Early Repayment and Rate Adjustment/Reset

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Market risk: central mortgage product design, pricing and credit issue

Interest rate mechanics of 3 principal mortgage products



- Adjustable-rate mortgage loan pools are always priced around E 100, as their contract rate varies with the market rate.
- **Fixed-rate** mortgage loan pools in principle price like fixed-rate government bonds
 - Rates fall below contract rate, bond price rises above E 100; *if they are call protected/non-callable.*
- **Callable fixed-rate** mortgage loan pools price like non-callable fixed-rates when interest rates rise, and like adjustable-rates when interest rates fall (convexity).
- Consumer protection issues
 - Payment shock risk
 - Adjustment via index or by lender? Rate ceilings?
 - Admissible call protection (indemnity) levels?

Product choice & funding in the Eurozone

Mortgage funding sources

BE DE IE GR ES FR IT CY LU MT NL AT PT SI FI euro

(percentages) (percentages) 1 month deposits 1-6 month non-covered bonds 6-12 month covered bonds 1-5 vrs securitisation 5-10 years money market above 10 other no reset no link 00000 100 100 100 80 80 80 60 60 60 60 40 40 40 40 20 20 20 20 0

EU systems are increasingly repricing in the short-term. →high dependency on ECB European FRM are typically reset before maturity and non-callable. Funding is short-term, high levels of maturity/interest rate risk transf. Source: ECB, 2009

Mortgage products by reset period

BE DE IE GR ES FR IT CY LU MT NL AT PT SI FI euro

Shorter reset period/lower amortization = higher payment shock risk

INSTRUMENT	PRICE, INITIAL PAYMENT				RISK OF FUTURE PAYMENT SHOCK		
BY PROTECTION LEVEL	Price impact	Marginal	Cumulative	Protection level	Protection impact	Risk level	
EPM callable			650 bp	HIGHEST		LOWEST	
	Prepayment option costs	50 bp	000 bp		Only upside risk	LOWEST	
FRM, non-callable	Full yield curve costs	120 bp	600 pp	T	Limited interest rate risk		
Capped ARM	Cap costs (high level, term)	30 bp	480 bp		<i>(repricings)</i> Some interest rate risk		
ARM	Negative amort of principal	100 bp	450 bp		<i>(term caps, levels)</i> Balloon risks		
Forex ARM	Negative amort of interest	50 bp	350 bp		Extromo balloon risk		
Option ARM	Negative amort of interest	50 bp	300 bp			•	
Payment holiday	No payment	300 bp	0 bp	LOWEST	Acute solvency risk	HIGHEST	

- Yield curve as pricing benchmark for reset. Europe today mostly ARM (except France, Belgium, Netherlands, Germany).
- Forex (CEE) and inflation-linked (fmr CEE, Iceland, Latin) as negative amortization variants of ARMs.
- Switch from French amortization to IO/bullets (Spain, Netherlands)
- As house prices rise, products with payment shock risk boom cyclically, exacerbating credit risk (risk layering).

Aggressive products may be also causal for house price inflation

Explaining inflation/volatility:

- Product type (discount factors)
- Equity withdrawal options
- High-Loan-to-Value markets
- Valuation methods

Regulatory issue:

- Misalignment of industry and consumer incentives.
- E.g. excessive valuation.



		Mortgage rate	MEW	Maximum LTV	Valuation method
Group 1	BE, CA, FR, DE, IT, ES, CH	Mostly Fixed	No	Low	Mixed
Group 2	DK, FI, JP, NL, US	Mostly Fixed	Yes	Medium	Mixed
Group 3	AU, IE, NO, SE, UK	Variable	Yes	Very high	Market value

Source: BIS/ Zhu & Tsatsaronis

EU FRM-ARM demand, yield curve

Market share of FRM > 5 yrs and Mortgage Yield Curve (5-10 yrs - <1 yr)



Similarities, but vastly different product shares. What explains the differences?

