

Danish Mortgage System is the Best

April 10th, 2014



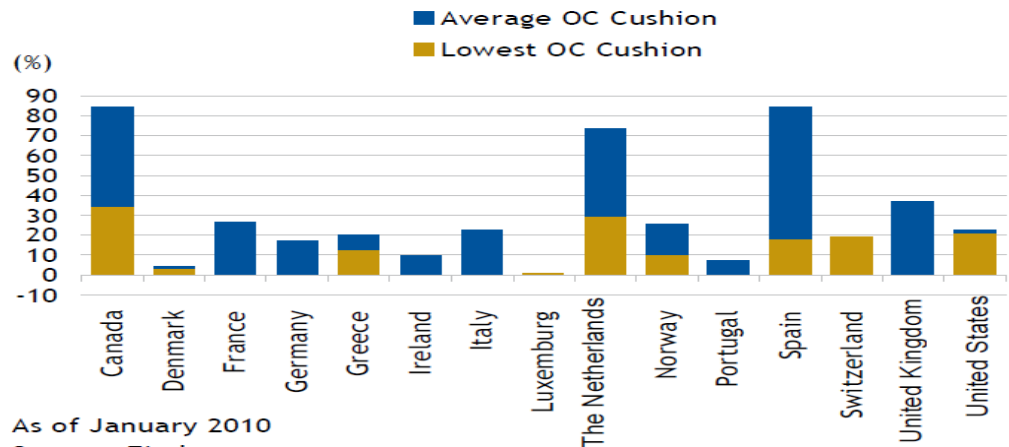
- AAA ratings from Moodys, S&P
- There has never been a default
- Danish MCI's have implicit government backing through strong regulation by
 - Mortgage Credit Act
 - Danish Financial Supervisory Authority / Finanstilsynet
 - Danmarks Nationalbank
 - Denmark's title registration system
- Principle of balance keeps MCI's honest
- Late 80's housing collapse showed system's strengths
- Compares favorably to other European models
 - See Moody's May 2002 report
 - See MOW's September 2003 report
 - See BIS March 2004 Quarterly Review
- Danish system has been copied by Iceland, Norway and Mexico
- Absalon Project is now working with Ireland, Ghana, Kenya, Armenia and KSA

Denmark is the Largest

Denmark is the largest and most efficient mortgage CB market in the world
Ratings agencies should focus on the systemic risk of OC to solve ALM mismatches and poor credit quality collateral

Residential housing	Average loan size (EUR)	LTV-levels	Average O/C
Denmark	114,378	66%	13%
Sweden	44,049	54%	30%
Norway	140,799	51%	21%
Finland	57,572	49%	47%

Chart 3: OC Cushion by Country = Current OC - Supporting OC



The Danish Mortgage System

Facts

- 200-year history
 - specialised mortgage lending and bond issuance
 - first institution in 1797
- No defaults for over 200 years
- Special legislation and supervision
- The largest mortgage covered bond market in Europe



A very robust system that has survived several crises

Crisis	Loss
Agricultural crisis of the 1880s	Less than 1%
WWI – Denmark remained neutral	No crisis
Dual currency bonds	Intervention
The Great Depression	Less than 1%
WWII – Denmark occupied by Germany	No crisis
Change in macroeconomic climate in 1980 and the 1990s	Less than 1%

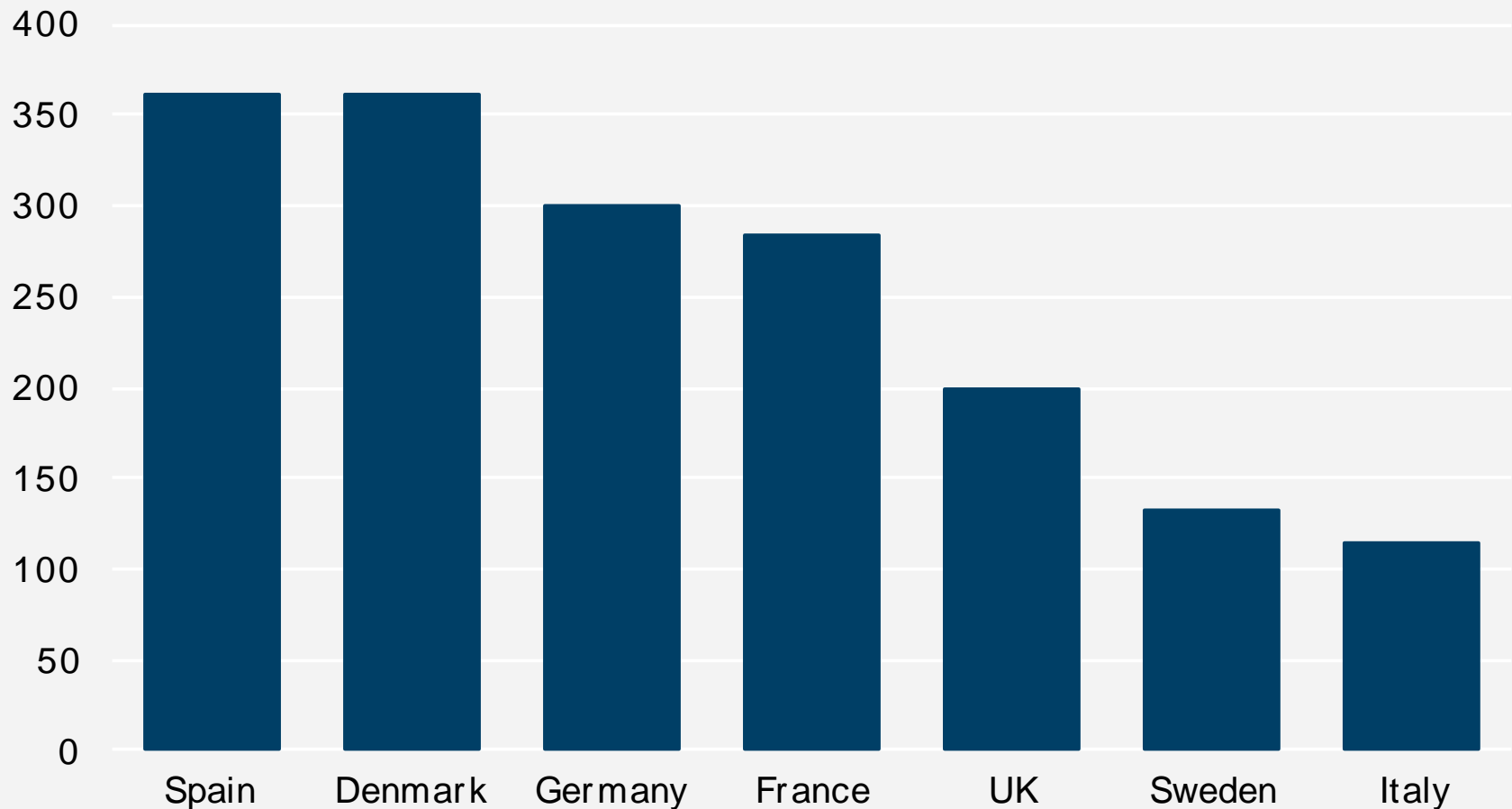
Danish Covered Bond Legislation

- The first Danish mortgage bonds date back **more than 200 years**
- Today Danish mortgage banks and one commercial bank grant loans against **registered mortgages on real property** funded by covered bond issues
- Mortgage lending has been regulated by **special mortgage legislation** since 1850
- The main principle of **low risk for investors**, as established in the 1850 legislation, is still the mainstay of Danish mortgage legislation
- The **new Danish covered bond legislation** took effect on 1 July 2007

Largest European CB Market

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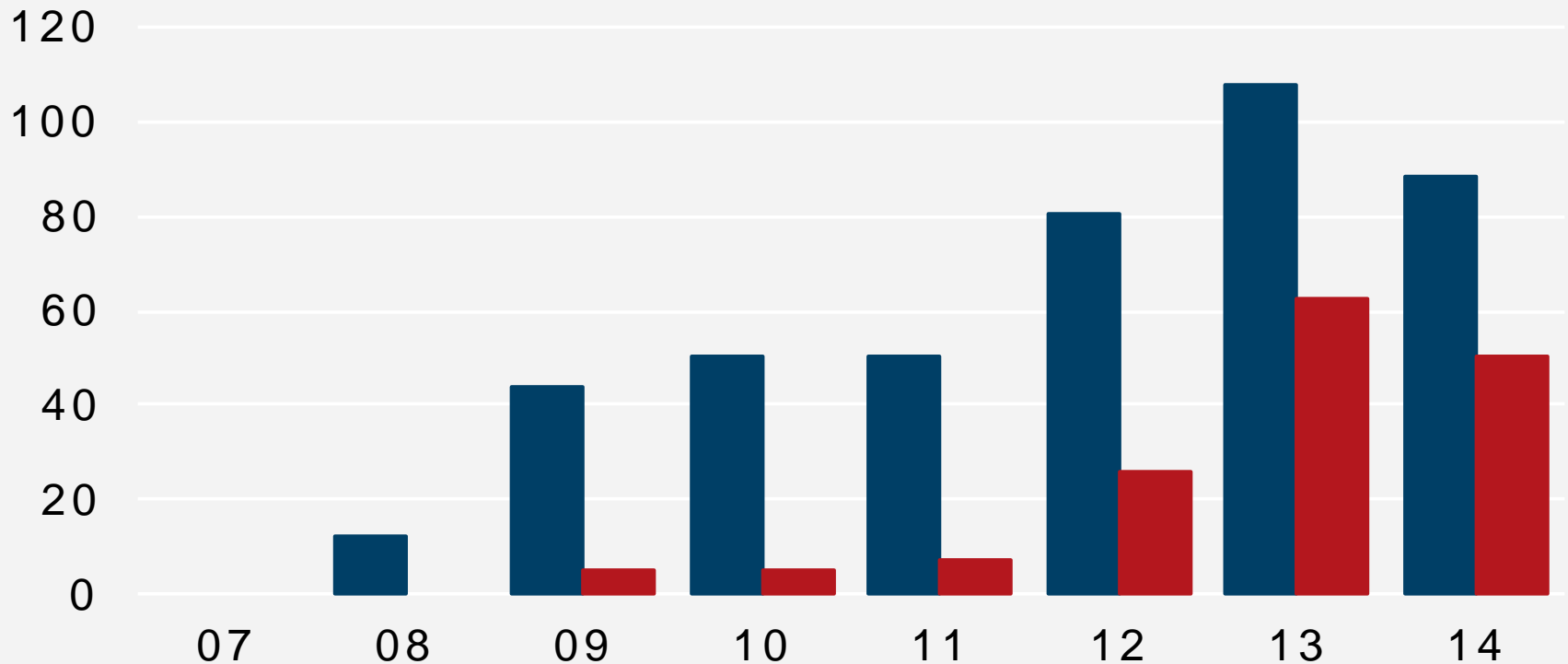
Covered bonds, Q1 2014, EUR bn



