

**Sustainable mortgage
funding markets for
sustainable housing markets**

Author: Prof. Dr.rer.pol. Stefan Kofner, MCIH

TRAWOS: Institut for Transformation,
Housing and Social Spatial Development

For the European Network of Housing Research
International Housing Conference, Toulouse, France
5th July

Prepared for the Plenary session 3: Legal and financial instruments for safeguarding sustainable communities

Contents

- 1 A brief outline 3**

- 2 Types of mortgage credit funding instruments 4**
 - 2.1 *Classical refinancing means* 5
 - 2.2 *Asset sale* 5
 - 2.3 *Risk transfer* 8
 - 2.4 *Mortgage-specific and non-specific instruments* 9

- 3 The housing cycle..... 10**
 - 3.1 *Definition and evidence of the housing cycle*..... 10
 - 3.2 *Theories of the housing cycle*..... 15
 - 3.2.1 *Initial overshooting of house prices* 16
 - 3.2.2 *The pig cycle* 18
 - 3.2.3 *The Kuznets cycle* 20
 - 3.2.4 *The credit cycle* 21
 - 3.2.5 *Review of the last U.S. housing and credit cycle* 22
 - 3.3 *Effects of system-inherent factors on the housing cycle*..... 25
 - 3.4 *The role of interest rates*..... 27
 - 3.5 *Why moderate housing cycles?*..... 28

- 4 Sustainable mortgage funding 30**
 - 4.1 *Towards a definition of a sustainable mortgage funding instrument*..... 30
 - 4.2 *Development of funding sources during the financial crisis*..... 32
 - 4.3 *The downfall of mortgage credit securitization* 36
 - 4.4 *Diversification of the funding mix*..... 38
 - 4.5 *Maturity transformation or obedience to the golden rule of accounting?* 39
 - 4.6 *Towards a methodology of assessing sustainability* 41

- 5 Conclusions 42**

- 6 Sources..... 43**

1 A brief outline

“A high-quality and progressive land culture necessarily requires an abundant and steady inflow of productive capital, it is simply impossible without this. ...

We have no better means to set in motion the existing capital, the entrepreneurial spirit and the manpower, as the real credit.”¹

Source: Rudolf Eberstadt: Handbuch des Wohnungswesens, Jena: Gustav Fischer, 2. Auflage 1910, S. 295.

The aim of this paper is to develop criteria to assess the available refinancing instruments for mortgage credit according to their sustainability. The concept of sustainability is applied to mortgage funding instruments and focuses on the continuous availability of the instrument at affordable interest rates in all phases of the housing cycle. In other words the term sustainability - as used here - is a matter of robustness in the face of market volatility.

The research question of the paper is deemed to be important because availability and price of refinancing funds are of important for a steady access of borrowers to mortgage credit, a steady development of primary mortgage rates and hence a steady flow of housing investment. Non-sustainable refinancing sources tend to accelerate the cyclical ups and downs of housing markets. A non-sustainable funding instrument will be in ample supply when the market is booming. Conversely, if the market is falling in terms of turnover, prices and the like, a non-sustainable source can almost dry out and thus accelerate the downward tendency of the market by restraining the supply of primary mortgage credit at an inopportune time.

The availability of a sustainable refinancing instrument on the other hand will develop along a more stable path and accelerating effects will be limited. Since the welfare effects of regulatory intervention are not obvious, possible reasons for the moderation of housing cycles will be discussed.

In the paper a definition of the housing cycle will be given based on empirical observation of relevant variables. Business cycle theories will be analyzed according to their explanatory value for housing cycles. In this context the role of development time lags, the availability of funding for mortgage credit and of other factors inherent in the housing system (e.g. appraisal

¹ The quote in German original: „Eine hochstehende und fortschreitende Bodenkultur bedarf unbedingt eines reichlichen und stetigen Zustroms von Produktivkapital; sie ist ohne diesen schlechthin unmöglich. ... Wir haben kaum ein besseres Mittel, um das vorhandene Kapital, den Unternehmungsgeist, die Arbeitskraft in Bewegung zu setzen, als den Realkredit.“

and innovative loan characteristics) with a pro-cyclical potential is discussed. It is assumed that a high degree of market volatility is accompanied by net welfare losses.

This exploratory research paper shall contribute to our understanding of housing market cycles and bubbles and their relation with primary and secondary mortgage markets. It can help to determine the research design and data collection method for future research projects in this field.

2 Types of mortgage credit funding instruments

Figure 1 shows in addition to the traditional funding instruments (such as mortgage bonds, deposits), the various instruments for the transfer of credits or credit risks to the capital market. The fundamental difference between the traditional and the innovative funding instrument is their impact on the balance sheet and on the risk position of the originator of the mortgage loans. It is questionable to label the sale of a mortgage credit pool as refinancing because in that case the assets are moved to independent investment vehicles, called “Special Purpose Vehicles” (SPV). To be precise, we can say that the loan purchase of the SPV has to be refinanced.

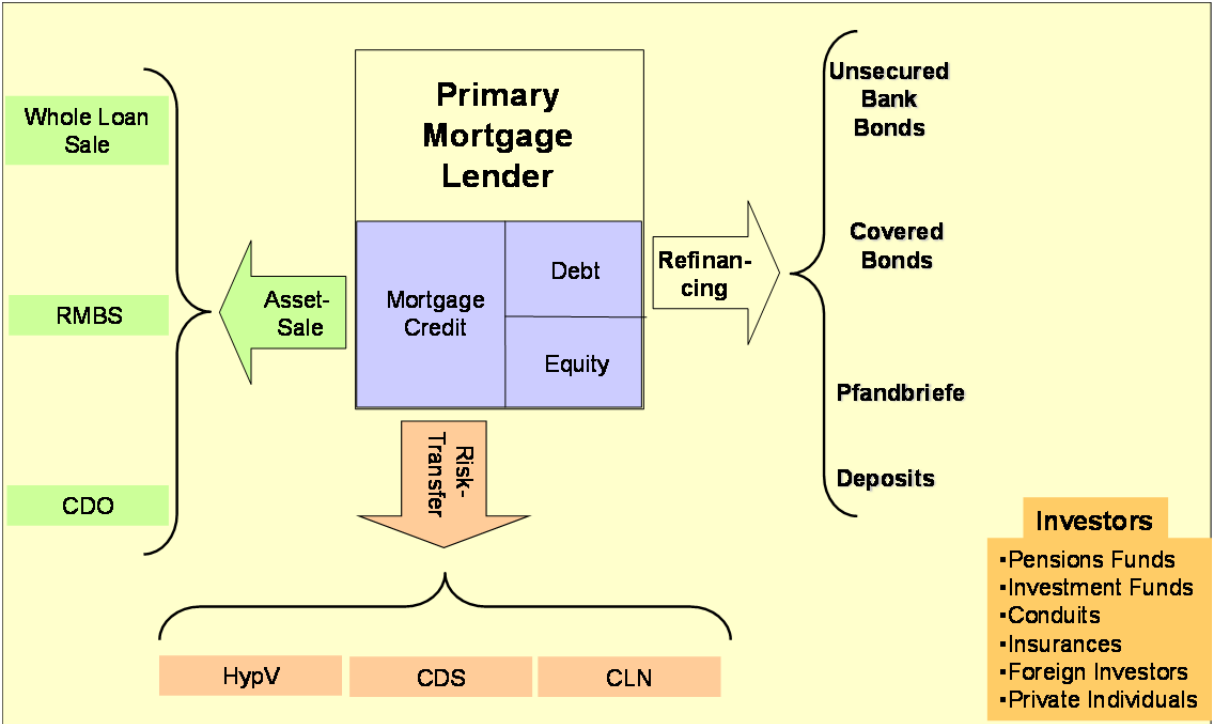


Figure 1: Mortgage credit funding and risk transfer instruments

2.1 Classical refinancing means

In the classic mortgage refinance mortgage loans remain on the balance sheet of their originator and the corresponding refinancing means are to be found on the liabilities side of the originator's balance sheet. Part of their primary credit market loans made banks refinance via customer deposits, and yet another part by the issuance of bank bonds or covered bonds, rotating at the secondary market afterwards. That is where supply of and demand for long-term financing meet. An efficient secondary market facilitates the financing of long-term investments extraordinary, because it combines the interest of credit institutions in long-term funding sources with the investors' preference for liquid investments.

The most important types of funding means for mortgage credit are:

- Credit facilities from other banks
- Unsecured bank bonds
- Covered bonds
- Deposits

Retail deposits are pre-dominant in Europe with an estimated 2/3 of Europe's mortgages funded through deposits.

Covered bonds are debt instruments secured by a cover pool of mortgage loans (property as collateral) or public-sector debt to which investors have a preferential claim in the event of default. They account for around 15-20 per cent of mortgage funding in Europe.

Mortgage Pfandbriefe are a the German version of the covered bonds model. They represent an important funding tool for residential mortgage loans in Germany. The Pfandbrief is subject to dense regulation (Kofner 2009, p. 9-18). The outstanding bonds have to be covered by pools of eligible collateral assets. Only commercial or residential mortgage loans, ship or aircraft loans and public sector loans qualify as cover assets. The holders of the bonds have a dual claim: one against the issuer, and the other against the cover pool. The Pfandbrief as a particularly fail-safe bond type is subject to additional and special regulation to minimize asset-related risks in the cover pool (e.g. worsened creditworthiness or fallen asset prices). Only mortgages that meet certain minimum requirements may be used as cover for Mortgage Pfandbriefe.

For financing owner occupied residential properties also Bauspar loans are often used in addition to mortgage loans. The funding of Bauspar-loans is a matter of the Bauspar collective and thus largely independent of capital market developments.

2.2 Asset sale

Unlike a traditional refinancing in the event of an asset sale the mortgage are taken away from the balance sheet and the bank receives the proceeds from the sale. Thus the selling bank re-

ceives liquidity and sets free capital for new business, which must be held no longer for the loans sold.

The asset sale may be made in the form of a securitization or a whole loan sale. A *whole loan sale* is a complete sale of the assets included without a subsequent securitization. The loans can be sold to another bank where they fit better into the loan portfolio or to a specialized credit recycler like the Lone Star group from Texas.

Mortgage Backed Securities are debt securities issued off-balance sheet. This system is particularly prevalent in the U.S. In Europe it accounts for around 5 per cent of mortgage funding at present. In a securitization transaction, future cash flows are converted into tradable securities that are sold to investors.

The bank that has granted the loans originally (also called the “Originator”) sells the loans to Special Purpose Vehicle (SPV), (a unit specially established for the acquisition). The SPV refinances the acquisition of the mortgages by issuing bonds at the capital market. The bonds “covered” by the outsourced mortgages are called “Mortgage-Backed Securities” (MBS) or “Residential Mortgage Backed Securities” (RMBS).² The SPV finally holds the purchased loans on the asset side of its balance sheet and the outstanding MBS on the liabilities side.

² Bonds backed by assets other than mortgages (for example, by leasing or credit card receivables) are called “Asset-Backed Securities” (ABS).

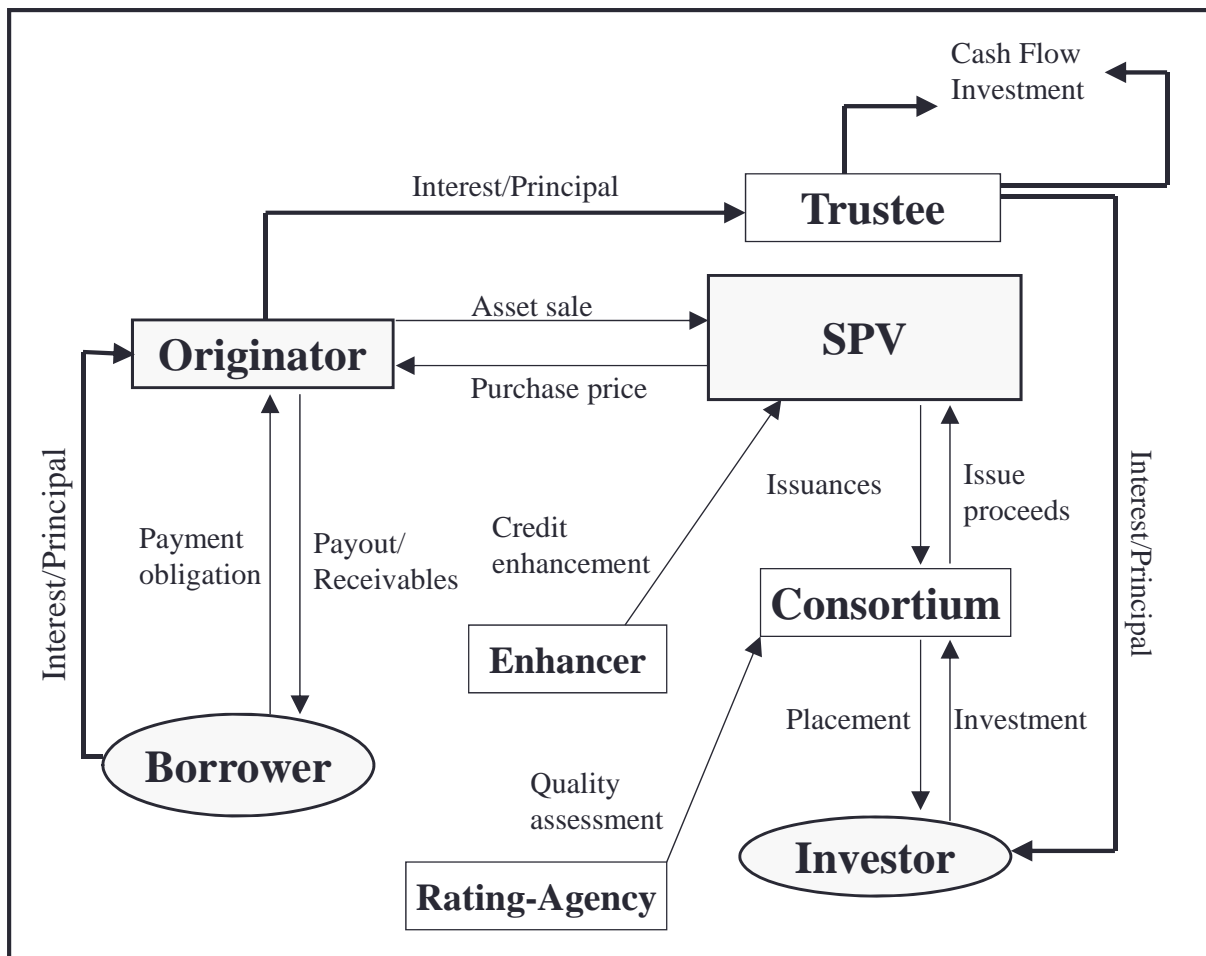


Figure 2: Structure of an MBS transaction

This means that the bank that had issued the loan initially, is released from the risk. It is not liable to the purchasers of the MBS issued by the SPV. The safety of the claims of the MBS creditors now depends primarily on the development of interest and principal payments from the “underlying” mortgages and no longer on the creditworthiness of the originator. If it comes to unplanned payment defaults, the value of the MBS bonds is directly affected. In contrast, the claims of creditors of ordinary bank bonds are only at risk if the entire bank should become insolvent. To improve the risk position of the MBS, however, creditors are usually protected by additional guarantees (so-called “credit enhancements”).