EU pricing differences, drivers

Germany vs. Denmark



Germany vs. Spain

	Spain	Germany						
London economics								
Variable rate mortgage spreads	1.19	1.45						
APRC spreads (i.e. including fees)	1.39	2.08						
ECB Statistics 2003-2005	ECB Statistics 2003-2005							
Fixed rates (mat >10 y) on loans for house purchase	6.39	4.82						
Long-term rate	4.1	4.1						
Spread	2.5							
Floating rates on loans for house purchase	3.34	4.59						
Short-term rate	2.2	2.2						
Spread	1.12	2.39						

- Options: DK with prepayable fixed-rate; DE non-prepayable or call protected fixed-rate.
- Consumer protection: Spain until recently limited FRM prepayment indemnities, high ARM indemnities. Germany yield maintenance for FRM, no ARM indemnities.
- Supply: DE adjustable-rate bank balance sheet pricing, variable spreads; DK adjustable rate capital market pricing, constant lender spread. ES: ARM pricing over Euribor (interbank) benchmark.
- Liquidity: Spain deeply liquid ARM market (lender swaps back fixed CB issued); Germany liquid non-callable FRM market.

Prep option costs impact on FRM mkt share



Pricing relative to Germany



Case Denmark 03-09

- Increasing prep options costs as implicit pension fund subsidies were withdrawn.
- Strong house price increase puts pressure on affordability.
- Increasing elasticity of ARM-FRM demand to yield curve changes.
- System converts to ARM (as US, DK has no mezzanine LT non-callable product).

Note: German funding comparator subsidized during crisis, Danish not

Market shares and yield curve



Non-callable FRM reset risk & forward rate markets

Non-callable FRM maturities and rates, Germany



1.00% 0.80% 0.60% 0.40% 0.40% 0.20% 0.00% 0.

Forward rate pricing Germany 10

- Non-callable markets exhibit 'reset period cycle' as borrowers try to gauge where equilibrium interest rate is.
- Canada/Germany/Netherlands: low spreads over (gov benchmark), but the roll risk is on the borrower.
- Forward rate markets can partly resolve (up to 5 yrs in Germany).
- Open issue: protection credit risk premium increase (back book discrimination).

Non-callable FRM prepayment indemnities - conceptual



Basic regulation questions for prepayment indemnities

- Interaction with legal transactions cost of prepayment
- Time limit & fair value (yield maintenance) indemnity, possibly symmetric.
- Volume limit (in practice, asymmetric), efficiency of mixed pricing?
- Combination with flexibility to change limits as risk situation changes?
- Symmetry? Waiver in hardship cases?

Symmetric model: debt buyback option

Denmark exercise of delivery option



Lock-in under asymmetric contracts



- In a 1-1-System (one loan = one bond), consumers can act like firms. As bond prices fall (rates increase), consumers buy back their debt at the market price.
- This avoids lock-in and keeps housing and bond markets liquid.
- In combination with below par issuance, reduces duration risk for callable loans, benefits investors.
- No reinvestment profit for lenders when rates rise.

Member State regulation trajectories



- Some systems above fair value (often on ARM; or if rates rise on FRM).
- With declining inflation, pressure to reduce or eliminate indemnities.
- However, counter movements (Spain).
- Can fair value principle be established under max harmonization?

Impact of regulations on prep speeds

Prepayment speeds in 5 EU states



Prepayment speeds Portugal after 07 reform



- Call protection combination of legal transactions costs and indemnities. Hence FR lower speeds than DE.
- Countries with high legal costs tend have low indemnities & vice versa (FR, IT).
- Removing indemnities can lead to singularity in callable FRM, large cross-subsidies.
- Margin risk additional factor, higher speeds will lead to proportionally higher upfront fees (affordability impact).

Prepayment matters in crisis for default performance



Source: LoanPerformance, Amherst Securities

European ARM Index-trackers vs. reviewable rates

UK, spreads of index trackers vs. standard (lender-reviewable) variable rate product



Source: Bank of England, Finpolconsult computations.