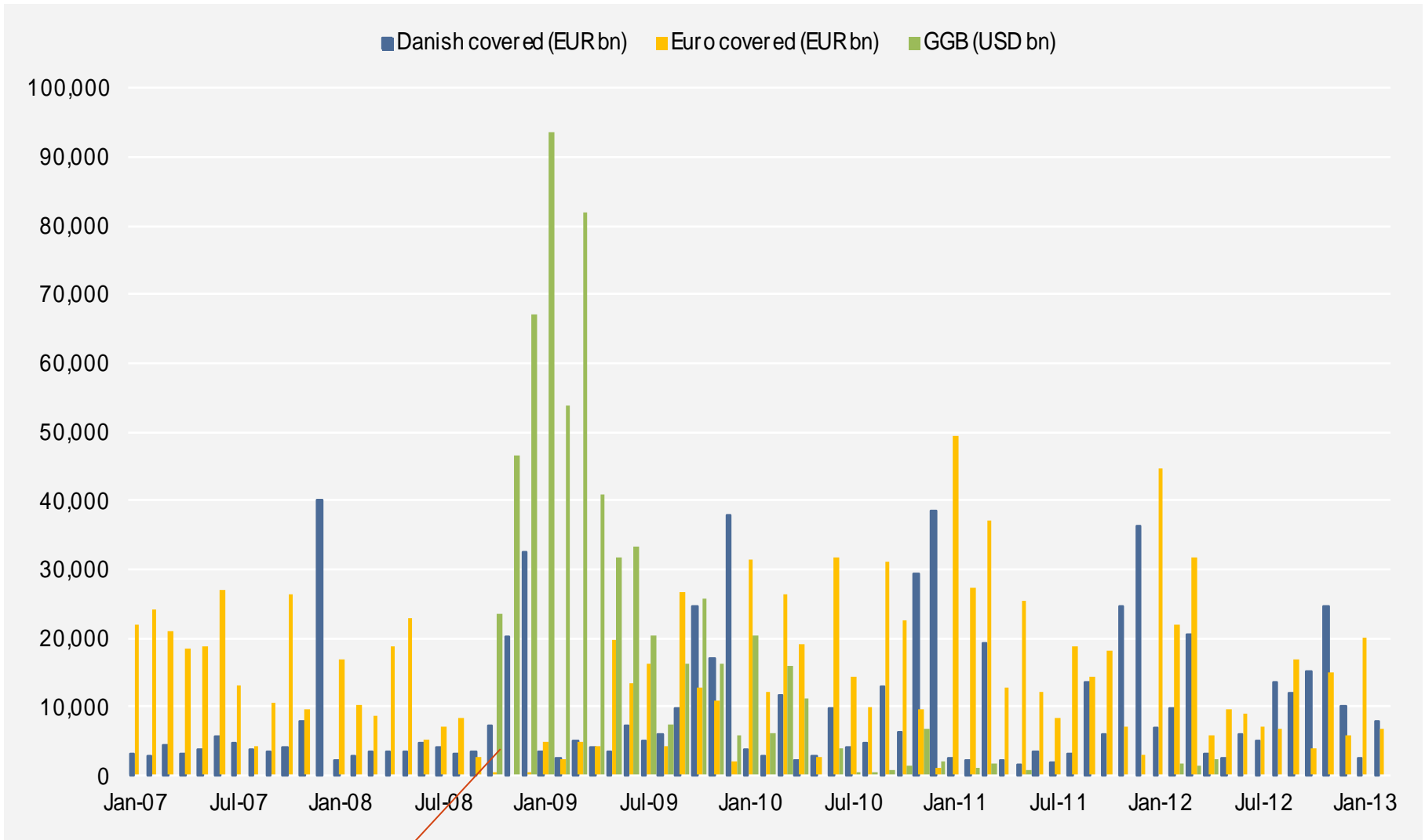
Exclude these bonds

Cumulative retained covered bonds with the ECB, EUR bn

■ Spain ■ Italy



Denmark stayed open

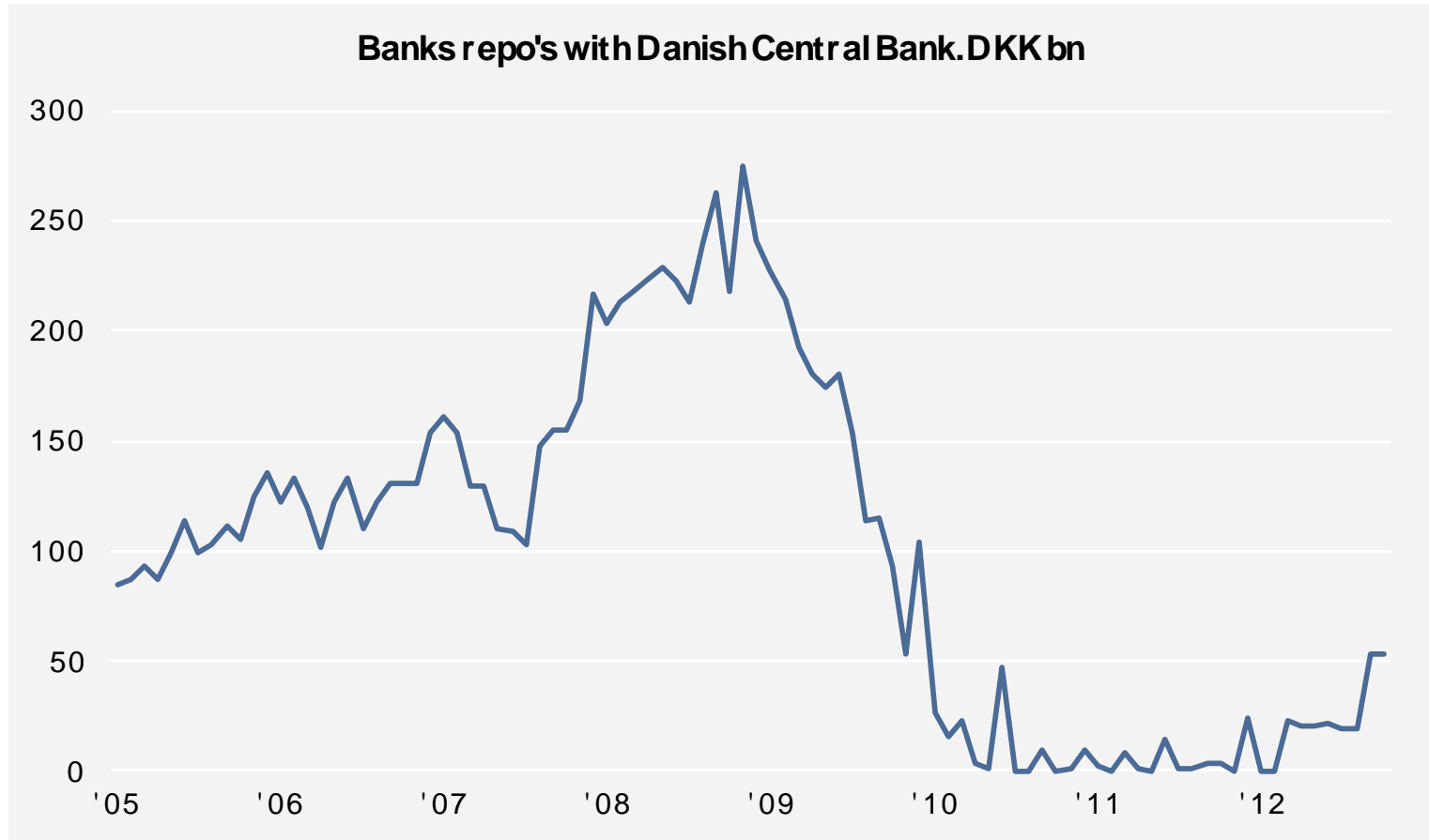


3/11/2013

Lehman collapse

Nationalbanken's Repo is close to zero even after two 3Y LTRO's

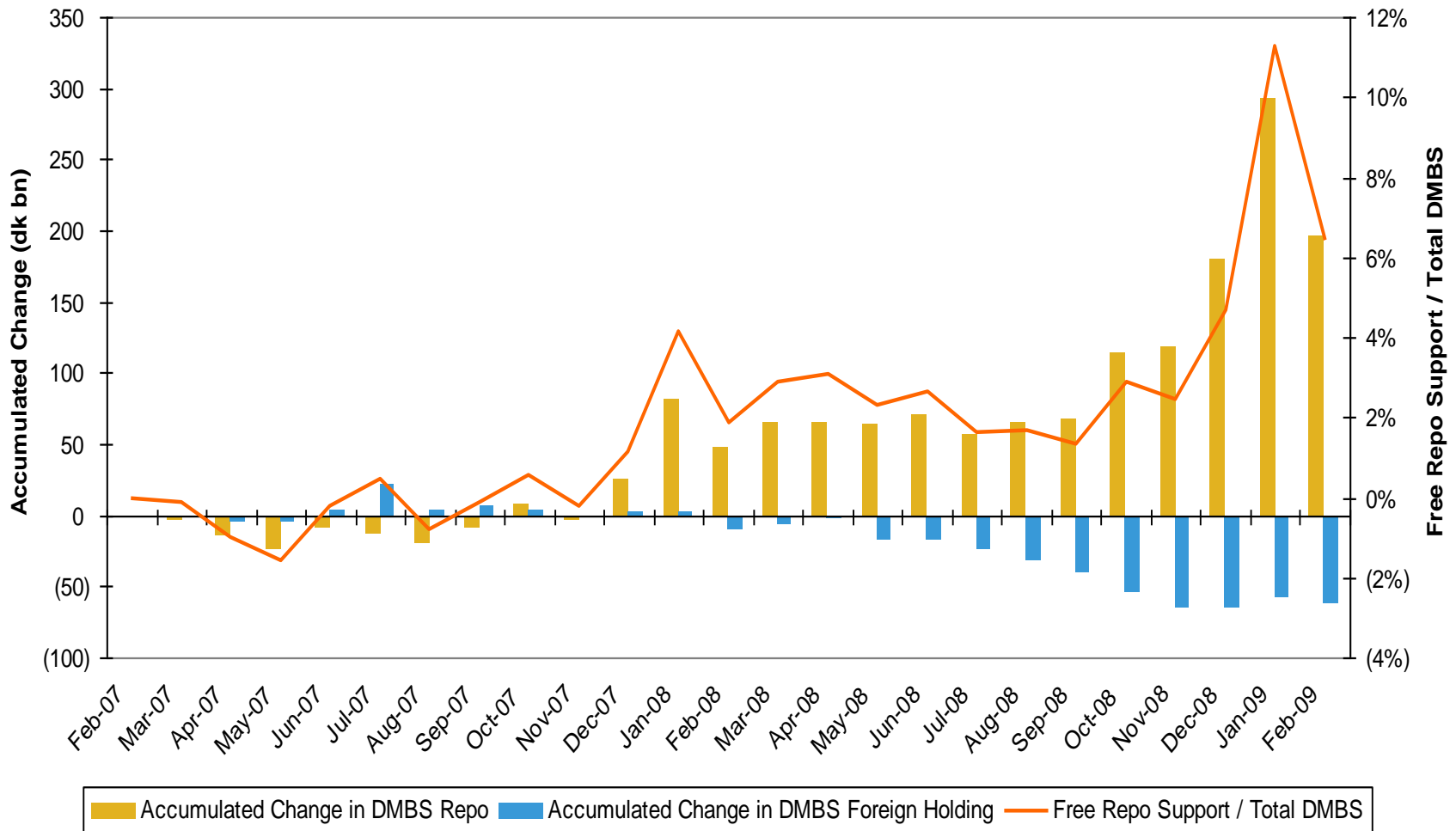
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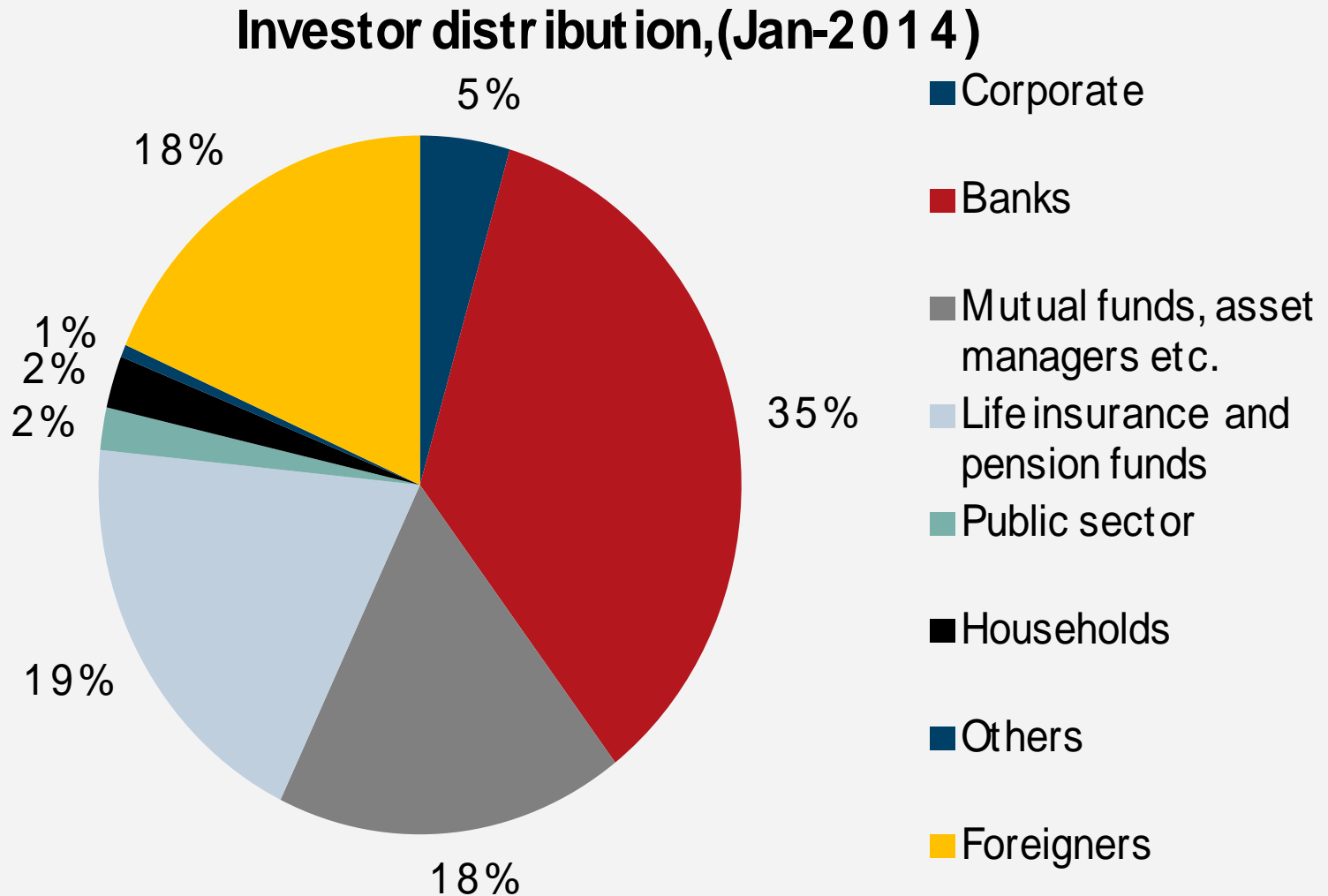
Source. Danish Central Bank

Net Nationalbanken Repo of MBS was Small in 2008

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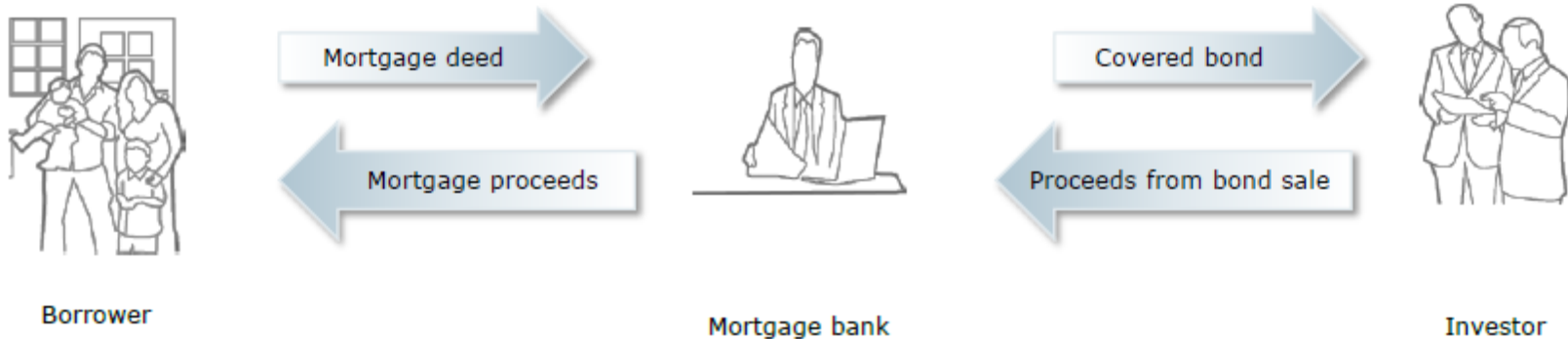


Investor Distribution



The Basics of the System

Mortgage origination



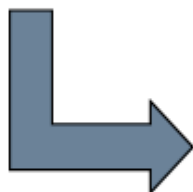
Payments



Mortgage Loan Workflow

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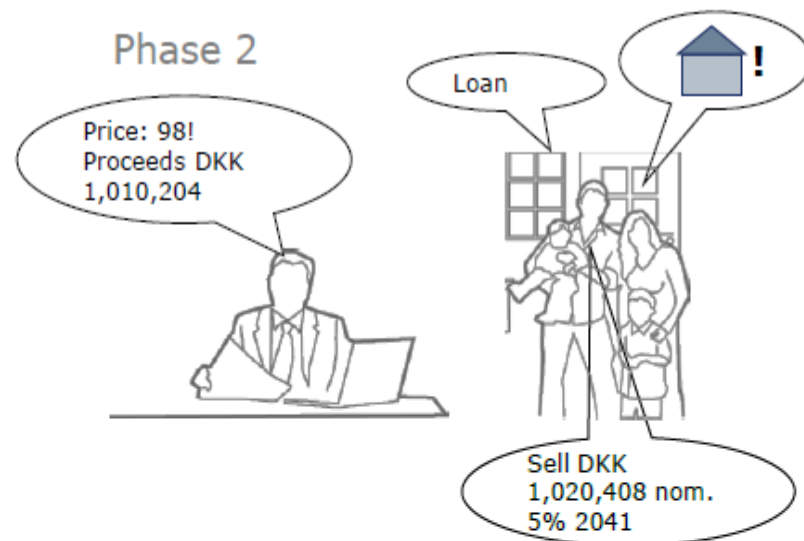
Phase 1



Loan offer

DKK 1,020,408
Nom. 5% 2041 at a price of
98 fixed rate worth
DKK 1m

Phase 2



Phase 4



Settlement:
1,020,408
at 98.00

Phase 3



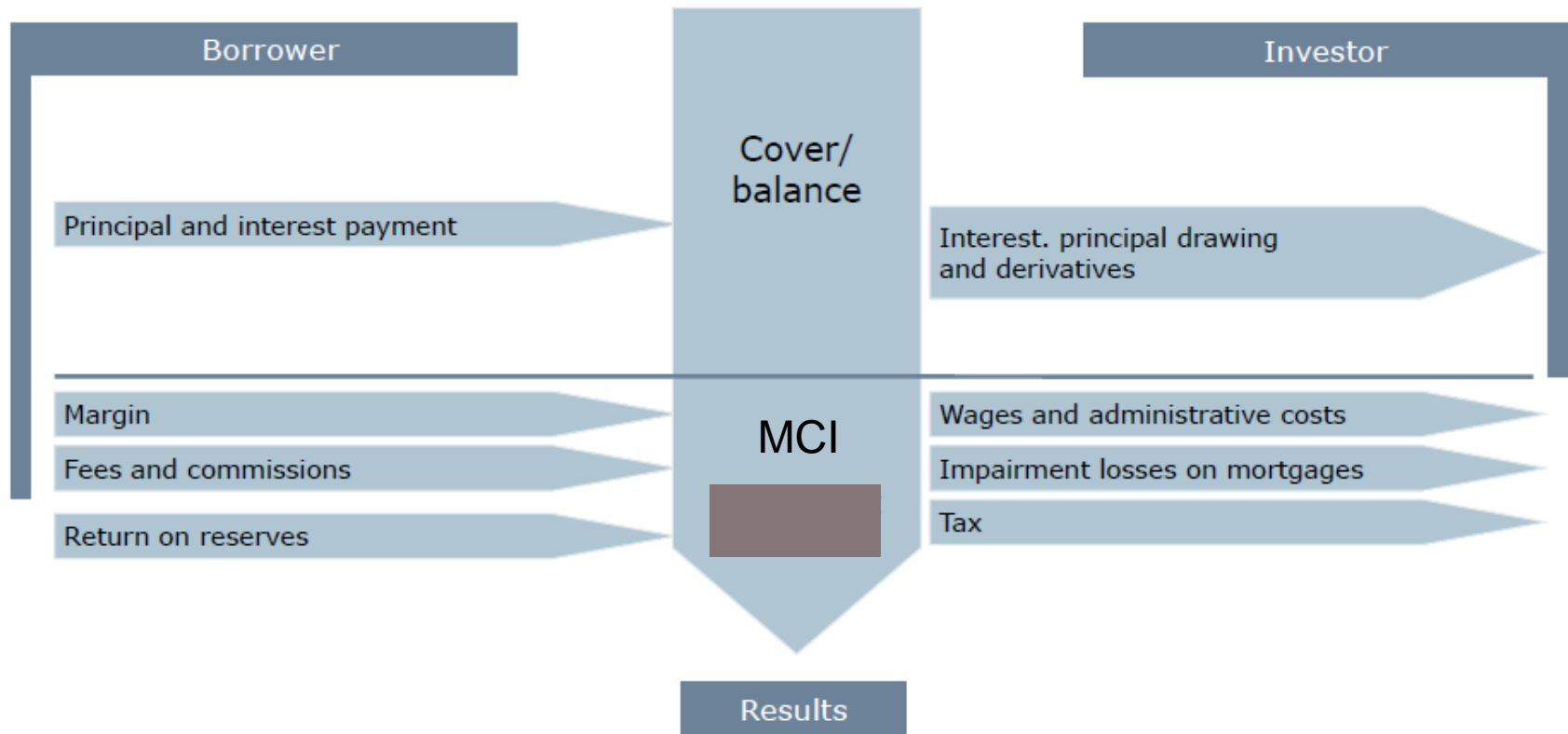
Main characteristics in the Danish Mortgage Model