The role of the rating agencies in such a securitization transaction is, among other things, to evaluate the MBS securities to determine a fair purchase price. For this purpose they estimate the default probabilities of the underlying loans, depending on the creditworthiness of borrowers and the value of the collateral objects (that is financed homes) using statistical methods based on historical data.³

³ For an introduction to the methods used and its pitfalls see Münchau 2008, pp. 137-149.

For the securitization of loans, financial markets have developed different forms. Compared with the RMBS is the so-called “Collateralized Debt Obligations” (CDOs) are backed by a broader range of assets – e.g. housing credit, credit card receivables, MBS or other CDOs. The CDOs thus offer investors a broader risk diversification. They are, however, so complex that an ordinary investor cannot cope with the risk assessment.

2.3 Risk transfer

Credit risk can be transferred without selling or securitizing the credit. For this purpose three financial instruments are at hand:

- Mortgage insurance,
- Credit default swaps (CDS) and
- Credit linked notes (CLN).

Independent of the chosen risk transfer instrument the loans remain on the balance sheet of the originator. If certain contractually defined credit events occur (for example the insolvency of a debtor), then the lender or insurance holder receives compensation payments from the insurers.

The classic form of risk transfer is the private mortgage insurance (see Kofner 2007 for details). The primary mortgage insurance protects the lender against the risk of losses from the liquidation of distressed mortgages. It is underwritten by the borrower in favor of the lender. The mortgage insurance is an additional protection in particular suitable for loans beyond the conventional loan limits. U.S. type mortgage insurance companies are hindered because of their strict regulation and supervision to offer cheap rate insurance coverage. Their premiums are calculated based on sound actuarial principles and the law forces them to hold reserves for bad times. For the lender it is thus a sustainable type of credit risk transfer.

In the years before the outbreak of the crisis the coverage of the default risk of loans with the help of credit default swaps (CDS) became more and more popular. CDS are a kind of tradable credit hedges. With the help of a CDS contract, the risk of default of a loan is transferred to a third party (“Insurer” or “risk taker”) for a limited period. The risk taker in turn receives an insurance premium. In case the contractually defined credit event occurs the insured party receives the agreed compensation. Because of their tradability CDS are a liquid asset class in normal times. Because of this property, CDS can also be used for speculative investments. With the help of CDS contracts speculators can place bets that the market assesses certain default risks too high or too low.

The underwriters of the risks at the CDS market are usually no insurances, but hedge funds, investment banks or others. These investors often lack experience in the management of credit risks and earmarked reserves for bad times. In the event of an unexpected accumulation of loan defaults such quasi-insurers may become insolvent. Moreover the volume of circulating

CDS contracts exceeds the volume of the underlying credit engagements by many times. From the close integration of market participants counterparty risks result which are difficult to assess. If CDS insurers become insolvent, the policyholders are also affected. They are then left without protection and may need to write-off their credit exposures.

A variant of the CDS, are Credit Linked Notes (CLN). CLN are covered bonds with an insurance element. If the pool of cover loans makes losses above a certain threshold, the bondholders have to forgo part of their capital. CLN are used by mortgage lenders not primarily interested in funding but in risk transfer. The lender does not sell loans to the Special Purpose Vehicle, but buys insurance from it. This is also known as “synthetic” securitization (see Report of the Mortgage Funding Expert Group 2006, p. 48).

2.4 Mortgage-specific and non-specific instruments

Of great importance in our context is the extent to which a refinancing instrument defines minimum requirements relating to the mortgages to be refinanced. Such requirements can pertain to

- the length of fixed-rate periods (“congruent coverage”),
- the level of interest rates (not lower than those of the funding means),
- the determination of the mortgage lending value,
- minimum LTV,
- insolvency privilege of investors relating to the mortgages in a cover pool in case of an issuer insolvency,
- supervision intensity,
- minimum credit scores of borrowers,
- need for additional safeguards, e.g. in case of a LTV ratio above 80 per cent of the mortgage lending value.

The instruments can be classified according to the intensity of such requirements. There are *non-specific* refinancing means such as deposits and unsecured bank bonds. On the other hand we have covered bonds which have a direct impact on the quality and quantity of the related cover loans. Even securitization transactions often define criteria with respect to the mortgages to be securitized. Then loan purchase criteria of Fannie Mae and Freddie Mac are a case in point. In private securitization we have a higher degree of flexibility, but the characteristics of the loans have an effect upon the rating of the issuance. To give an example, a higher share of subprime mortgages in a credit pool will result in a lower rating, a lower price of the issuance and finally in higher interest rates at the primary mortgage market.

Regarding the *non-specific instruments* (deposits, unsecured bank bonds) one might be inclined at first sight to assume that they are neutral in terms of the quality of the loans refinanced. However, the possibility of sanctioning behavior of investors in the event of deteriorating creditworthiness of the issuer needs to be taken into account. One might even say that

the quality of the loan portfolio is a critical parameter for the funding conditions of a bank. In that regard, it is doubtful whether efficiently working markets could be improved by introducing covered bonds. If they do not work efficiently, covered bonds have characteristics of a public good.

3 The housing cycle

3.1 Definition and evidence of the housing cycle

It is not easy to define the housing cycle. Real estate cycles are marked by similar cyclical developments of certain time series variables like building permits, building completions, real estate prices, default rates of mortgage borrowers, real estate investment and sales activities, vacancy rates, volume of newly granted mortgage loans and so forth around a long-term trend. In practice the focus is often limited to price variations. That focus does seem to be in line with the observation that comovements between major Euro area countries in the housing sector are much weaker for prices than for real variables like housing starts (Alvarez et al. 2009).

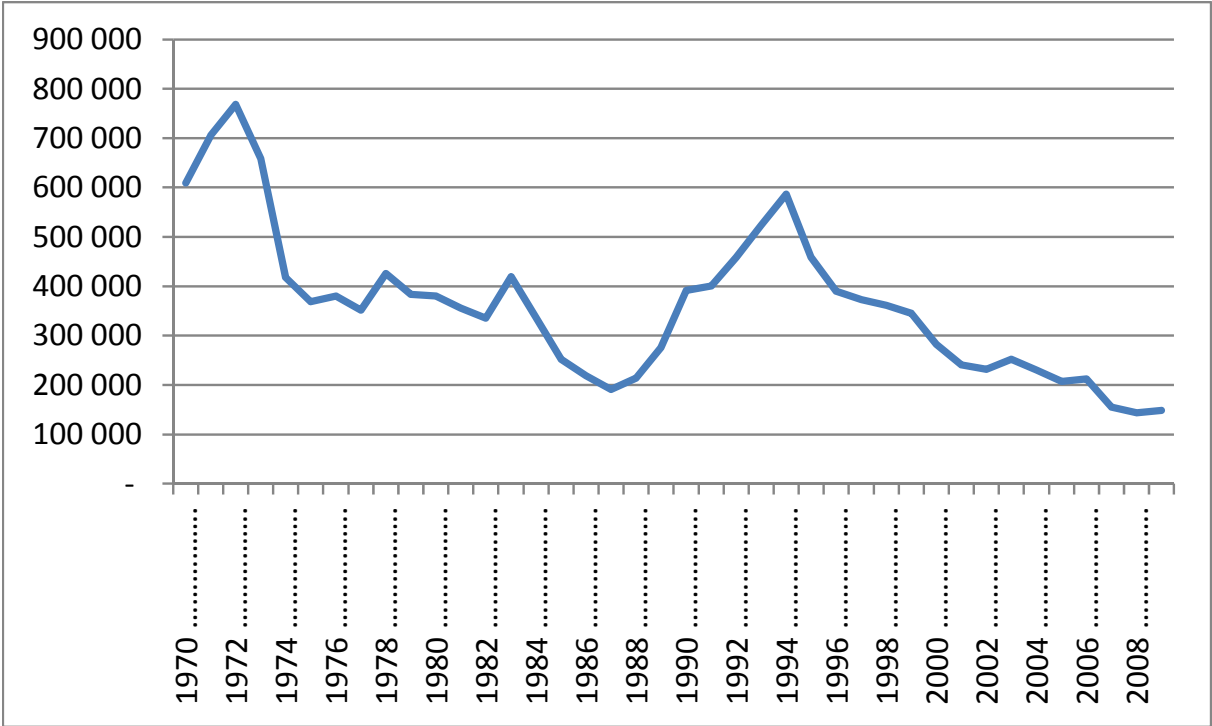
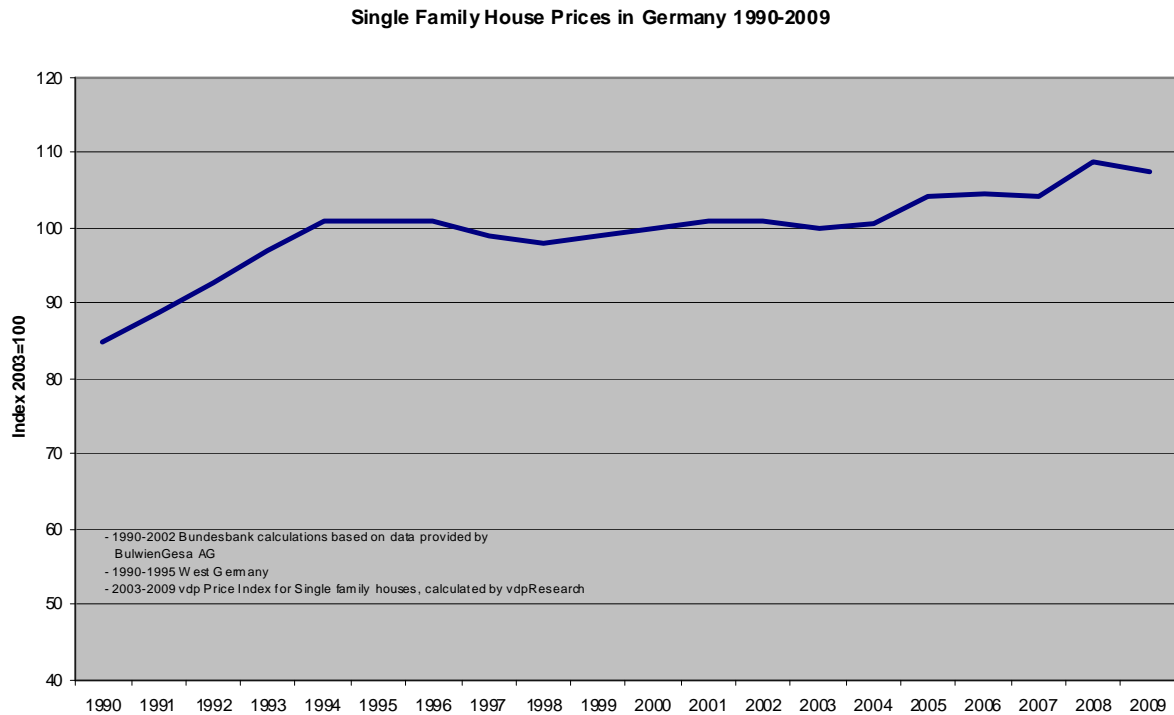


Figure 3: Building permits for dwellings in residential and non-residential construction Former federal territory (from the year 2005 without West Berlin)



Sources: Deutsche Bundesbank 2008, vdp 2010a

Figure 4: Single Family House Prices in Germany

Another problem is the differentiation between cycles and bubbles. The term “bubble” is obviously inconsistent with the concept of efficient markets. What kind of *inefficiencies* are prevailing at the housing market? These include

- externalities of land use,
- difficult market access for specific groups,
- imperfect allocation of housing stock to tenants,
- merit good characteristics,
- special features of the investment decision,
- high transaction costs,
- frictions in price formation,
- cyclical fluctuations in housing markets (between housing shortage and excess supply),
- high degree of market intervention.

Among these features the special features of the housing investment decision are of crucial importance. A real estate investment requires a binding commitment to the location without a possibility of interregional balancing out of capacities and a high initial capital commitment. Also because of the long life cycles of buildings the capital invested will usually amortize slowly. The resulting long term capital commitment creates financial risks, i.e. interest rate

and loan extension risk. All in all the risk of making a bad investment is surely not negligible in housing. Investors will tend to take a wait and see attitude. They will tend to delay their investment in case of rising uncertainty about input variables like rent or interest rate.

A *housing bubble* is characterized by house prices reaching a temporary and unsustainable peak in time because of the irrational behavior of many market participants. The irrational element is a fundamentally unfounded expectation of rising house prices and rents in the future. In the formation phase of a bubble the expectation of future capital gains becomes ever more important for the expected income of the investment. For the definition of a bubble it is important that the only “rational” explanation for the rising values is the common expectation of rising values.⁴ It is basically a phenomenon of social psychology, a kind of collective suggestion. According to the definition given the possibility of a house price bubble is culturally bound. If people regard the investment in their home as once in a lifetime decision and do not even monitor current market prices, they will not take part in any bubble hysteria.

And how about the relationship between housing bubbles and housing cycles? This issue affects our definition of a bubble. The crucial question is if speculative bubbles are independent or just amplifiers of cycles. In that sense the bubble would be a normal cyclical phenomenon – an exaggerated cycle.

⁴ Case / Shiller (2004, p. 299) have put it like that: “We believe that in its widespread use the term refers to a situation in which excessive public expectations of future price increases cause prices to be temporarily elevated.”

