country's stability because of their strict regulatory control over aspects such as, e.g., the investment use of deposits. However, over the course of a continued low interest rate phase, building societies were facing the same issues as insurance companies. Strong pressure to generate sufficient returns to cover the commitments of existing contracts became the trigger for policies that tentatively deregulated this industry. Such policies were advocated for by the building societies themselves. The result was a loosening of investment requirements (allowing investments in stocks, for example), and the opportunity to expand into more standard mortgage products. Due to these regulatory changes, one can fear that building societies may continue to lose share in their core business of SLCs, which in turn could jeopardize their important role as stabilizing agents. Thus, our paper also aims to demonstrate their relevance as stabilizing agents in order to prevent further policy actions that could force them to morph into classic mortgage banks. Higher volatility and fewer SLCs could be the result of such a misguided (de-)regulation. The savings and loan crisis of the late 1980s is a case study of the potential danger of shortsighted deregulations. That crisis arose because of an increasing maturity mismatch problem, which led to the need for other sources of return on investment for U.S. savings and loan institutions. Regulations were consequently loosened, but did not solve the industry's problems. Instead, they ultimately caused the insolvency of many of these institutions (*Kane* 1989; *Acharya* et al. 2011a).

Our analysis of SLCs as stabilizing agents of housing market boom-bust cycles point into the direction that SLCs may be most useful for economies that suffered the most when the housing bubbles burst in 2007/2008. Because these economies tended to possess more fragile real estate financing structures, they could benefit from the implementation of countercyclical incentive structures by using similar forms of financing contracts. SLCs have the potential to establish incentives that smooth housing demand in overheated markets while simultaneously stabilizing housing demand during times of liquidity shortages. Even more, this mechanisms of providing stability are not to the detriment of the institutional stability. On the contrary, with respect to macroeconomic shocks building societies show higher resilience in comparison to universal banks (*Molterer* 2019). Therefore, we believe SLCs should be considered as appealing and effective supplementary instruments in the "toolbox" of available policy actions to stabilize housing markets and reduce the risk of financial crises.

A Appendix

Table 8

Literature Overview – Factors and Structures that Lead to Robust Housing Markets

No	Author(s)	Year	Focus of Impact Factors			Title	Research Question	Regional Focus	Key Findings
			Regulation/ (Monetary) Policy/ Mortgage Financing	Institutional Setting/ Banking Focus	Contract Forms/ Instrumental Set of Financing				
1	Kuttner, K. N., Shim, I.	2016	x			Can non-interest rate policies sta bilize housing markets? Evidence from a panel of 57 economies	How effective are different non-interest rate policies at stabilizing and controlling house prices and housing credits?	57 advanced and emerging market economies worldwide	Strong evidence that introductions/ reductions in maximum debt service-to-income ratio moderate increases in housing credits (slowing real credit growth by approximately 4–6 ppt). Results suggest that increases in housing-related taxes tend to slow the growth of real housing credit and real house prices by 3–4 ppt.
2	Hott, C.	2015	x	x		A model of mortgage losses and its applications for Macroprudential instruments	What are the main underlying risk factors of mortgage loss rates and how can they be accurately modelled?	The U.S. and Switzerland, but claim universal applicability	Loss rates are positively influenced by house price levels, LTV ratios, interest rates, and unemployment, and negatively influenced by growth in house prices and income level. Calibration shows ability to describe loss rate development for CHE and the U.S. Potential application of the model as a macroprudential instrument.

3	Ott, H.	2014	x	x		Will euro area house prices sharply decrease?	Investigation of the empirical relationship between Euro area house prices and various drivers	Europe, Japan, and the U.S.	Bust phase of Euro area house prices began in 2007, an equilibrium level was determined by 2014, and current house prices might return to this level.
4	Davis, M. A., van Nieuwerburgh, S.	2014	x		x	Housing, Finance and the Macroeconomy	What has been studied so far and what is well understood by economists in the realm of interconnections among macroeconomics, finance, and housing?	The U.S.	While research on the interconnections among housing, finance, and macroeconomics has advanced, many challenges remain, particularly relating to the origins of housing booms and busts, for example. A recommended future focus would be on the role played by housing in financial crises.
5	Crowe, C., Dell'Ariccia, G., Igan, D., Rabanal, P.	2013	x			How to deal with real estate booms: Lessons from country experiences	1) "What kind of indicators should trigger policy interventions to stop or slow a real estate boom?" 2) "Assuming policymakers were fairly certain that an intervention was warranted, what policy tools would be at their disposal?" 3) What are their impacts? 4)"What are their negative side effects and limitations? What practical issues (including political economy considerations) would limit their use?"	Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the U.K., the U.S.	1) Policy options (macroprudential measures) should be accommodated depending "on specific circumstances in different locations at different times". 2) However, measures may not always be effective (e.g., "under lax monetary policy stance and pressure from external demand"). In summary, they find some core principles that should apply: a) "Recognize imbalances that do not necessarily show up in traditional measures", b) consider local housing market features, c) "minimize distortions due to special treatment of housing and homeownership", and d) "strengthen the supply side response to mitigate the impact of demand shocks".

6	Nguyen, Q. H.	2013	x			Housing investment: What makes it so volatile? Theory and evidence from OECD countries	How can mortgage market liberalization introduce greater volatility in the housing market?	17 OECD countries	Stylized empirical facts: real housing prices are significantly procyclical with real GDP, housing investment co-moving with non-housing investment and output in most OECD countries, housing investment however with significantly higher standard deviation, especially in those with liberalized mortgage markets, and higher cross-country variation. In the DSGE model, this is attributed to, among others, including a housing collateral constraint, and creating a link between the housing market and borrowing capacity.
7	Pan, H., Wang, C.	2013		x		House prices, bank instability, and economic growth: Evidence from the threshold model	Do house prices affect the stability of banks under different income growth levels, and, if so, how?	286 U.S. Metropolitan Statistical Areas (MSAs)	Two income growth thresholds for changes in the house price index, one when using house price deviations from fundamental values. Supporting findings of both collateral value and deviation hypotheses. No long-run relationship found in non-MSA sample-based robustness checks.