- Principle of Balance
- Prepayment Options
- Responsible Lending
- Transparency
- Liquid Bond Pools
- High Ratings

The Balance Principle

- The balance principle regulates the financial risks of the mortgage credit institution resulting from differences in payment between loans and funding, fluctuations in interest and exchange rates and the use of financial instruments.
- The principle states that the payments on the debtor side and the creditor side of a mortgage credit institution must balance as a whole within certain limits. This is achieved by issuing a bond or a portfolio of bonds each time a loan is granted.
- Loans disbursed as bond loans must be funded with bonds of the exact same nominal value and interest rate as the loans. All loan features are incorporated in bonds.
- The borrowers pay for the services of the mortgage credit institution on top of the loan, by fees (front end-fees) and administrative margins (interest margins). Apart from covering the expenses of the mortgage credit institution, the net profits contribute to the build-up of reserves that are required by law.
- **The risk of the mortgage credit institution is limited to credit risk, i.e. the risk on the borrower's ability to meet his obligations**

The Balance Principle



Tap Issuance: Mortgage bonds are generally issued on tap in the bond market, reflecting ongoing lending and refinancing activity.

Prepayment Option

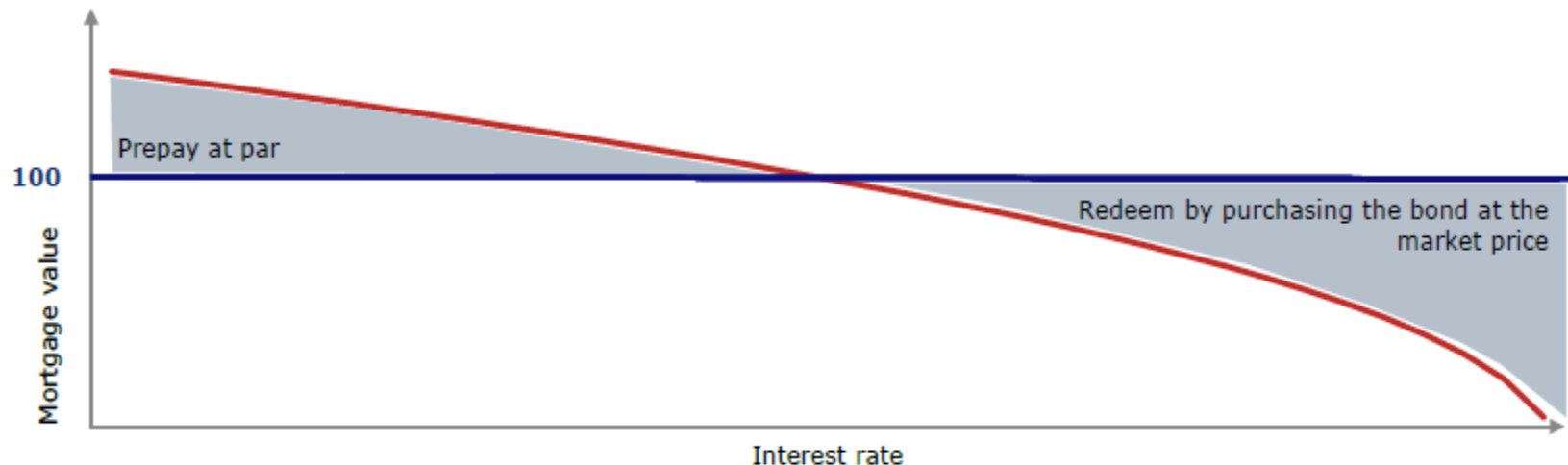
Borrowers are entitled to pay all or part of their principal at any time. Borrowers raising a callable mortgage loan are entitled to prepay the mortgage at par prior to maturity.

Basically, a borrower's right to prepay is embedded in one or two prepayment options:

- Callable loans have an embedded call option and a delivery option
- Non-callable loans have an embedded delivery option only

Under the Balance Principle, the borrower's call option must be embedded in issued covered bonds in order to achieve a perfect hedge,

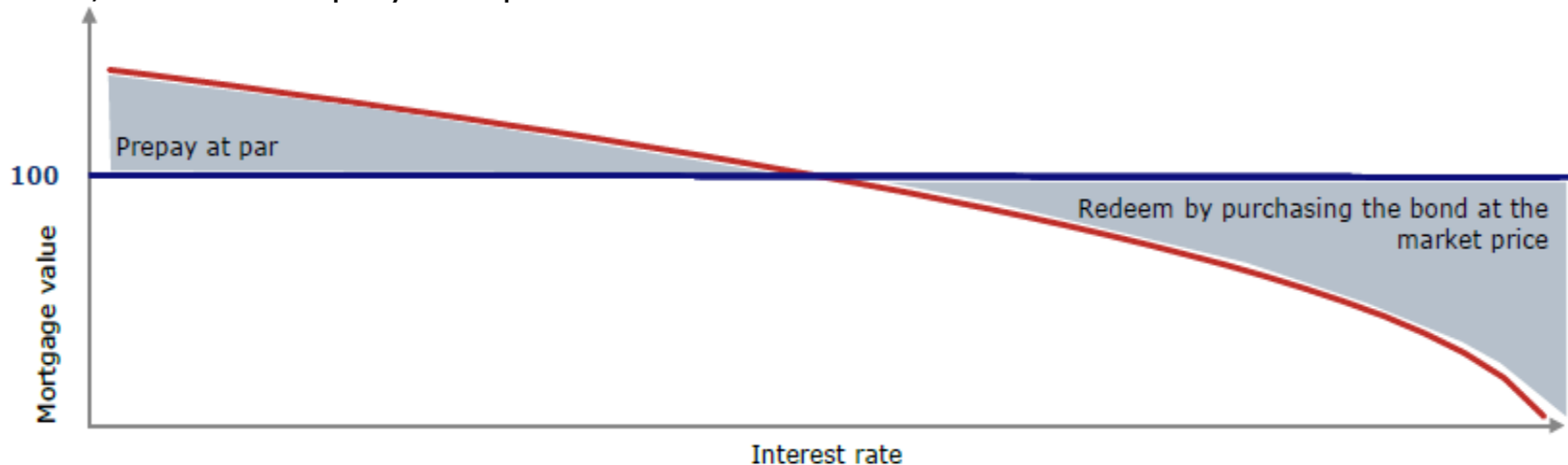
ie, the mortgage banks do not suffer a loss when call options are exercised.



Since the value of homes and the associated mortgage bonds tend to move in the same direction, the borrower is protected against negative equity.

Prepayment Option - Example

Borrower John Doe has a €200,000 balance on his 5% mortgage, and he expects to sell his house for €250,000 in a market in which home buyers pay 5%. But before he can sell, market rates jump from 5% to 7.5% and potential buyers can now only afford to pay €200,000, wiping out Doe's home equity. However, because of the rate increase, the market price of Doe's 5% mortgage has dropped from €200,000 to €170,000. If Doe is a Dane, before selling his home, he can refinance into a 7.5% loan by paying €170,000 to retire his old loan; by so-doing, he retains three-fifths of his equity. If Doe is from the U.S., his entire equity is wiped out.'



Since the value of homes and the associated mortgage bonds tend to move in the same direction, the borrower is protected against negative equity.

Responsible Lending

Real estate

- On site appraisal of all properties – maximum LTV determined by law
- Banks have access to detailed property data from public registers
- Land registry data, house price data and local knowledge
- Mortgage bank lending is stringently regulated by the Danish FSA

Borrower

- Sophisticated proprietary credit scoring model (no FICO in Denmark)
- Nykredit demands household budget, payslips and income tax returns
- Customer must be able to afford fixed-rate 30Y amortising loan
- Negative credit register check (Experian)

Legal and policy

- Borrowers are personal liable for mortgage loans
- No financing of speculative buying – credit approval always based on ability to service debt
- Standard documentation eliminates legal uncertainty
- Flawless title and mortgage registration guaranteed by the government

- Borrowers have a full overview of all loan costs.
- Total costs consist of interest and principal payments relating to the bonds funding the loan as well as a margin charged by mortgage banks to cover their daily operating costs including any losses.
- Borrowers know which bonds fund their loans, and the bonds are listed on a stock exchange.
- Bond prices are quoted daily.
- There is transparency in connection with new loans as well as refinancing and prepayment.

"Denmark has the best mortgage system in the world. It is transparent and inexpensive. The interest rate of a mortgage loan and the prepayment price are directly reflected in the price of the mortgage bonds funding the loan. And everybody can monitor bond prices daily — for instance in newspaper price lists."

Ane Arnth Jensen, Director General, Association of Danish Mortgage Banks

- Overall, our findings suggest that Danish benchmark covered bonds by and large are as liquid as Danish government bonds during periods of market stress.
- The findings also suggest that before the crisis government bonds were slightly more liquid than covered bonds in both the short and long term market segments.
- For the period after the crisis, the two markets appear to have had more or less the same level of liquidity for short-term as well as long-term bonds.

- **DANMARKS NATIONALBANK WORKING PAPERS 2010 • 70**
 - Liquidity of Danish Government and Covered Bonds – Before, During and After the Financial Crisis
 - Preliminary Findings, September 2010

Liquidity – definition:

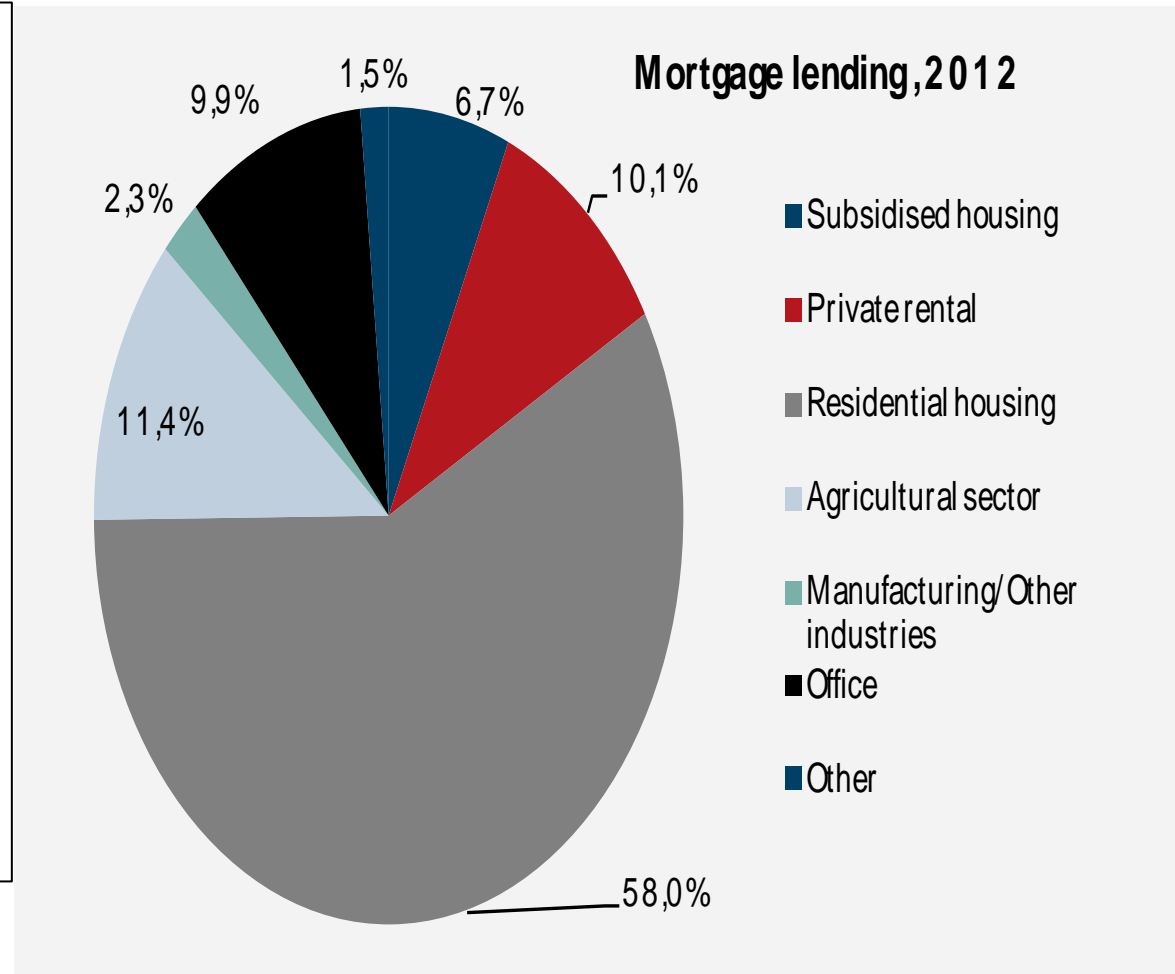
1. Liquidity is how fast you can generate cash (fungible fiat money which you can use for any purpose) from an asset, either physical or paper claim.
2. Liquidity can mean selling or repo-ing, either in the public financing markets or with the central bank. If the central bank has a proper asset-based lending programme, a private market will spring up in front of it and you will not need it.
3. Liquidity is measured by size, speed, bid/offer spread ... it is not measured by price levels. A liquid market, by definition, has prices move on a continuous basis to make sure that buyers equal sellers. Little price movement and large changes in volume is evidence of an illiquid asset.
4. Liquidity is like creditworthiness, if you have to ask about it and you must make giant protestations about it then you don't have it.
5. Liquid markets share attributes, like the ability to set short positions or market makers whose jobs depend on finding the market clearing price at all times. The most liquid markets make no distinction between primary and secondary transactions, in which a new short position is treated the same as new primary issuance. Thus, futures markets are very liquid. The Danish mortgage market is quite similar since the issuer (household) is economically the same as a short seller with a term repo ... both can be buyers when the market falls. Show me a market that has shorts and you have found a liquid market. Show me a market that cannot be shorted and you have found a market that will fail when prices fall.