Country	1970-1999	2000-2006	Country	1970-1999	2000-2006
U.S.	0.012	0.055	Netherlands	0.023	0.027
Japan	0.010	-0.045	Belgium	0.019	0.064
Germany	0.001	-0.029	Sweden	-0.002	0.059
France	0.010	0.075	Switzerland	0.000	0.019
Great Britain	0.022	0.068	Denmark	0.011	0.065
Italy	0.012	0.051	Norway	0.012	0.047
Canada	0.013	0.060	Finland	0.009	0.040
Spain	0.019	0.081	NewZealand	0.014	0.080
Australia	0.015	0.065	Ireland	0.022	0.059
Average	1970-1999	0.012			
	2000-2006	0.046			

Average Annual Real Price Growth by OECD Country

Source: Hurst 2009

A closer look at historic real house price growth for a set of OECD countries reveals important differences in house price dynamics. First of all, we can state that between 1970 and 2006 real house prices substantially grew on average. Secondly, the average real growth rate of house prices was substantially higher in the years before the bubble burst: 4.6 per cent for the years between 2000 and 2006 as compared to 1.2 per cent between 1970 and 1999.

Furthermore, it stands out that there is a strong correlation between house price dynamics before and after 2000. There are countries like Britain which experienced above average real house price growth in both periods, countries like Germany which underperformed both times and countries like Norway which developed like the average. Whilst it happened in some cases that growth rates as compared with the average accelerated (France, Canada) or decelerated (Japan) a reversal of the trend (Netherlands, Sweden) was an exception.

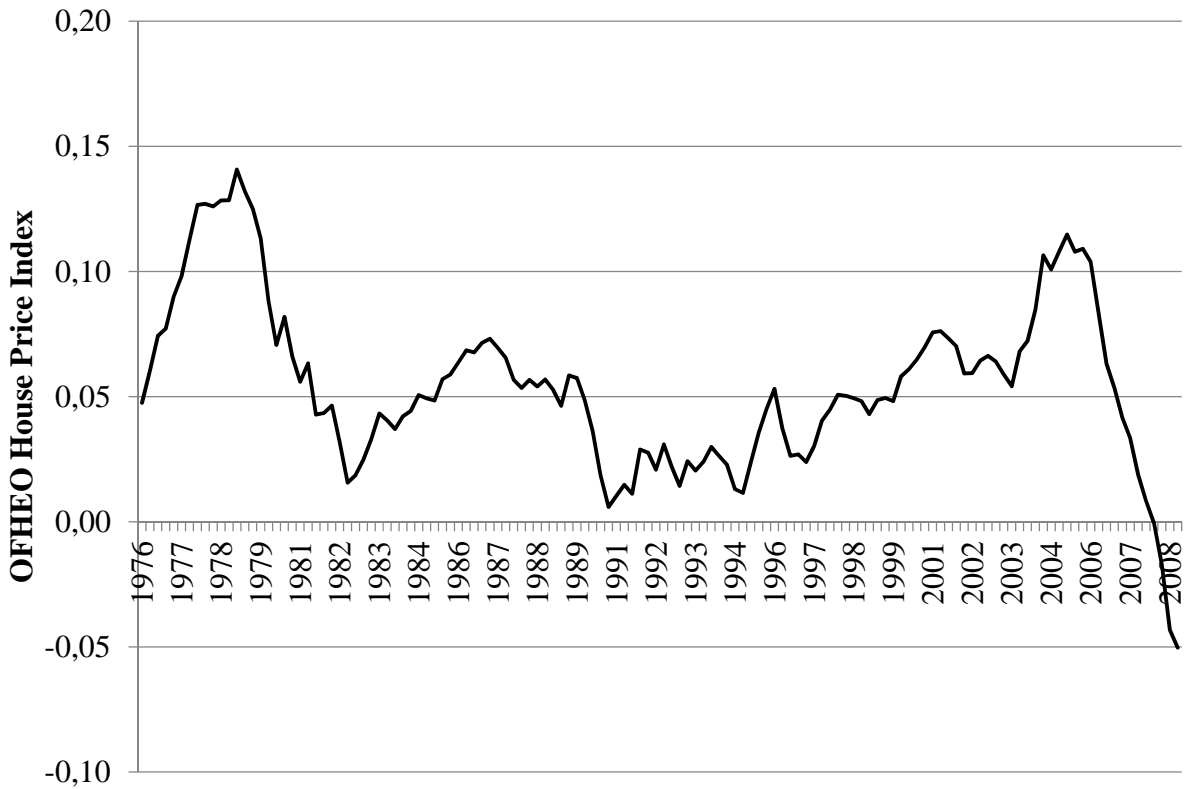


Figure 5: U.S. Nominal House Price Appreciation 1976-2008 (OFHEO Data)

There is strong empirical evidence for the U.S. and other countries that “persistent housing price increases are always followed by persistent housing price declines” (Hurst and Guerrieri 2009). The two authors have analyzed statistics of U.S. metropolitan areas between 1980 and 2000 and found out that the average price increase over boom (consecutive periods of price increases) was 55 per cent. The average price decline during the subsequent bust (the following period of price declines) was 30 per cent in that period – the average length of a bust being 7 years. Using historical data (Country, State, Metropolitan Area) they have estimated that a 100 per cent increase in house prices is usually followed by periods of 50-60 per cent declines.

Real House Price Growth Italy - UK - Japan: 1978 - 2006

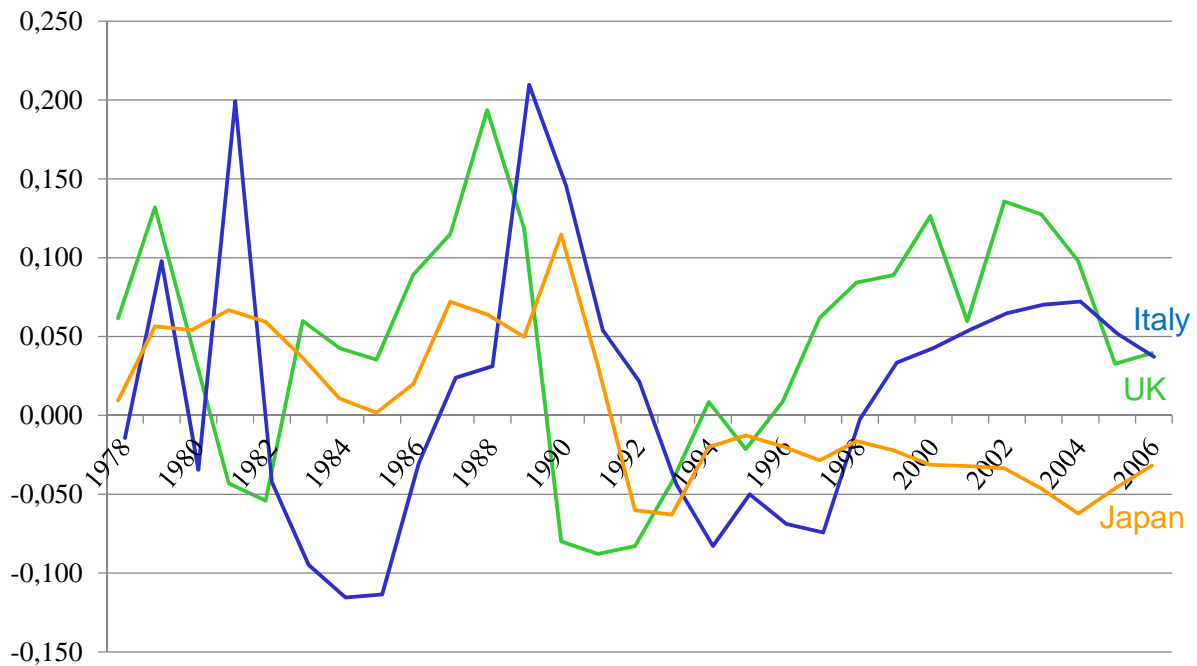


Figure 6: Real house price growth Italy – UK – Japan

3.2 Theories of the housing cycle

The research on housing cycles is focused on the search for correlations between aggregates whilst the theoretical foundation still has some weaknesses. Research interest centered around the wealth effects of house prices and the resilience of housing markets against macroeconomic shocks. The housing markets were mostly regarded as being largely dependent on the general business cycle and not as independent sources of instability.

After the recent experience of a worldwide financial crisis with origins deeply rooted in the housing and related mortgage markets this “dependent” view of the housing sector must be challenged. The relationship between cause and effect may be much more complex than we thought. The naïve concept of a “non-housing sector” responsible for cyclical swings and periodical bubbles and a housing sector as a kind of restrainer or accelerator of those (being more or less resilient depending on culture and institutional setting) could be more than an over-simplification.⁵ Maybe the earth orbits around the sun. Could it be that those fascinating cycles and bubbles at least partially *originate* from the markets for long-term real assets including the housing market? If that were true, we should try to find the explanations for the

⁵ The older literature on the modeling of residential investment takes the overall business cycle as given and explores the effects of income and interest rates on residential investment. It is admitted that residential investment is an important channel through which monetary policy affects the economy, but somehow this revelation did not make its way into the mainstream of macro-economics (Leamer 2007, p. 2).

independent (or endogenous) cyclical development of these assets and ask about the resilience the rest of the economy (e.g. labour market regulation and social security nets). As Leamer has put it in 2007 already: “I have not been able to find any macroeconomic textbook that places real estate front and center, where it belongs.”

A common classification of the factors with the potential to invoke real estate cycles is the distinction between “*exogenous*” and “*endogenous*” factors. The endogenous factors for their part are divided into four groups (Rottke 2006, p. 65):

- Time lags
- Information inefficiencies
- Bounded rationality
- Special items

Development time lags can induce the pig cycles known from agricultural markets (see below). Such pig cycles can prevail at any market where supplier’s decisions on quantities to be offered only take effect after a considerable time lag.

A market is information-inefficient if the relevant information for assessment is not fully or incorrectly reflected in prices (Shleifer 2000, p. 1). Non-transparent markets, particularly in the context of asymmetric information in principal-agent relationships (i.e. the presence of less well-informed principals and better-informed agents) are subject to such information-inefficiencies. As a consequence of an asymmetric distribution of information the affected markets may experience cyclical excesses, as price information is distorted and transactions take place on an erroneous basis.

Bounded rationality is basically any deviation from the conception of the homo oeconomicus – the idea of humans being a kind of walking calculators always and everywhere able to define and choose the utility-maximizing alternative. Financial markets can be subject to bounded rationality as well as the markets for real assets. It often takes the form of misguided speculation. People bet on future capital gains without taking notice of fundamental factors. Such behavior, if widely spread as in a stock market mania can result in grossly overpriced assets. The correction will of course follow right on the heels of the exaggeration. In a recession buyers might be reluctant to buy because they think they can get a better deal in the future. The concept of bounded rationality is part of the credit cycle explanation of housing cycles.

3.2.1 Initial overshooting of house prices

Every theory of the housing cycle should start with the special properties of housing supply and demand. Both, supply and demand curves are deemed to be relatively inelastic in the short run. Hence considerable price movements are necessary in the short run to clear the market after an unanticipated increase in demand.

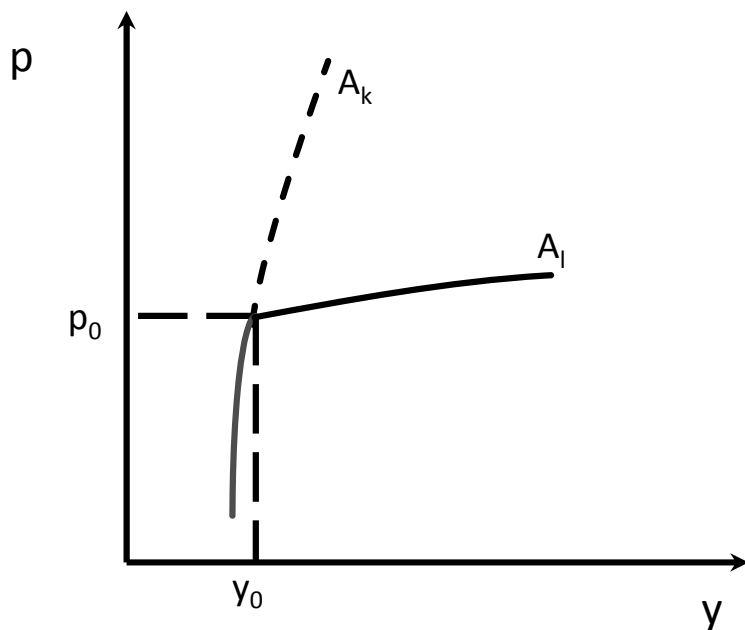


Figure 7: Shape of the supply curve of housing

The shape of the housing supply curve is somewhat special. It has been called a “kinked” supply curve, i.e. we expect an asymmetric reaction depending on the direction of price movements. The reaction on rising prices / rents will be very inelastic in the short run. In the long run, it might be more elastic, however. The reason is the *development time lag*. Investors need considerable amounts of time for planning, building permit proceedings, construction and marketing of their projects. The reaction time can get even longer if government regulation causes development bottlenecks, e.g. a scarcity of housing land.

Under such conditions we would expect an initial overshooting of rents and house prices in case of an unexpected demand shock. From a dynamic point of view development time lags can induce pig cycles after an initial shock.