8	Bordo, M. D., Landon-Lane, J.	2013	x			What explains house price booms? History and empirical evidence	Do expansionary monetary policy, low inflation, and/or bank credit expansion lead to house price booms?	11 OECD countries	The history of house price booms displays evidence of a connection with monetary expansion, albeit with notable variations among countries. The PVAR showed that all three explanations for booms have merit (i. e., loose monetary policy, low inflation, and easy bank credit). The majority of forecast error variance, however, is attributable to "other" shocks that refer to financial innovation or the impact of the shadow banking system, for example.
9	Brueckner, J. K., Calem, P. S., Nakamura, L. I.	2012			x	Subprime mortgages and the housing bubble	What is the connection between house price expectations of mortgage lenders and the extent of subprime lending?	The U.S.	1) Evidence for a connection between "house price expectations of mortgage lenders and the extent of subprime lending." 2) Borrower riskiness rises when past price appreciation (as a proxy for expectations) becomes more favorable.
10	Campbell, J.Y.	2012	x	x		Mortgage Market Design	What explains "causes and consequences of cross-country variation in mortgage market structure" (with focus on urban economics, asset pricing, behavioral finance, financial intermediation, and macroeconomics)?	Euro area, the U.S., Japan and Australia, Singapore, Russia, Chile	1) Unregulated systems may lead to inefficiencies, e. g., "negative externalities from foreclosures, financial system instability, and high costs for unsophisticated borrowers", 2) mortgage market design should be more flexible and ad hoc-oriented, and should apply "lessons learned" from other countries such as Denmark (e. g., implementation of European covered bonds) (inter alia).

11	Agnello, L., Schuknecht, L.	2011	x			Booms and busts in housing markets: Determinants and implications	What are the characteristics and determinants that drive boom and bust cycles in housing markets (housing prices)?	Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the U.K., the U.S.	1) Analyzing eighteen industrialized countries (over the 1980–2007 period), one finding is that the recent housing boom "has been the longest in the past four decades". 2) Domestic credit and interest rates are the main drivers of "the probability of booms and busts". 3) Liquidity in the markets also influences the "occurrence of housing booms", especially in "conjunction with banking crises for busts" (inter alia).
12	Dam, N. A., Hvolbol, T. S., Pedersen, E. H., Sorensen, P. B., Thamsborg, S. H.	2011	x		x	The Housing Bubble that Burst: Can House Prices be Explained? And Can Their Fluctuations be Dampened?	1) What factors drive house prices? 2) Explanation of fluctuations in owner-occupied housing and how they can be curbed	Denmark	Housing market boom in Denmark in the last decade was largely driven by the 1) introduction of new financing instruments in housing finance and 2) by the "nominal freeze on the property value tax" (to some extent).
13	Scanlon, K., Lunde, J., Whitehead, C.	2011	x		x	Responding to the Housing and Financial Crises: Mortgage Lending, Mortgage Products and Government Policies	How did mortgage markets and stakeholders, particularly governments, respond to the challenges presented by the financial and housing market crisis?	16 industrialized OECD countries	Problems in the housing market are related more to how creditworthiness was assessed than with innovative mortgage market products. Government programs focused mainly on reducing monthly payments through lower interest rates, longer mortgage terms, and deferred payments. There was a limited practical effect of these programs, partly due to lower than expected demand.

14	Koetter, M., Pophosyan, T.	2010		x		Real estate prices and bank stability	Influence of house price deviations and nominal house price developments on bank stability	Germany	Collateral value hypothesis: Nominal house price developments do not influence banking instability; Deviation hypothesis: Deviations in house prices contribute to bank instability.
15	Duca, J. V., Muellbauer, J., Murphy, A.	2010	x			Housing markets and the financial crisis of 2007–2009: Lessons for the future	What drove the housing and financial crisis in 2007–2009, and what important lessons can be drawn for the future?	Europe, the U.S., and Japan	1) Financial innovation, misaligned incentives, and duration positions must be critically evaluated, 2) importance of financial liberalization, 3) spillover effects of housing market instability to other countries, 4) importance of prudential, forward-looking regulation.
16	Muller, A., Almy, R., Engelschalk, M.	2010	x			Real Estate Bubbles and the Economic Crises: The Role of Credit Standards and the Impact of Tax Policy	1) What are the main conclusions regarding the drivers of real estate price bubbles? 2) What were the differences among real estate bubbles in 2008 in the U.S., Denmark, and Germany? 3) What problems can real estate bubbles create for local governments?	OECD, with a focus on the U.S., Denmark, and Germany	1) Deregulation was a main driver of the instability in Denmark's housing market (inter alia). 2) Germany has a stable housing market because of its balance between homeowners and tenants, "negative population growth and slow growth of effective per capita income", and relative high mortgage interest rates (inter alia). 3) Insufficient creditworthiness, a high loan-to-value ratio, and very low mortgage interest rates were the reasons for the U.S. housing price bubble (inter alia).

Notes: This table provides an overview of recent and relevant literature in the context of housing markets and global real estate markets, savings and loan contracts, mortgage finance markets and their institutional settings, influence of housing markets on stability of financial markets and financial industry, housing markets, and financial crises. YEAR = year of publication, REGIONAL FOCUS = focus of empirical research and consistency of dataset, RESEARCH LINK = link to other relevant research in this table. Listing in chronological order.

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