Issues facing Danish MCIs

- Danish mortgage loans are no longer entirely financed through 30Y callable bonds - but no other mortgage market in the world does either!
- Different Danish borrower segments finance themselves different ways
- Danish borrowers have lots of choices, all priced by the bond market
- Looking around the world – Danish covered bonds are still the safest!
- The Danish MCIs made some mistakes and should focus on past success
- The Danish government and regulators have also made some mistakes but have shown leadership on moral hazard and bank resolution issues
- The rating agencies have used inappropriate models based upon RMBS failures elsewhere... and the bond market knows it.
- The ratings agencies did the Danish mortgage banks a big favor by starting with them

Borrower Type

- Compared with other countries - a large part of Danish mortgage loans are provided for Commercial, Agriculture, Rental Housing and Social Housing.
- Those loan segments have natural preferences for ARMs and floating rates.
- This explains a large part of the Danish ARM issuance.
- As illustrated on the following slides, over half of Danish ARMs are given to Commercial, Agriculture, Rental Housing and Social Housing.
- The Residential sector has the lowest ARM penetration rate.
- Danish cover pools mix asset segments unlike other markets.



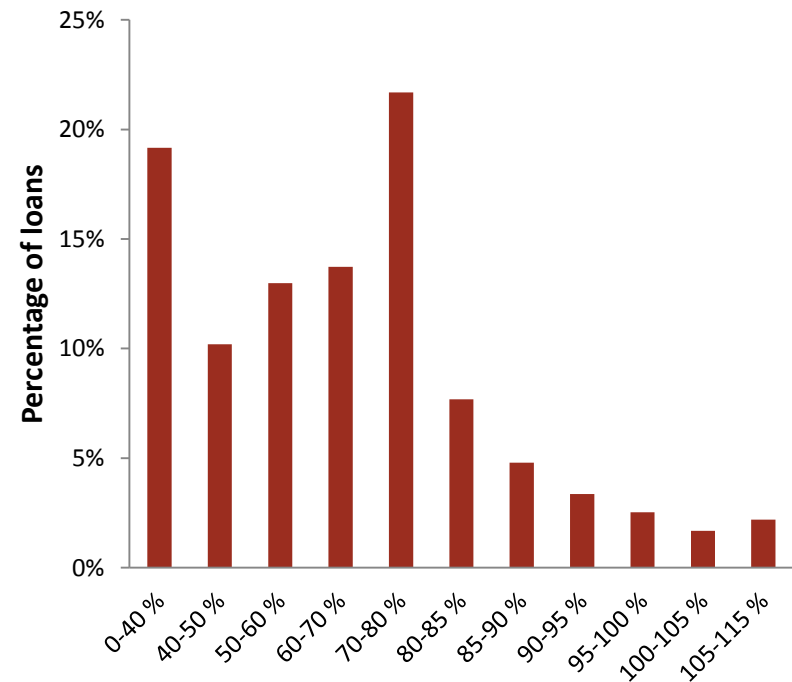
Danish residential loans

Key data on residential loans

- Legal LTV limit = 80%
- Average LTV = 66%
- Roughly 1.2 million households with loans
- Average loan size = 114,000 EUR
- 56% of loans are fixed rate and capped floaters
- 44% of all loans are Adjustable Rate Mortgages (ARMs and uncapped floaters)
- Most of the ARM borrowers are sophisticated and know what they are doing
- Perhaps 20% of the Danish ARM borrowers are doing so for affordability reasons, this is a source of significant risk to the MCIs
- Such borrowers are more likely to be younger and have less savings

LTV distribution

LTV distribution: residential loans



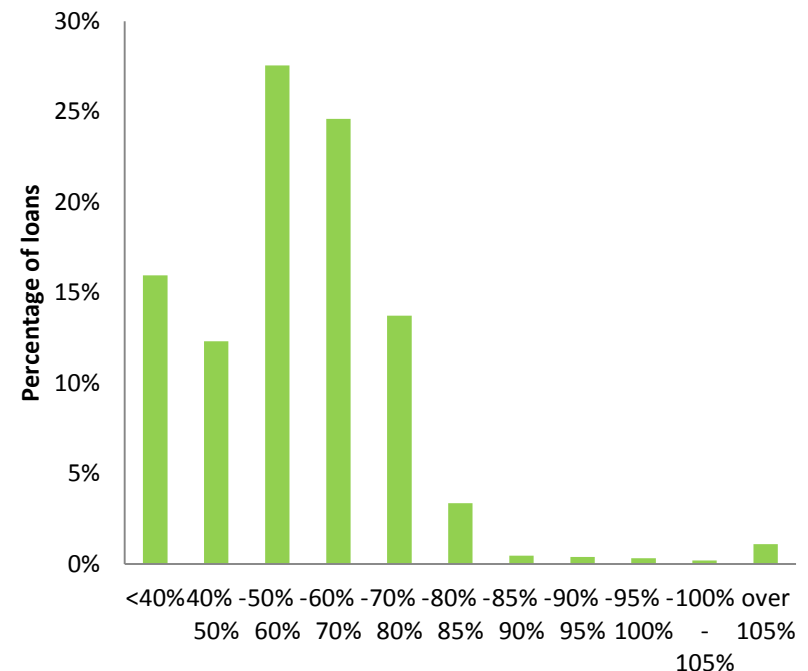
Danish commercial loans

Key data on commercial loans

- Legal LTV limit = 60%
- Average LTV = 56%
- Median LTV = 32%
- Average loan size DKR 7.2 million
- 13% of loans are fixed rate
- 87% of all loans are Adjustable Rate Mortgages (ARMs and uncapped floaters)
- Corporate Treasurers use the Danish mortgage system as their main source of debt, as it is more efficient
- Corporations tend to borrow more short term than long term, they are NOT natural borrowers of 30 year, fixed-rate loans
- Corporate Treasurers are professionals and constantly adjust their debt to equity ratios based upon numerous factors

LTV distribution

LTV distribution: commercial loans



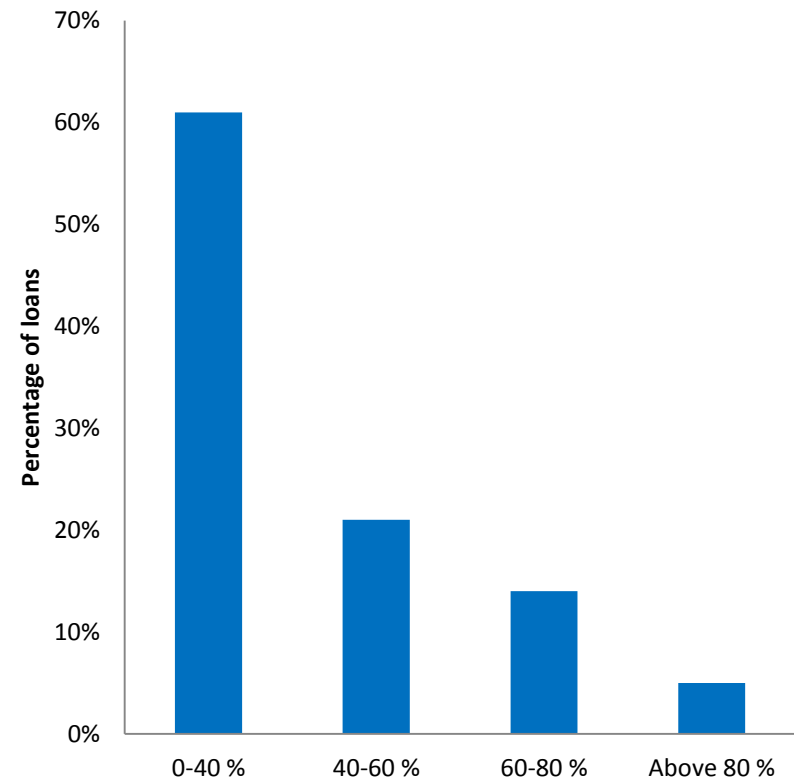
Danish rental housing loans

Key data on rental loans

- Legal LTV limit = 80%
- Average LTV = 62%
- Median LTV = 36%
- Average Loan Size of DKR 5.5 million
- 20% of loans are fixed rate
- 80% of all loans are Adjustable Rate Mortgages (ARMs and uncapped floaters)
- This is a source of significant risk to the MCIs....

LTV distribution

LTV distribution: rental housing

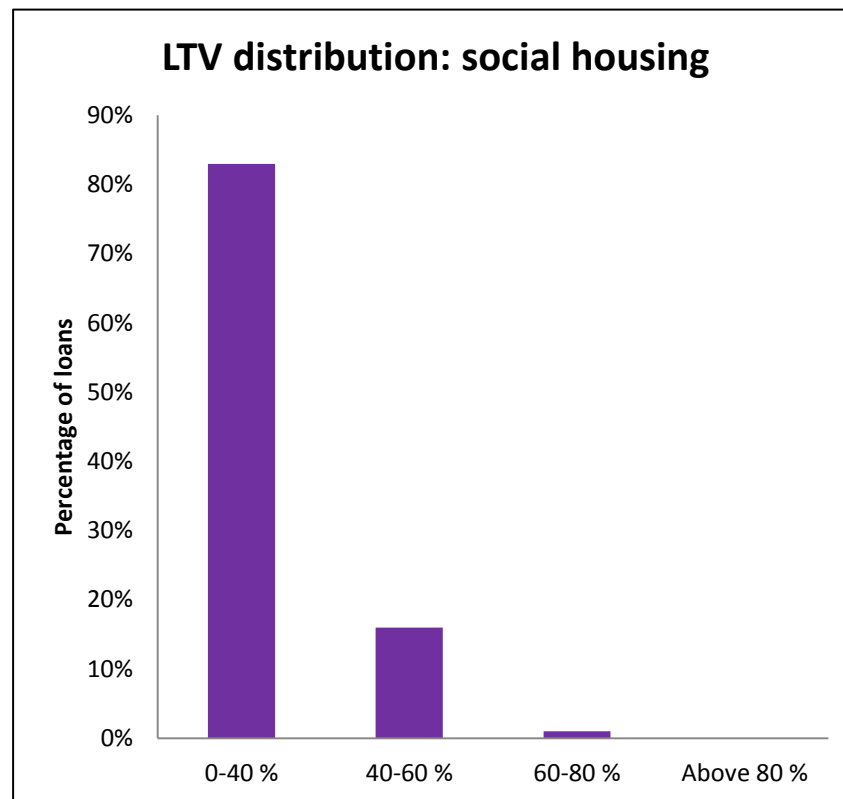


Danish social housing loans

Key data on social housing

- Legal LTV limit = 80%
- Average LTV = 40%
- Median LTV = 24%
- Average Loan Size of DKR 8.2 million
- 40% of loans are fixed rate
- 60% of all loans are Adjustable Rate Mortgages (ARMs)
- No floaters, capped or uncapped
- Municipalities are instructed to borrow short by Minister of Economy and Nationalbanken as Denmark has almost no public debt and should not have long tenors
- Municipalities have never been able to keep the benefit from alternative redemption of their bond series at a discount
- Zero credit risk in this sector

LTV distribution



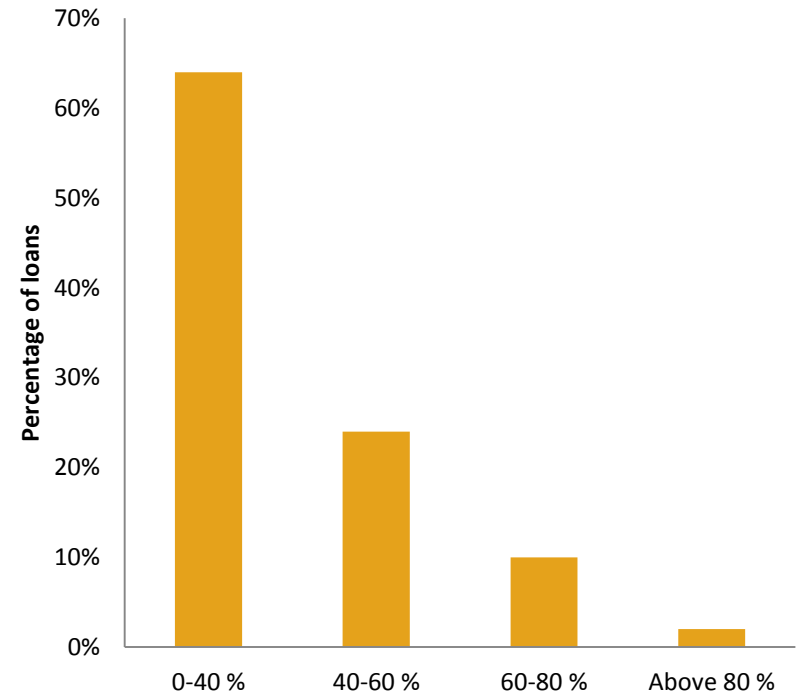
Danish agricultural loans

Key data on agricultural loans

- Legal LTV limit = 70%
- Average LTV = 49%
- Median LTV = 33%
- Average loan size of DKR 4.0 million
- 19% of loans are fixed rate or capped floaters
- 82% of all loans are Adjustable Rate Mortgages (ARMs or uncapped floaters)
- Farmers income is highly geared to food inflation, probably a safe bet to be borrowing in floating rates.

LTV distribution

LTV distribution: agricultural loans



Conclusions

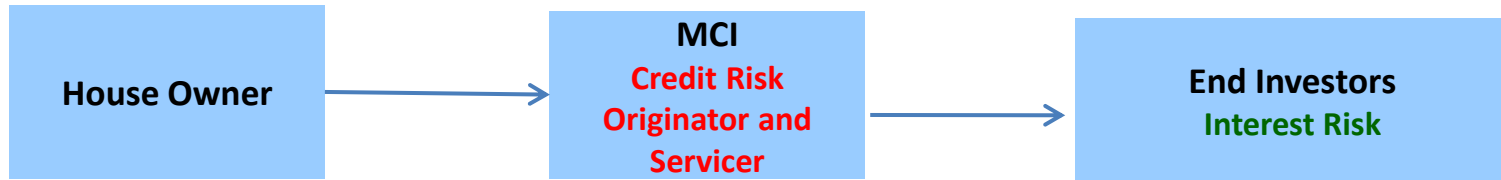
- ARMs have allowed Danish borrowers to put aside savings or pay down debt
- ARMs are priced and held by the bond market, no bank is forced to own a market indexed security below their cost of funding
- By breaking down the borrowers by sector we see that households are much less exposed to floating rates than the entire universe of Danish borrowers
 - Owner Occupied ARMs – 44%
 - Social Housing ARMs – 60%
 - Private Rental ARMs – 80%
 - Commercial and Industrial ARMs – 87%
 - Agriculture ARMs – 82%
- NRSROs did the Danes an unintended favour by calling for more capital in June
- There is some risk in the commercial and household sector, but there is plenty of capital to deal with the worst case situation

The “Best” Model for Mortgage Finance

- Basle II risk capital guidelines
 - Article 22.4 of UCITS directive
 - Lowest risk capital weighting will rule the roost
- Central Bank “repo-ability” provides liquidity(see Fed and ECB)
- Consumers and bondholders will choose the winner
- Standardized and transparent loans and bonds = the best
- System should have macro economic stabilizers built in
- Extra Balance Sheets are unnecessary and a potential source of risk
- Deposit based systems are fraught with risks in volatile rate scenarios
- Inflexible Bond based systems do not scale up
- Other covered bond models are very inefficient structures (extra OC)

- Transparency of loans to bonds and information search costs
- Regulatory and Ratings Issues
- Credit, Delinquency and Foreclosure Issues
- Externalities through linkage mechanism to Capital Markets
- Premium vs. Discount Origination
- Socialization of Credit Risk or Credit Availability
- Conflict of interest between bond holders and issuers/insurers
- Mortgage insurance through balance sheet or monoline providers
- Vertical integration or atomization of skills (separate origination, financing, securitization, trading, investing, servicing, master servicing and special servicing functions)