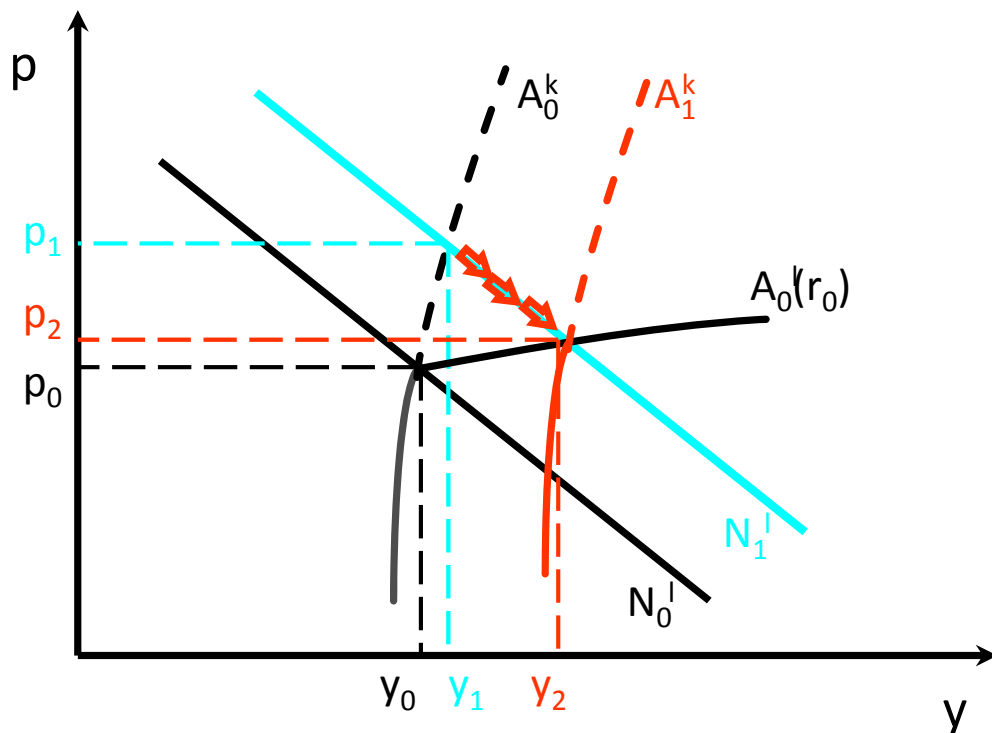


Figure 8: Adjustment after an increase in housing demand

With a kinked supply curve the initial reaction of the market will be a very limited increase in volume and a hefty price increase. In the long run however supply will react more elastic. Step by step the new houses planned immediately after the initial shock will reinforce supply. Hence house prices or rents will gradually decrease.

3.2.2 The pig cycle

So far we have only collected arguments for overshooting prices in case of a shock. We have no explanation yet for cyclical developments in time. Such an explanation might be found by comparing house price cycles with agricultural price cycles and especially with “livestock” cycles.

The reasons for the price cycles in livestock are reaction lags of suppliers. The suppliers are responding to current prices but the effect of their decisions on the market will only realize after considerable time lags. In agricultural markets we have to take into account the “psychological lag” (time required for the realization of changing market situations) and the “biological lag” (time required until market effectiveness of production decisions). Economists use the so-called cobweb theorem to explain dynamic consequences of supply-side delays.

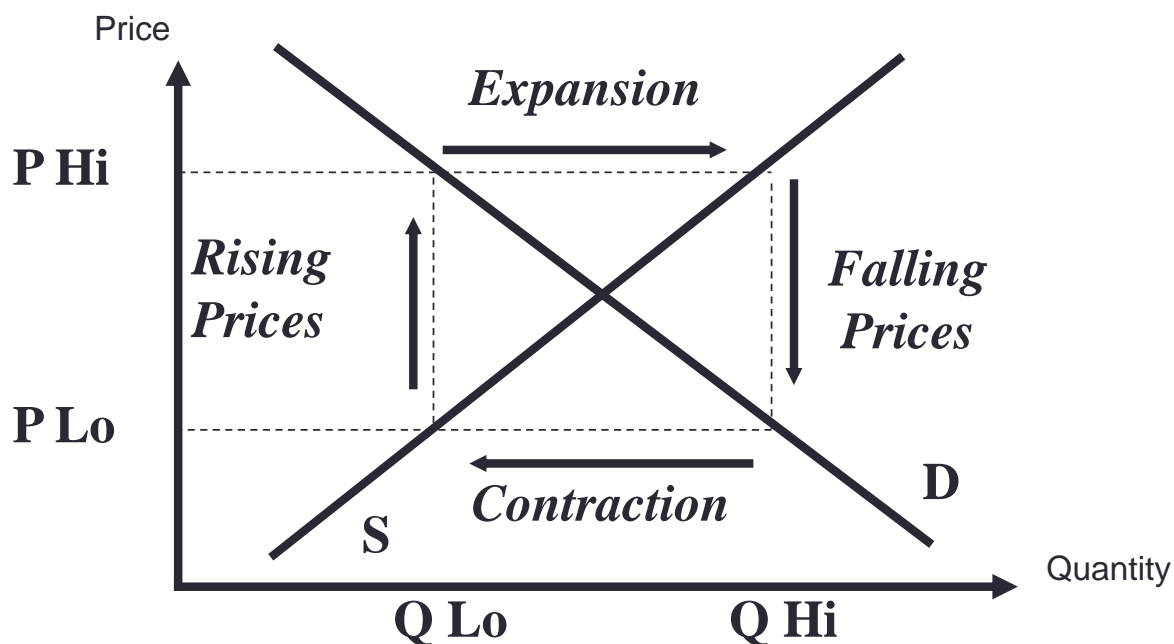


Figure 9: Cobweb model

The model does not allow for the possibility of learning of the suppliers. That might be a realistic assessment, although Hanau recommended in 1928 already:

“The farmer’s calculation of the profitability of pig fattening should not use those pig prices prevailing at the time of stabling or during the fattening period, but the pork prices, which will be achieved after completion of the fattening in case of sale.” (Hanau 1928, p. 33).

The housing market is a market fitting into the assumptions of the cobweb theorem. Convergence or divergence of the model is a question of the relative slopes of the supply and demand curves. If the slopes of supply and demand curve are the same the model produces a continuous oscillation with constant amplitude. If the slope of the demand curve is higher than that of the supply curve, the model will behave convergently. In the other case the amplitude of the cycles will become ever bigger as time goes by.

What interim conclusions can we draw from this? The model can explain dynamic cyclical developments of quantities and prices after an initial shock in the absence of learning of suppliers. After a demand shock an initial overshooting of house prices and rents is to be expected. Although supply will adjust in the long run in a market characterized by development time lags we can expect cyclical repercussions and there is no guarantee that the market will ever regain a stable equilibrium state: “For housing it’s the cycle that is persistent. Once the cycle starts, it keeps on going. Like a pebble thrown into a smooth pond of water.” (Leamer 2007, p. 3).

Also, the housing cycle can extremely differ between regions. Within metro areas there is extreme heterogeneity with respect to housing price changes (Hurst). That is no wonder if we

consider the characteristics of the housing market as compared with markets for livestock. Housing markets are regional markets whereas agricultural markets are spatially integrated. A case in point is the price for pork meat in Germany and Austria.

With a multitude of local or regional housing markets, how can we have a macro-economic housing cycle? Let us imagine that all regional housing markets in a country are initially equilibrated. If an unanticipated wave of immigration hits that country and all immigrants move to a set of boomtowns, the boomtown markets would start to pig-cycle if the assumptions of the cobweb theorem hold. The pig cycles would still be observable on the national level, although weaker.

The problem is that any kind of unanticipated demand shock, be it a cyclical phenomenon or not, can induce a regional pig cycle. It thus seems plausible that market volatility is higher on the regional than on the national level. Markets in different phases of the cycle balance themselves out on the national level.

We are still not able to explain nationwide house cycles with the cobweb theorem. The only possibility to do so would be to identify (unanticipated) factors affecting all or at least many regional housing markets in the same way. Natural candidates would be significant changes in interest rates, migration balance, wages and unemployment rates, national housing market regulation or subsidization. Interest rate changes would be particularly interesting because they tend to behave cyclical themselves.

The problem with this approach is that different types of housing (e.g. apartment complexes and single family homes) may have *different development time lags* and thus different cycles. Also we cannot ignore the possibility of regional differences in development lags. Think about dynamic / apathetic bureaucrats or capacity utilization in the construction industry.

Since other real estate markets share the development time lag and the sensitivity to interest rate changes with the housing market⁶, there is a danger of confusion of cause and effect with respect to the general business cycle. If real estate markets were inherently unstable, the resulting cyclical flow of real estate investment could be one of the major explanatory factors of the general business cycle.

3.2.3 The Kuznets cycle

The Kuznets cycles are long-term (15-25 year) transport and building cycles. They are usually associated with the demand for consumer durable goods and longer-lived capital goods, like houses, factories, office buildings and ships.

This cycle is believed to be caused by demographical factors which cause investment expenditures on housing and other fixed structures to fluctuate. A certain chronology of events is assumed: During economic booms rising wages and other factors create incentives for new family formations. Hence the demand for new housing units will rise which in turn boosts

⁶ Different types of real estate have different cycles reflecting different development lags.

economic output more. Critics have argued however that the Kuznets cycle just represented waves of population and migration.

Kuznets has divided the building cycle into four phases, development, overbuilding, adjustment and acquisition. The key figure in each of the four phases is the relation between housing starts and housing sales. The idea is that new housing development lags home sales is akin to pig cycle mechanism.

In the *development phase* demand picks up and an increase in housing starts follows. This phase is characterized by low vacancy rates and rising rents. It reaches maturity after about 3 to 5 years. A signal of the turning point is the aggressive bidding up of land prices. The following *overbuilding phase* is characterized by the fact that housing starts consistently pace out home sales. In the subsequent *adjustment phase* builders react to the declining demand and curtail housing starts. Finally, in the *acquisition phase* of the cycle housing starts continue to decline while home sales are firm. The building activity is further reduced although vacancy rates have peaked and rent concessions have ceased.

3.2.4 The credit cycle

We need to take into account the possibility of credit-driven price cycles (access to mortgage credit, interest rate cycles). It is unclear however, whether the forces of the credit market are a source of instability of their own, or just an amplifier of the housing cycle. Again, it is not obvious what is cause and what is effect in this respect.

Debt and speculation can play a major role in the business cycle. Debt can feed speculation when lenders are willing to lend more on rising asset prices. This role has been investigated by Irving Fisher, Hyman Minsky, and others. More recently, Cantor and Wenninger analyzed how the credit cycle leads to a “credit crunch”, and how finance and economic activities interact. According to Cantor and Wenninger, the credit cycle process consists of ten steps:⁷

1. Demand for capital assets and investment increases. Possible causes: An “expansionary monetary or fiscal policy,” a “boom in the stock market”, or an “upward shift in inflationary expectations”.
2. Additional investment financed with additional debt. Prices of collateral assets rise. Lenders start to lower credit standards tempted by a false sense of security.
3. Investors start to use riskier financing methods, e.g. higher leverage, maturity mismatch, new debt to pay old interest. Shock vulnerability of the system increases.
4. Expectations about increased profits and rising capital gains shift downward. Possible causes include: a tightening of monetary or fiscal policy to control inflation, external shocks, or an oversupply of assets because of production time lags. Cash flows, profits and asset prices begin to decline.

⁷ Cantor / Wenninger 1993, pp. 31-32.

5. Interests of debtors and lenders diverge because of falling collateral values and deterioration of debtors' ability to repay: borrowers want to refinance short-term debt, but lenders want their money back. The "credit crunch" begins.
6. Borrowers fail to roll over loans. Lenders do not get paid. Financial distress spreads.
7. Assets are sold at distressed values. The number of insolvencies increases. Distress can become contagious. Fight for quality and possibly lender-of-last-resort intervention.
8. Nonperforming loans and related depreciations increase.
9. Highly leveraged banks lose equity capital and regulatory screw tightened. The "credit channel" gets partially or fully blocked. The credit crunch spreads to other sectors of the economy.
10. All "economic units" decrease their spending. The economy slows down.

Houses are one type of the capital assets used as collateral for credit along the credit cycle. The problem with the credit cycle model is that the set of reasons for the initial increase in demand for capital assets seems to be somewhat arbitrarily chosen. It is possible that monetary policy or any other possible cause followed a cyclical pattern in the past, but in the absence of a theory we cannot be sure if the cyclical pattern will reproduce in the future. Also, the reasons given are only loosely connected with the credit and asset markets. And the same goes for the set of reasons given for the failure of capital assets to generate the expected profits. And finally, the distinction between primary and secondary credit markets is not always clear.

The credit cycle is basically not more than a set of stylized developments of certain capital- and asset-market variables during a boom and bust cycle. It is not in my view an explanatory model for general business or real estate cycles. Monetary policy is important as a trigger in so far as it influences the lending activities of the banking sector. One thing is certain, a housing cycle is virtually unthinkable without an accompanying credit cycle. It is therefore worthwhile to analyze the dynamic forces shaping supply and demand for mortgage credit. In this context the liquidity of secondary mortgage markets is presumably a very important supply side factor.

3.2.5 Review of the last U.S. housing and credit cycle

The last boom and bust cycle of the U.S. housing market gave us the chance to study the transmission channels between financial and housing markets. The foundation of the boom which lasted for more than 10 years (the Case Shiller house price index rose every single month for 10.5 years in row – between January 1995 and June 2006) was excess liquidity searching for profitable investment opportunities. Creative investment bankers developed financial innovations like Asset Based Securities (ABS) and Credit Default Swaps (CDS) able to transform mortgage credit risk into tradable securities or swaps. These financial innovations were particularly well suited to securitize risky mortgage loans like credits for borrowers

with a very low credit score. With the new funding instruments in the background it was possible to provide new target groups with mortgage credit, i.e. households who had no access to mortgage credit before. It was possible to continuously relax lending standards and lend to ever more vulnerable borrowers because either the loan itself or the default risk could be transferred to the anonymous capital market. Principal-agent theory is able to explain why the final risk-takers were unable to control quality of the loans to be securitized. The originators used the capital markets as a dump for ever-worsening credit risk.



Figure 10: Causal chain of a housing bubble - Source: Kofner 2008, p. 11

It is no wonder that as long as banks managed to enlarge the target group for mortgage credit in terms of creditworthiness house prices were on the rise. If house prices have risen for a certain period of time expectations about future houses begin to change. The home slowly transforms into a speculative asset. People buy houses chiefly because of the expectation of future capital gains. Investors hasten to jump on the band wagon and banks expectations about the future house price increases begin to rigidify (“adaptive expectations”). If it comes to that point credit decisions more and more neglect personal creditworthiness and bet for continuously rising prices. The risk of further lowering lending standards seems to be limited. De-

mand for financial innovations to get rid of the risks associated with the worsening credit quality goes up and will be met as long as liquidity is ample.

The bursting of credit and price bubble was inevitable, because many among the vulnerable borrowers without sufficient income and reserves were unable to cope with the slightest additional burden. Subprime borrowers are fair-weather borrowers for the most part, who can only sustain at low interest rates and ever rising house prices - and even then only if they do not lose their job or become ill.

The end was in sight - not just the when and the how. The actual occasion then was a real change in the course of U.S. monetary policy. The rate hikes between middle of 2004 and middle of 2006 directly hit the borrowers with variable rate mortgages. Their monthly payments increased significantly. As a result, the most vulnerable subprime borrowers defaulted on their loans. Thus began the phase of correction of previous excesses, which we may designate as a purification crisis. During such a crisis all exaggerations are trimmed back to their normal levels. Also, the behavior of market participants in terms of risk-consciousness should change lastingly.