EU legal comparison ca 2005

	Compulsory Base Rate Indexation	Spread/Fee or Rate Adjustment Option by Lender	Indexed vs. Reviewable in Practice	Interest rate of payment caps widely practiced?
Denmark		•	Not applicable*	Yes
France	•		Indexed	Yes
Germany		•	Indexed**	Yes
Italy	•		Indexed	No
Netherlands		•	Reviewable	No
Portugal	•		Indexed	Yes
Spain	•		Indexed	Yes
UK		•	Reviewable	No

unclear

- Compulsary indexation may increase volatility. Market may tilt to single instrument (Spain). Reviewable with unsolved CP issues (downward adjustment).
- Caps practiced primarily where fixed-rate mortgages already exist.
- Minimum interest rate practices, forced float-fixed swaps (Spain).

US MBS: mispricing of (teaser rate) ARM dominates securities markets problems

- ARM (in US mostly with teasers) more severely mispriced than FRM and than Subprime.
- Option ARM (product innovation) more severely mispriced than Subprime (credit innovation).
- As house prices ballooned (06/7 cohorts), ALL products became mispriced.

<u>% Of The Original AAA Universe Currently Below Investment Grade</u>							
Vintage	Prime Fixed	Prime ARM	Alt-A Fixed	Alt-A ARM	Option ARM	Subprime	
2004	4%	14%	12%	23%	50%	13%	
2005	66%	76%	88%	83%	77%	62%	
2006	91%	97%	94%	96%	97%	95%	
2007	90%	90%	92%	96%	97%	95%	

Source: BlackRock Solutions® as of May 7, 2010

Note: data indicate mispricing of RMBS, i.e. net of basic credit assumptions/pricing.

European ARM: Forex lending in Poland and Hungary

Interest rate and installment differentials 2007 CHF vs. local currency delinquency rates cohort



Source: forthcoming World Bank report, Duebel/Walley.

- Polish banks mostly tie CHF rates to a CHF money market index; this creates what one could dub 'policy hedging', i.e. a bet on Swiss central bank action.
- Hungarian banks practice "reviewable" CHF rates, i.e. pass through funding cost changes; result is lower cost of funds risk bought by higher default risk.

The open product regulation/ preference debate

Issues:

- Consumer protection vs.
 affordability (e.g. indemnities)
- General lending standards and capital requirements
- Supply constraints (e.g. prep option, forward market).

U.S.

- 07 Interagency guidance (FIFA)
- Dodd-Frank -> product preference re 'skin in the game'. Federal banking agencies, the SEC, the Secretary of HUD and the Director of the FHFA to jointly define the term "qualified residential mortgage"

BIS

- Mortgage underwriting standards, forthcoming
- Capital requirements favoring FRM?

EU

- Numerous failed efforts to transpose even limited CCD canon (early repayment, rate adjustment, assignment)
- White Paper: will not touch material CP issues (part of CCD), indirect via responsible lending?

Member States

- UK FSA to consider cumulative effects of products with amortization and underwriting issues (LTV etc).
- Spain initiative re minimum rates in ARM contracts?
- Hungary/Poland **severely curtailed CHF** and partly EUR lending.

Other

 Iceland to ban negative amortization product ex post (banks to bear losses)

 \rightarrow it will never happen on the EU level \rightarrow proposal overleaf.

How much tolerance does the EU have for ad-hoc policies? Italy – retroactive Bersani decree 2007





2007: **Prepayment indemnities abolished**, CPRs of fixed-rates almost double.



2007: 2003-06 ARM wave, government reacts to increasing rates by giving consumers right to defer payments above 2006 max.

EU-Member State Interaction on Material Cons Protection, Proposal

EU is challenged to address material consumer protection issues to fulfil mandate as competition watchdog. Proposal:

The European Union

- Defines a **methodology to estimate the** (default/insolvency) **risk exposure** of consumers that purchase certain products, are exposed to certain practices.
- Sets wide minimum material consumer protection rules (max harm), empirically reviewed regularly (e.g. every 10 years).
- Allows Member States to require from lenders heightened disclosure within minimum where new product are introduced, for some time.
- Creates an appeals process for the Member State aiming to keep or introduce stricter national material consumer protection rules based on above methodological rules.

The Member State either

- accepts the maximum harmonization level, i.e. eliminates more far-reaching legislation,
- Or **appeals** to the Commission **for setting stricter national rules** by providing empirical evidence within the methodological framework provided. Those national rules are subject to **review on more frequent basis** (e.g. every 3-5 years).