How the system could be fixed by emulating Denmark

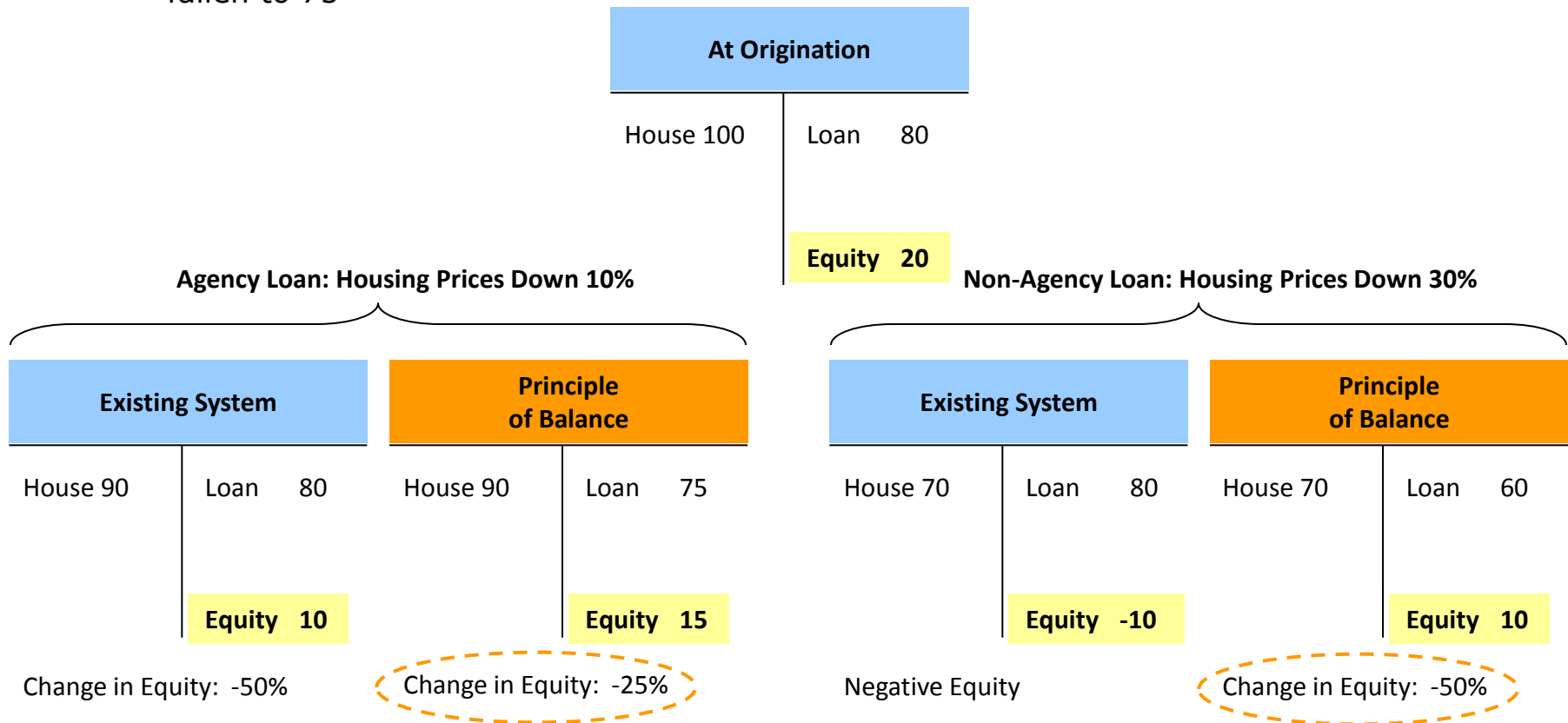


1. **Mortgage Credit Institutions (MCIs)** are required to retain credit risk and service the loans
 - Bond investors only retain interest risk rather than credit and interest risk
 - MCIs can participate on equal terms, subject to rigorous regulatory requirements
 - MCIs act as “liability advisors” to homeowners, seeking to put their customers into the lowest risk adjusted cost loans AND seeking to take advantage of temporary dislocations in the bond market that may allow for an NPV gain for the borrower
2. Mortgage is funded by the issuance of standardized bonds
 - Bond market deals with familiar and hedgeable risks: level of rates, slope and curvature of yield curve, interest rate volatility, financing and counterparty selection
3. Asymmetric nature of most mortgage systems is replaced by the Danish Principle of Balance

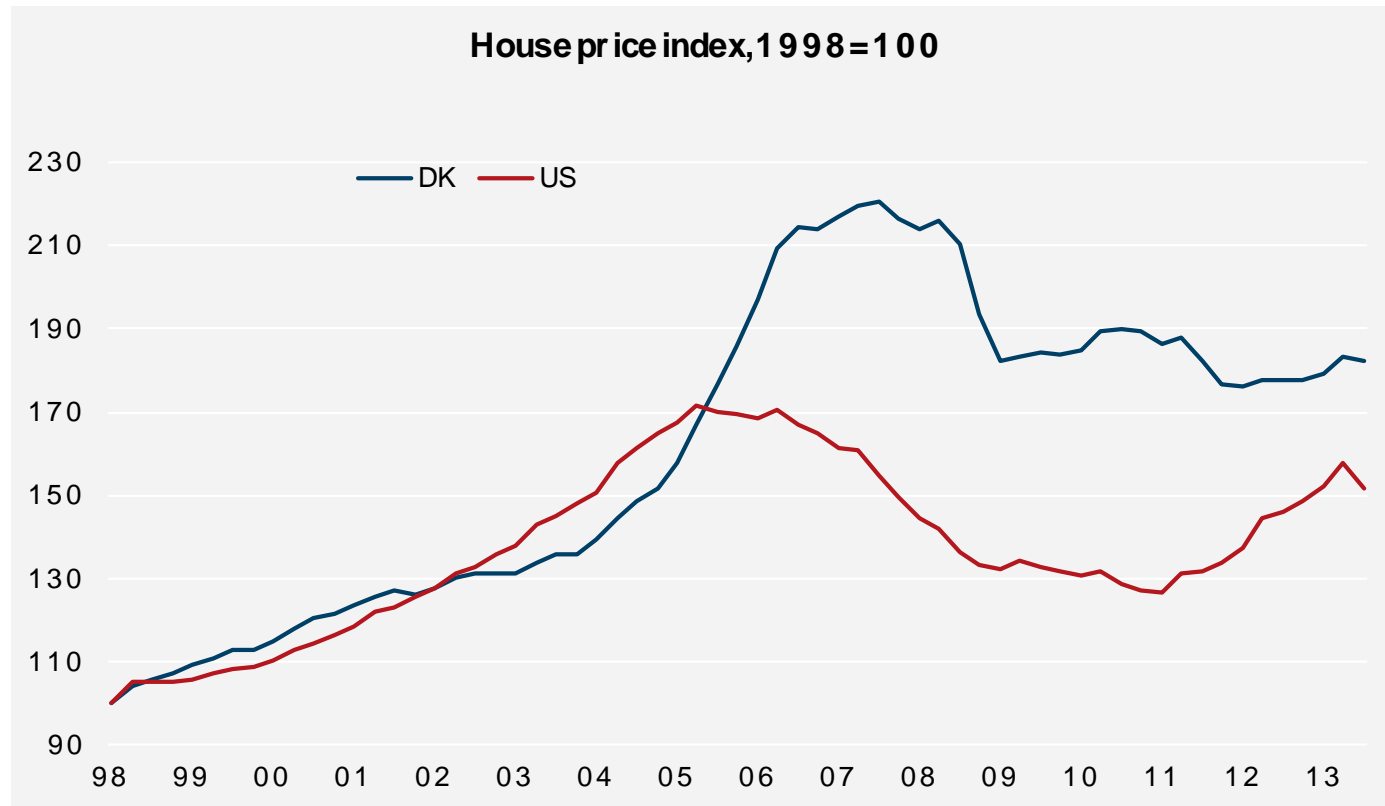
Principle of Balance: Borrowers can retire their mortgages by paying the lower of par or by purchasing the bond at the current market price

Choice of securitization model can reduce negative equity

- Typical homeowner scenario:
 - Borrower pays \$100,000 for a house with an 80% LTV, loan originated at par
 - Agency Loan, housing prices have fallen 10% and FN 5% mortgage bond prices have fallen to 94
 - Non-Agency Loan, housing prices have fallen 30% and mortgage bond prices have fallen to 75

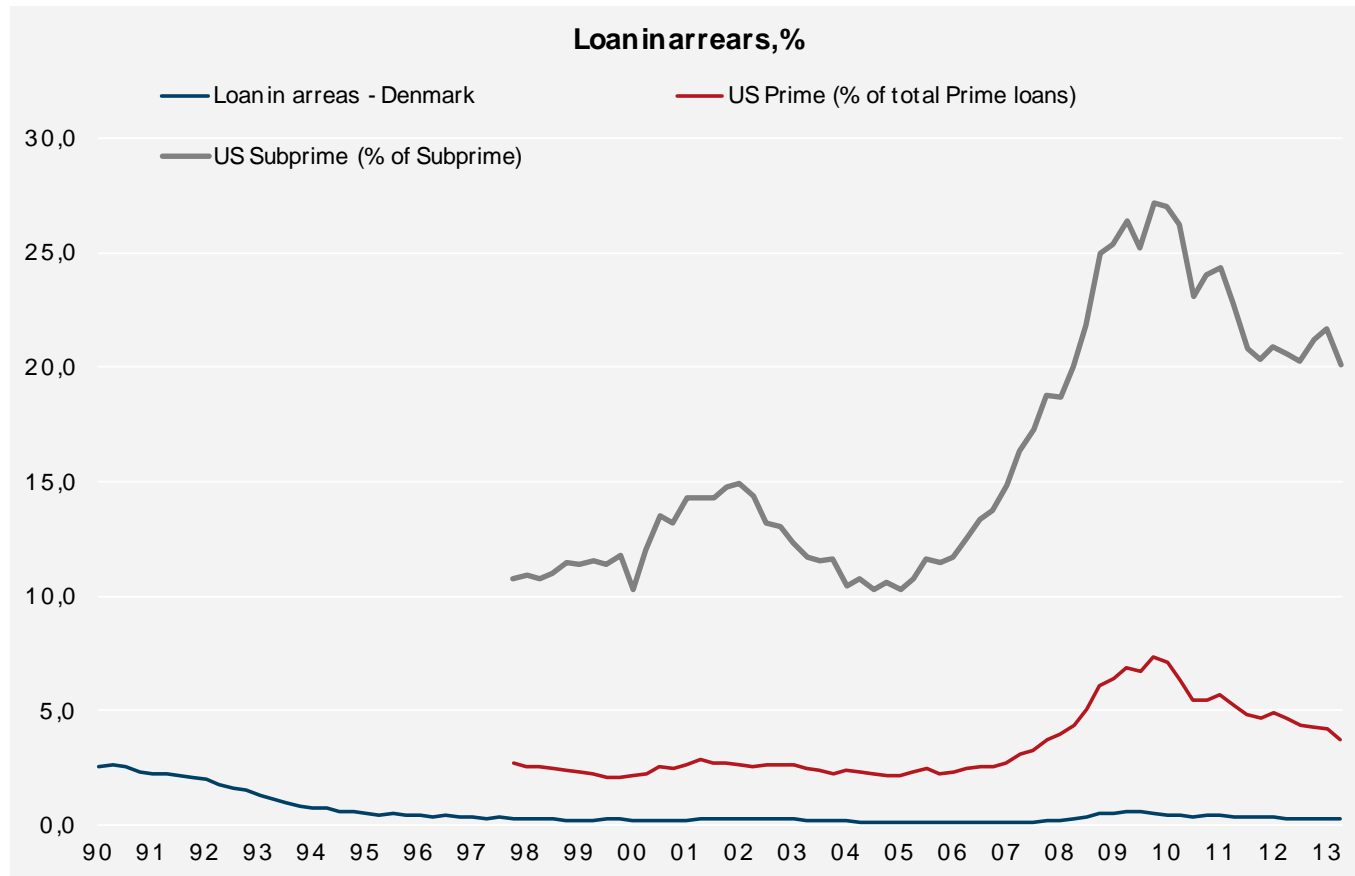


Denmark experienced a larger housing bubble...

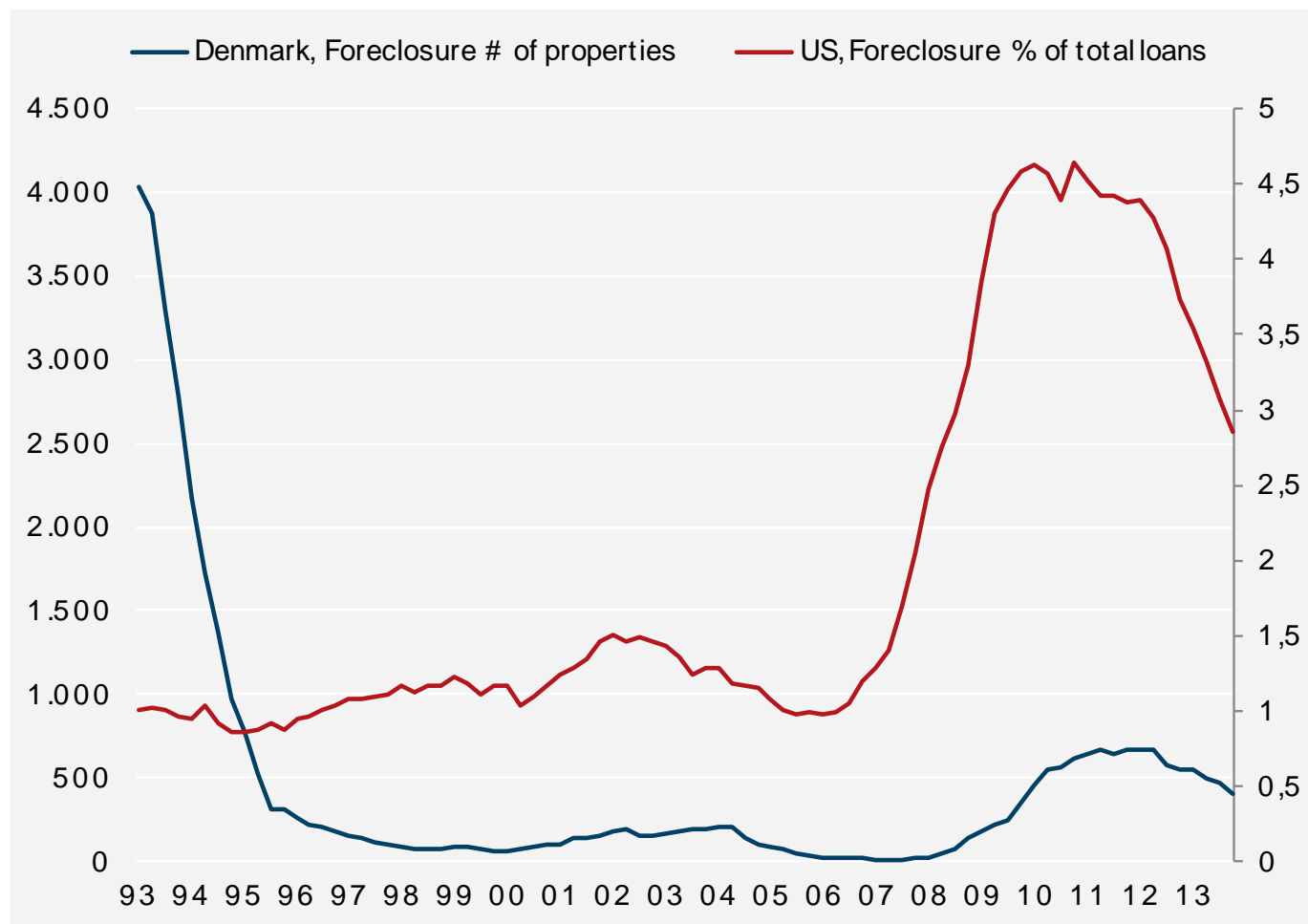


Source. Danske Markets, Bloomberg

Loans in arrears – small in DK relative to US



US experiences higher total foreclosure rates

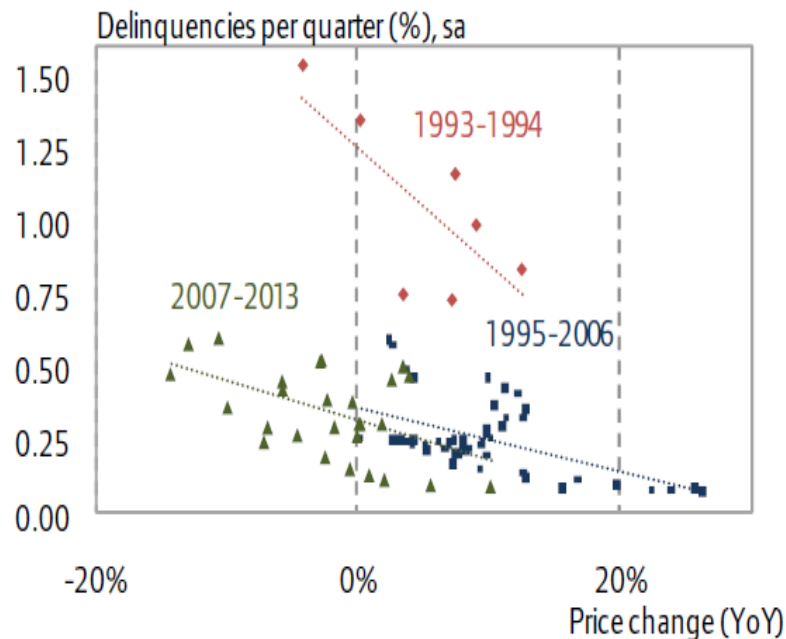


Source. Danske Bank, Ecwin, Realkreditrådet.