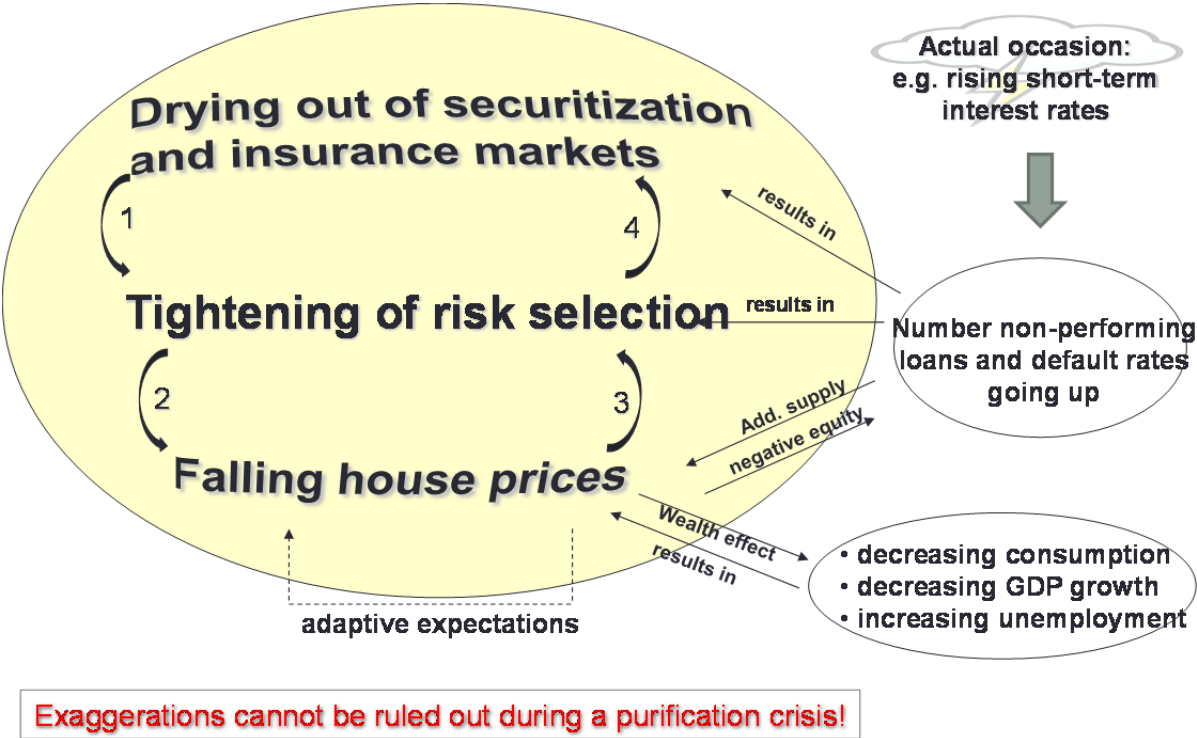


Figure 11: Purification crisis - Source: Kofner 2008, p. 43

During the purification crisis all cause-effect relationships that led to the emergence of the bubble operate in the opposite direction. As with the emergence of the bubble, the effects are mutually reinforcing, and market participants are subject to significant behavioral changes. As during the development of the bubble exaggerations cannot be ruled out in.

When market participants realize that the number of non-performing loans goes up, we can expect that

- Securitization and insurance market especially for bad credit risk dry out.
- Banks tighten their risk selection policies because of the first signs of market instability and the limited possibilities to dump credit risk.
- House prices will start to fall.

A downward spiral can now easily develop: Securitization and insurance market become ever drier, hence lending standards are tightened, hence house prices fall, hence lending standards are tightened and secondary markets get even drier, and so forth. Adaptive expectations of house prices declining ever more make things worse. Also, when house prices fall continuously, more and more borrowers slip into a negative equity position. As a consequence the number of sales and foreclosures will rise further, the extent depending on the institutional design and the behavior of lenders and borrowers. The resilience of the macro-economy can possibly accelerate the downward spiral. The extent depends on the wealth effect of falling house prices, labor market regulation and the social security system. As we have seen, a severe purification crisis at the housing and related credit markets can have devastating contagion effects throughout financial and real markets.

3.3 Effects of system-inherent factors on the housing cycle

A part of the housing cycle could be explained by the *general business cycle* fluctuations. The cyclical fluctuations of GDP, inflation and interest rates presumably have an important influence on housing demand and investment activity. What is more, because of *development time lags* the housing sector is an independent source of economic instability. A change in the national housing market subsidization system can induce housing cycles independent of the general business cycle. And even if the shock event is related to the general business cycle – say falling interest rates – the development time lag shapes the housing cycle in its own way according to the cobweb theorem. Remember that supply side related time lags are irrelevant for many markets other than real estate and agriculture. They might be typical for industrial expansion investments however, especially when investment in additional equipment is accompanied by construction investment.

The *availability of funding* for mortgage credit is probably another causal factor or accelerator of the housing cycle. And last but not least there are certain *factors inherent in the housing system* with a pro-cyclical potential to accelerate or decelerate the cyclical swings of the housing market.

Housing-specific taxation and subsidies are a case in point. If, for example the parliament reduces the depreciation rates for new apartment buildings in a general economic downturn the negative impact on housing investment activity will reinforce the downward tendencies in

the housing sector as well as in the general economy. A pro-cyclical variation of housing taxation and subsidization would induce a political housing cycle.

The direction of the influence of system-inherent factors like government intervention on the housing cycle is not a law of nature. It is, in fact, shaped by institutional design and changing patterns of human behavior. To give an example, *non-recourse mortgage credit* for homeowners is common in most states of the U.S. but totally uncommon in Germany. These institutional differences shape the development of downward cycles. U.S. homeowners tend to cease payments on their mortgages and abandon their homes in case of negative equity whilst German homeowners use to stick to their mortgages “until their last breath”. Also the U.S. homebuyers might be ready to take higher risks in advance because of the non-recourse characteristic of their loan. Their German counterparts on the other hand might choose to stay tenants or buy a more modest home. Hence, we have an accelerating effect in the U.S. and a neutral one under the German institutional design.

Another case in point is *real estate appraisal*. If valuation methodology stresses current market values it will not impede mortgage lending activities in an upswing. In a downswing market valuation will result in a pronounced need for correction of the over-hyped values.⁸ Conversely, a methodology relying chiefly on substance value or sustainable DCF will result in sensibly higher equity requirements of lenders when house prices rise and thus curb the volume of mortgage credit in a boom phase.

Apart from changing requirements relating to the collateral we need to take the possibility of changes in other loan criteria into account, in particular changes in the requirements relating to the creditworthiness of borrowers. There are clear indications that in the years before the outbreak of the financial crisis the *lending standards* in the U.S. were continuously lowered, hence the rising market share of subprime and Alt-A mortgages. It looks like lending standards are tightened and loosened in a pro-cyclical way in some countries. This is a point to be further investigated.

Another candidate for a cyclical variable is the *loan-to-value ratio* (LTV). It is conceivable that the minimum share of equity capital necessary to get access to a mortgage varies pro-cyclically, too. Last, but not least the *share of mortgages with variable rates* might have an effect on the housing cycle.

Innovative loan characteristics like Interest Only Mortgages, teaser rates, grace periods, „Option Adjustable Rate Mortgages“, Cash-out refinancing and foreign currency loans may also have a pro-cyclical effect. When house prices rise rapidly there is sometimes a tendency on the lender’s side to offer a kind of initial financing which will only be affordable in the long run if conditions like regional houses prices and income of the borrower change for the better.

⁸ And thus more cases of negative equity.

	accelerating	decelerating	neutral	unclear
Taxation and subsidies				X
Share of non-recourse mortgages	U.S.		Germany	
Market-oriented appraisal of collateral	U.S.		Germany	
Cyclical lending standards	U.S.		Germany	
Cyclical LTV requirements	U.S.		Germany	
Share of adjustable rate mortgages	U.S.		Germany	
Share of loans with innovative characteristics	U.S.		Germany	

In principle all system-inherent factors as well as the funding mix for mortgage credit can have an accelerating, a decelerating or a neutral effect on the housing cycle. Also we need to take into consideration the possibility of asymmetries. A factor of accelerating nature in a boom might have a neutral or less decelerating influence during a downturn. To give an example, take the possibility of a changing valuation methodology stressing market value during the boom and long-term DCF in a downward phase. Most factors are presumed to be accelerating or neutral. It would be hard to give an example for a counter-cyclical impact of a factor. Regarding valuation that would mean to have lower property values in a boom than in a downswing.

With the recent experience of a severe mortgage market and financial crisis in our minds the dangers of running a mortgage system with several accelerating factors active at the same time are obvious to everybody. In this context, the potential for mutual reinforcement as between market-oriented appraisal and non-recourse type of mortgages should be taken into account. However, the dangers were not so obvious even for insiders in banks and supervising authorities before the outbreak of the crisis.

3.4 The role of interest rates

A steady flow of mortgage credit at the primary market is a necessary – but not sufficient – prerequisite for a moderate development of the housing cycle. That is because most acquisitions and developments are financed with considerable leverage. Just as important as the continuous access of investors to mortgage credit is the development of interest rates for mortgage credit. The steadier interest rates develop through time, the more moderate the cyclical fluctuations of a housing market will be.

The rate of return on the equity capital to be invested is negatively correlated with the interest rate to be paid for the debt capital involved. If high interest rates prevail, many projects are not regarded as profitable enough and presumably the financial leverage of the projects real-

ized is lower. Low interest rates on the other hand create an incentive for higher loan-to-value ratios and enhance the profitability of all leveraged projects.

Hence *stable interest rates* are a prerequisite for a stable investment flow. Conversely, an unsteady development of interest rates will entail an unsteady flow of investment in housing.

For a steady access to mortgage credit and a steady development of mortgage rates – and hence a steady flow of housing investment – the *continuous availability of refinancing funds* and a *steady level of refinancing rates* are of crucial importance. That is because each mortgage credit granted additionally means a balance sheet extension for the lender because it requires a refinancing transaction, e.g. creation of new credit via bank bonds or bank deposits. To put it in a nutshell: no credit without refinance.

3.5 Why moderate housing cycles?

Our underlying thesis is that a curbed housing cycle is more desirable than a cycle marked by hefty fluctuations. But why should it be desirable to moderate housing cycles? Six different groups of arguments could be relevant in this respect:

- **Allocative efficiency reasons:** The housing sector could attract more than its optimal share of scarce investment capital in case of a housing boom phase or bubble. On the other hand, in case of a purification crisis – after the bubble has burst – it might not be sufficiently equipped with new capital. This argument clearly denies the efficient market hypothesis and allows for overshooting as well as undershooting asset prices and hence for spontaneous deviations from the optimal allocation of real capital between economic sectors and asset classes.
- **Economic growth considerations:** When a house price bubble is developing, the housing sector is taking away scarce capital from other sectors where capital formation might contribute more to the future growth potential of the economy.
- **Distributional arguments:** In an environment with extreme house price fluctuations the timing of consumers' buy and sell decisions becomes critical for the performance of their investment. That is especially a problem in markets without an abundant rental housing market. The consequence will be arbitrary distributional effects between winners and losers. Remember, that most consumers have allocated a very considerable part of their total wealth to their home (the home often being the only considerable asset). Heavy house price fluctuations therefore have a resounding impact on their overall wealth position.⁹ We can expect that in an environment with very volatile house prices the individual level of housing consumption in terms of quality and quantity becomes a sort of lottery. Such arbitrary distributional effects of house price fluctuations make mockery of all political efforts to enhance the distribution of wealth and income.

⁹ Depending on the length of the cycles we also need to consider inter-generational distributional effects.

- **Urban-planning reasons:** A more steady flow of real estate investment activity along the timeline possibly has other advantages. As a consequence of a more even distribution of investment in time, the change of the urban landscape will follow a different path as compared with a row of boom and bust cycles. We can generally expect that on a sustainable path most investment projects will be carefully considered and checked from all sides, e.g. market research, investment calculation. Conversely, on a non-sustainable path, we observe hasty planning and decision-making during the boom and prolonged phases of reluctance to invest during the cyclical downturn. Our thesis is that a pronounced cyclical flow of investment has a negative effect on the quality and sustainability of investment decisions.
- **Housing policy deliberations:** The affordability of home ownership worsens when a house price bubble is developing. The number of average yearly household incomes necessary to buy an average home rises dramatically during a house price boom. That again is especially a problem in markets with a small rental housing sector.
- **Macroeconomic stabilization policy considerations:** As we have argued, the stabilization of the housing market might be an aim in itself. Apart from that we can derive an argument for intervention from possible macroeconomic spillovers of a volatile housing market: The wealth effect of rising / falling house prices is deemed to be the most important spillover effect. Leamer (2007, pp. 10-13 and 37) has shown that “residential investment consistently and substantially contributes to weakness before the recessions, but business investment in equipment and software does not. And the recovery for residences begins earlier and is complete earlier than the recovery for equipment and software. ... I take it as clearly implied that the business cycle would be less frequent and less severe if the housing cycle were less frequent and less severe.”

We have discussed allocative, distributional and stabilization policy arguments in favor of moderate cyclical swings of the housing market. Affordability and urban planning considerations strengthen the argument.

We must, however, acknowledge the possibility of trade-offs. There must be an optimal degree of cyclical instability. It would be almost impossible to suppress the housing cycle completely. That is because the government is not in control of all possible shock variables. Remember that housing cycles have a regional nature. The cost of an anticyclical policy to suppress the cycles would be prohibitively high and presumably the related information and time lags are insuperable. All we can hope for is a moderation of the cycle by promoting stability-oriented monetary policy, restricting erratic government intervention and limiting accelerating factors.

4 Sustainable mortgage funding

4.1 Towards a definition of a sustainable mortgage funding instrument

The concept of sustainability applied to mortgage funding instruments focuses on the continuous availability of the instrument in all phases of the housing cycle at an “affordable” interest rate, though not necessarily in the same volume. There may be no instrument without any fluctuations during the cycle. It thus makes sense to order the instruments along a sustainability continuum.

A mortgage funding instrument more on the sustainable side should develop relatively stable in case of external shocks affecting the primary market for mortgage credit, e.g. a considerable changes in house prices or unemployment rates in a given period of time. It is important that the concept of stability relates to the times of stress as well as to boom phases. The concept of sustainability requires that a funding instrument is not cheap and overabundant in a housing market boom likewise.