Denmark vs. US

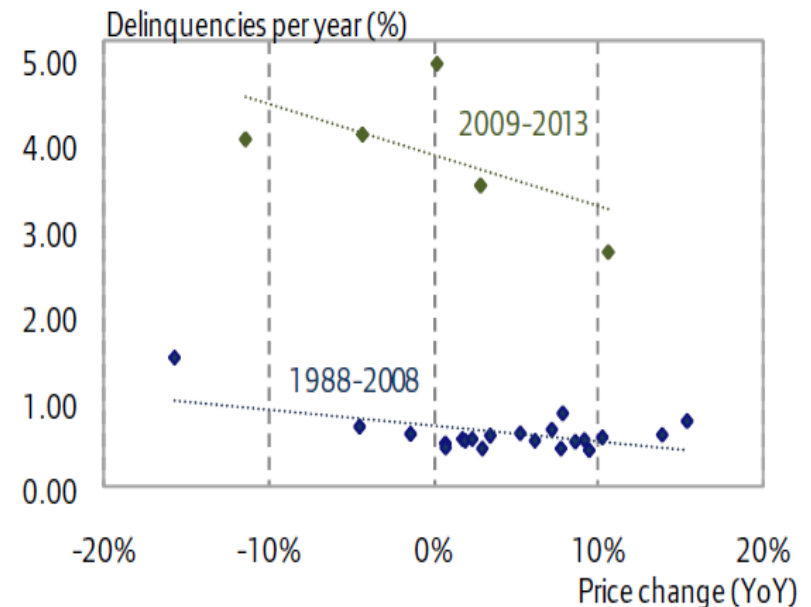
DK: Price decline of 15-20% and rise in delinquencies to 0.6% in 2009

US: Price decline of 25-30% and rise in delinquencies to 5%



House prices have plunged by nearly 20% since 2007, but homeowners' mortgage delinquency rate has not exceeded 0.6% since then.

Source: Association of Danish Mortgage Banks, Nykredit Markets



In the US, house prices plunged by more than 30% from the peak in 2006 to the trough in early 2012. Homeowners' delinquency rate rose markedly in 2008-2009, exceeding 5% at the beginning of 2010.

Source: RealtyTrac, Macrobond, Nykredit Markets

Fully transparent: real time information on each series

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Bonds Denmark

Search Danish bonds

Search: name/ISIN-code:

Bond type ☐ Benchmark bonds ☒ Mortgage credit and special institutions ☐ Government bonds ☐ Structured bonds ☐ Corporate and other bonds ☐ Forwards

Issuers

Coupon/Expiry

Interest rate type ☐ Fixed ☐ Floating

Deferred amortisation ☐ Yes ☐ No

Open / Closed ☐ Open ☐ Closed

Name	ISIN	Coupon	Year of expiry	Volume	Exp.	CCY
10DLR43.18	DK0006304035	10.00	2009			
6BRF111.26	DK0009334575	6.00	2010			
7NYK 03A.32	DK0009750010	7.00	2011			
8NYK 3Cs26	DK0009726309	8.00	2012			
6 D 23ds35	DK0009268765	6.00	2013			
4 KBH13.14	DK0007200703	4.00	2014			
6nyk03D.35	DK0009753386	6.00	2015			
5NYK2C.19	DK0009745796	5.00	2016			
5TK111Cs32	DK0004713807	5.00	2017			
			2018			
			2019			
			2020	227	2019-02-01	DKK
			2021	109,041	2026-10-01	DKK
			2023	391,516	2032-07-01	DKK
			2025	4,654,792	2026-10-01	DKK
			2026	100,000	2033-07-01	DKK
			2028	20,000	2014-01-01	DKK
			2029	340,000	2033-07-01	DKK
			2031	173,899	2019-10-01	DKK
			2032	1,687,692	2032-07-01	DKK
			2033			
			2035			
			2037			
			2038			
			2041			

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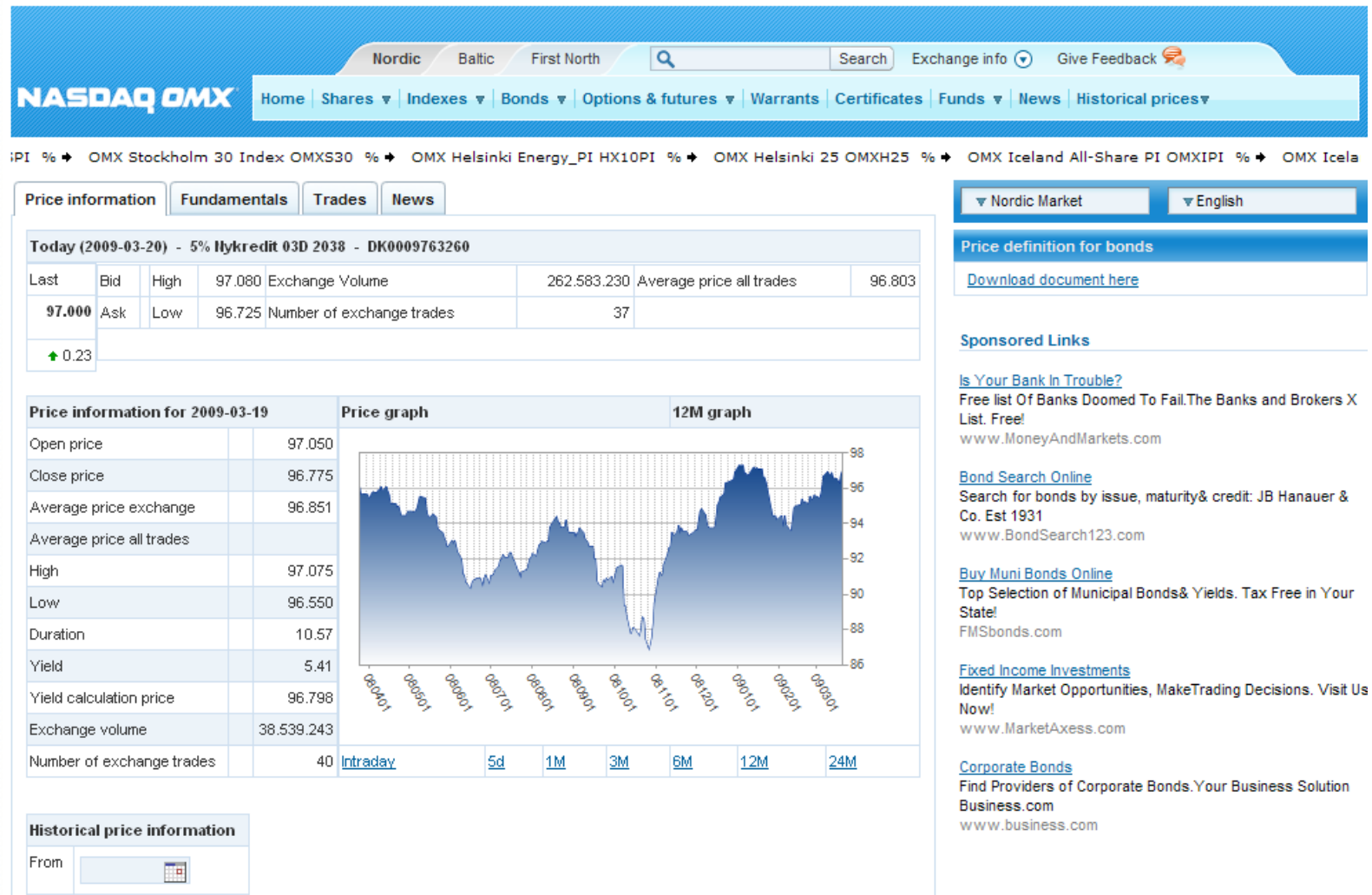
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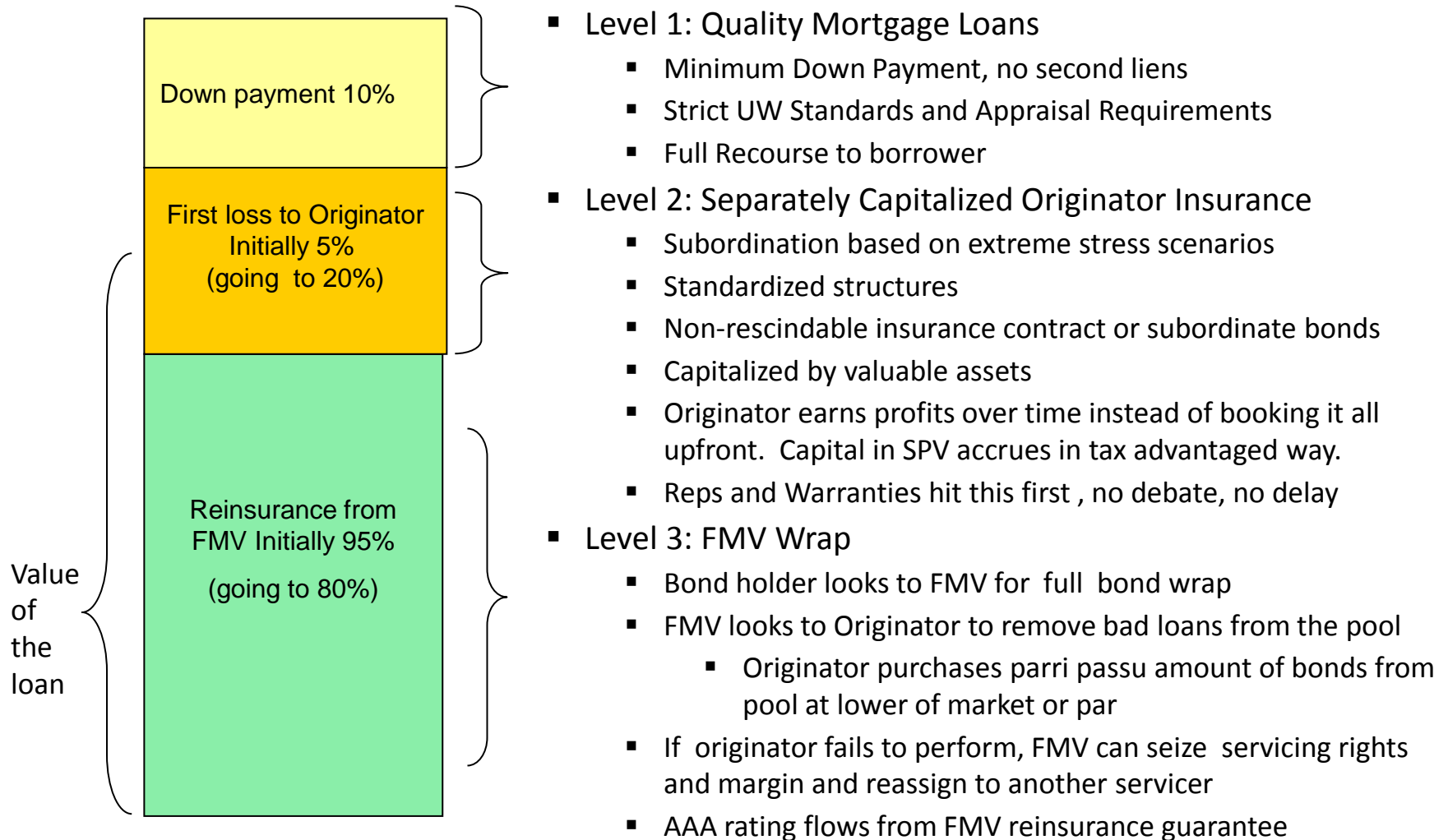
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Time series and transactions data



Credit Enhancement Structure for Risk Sharing



- Incentive alignment
 - Originator takes only the risk they are best equipped to deal with, individual credit risk of borrowers they know
 - FMV focuses on industry standards and surveillance systems
 - FMV raises outside capital to expand reinsurance business
 - Private sector participation for other asset classes (agriculture, hotels)
 - Mining Fund for affordable housing
- Reduce risk over time by having lower inception levels for taxpayers.
 - Private sector takes more of the first loss every year.
 - FMV starts with bottom 95% of risk
 - Maximum inception point drops by 1-2% every year until it reaches 80% of loan value
- Expected Capital reserves in separate insurance SPV of Originator
 - 30% for first 5% loss / 1.5 points
 - 20% for first 10% loss / 2 points
 - 12% for first 30% loss / 3.6 points

Denmark vs Sweden

	Sweden	DK	SW-DK
Rates			
5 Year Government	1.47	0.81	66
5 Year Swap	1.88	1.25	63
5 Year Mortgage Loan	3.54	1.97	1.57
5 Year Mortgage Bond	2.23	1.15	-1.08
Spreads			
Swaps - Government	41bp	44bp	-3bp
Loan-Bond	131bp	82bp	49bp
Bond-Swap	35bp	-10bp	45bp
Ratings			
LTV Maximum	75%	80%	5%
Balance Principle	Cover Principle	Extreme Balance Principle	

Denmark vs the Netherlands

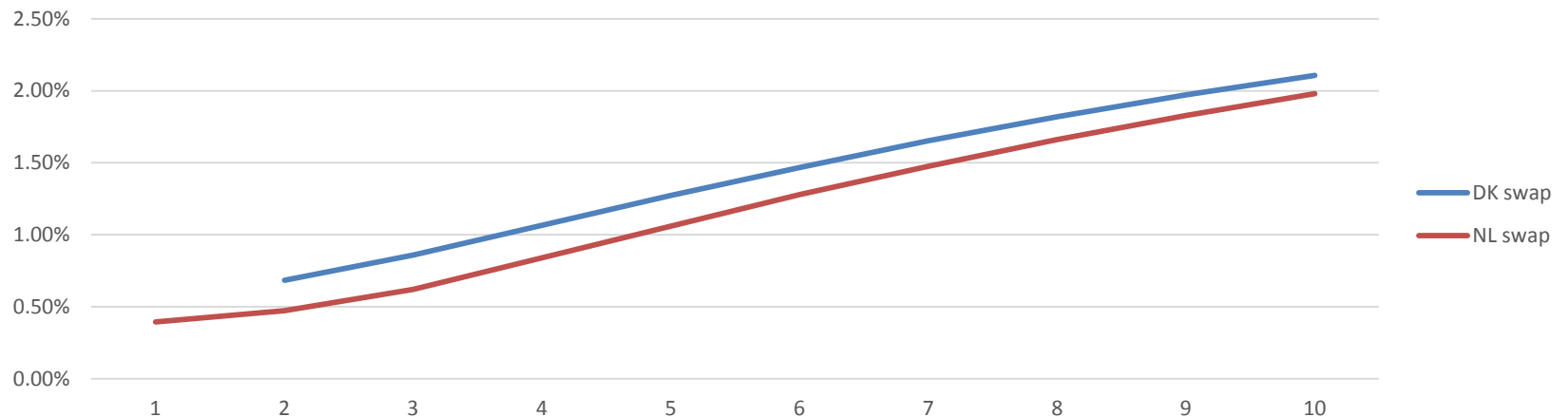
	Nederland	DK	NL-DK
Rates			
5 Year Government	0.79	0.77	0/02
5 Year Swap	1.06	1.27	-0/21
5 Year Mortgage Loan	3.60	1.90	1.70
5 Year Mortgage Bond	1.18	1.11	0.07
Spreads			
Swaps - Government	27bp	50bp	-31bp
Loan-Bond	242bp	79bp	2.00bp
Bond-Swap	12bp	-16bp	28bp
Ratings			
LTV Maximum	100%	80%	20%
Balance Principle	Cover Principle	Extreme Balance Principle	