We can expect those funding means to remain relatively unimpressed in times of stress which are institutionally unsuitable to refinance low-quality mortgages - the German Pfandbrief being a case in point (Kofner 2009). In times of stress a system with “buffers” will perform better. Those buffers are *system-inherent factors* (see above) like LTV requirements or the share of adjustable rate mortgages which can improve or weaken the resistibility of borrowers depending on their accelerating or decelerating alignment.

For the assessment of the sustainability of different funding instruments we need empirical evidence about secondary market liquidity and issuance activity. Also we need to define acceptable bandwidths in a given period of time for each indicator of sustainability. The assessment has to take into account the possible distortions generated by government intervention, e.g. the German guaranty for all kinds of deposits or the ECB’s 60 billion Euro purchase program for covered bonds.

A methodological problem is to interpret time series like the development of the volume of new issuances of a certain type of mortgage bond in time. The problem with such a volume figure is that it basically reflects market turnover. From the point of view of sustainability it would be important however to know the relative contributions of supply and demand shifts to the dynamic development of the figure.

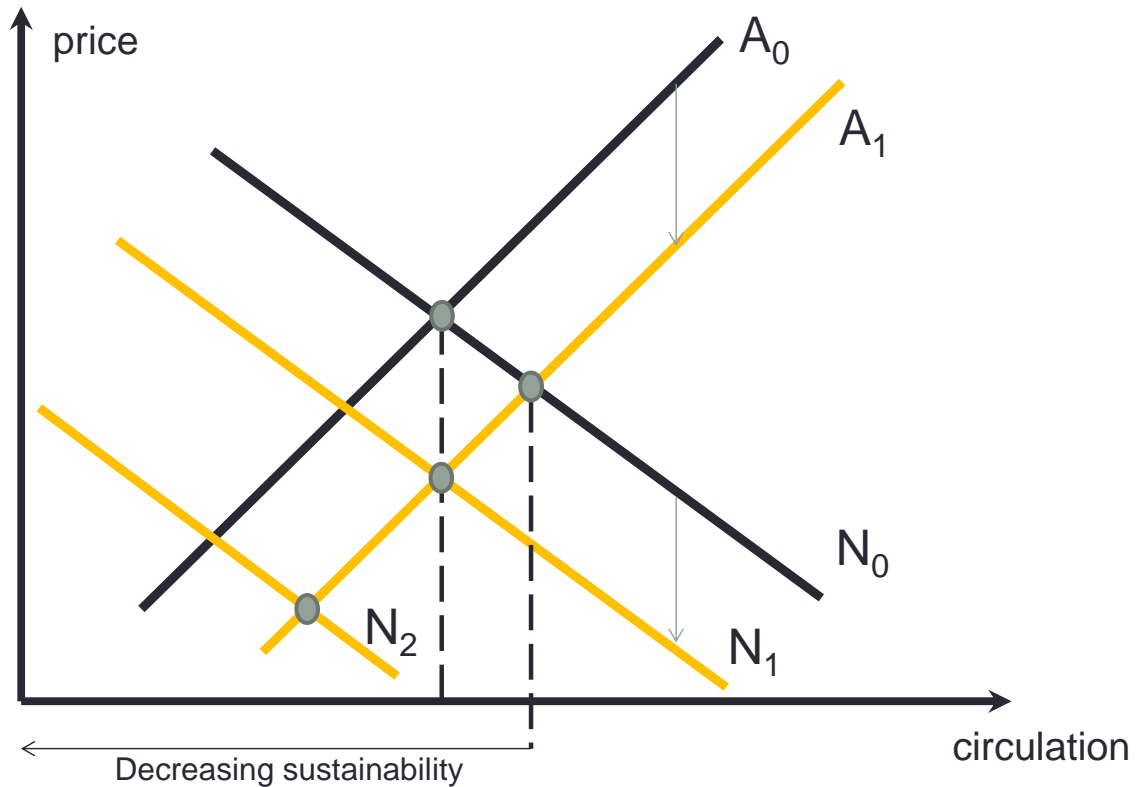


Figure 12: Pessimistic change in risk perception

Figure represents the circulating market for a funding instrument, e.g. some type of covered bond. Initially the market is equilibrated. If this market is exposed to stress buyers and sellers change their risk perception. Buyers are only willing to buy given quantities for lower prices because they demand higher risk premiums. Sellers on the other hand are ready to accept lower prices for given quantities because they have lower risk investment alternatives with comparable interest rates at hand. The result will be lower prices for the securities. The direction of the volume effect is dependent on the relative changes in risk perception of buyers and sellers. If buyers react more sensitively than sellers the volume circulating will shrink et vice versa. If we accept the initial equilibrium volume as a neutral starting point, the sustainable outcomes are on the right side. The degree of sustainability increases the more we move to the right. To the left of the neutral starting point we have the unsustainable outcomes. We can thus define a sustainable funding instrument as an instrument where circulation does not fall markedly and market yields do not rise sharply after a steep rise in perceived risk.

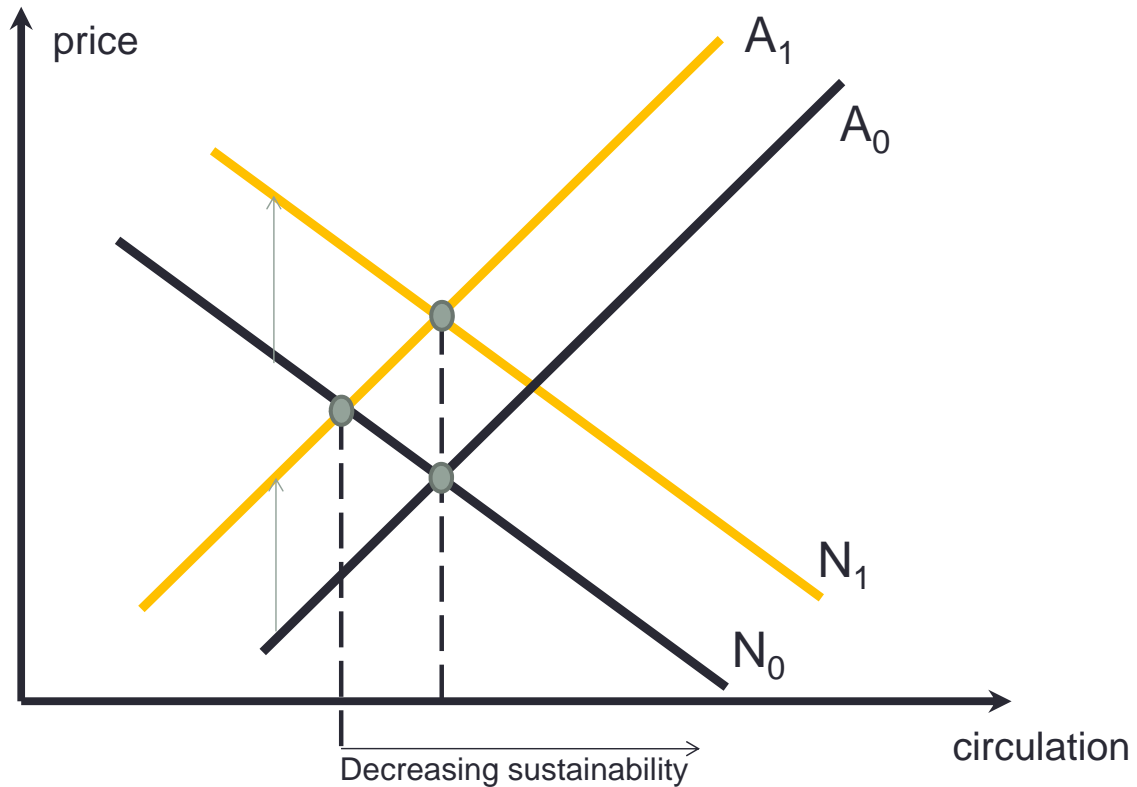


Figure 13: Optimistic change in risk perception

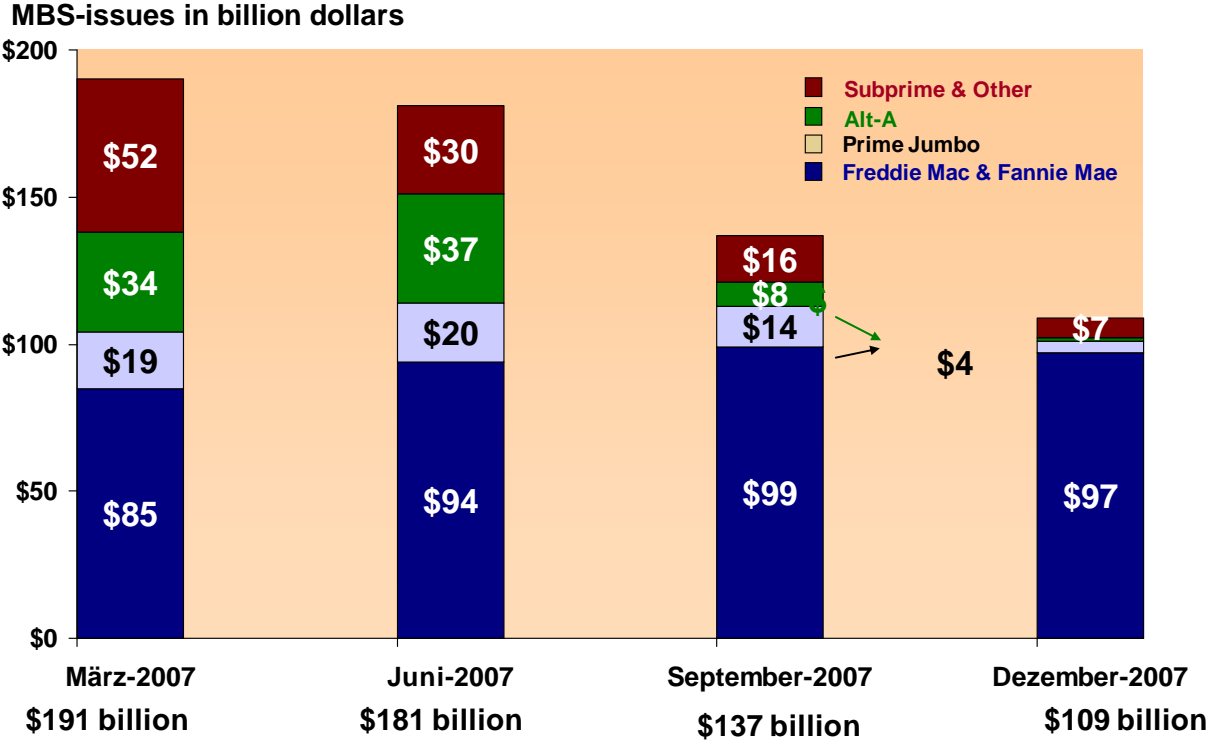
Consider the consequences of an optimistic change in risk perception. Under such circumstances buyers are willing to accept higher prices for given quantities reflecting the lower risk premiums. Sellers on the other hand demand higher prices for given quantities. The result will be a higher price for the securities. The direction of the volume effect is again dependent on the relative changes in risk perception of buyers and sellers. Sustainability increases to the right. We can thus define a sustainable funding instrument as an instrument where circulation does not rise markedly and market yields do not fall sharply after a steep fall in perceived risk.

4.2 Development of funding sources during the financial crisis

In the storm of the financial crisis the classic funding instruments like deposits, bank bonds and Mortgage Pfandbriefe have suffered whereas “innovative” instruments like securitization and shorter term credit facilities from other banks experienced a disaster (Kofner / Hofer 2010, pp. 18-21).

Banks relying on shorter term credit from other banks were the first ones to be hit from the declining market confidence. The fate of Northern Rock from England is a case in point. After lending banks were not willing to roll forward their credit any more, in September 2007 a genuine bank run and later on the nationalization of Northern Rock followed.

What is more, the markets for mortgage credit securitization dried out faster than anyone had expected. Since the middle of 2007 (!) private securitization markets were virtually no longer available as a refinancing channel for residential mortgage loans (see figure). Since then the vast majority of U.S. private mortgage loans was purchased by the two semi state controlled securitization agencies known as Fannie Mae und Freddie Mac.



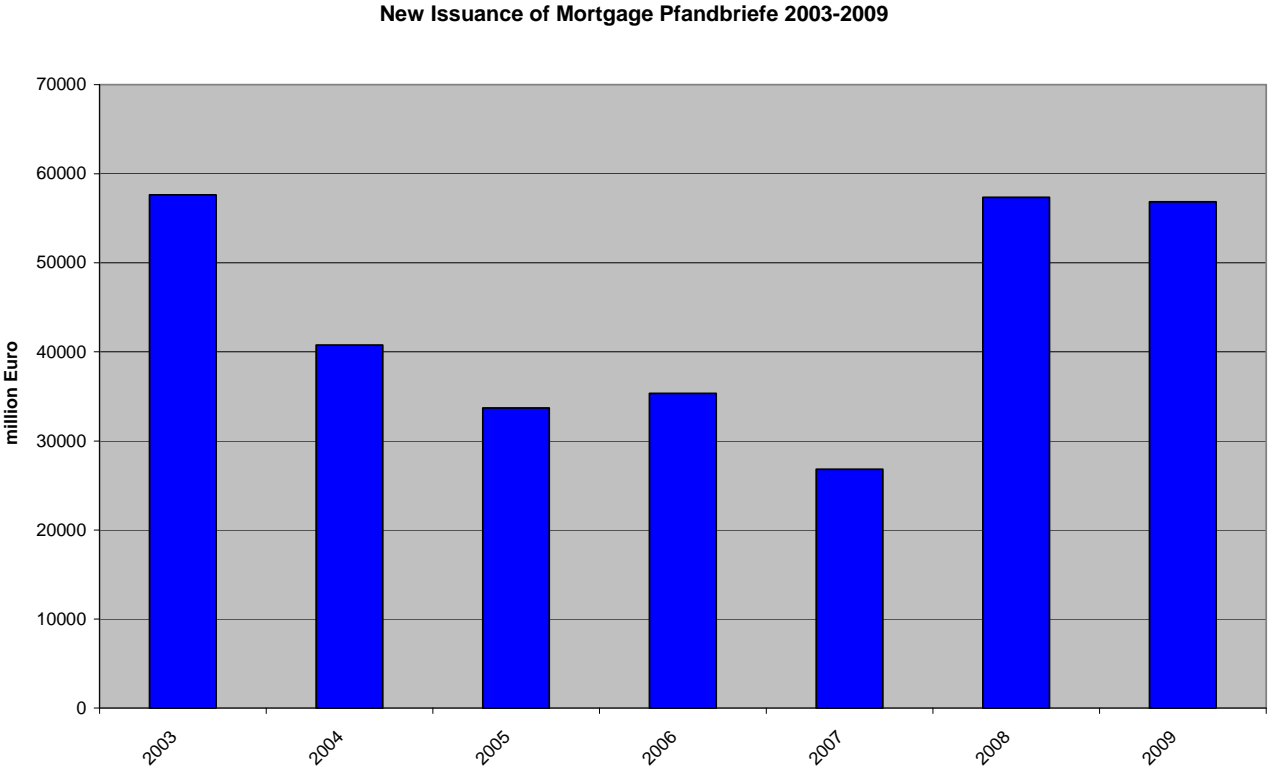
Source: Inside Mortgage Finance

Figure 14: Quarterly MBS-issues in billion Dollars in 2007

The market for unsecured bank bonds proved to be vulnerable, too. In the middle of 2008 rates had risen above 8 per cent and after the Lehman collapse the underwriting business came to a halt for nearly six months. In these months government bonds and the new asset class of state-guaranteed bonds dominated issuance. Measured in terms of swap spreads uncovered bank bonds have fared considerably worse than covered bonds and especially far worse than German Pfandbriefe.

And how about bank deposits? That asset class was regarded as a safe haven by most private investors during the hard days of the crisis. We do not know however what would have happened without the public guarantees for private deposits provided by most EU governments. In a crisis of confidence overnight or short-term deposits may turn out to be an unreliable funding source. However, since the market participants trusted in the governmental guarantee German banks with a funding side based on deposits did not have any liquidity difficulties during the financial market crisis.

The Pfandbrief initially benefited from the financial disturbances. There was a lack of funding alternatives since the markets for the securitization of mortgage credit had almost dried out by the end of 2007 and the market for senior unsecured bank debt became illiquid. The Pfandbrief as the major funding tool for mortgage loans with capital market orientation was able to step into the breach and the issue volume and the nominal value of the outstanding Mortgage Pfandbriefe rose strongly in 2008 (see figure). In the fourth quarter of 2008 however, the volume of Pfandbriefe sold was considerably smaller than it had been in the first three quarters of the year.



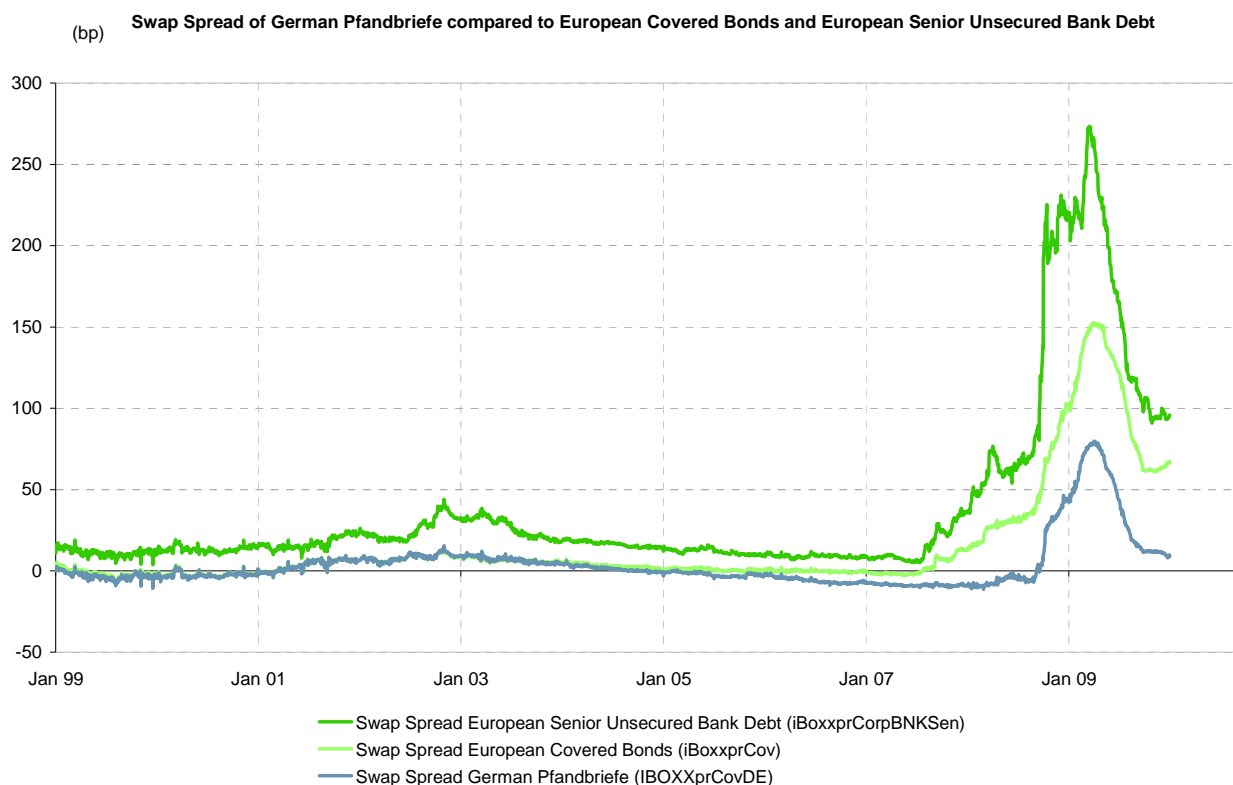
Source: Association of German Pfandbrief Banks (2010b), European Covered Bond Council (2009)

Figure 15: New Issuance of Mortgage Pfandbriefe 2003-2009

Similar to other funding tools tradability of Pfandbriefe was temporarily restricted.¹⁰ Also in the middle of the year 2008 the risk premiums began to rise. Pfandbrief spreads widened significantly (see figure). However, the temporary liquidity problems in the Pfandbrief market cannot be compared to the complete breakdown of the markets for credit securitization. Compared with other mortgage funding instruments the Pfandbrief fared reasonably well and was

¹⁰ While investors were always able to buy or sell bid-offer spreads widened. Interbank secondary market trading with Jumbo Pfandbriefe suffered from restrictions during the peak of the crisis. For further details see Kofner 2009, pp. 19-23.

able to maintain access to liquidity by and large, if somewhat restricted and dearer. And we should not forget that the Pfandbrief market recovered at a very early stage of general market recovery. In 2009 the issue volume of mortgage backed Pfandbriefe reached 56.8 billion Euro, almost equaling the record level of the year before.



Source: Commerzbank Credit Research (2010)

Figure 16: Swap Spread of German Pfandbriefe compared to European Covered Bonds and European Senior Unsecured Bank Debt

Admittedly, government intervention has helped. The bail out of Hypo Real Estate in early October could be interpreted as an implicit state guarantee for all bigger banks regarded as relevant to the system. The EU finance minister's rescue package which included an explicit commitment to bail out any bank constituting a systemic risk in the banking market and common principles for the re-capitalization of ailing institutions (F.A.Z., 08.10.2008, Nr. 235, p. 11) was also helpful to re-establish trust in the stability of the financial system. Another milestone was the German government's declaration to ensure the functionality of the Pfandbrief Market and the safety of the Pfandbrief from 13. October 2008.¹¹

¹¹ Contained in the Explanatory Memorandum of the Financial Markets Stabilization Act (Finanzmarktstabilisierungsgesetz).

What can we learn from this in terms of sustainability of funding instruments? First of all, we must bear in mind that this financial crisis was one of the heaviest ever experienced. Liquidity almost completely dried out in many market segments and the crisis of confidence was so deep that even the overnight money markets were hit. Under these conditions of extreme stress we observed differences in shock resilience of the different funding instruments. Comparing and assessing the performance of the different instruments is not an easy task anyway, because of the distortions created by government intervention.

4.3 The downfall of mortgage credit securitization

Why did securitization markets perform so badly during the crisis? These markets were especially vulnerable in a crisis of confidence not only because of the ever deteriorating quality of the securitized credits, but also because of the complexity and intransparency of the securitization structure. The risks of the complex securities created were almost impossible to assess for outsiders. A case in point is the tranching of mortgage bonds like MBS and CDO.

With the help of the tranching method a loan pool with a certain probability of failure could be split in different sub-issues with different risk and return profiles. It allowed securities to be tailored to the preferences of different investor groups. The AAA-rated tranches were bought by, for example, pension funds and the remaining tranches by yield-hungry hedge funds perhaps.

The importance of the tranching method for the global credit crisis can hardly be overestimated. An unstructured bond covered with inferior credit would necessarily get a lousy rating. Only through the slicing and dicing was it possible to transform “garbage into gold”. Using this kind of modern financial alchemy bonds covered with low-quality mortgages achieved an AA-and AAA-rating.

Because of its complex and intransparent structures securitization of mortgage credit is subject to the well-known principal-agent-problem. The “principal” are the investors who invest their money into MBS and not in ordinary bank bonds or covered bonds. It could be also buyers of other securities, which are themselves covered by the MBS. As “agents” of the investors we have: the mortgagor, the credit-issuing bank, in many cases independent credit intermediaries, the investment bank that arranged the securitization and the credit rating agency that rated the MBS issue.

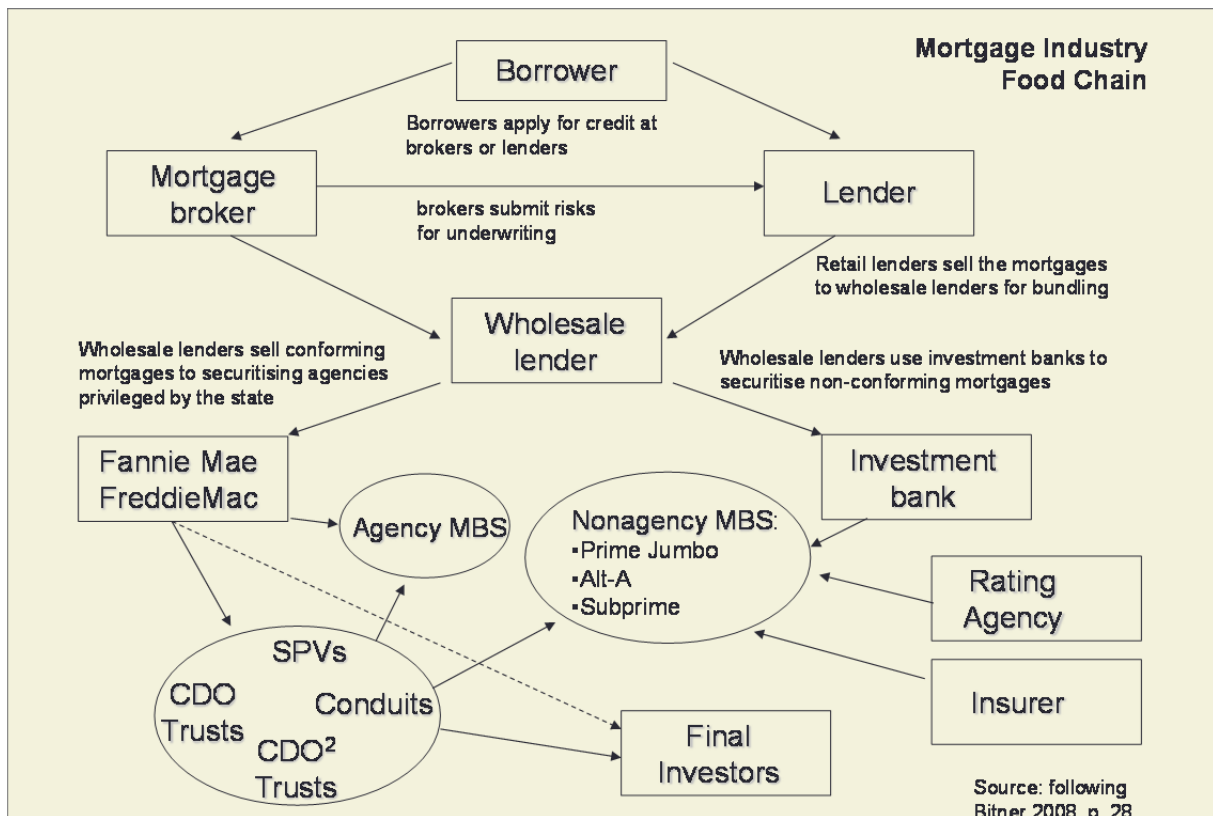


Figure 17: The Mortgage Industry Food Chain

The problem now is that the agents are just not behaving as vicarious agents (i.e. as if they were themselves the holders of the MBS), because the investors can hardly control them in such a complex web of relationships.¹² So the agents have enough leeway to pursue their own goals. In the securitization of a credit relationship, particularly the credit intermediary (often also performing the lending test), the originator and the investment bank are susceptible to carelessly grant or securitize mortgage loans to the detriment of MBS creditors – loans they would not have taken on their own balance sheet because of their low credit quality. Therein lies the so-called “moral hazard” of the whole structure.

With a 100-percent securitization none of the agents is more involved in the risk of default, which is then carried fully by the MBS creditors. A control function can at best be performed by the rating agencies who assess the credit bundles. That the agency is acting in the interests of the creditors is doubtful, but depends on the incentive and remuneration structures. Critics suggest that such complex structures have been created, not least to be able to deceive investors better about the risks. In any case, those responsible have withdrawn from effective control as much as possible.

This kind of organized intransparency and irresponsibility is just the opposite of the German Pfandbrief system where creditor and issuer of debt securities are not as widely as possible

¹² For a detailed analysis of these interactions see Ashcraft / Schuermann 2008.

separated from each other, but institutionally identical. The loans will remain at 100 percent on the balance sheet of the securities issuer and it has no interest to grant mortgages to borrowers with a defective creditworthiness.

The boundless expansion of the practice of securitizing real estate loans was the starting point of the financial market crisis. With the help of securitization transactions, the lending banks were able to remove mortgages with second-class credit ratings from their balance sheets. The possibility of securitization acted as an incentive for the mortgage lenders to take on ever greater credit risks and to pass them on to the capital market.