The Netherlands

- The efficiency of the Danish mortgage market is perhaps best demonstrated when compared to the Netherlands
- Netherlands is 3x the size of Denmark. other than that both countries are very comparable:

Source: CIA factbook 2010	Population	GDP	GDP/Capita	Unemployment	Current account	Debt/GDP	Budget deficit	Growth rate	Country rating
Netherlands	16.8 million	\$680 billion	\$40,300	5.5%	+\$61 billion	63%	-5.3%	1.7%	AAA
Denmark	5.5 million	\$210 billion	\$36,600	5.9%	+\$17 billion	43%	-2.8%	2.1%	AAA

- The interest term structure does not differ much as shown in the respective swap-curves below
- As of **April 2014**, the Dutch swap-curve is about 20 bps below the Danish

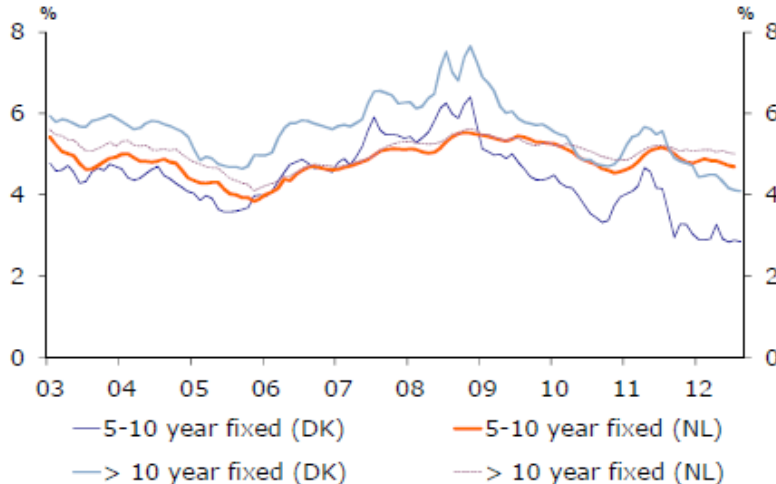


Source: www.dnb.nl, www.finansraadet.dk

The Netherlands

Source: <i>www.hypo.org</i>	Mortgage debt	Residential debt/GDP	Per capita mortgage debt	Foreclosures % of housing stock	Tax deductibility
Netherlands	€630 billion	106%	€37,000	Less than 0.1%	Up to 52%
Denmark	€235 billion	104%	€42,000	Less than 0.1%	33%

Mortgage rates in the Netherlands and Denmark



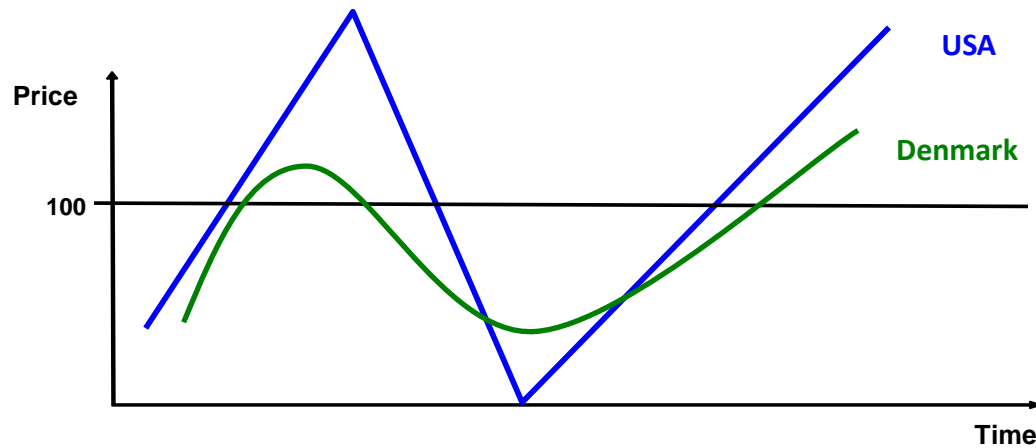
Source: www.hypotheekrente.nl, www.nykredit.dk

Netherlands could benefit from the Danish standardized bond market solution:

- LTVs would decline: Dutch mortgages even after reforms likely to carry 100% LTV, Danish 80% LTV.
- Roll-over risk would be eliminated through the pass-through structure, i.e. higher rates (spreads) during downturn would no longer be material for consumers.
- Fixed-rate loans would have to be fully amortizing, could carry full prepayment option (reducing credit risk).
- The delivery option would reduce credit risk for Dutch lenders since many consumers would repurchase their loans when spreads increase (house prices fall).
- Increased competition in the deposit and interbank markets, which has affected NL during the crisis, would not matter for the funding of existing mortgages.
- Wholesale funding would become less expensive through standardization.

These steps would reduce the differences in rates seen between NL and DK during this crisis (chart).

Securitization choice can reduce interest rate volatility

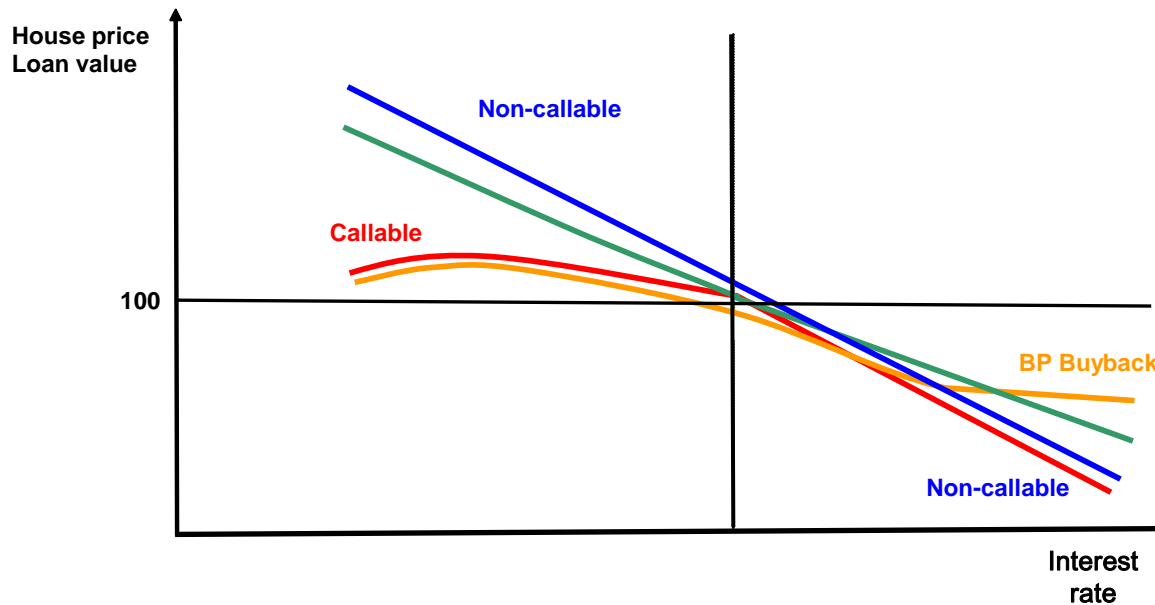


Option Adjusted Duration (Years)

	USA (orig. @ 101.6)			DK (orig. @ 98.9)		
	<u>5.5%</u>	<u>4.5%</u>	<u>3.5%</u>	<u>5%</u>	<u>4%</u>	<u>3%</u>
Rates – 100bp	---	(0.8)	3.6	---	.28	8
Spot	---	2.5	---	---	6.9	---
Rates +100bp	n/a	7.4	---	5.5	7.5	---

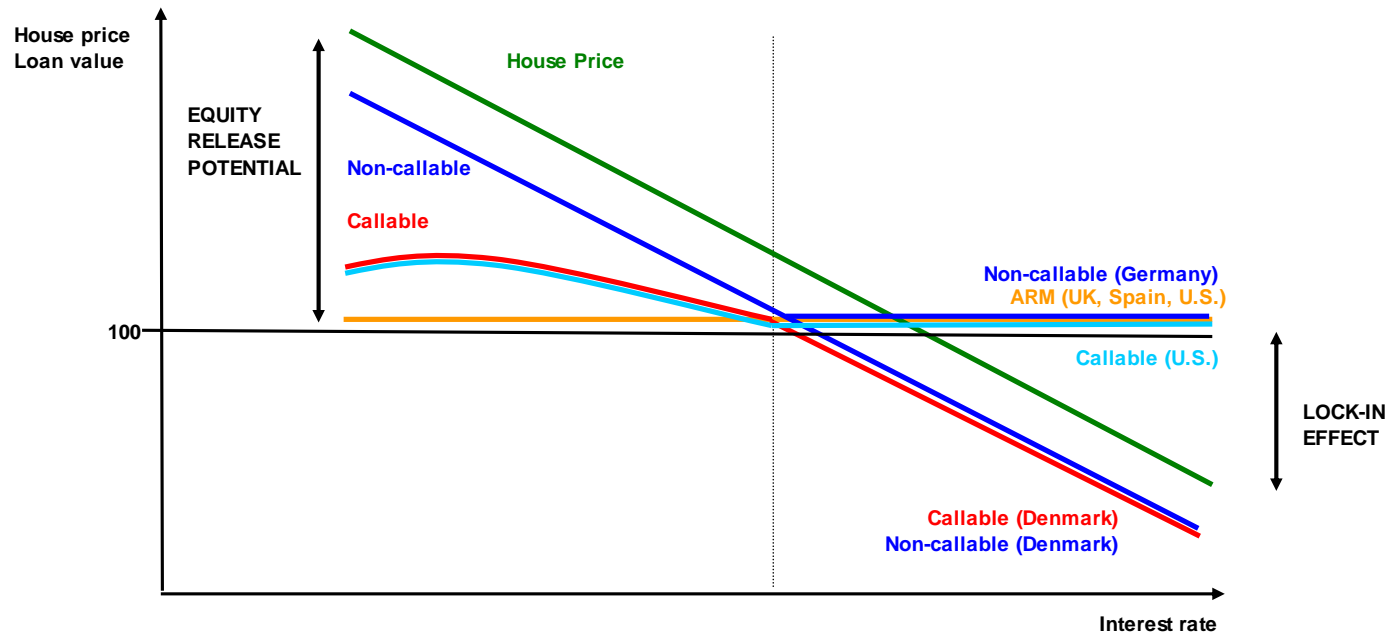
- U.S. mortgage market is a “premium origination” model. This opaque process is used to get the bond market to pay loan origination costs
- Callable loans are made with option struck in the money. This leads to the OAD “illusion” of very low durations of 30 year mortgages
- When interest rates rise, “contingent duration” appears and can be a multiple of original OAD
- No mechanism for the bond market to reduce systemic duration risk
- Danish model is a “discount origination” model
- Loans are priced transparently by bond issuance
- Mortgage banks compete with transparent origination, servicing and insurance charges
- Callable loans are made with option struck out of the money. Thus, 30 year mortgages have significant duration at issue
- When interest rates rise, the duration of the loans increases slightly
- Homeowners can take duration out of the system via optional redemption and refinancing a smaller balance into a higher coupon loan. Call option is re-struck at market rates

Securitization choice can improve negative convexity



- Callable mortgage markets suffer from “convexity paradox” where each investor must hedge his own changes in OAD as well as worry about all the other investors trying to hedge changes in OAD. This becomes an exercise in game theory, as investors hedge to the expectation of other investors’ hedge activity
- Individual investors (and system) worry about change in partial durations (dP/dY) and the size of the error term at every point on the expected callable mortgage price/yield path vs. the original hedge duration
- Duration management tools (interest rate futures, swaps and options) are smaller than the mortgage market
- Asymmetric U.S. mortgage market results in significant duration extension when interest rates rise
- Danish mortgages allow for homeowner to exercise optional redemption when bonds trade at discounts. This smoothes the price path when rates rise. The mortgages trade with lower “empirical” duration. This allows for a lower “hedge duration” at loan origination AND smaller error terms at each point on the price/yield path

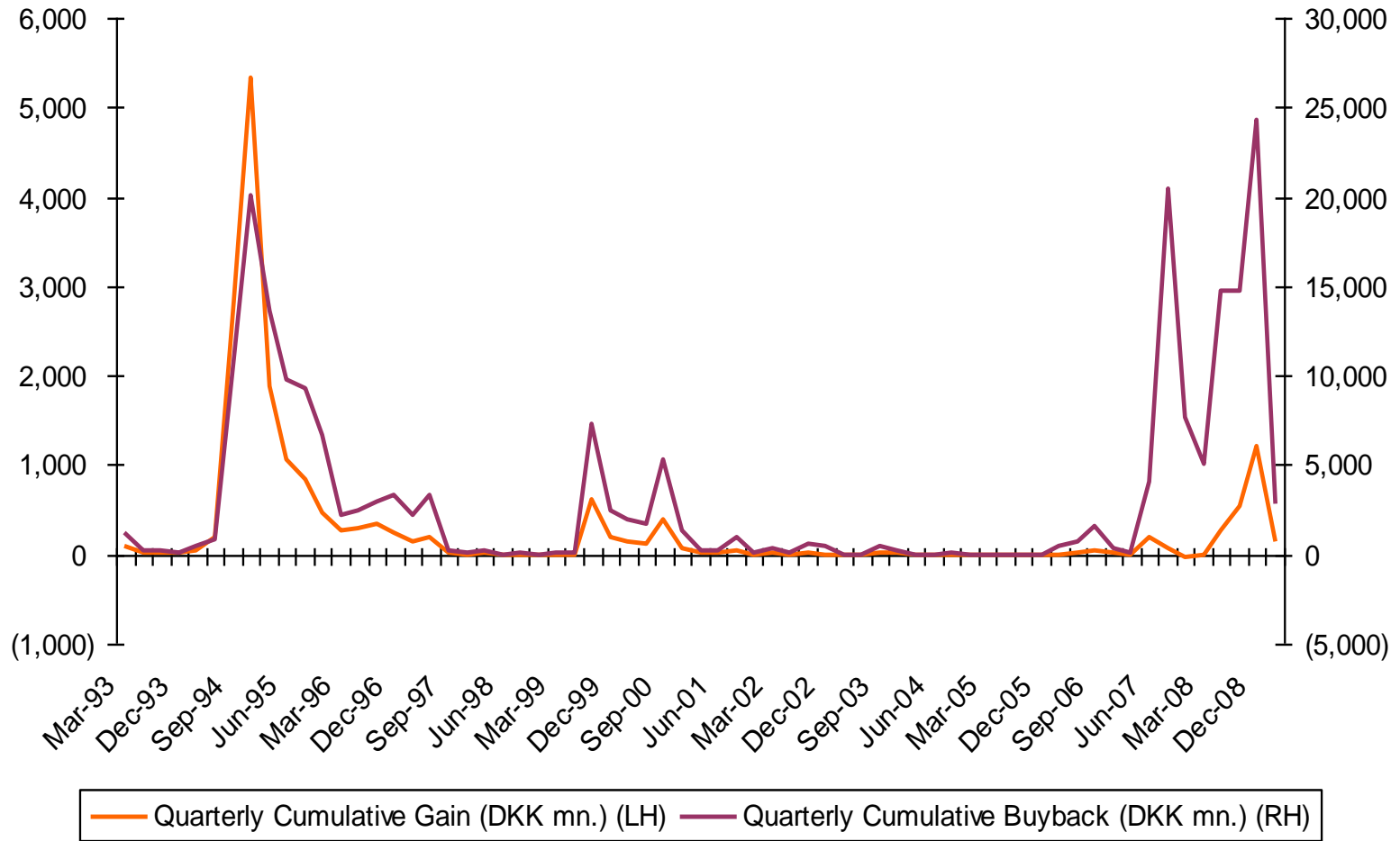
Summary of mortgage risk transfer systems