Is securitization thus to be banned completely? If we could limit the principal-agent-problem and develop easier and more transparent structures, a second attempt seems feasible. A stable funding system is however a system that rests on a number of pillars.

4.4 Diversification of the funding mix

For the stability of a national housing market the *funding mix* (i.e. the composition of the refinancing means) is presumably more important than the availability of certain funding means. From a stability point of view a steady flow of primary mortgage credit is required. Mortgage lenders react upon changes in their funding conditions by changing primary interest rates, loan criteria (requirements relating to the collateral or the creditworthiness of the borrower), appraisal standards or loan characteristics.

For their lending behavior the refinancing conditions in their entirety are relevant. The macro-stability of the system depends on the lending behavior of the whole banking sector. If a funding source dries out (e.g. uncovered bank bonds), there is no problem for the availability of primary mortgage credit, if at the same time another funding instrument is ready to step into the breach (e.g. bank deposits). If investors restructure their portfolios in a way that does not affect the availability and conditions of funding for mortgage credit there will be no negative effect on mortgage volume and real estate investment. The banking sector as a whole simply adapts its refinancing portfolio. However, the distribution of market shares between lenders or groups of credit institutions can change by doing so. Also, there may be differences in terms of the *adaptability* of national housing finance systems to changes in the availability of certain funding means: A part of the additional bank deposits in our example could be used for other types of credit than mortgage credit.

As the financial crisis has shown (again) refinancing instruments are subject to sudden changes in availability, price and liquidity. Also it depends on the type of crisis and the general capital market and macro-economic environment including bail-out measures of governments which instruments suffer the most. Since it is not perfectly predictable how the different funding sources will be affected in a future secondary market liquidity crisis it is always a good idea for a lender to spread the refunding risk as widely as possible. This argument is especially valid for so-called “systemic” banks: A one-sided funding mix of a systemic bank can cause stability problems for the whole banking system. A bank that relies solely on one source of funding is subject to a greater risk of insolvency and will *ceteris paribus* show a more dis-

continuous lending behavior. This is probably also true for the banking sector of a whole national economy. A multi-channel funding mix should enhance the shock resilience of the system.

4.5 Maturity transformation or obedience to the golden rule of accounting?

Disturbances or fluctuations at the secondary mortgage markets generally affect both, the circulation and the issuance market. The issuance market however will usually be hit more early and directly. For the development of the circulation market and the related mortgages after a shock, the *exit options* of the investors are crucial. It depends on the formal commitment periods and possibly also on the behavior of the investors. The maturity structures of all refinancing means circulating in the financial sector determine the shock absorption capacity of the system. The longer the average maturity, the less vulnerable the system should be when confronted with external shocks. Issuers of bonds with longer maturities can afford the time to wait until the markets have calmed down again. They do not have to pay back their debt during the worst market panic. Mortgage lenders relying on short-term market funds on the other hand may not be able to replace these funds when market liquidity dries out.

The available funding instruments differ significantly in terms of their maturity. At one end of the spectrum we have irredeemable long-term covered bonds such as German Pfandbriefe and at the other end we have short-term credit from other banks. As we know, any mismatch of maturities between assets and liabilities side (or rather any maturity overhang on the assets side) creates an interest rate and a loan extension risk. We can subsume both risks under the term “*roll over risk*”. The roll over risk is potentially dangerous for individual banks (e.g. the Northern Rock bank), for segments of the capital market (e.g. Asset Backed Securities [ABS] during the financial crisis) as well as for the whole financial system.

The danger arises from the *shifting liquidity preferences* of market participants. In autumn 2008 the liquidity preference of investors had shifted to extreme highs. In such a panic situation anyone in need to roll forward a position is in a difficult situation. What is more, in a liquidity crisis the liquidity of assets can be subject to sudden unexpected changes. A case in point is the fate of the Collateralized Debt Obligations (CDO) during the financial crisis. They developed from a rather liquid to a rather illiquid asset in a comparatively short period of time. The problem is that any firm holding assets which suffer from sudden illiquidity runs an increased roll over risk because lenders will take the liquidity of the borrower’s assets side into account. Conduit structures and ABS funds are good examples.

Independent of the market mood investors have a general preference for liquidity. That means that investors demand a compensation – a higher interest rate – for longer term commitments. It is conventional textbook wisdom that one of the functions of a bank is *maturity transformation*. Banks traditionally transform short-term deposits into long-term credit. On the other hand, any kind of maturity transformation is a violation of the old-fashioned “golden rule of accounting” (also called congruent coverage principle) which forbids any maturity mismatch-

ing. The rule is essentially meant to assure insolvency-resistance by eliminating the roll over risk. Is the golden rule the key to a sustainable funding system?

For the design of a sustainable funding system two questions are of crucial importance:

- Is the roll over risk inevitable?
- If it is, how can we manage the roll over risk on the macroeconomic level?

In a free market economy the roll over risk is inevitable because the general liquidity preference of investors provides for an upwardly directed yield curve and thus an incentive for maturity mismatching for banks and borrowers.¹³ It is doubtful if it would make sense to force all banks and borrowers to respect the golden rule of accounting via regulation, supervision and sanctions because that would mean higher long-term and lower short-term interest rates. The resulting fundamental change of the slope of the yield curve would foster short-term investment at the cost of long-term investment. The long-term growth prospects of the economy would suffer and especially real estate investment would slump when long-term credit would be generally scarce. Whilst the golden rule of accounting taken literally would assure a high degree of capital market stability, the cost of its enforcement seems unbearable.¹⁴

Since macroeconomic mismatching entails costs and benefits there must be an *optimal degree of mismatching*. Reducing the degree of mismatching creates marginal benefits by reducing financial market instability but also marginal costs in terms of future GDP losses. The crucial question is if we are faced with *market failure* in this respect. Does the private sector tend to expand maturity overhang beyond the optimal point? The answer is an issue of liability. If the corporate governance system is defective or a bail out by the government is probable when the risk of insolvency increases, the management has an incentive to boost profit expectations in good times by extending the maturity overhang.

The government is thus well advised to keep an eye on the roll over risks in the banking system. If a systemic bank cannot roll over funding means because of capital market liquidity strains a chain reaction with unforeseeable consequences is possible – as we have seen after the collapse of the investment bank Lehman brothers. The roll over risk thus needs to be limited, contained, supervised and cleverly distributed in order to make the whole system shock-resistant.

Mortgages for private homes usually contain both types of risk, the interest rate and the loan extension risk. That even applies to Germany where private mortgages often have a fixed interest period of 10 years. The only exemption is the traditional 30 years fixed rate mortgage common in the U.S.

¹³ It does not matter here if banks or borrowers take the roll over risk.

¹⁴ The other possible outcome of a trial to enforce the golden rule could be creative circumvention of such regulation by banks.

For the stability of the housing market it is obviously a good idea to contain the roll over risk and especially the interest rate risk on the level of the borrowers. By containing the interest rate risk the number of delinquent borrowers in case of a hefty interest rate rise can be limited. This could be achieved by long (initial) fixed interest rate periods combined with considerable initial amortization rates, by interest rate caps or by taking more than one loan and mix maturities (e.g. three mortgages with 5, 10 and 15 years initial fixed interest rate periods).

From a systemic point of view however, this sort of *stability may not be costless* (no free lunches). As we have argued, a certain degree of maturity overhang is efficient. Longer credit terms put additional stress on the stability the financial system. This is because a part of most long-term credit engagements will be refinanced with short-term means. Even when covered bonds are used for funding, we can argue that by creating additional demand for long-term capital short-term interest rates will rise. If regulation forces lenders in one segment of the market to strictly respect the golden rule of accounting a higher degree of maturity mismatching somewhere else in the system will be the consequence.

Hence making the borrowers weatherproof is not a panacea. Less vulnerable borrowers could mean more vulnerable lenders. Or less vulnerable lenders could mean more secondary mortgage market volatility. The challenge is to distribute the roll over risk in way that fosters the stability of the whole system. If borrowers take out mortgages with variable interest rates the lender does not run a roll over risk, but the probability of default of the borrowers will be higher. If borrowers take out the classical 30 years fixed rate mortgages the roll over risk is completely transferred to the banking system. Does this make sense? Arguably, it may be easier for the lender to manage the roll over risk because banks usually run large credit portfolios with different maturities whilst homeowners usually only hold one collateral asset financed with one mortgage loan.

4.6 Towards a methodology of assessing sustainability

A global analysis for example of the MBS market would not be promising because the funds raised are distributed to several primary markets. According to our definition of sustainability which focuses on availability especially in stress situations it would make sense to take a look at a set of countries that promise a specific learning effect because some shock event has hit their primary mortgage market. On our shortlist we might put countries where house prices have fallen dramatically during the financial crisis, e.g. the U.S., Ireland and Spain. For each country we should compare the performance of different funding instruments. In the case of Spain we could compare Cedulas, deposits and unsecured bank bonds.¹⁵ It is doubtful however if the U.S. would be a suitable country for investigation. The problem is the prominent role of state-controlled securitization agencies like Fannie Mae and Freddie Mac. There is strong evidence that these agencies stabilize the secondary market in times of stress. It is probable that the private securitization market is distorted by their activities.

¹⁵ We may have to control for the ratings the issuers.

5 Conclusions

As we have argued above, it is desirable to moderate housing cycles, not least because of it is a prerequisite for macro-economic stability: „Housing is the most important sector in our economic recessions and any attempt to control the business cycle needs to focus especially on residential investment.” (Leamer 2007, pp. 1-2).

If it is desirable to moderate the housing cycle, how can it be done? The pig cycle can be moderated by appropriate measures to relax the supply-side rigidities (e.g. land supply). Also, the government has a responsibility to stabilize the expectations of investors. Surprising interventions in the housing market surely have a destabilizing effect and should thus be avoided. Stable framework conditions stabilize the flow of housing investment in time. Apart from this, housing need forecasts can help to stabilize investor’s expectations. They can help investors to anticipate future changes in demand and thus reduce development time lags.

It is surely more difficult to moderate the credit cycle. That is basically a problem of timing of monetary policy: „The best time to fight the housing cycle with tight monetary policy is when the wave is starting to rise, not when it is cresting. The worst time to stimulate the economy with loose monetary policy is when the wave is starting to rise. That is going to make the crest all the higher, and the crash all the more catastrophic.” (Leamer 2007, p. 3).

First of all, the definition of monetary stability should include the development of prices for key assets. Monetary policy not only affects the prices of consumer goods, but also asset prices. If by monetary expansion credit creation in the banking system is facilitated, this may affect commodity prices, stock prices, house prices or any other asset prices. All assets that can be purchased on credit are in danger, to become victims of a credit-induced inflation of asset prices. This is especially dangerous for stability when the rising asset prices in turn attract an increased credit creation. A lax monetary policy and unsustainable lending practices must come together. If in an environment with lax regulation banks constantly adapt the collateral values during the price cycle to inflated asset prices or raise the lending limits over and over again, further upward pressure on prices will be the result.

In a bank-dominated system, where the risks remain predominantly on the balance sheets of lenders, not even that would be enough to generate price and credit bubbles of the extent the market for subprime mortgages incurred. Only when an easy money policy lasting for many years, lax regulation of lending and the possibility of removing credit risk from the balance sheets of lenders meet the explosive mixture is ready, that triggered the current crisis in financial markets.

6 Sources

Alvarez, L. / Bulligan, G. / Cabrero, A. / Ferrara, L. / Stahl, H. (2009): Housing and macroeconomic cycles in the major Euro area countries, Conference on Macroeconomics of Housing Markets, Banque de France, 3-4 December 2009.

Arndt, F. / Tolckmitt, J. (2000): The Pfandbrief, in: The Pfandbrief 2000: Facts and Figures, ed. by VDH Verband Deutscher Hypothekenbanken, pp. 7-26.

Ashcraft, A. / Schuermann, T. (2008): Understanding the Securitization of Subprime Mortgage Credit. Wharton Financial Institutions Center Working Paper No. 07-43.

Barras, R (1994), Property and the economic cycle: building cycles revisited, *Journal of Property Research*, 11, pp. 183-197.

Bitner, R. (2008): *Confessions of a Subprime Lender*, Wiley.

Cantor, R. / Wenninger, J. (1993): Perspective on the Credit Slowdown, *Federal Reserve Bank of New York Quarterly Review*, Spring 1993, Vol. 18, No. 1.

Case, K. / Shiller, R. (2004): Is there a bubble in the housing market?, *Cowles Foundation Paper No. 1089*.

Catte, P. et al. (2004), "Housing Markets, Wealth and the Business Cycle", *OECD Economics Department Working Papers*, No. 394, OECD Publishing.
<http://dx.doi.org/10.1787/534328100627>

Hanau, A. (1928): Die Prognose der Schweinepreise, in: *Vierteljahreshefte zur Konjunkturforschung*, Sonderheft 7, Berlin.

Hurst, E. (2009): *Housing Prices, Housing Cycles, and Consumption*, Presentation University of Chicago.

Kofner, S. (2007): Hedging mortgage default risk with mortgage guaranty insurance: A model for Europe?, in: *Housing Finance International*, vol. 21, No. 4, Juni 2007, S. 3-15.

Kofner, S. (2008): *Die Hypotheken- und Finanzmarktkrise*, Frankfurt a.M.: Fritz Knapp Verlag.

Kofner, S. (2009): The German Pfandbrief system facing the financial crisis, paper presented at the European Network of Housing Research International Housing Conference, Prague, Czech Republic, 28th June – 1st July 2009.

Kofner, S. / Hofer, T. (2010): The German residential mortgage market before, during and after the financial crisis: business as usual? paper presented at the European Network of Housing Research International Housing Conference, Istanbul, Turkey, 4th – 7th July 2010.

Kuznets, S. (1930): Equilibrium economics and business cycle theory, in: *QJE*, vol. 44, pp. 381-415.

Leamer, E. (2007): Housing and the Business Cycle, paper presented at the Symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 30 - September 1, 2007.

Münchau, W. (2008): Vorbeben, München: Hanser.

Report of the Mortgage Funding Expert Group for the European Commission, Brussels, 22 December 2006.

Rottke, N. (2006): Integration von Immobilienzyklen in das Immobilienmanagement, in: Bone-Winkel et al. (ed.): Stand und Entwicklungstendenzen der Immobilienökonomie, Köln: Rudolf Müller Verlag.

Shleifer, A. (2000): Inefficient markets – an introduction to behavioral finance, Oxford.