- **U.S. Mortgage Loans:** Can be called at par. However, due to non-standardized securitization, loans may not be redeemed at the market price when trading at a discount. This allows for equity release in event of lower rates, but subjects the borrower to the lock-in effect when rates rise
- All Adjustable Rate Mortgages are worth par in most interest rate scenarios. This implies that the borrower has no hedge against the interest rate sensitivity of home prices exposing him to more significant fluctuations of net home equity
- **Danish Mortgage Loans:** Can always be prepaid at par or redeemed by purchasing the bond at the market price
- **German Mortgage Loans:** Non-Callable at par: homeowners must instead pay a yield maintenance penalty equal to the NPV of the cash flows. When interest rates are higher, the loans are not redeemable at a discount. This is the worst of all possible risk transfer mechanisms

Alternative Redemption Increased to Stabilize Market

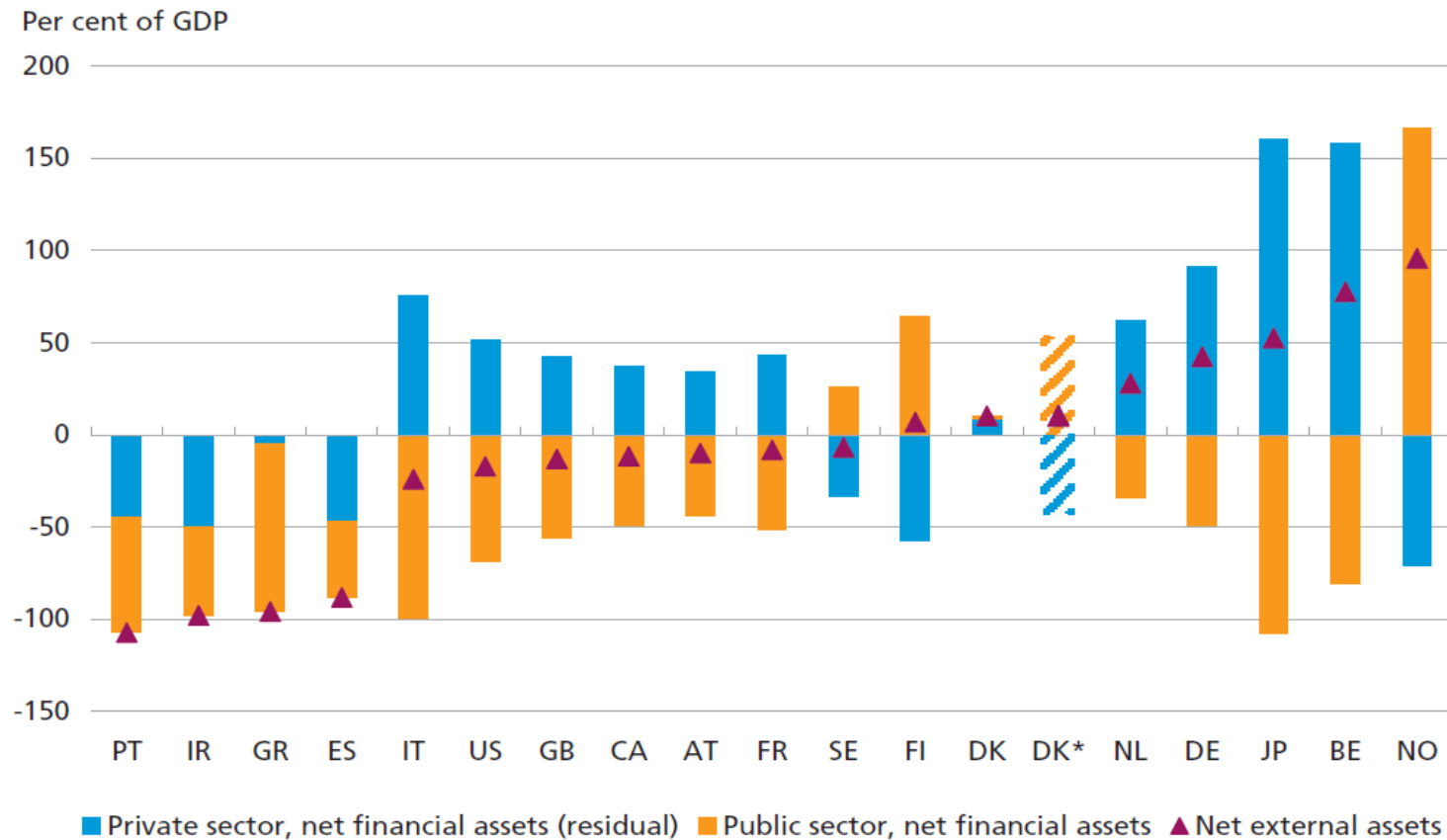
absalonproject



Denmark is Rich

EXTERNAL DEBT AND NET FINANCIAL ASSETS AT SECTOR LEVEL (2010)

Chart 4

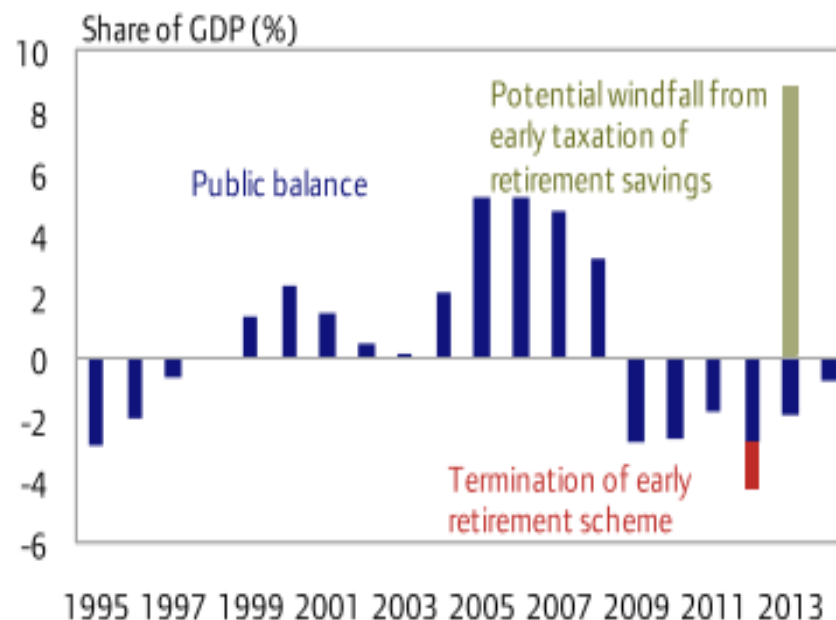


Note Due to lack of data, statistics for Italy, France, Germany, Japan and Ireland are from 2009. DK* indicates sector balance sheets for Denmark, adjusted for deferred tax on household pensions.

Source: IMF, Eurostat and OECD.

Government is a saver

- Government debt is only 35% of GDP
- Government is running cash balances of DKR75 billion in the banking system
- Entire pension fund system is solvent at market discount rates and underweighted in mortgage bonds
- Corporations are flush with cash
- If the government and corporations are big savers, then someone has to borrow. This is not an option, it is a tautology

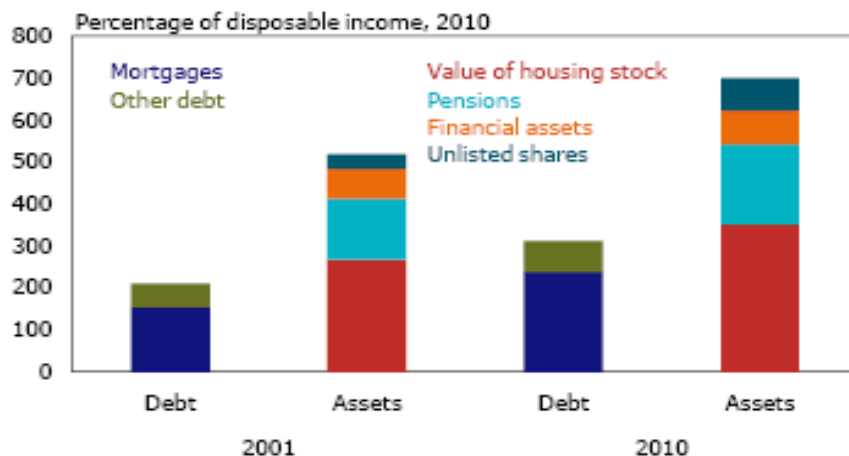


The massive deficit this year may well turn into a surplus in 2013.

Source: Macrobond

Households must borrow

- Danish households are needed to balance the current account
- The Danish mortgage system makes it efficient for households balance
- Danish households can borrow flat to the CIBOR/EURIBOR curve
- Household wealth is up substantially. They own the country and companies
- They are being paid to expand their balance sheets as their assets yield much more on an after-tax basis than mortgage bond liabilities
- This makes a lot of sense.



Danes have substantial wealth.

Sources: Danmarks Nationalbank, Nykredit Markets



Danish households are the most indebted in the Nordic region – but also the most wealthy.

Sources: Danmarks Nationalbank, Nykredit Markets

S&P Ratings 2014

Capital centre	Classification	Rating (ICR/covered bond)	Outlook	Current ALMM Risk	WAFB	WALS	Target CE	Actual CE	Maximum uplift above the ICR	Unused uplift
Realkredit Danmark		A-	Stable outlook							
Capital centre S	SDRO	AAA	Stable outlook	Low	20.04%	28.77%	5.66%	11.22%	7 notches	1 notch
Capital centre S	JCB	A-	Stable outlook							
General capital centre	Grand RO	AAA	Stable outlook	Low	16.48%	23.31%	4.04%	4.63%	7 notches	1 notch
Capital centre T	SDRO	AAA	Stable outlook	Low	22.52%	29.39%	6.69%	11.84%	7 notches	1 notch
Capital centre T	JCB	A-	Stable outlook							
Danske Bank		A-	Stable outlook							
Register C	SDO	AAA	Stable outlook	Low	22.46%	24.44%	33.74%	39.30%	7 notches	1 notch
Register D	SDO	AAA	Stable outlook	Low	12.80%	37.82%	19.15%	19.80%	7 notches	1 notch
Register I	SDO	AAA	Stable outlook	Low	13.97%	18.43%	19.53%	20.46%	7 notches	1 notch
Nykredit Realkredit		A+	Negative outlook							
Capital centre C	Grand RO	AAA	Stable outlook	Low	14.98%	9.91%	4.86%	6.76%	7 notches	3 notches
Capital centre D	Grand RO/ New RO	AAA	Stable outlook	Low	20.43%	25.29%	5.57%	6.43%	7 notches	3 notches
Capital centre D	JCB	A+	Negative outlook							
Capital centre E	SDO	AAA	Stable outlook	Low	14.97%	26.97%	4.57%	8.49%	7 notches	3 notches
Capital centre E	JCB	A+	Negative outlook							
Capital centre G	New RO	AAA	Stable outlook	Low	27.24%	86.29%	24.03%	25.40%	7 notches	3 notches
Capital centre H	SDO	AAA	Stable outlook	Low	18.07%	26.93%	4.41%	5.05%	7 notches	3 notches
Capital centre H	JCB	A+	Negative outlook							
Capital centre I	New RO	AAA	Stable outlook	Low	13.03%	89.65%	11.78%	14.20%	7 notches	3 notches
General capital centre	Grand RO	AAA	Stable outlook	Low	17.75%	20.53%	36.37%	799.93%	7 notches	3 notches
Totalcredit CC C	Grand RO	AAA	Stable outlook	Low	11.28%	15.59%	1.43%	5.35%	7 notches	3 notches
Nordea Kredit		AA-	Negative outlook							
Capital centre 1	Grand RO	AAA	Stable outlook	Low	13.99%	25.61%	5.17%	9.23%	7 notches	4 notches
Capital centre 2	SDRO	AAA	Stable outlook	Low	20.68%	33.21%	7.76%	15.20%	7 notches	4 notches
BRFKredit		A-	Stable outlook							
Capital centre B	Grand RO	AAA	Stable outlook	Low	20.94%	34.44%	6.82%	11.00%	7 notches	1 notch
Capital centre E	SDO	AAA	Stable outlook	Low	19.45%	35.42%	5.84%	10.01%	7 notches	1 notch
Capital centre E	JCB	A-	Stable outlook							
General capital centre	Grand RO	AAA	Stable outlook	Low	15.93%	34.43%	10.66%	40.08%	7 notches	1 notch
DLR Kredit A/S		BBB+	Stable outlook							
Capital centre B	SDO	AAA	Stable outlook	Low	29.48%	41.79%	12.80%	17.10%	7 notches	0 notch
Capital centre B	JCB	BBB+	Stable outlook							
General capital centre	Grand RO	AAA	Stable Outlook	Low	21.97%	18.37%	5.20%	8.76%	7 notches	0 notch

Source: "Global Covered Bond Characteristics And Rating Summary Q1 2014".

Definition of Terms

GRAND RO: Grandfathered RO bonds issued before 2008 – (RO = Realkredit Obligationer)

New RO: RO bonds issued after Jan. 2008

SDO: Særligt Dækkede Obligationer – covered bonds issued after Jan. 2008

SDRO: Særligt Dækkede Realkredit Obligationer – covered bonds issued after Jan. 2008

CC: Capital center

OC: Overcollateralisation

ALMM: Asset-liability mismatch

WAFF: Weighted-average foreclosure frequency

WALS: Weighted-average loss severity

CE: Credit enhancement

Fitch Ratings 2014

Capital centre	Classification	Rating (IDR/covered bond)	Outlook	Discontinuity Caps	Asset Segregation	Liquidity gap and systemic risk	Alternative management (cover pool specific)	Alternative management (systemic)	Privileged derivatives
Danske Bank		A	Stable Outlook						
Register D	SDO	AAA	Stable Outlook	3 (moderate high risk)	Low	Mod. high*	Moderate	Low	Moderate
Register I	SDO	AAA	Stable Outlook	3 (moderate high risk)	Low	Mod. high*	Mod. high*	Low	Mod. high*
Register C	SDO	AAA	Stable Outlook	3 (moderate high risk)	Low	Mod. high*	Mod. high*	Low	Mod. high*
Realkredit Danmark		A	Stable Outlook						
Capital centre S	SDRO	AAA	Stable Outlook	3 (moderate high risk)	Very low	Mod. high*	Moderate	Low	Very low
Capital centre T	SDRO	AA+	Stable Outlook	2 (high risk)	Very low	High*	Moderate	Low	Very low
Nykredit Realkredit		A	Stable Outlook						
Capital centre E	SDO	Not rated							
Capital centre H	SDO	Not rated							

*Limiting risk component.

Source: "Fitch Ratings: Covered Bonds Surveillance Snapshot, February 2014".

• **Asset segregation**: the degree to which cover assets are considered adequately ring-fenced

• **Liquidity gap and systemic risk**: the liquidity risk is the risk arising from incoming cash flows from cover assets not matching payments due on outstanding bonds.

• **Alternative management (cover pool specific)**: the ease with which assets can be transferred to the alternative manager in a data/IT context.

• **Alternative management (systemic)**: in the event of an issuer default, the management of cover assets and timely payments to bondholders will be transferred to a third party.

• **Privileged derivatives**: 'privileged derivatives' are those derivatives with the special purpose of hedging the cover assets following an issuer default.