Study on the costs and benefits of the different policy options for mortgage credit

Final Report

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Internal Market and Services DG

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1.1 Policy options under review

1.1.1 Terminology conventions and definitions[1]

Legal vs. economic early repayment concepts – non-callable vs. callable Fixed Rate Mortgages

A legal early repayment right given to the borrower either contractually or by law can be translated in economic terminology into an 'option' for the borrower.

Options are financial derivatives whose pricing can be determined with standard financial mathematics techniques based on assumptions made about underlying financial variables.[2]

There are two main variants of the price at which the early repayment option can be exercised: the outstanding loan volume ('par') or the market price, which can be determined e.g. when loans are traded. Legal terminology usually does not make such a distinction, as a default prepayment at par is assumed in basically all laws. We will thus generally refer to prepayment at par throughout this chapter, unless otherwise indicated (e.g. in the Danish case).

A legal compensation arrangement for costs incurred by lenders through an early repayment in economic terminology is often called 'call protection', i.e. it reduces the value of the call option for the borrower and costs for the lender. The term 'call protection' may also denote covenants beyond legal features that tend to slow down exercise behaviour or reduce the value otherwise, for example if the loan is originated below par. We will generally use the term 'call protection' and add a prefix 'legal' when referring to contractual or statutory measures used.

The combination of both a legal right and a compensation or contractual fee arrangement may lead to a situation where the option value for the typical borrower in the typical situation is zero or close to zero. In that case, finance

[1] The terminology is defined in the glossary to this report.

[2] The early repayment option is technically an American call option which gives the borrower the right at any time ('American') to prepay ('call') the loan at either the outstanding balance (par) or, if loans are traded, at the market value.

terminology uses the term 'non-callable' loan even if legally the loan can be prepaid and in some situations or for some borrowers it may be even be economically advantageous to prepay. In contrast, legal non-callability usually refers solely to an exclusion of the right to prepay. We will use the term 'non-callable' in the finance terminology, i.e. where the option value economically is zero or close to zero, and refer to 'legally non-callable' where the early repayment right is not a contractual or statutory feature.

For didactical and material analytical purposes it is important to differentiate between 'callable' and 'non-callable' mortgage loans, denoting essentially loans without and with economic 'call protection' features that leave the option value intact, reduce it gradually or eliminate it.

Since usually in the discussion fixed rate mortgages (FRM) are associated with call protection features, we use the terminology 'callable FRM' and 'non-callable FRM' to distinguish the two main classes. We note that also some adjustable rate mortgages (ARM) products come with call protection features, especially hybrid ARM during the initial fixed-rate period or discount ARM products which over some time of their life carry pricing characteristics similar to FRM.

Partial vs. full fair value compensation

We will discuss in detail the concept of and benchmarks for fair value compensation reflecting lender costs. We will use the terminology full fair value if for a given fair value concept, for example yield maintenance, the fair value is observed under all economic scenarios (especially interest rate changes). A symmetric early repayment compensation based on yield maintenance comes close to this ideal.

For circumstances where a fair value concept is only applied for some economic scenarios, we will use the terminology partial fair value, especially for asymmetric early repayment compensation (fair value only when interest rates decline) and conditional compensation (fair value only under certain conditions), or combinations thereof.

Compensation vs. fee

We use the term 'compensation' in the economic sense as a price to be paid in proportion to the costs incurred by the service provider. A fee for a service in contrast does not necessarily bear a direct relation to the costs of the provider.

In some cases, ambiguity is not avoidable as the policy options speak of compensation in a broader sense, including fees.

Synonyms

The terms "early repayment" and "prepayment" are used as synonyms throughout the text.

1.1.2 Policy options under review and basic analytical approach

We can sort the five policy options formulated in the Terms of Reference for the field of early repayment into three main evaluation areas with sub-cases:

1. Harmonisation of the scope of the early repayment right:

   - Unconditional contractual option (i.e. including the lender right to exclude early repayment) (Option 1);
   - Conditional contractual option / conditional right (i.e. universal right in certain circumstances, e.g. personal hardship cases such as divorce, death of spouse, professional move) (Option 2);
   - Universal right (Option 3).

2. In combination with any option under 1., harmonisation of the ceilings imposed on the compensation payable to lenders (i.e. the exercise price of early repayment) :

   - Harmonisation through fair and objective value reference ('actual costs') (Option 1-3 a).
   - Harmonisation through specific caps (formula) limits (%, years..) (Option 1-3 b).
   - As a sub-case of the latter and of Option 3, harmonisation through the caps formulated in the revised CCD (Option 5).

We also observe two additional empirical dimensions of compensation that are not covered by the policy options and will play a role in our evaluations:

- Conditional compensation, e.g. as practiced in Netherlands or France in certain cases or in Germany for certain products.
- Symmetry of compensation, with special regard to the Danish practice enabling borrowers in cases of loans trading on the capital market to prepay below par ('delivery option').

Moreover, we interpret the fees practiced in many jurisdictions as 'compensation' within the terminology of the policy options.

3. Mutual recognition (Option 4) of early repayment right and compensation legal regimes.

This approach allows us to clearly separate legal and empirical cost-benefit questions to be addressed between the scope of the right of early repayment and the harmonisation of the ceilings or limits for compensation.

In the analysis, the following will be measured:

- the distance of each legal system from the option (or combination of options, as e.g. in policy option 1-3b);
- the changes in costs and benefits for the stakeholders and the economy as a whole involved when their legal regime is in transition to a new configuration.

After reducing the number of interventions and countries to be analysed to a manageable and economically meaningful set as well as an extensive review of the empirical evidence available for model calibrations, we will proceed to first qualitatively and then quantitatively evaluate the costs and benefits of the policy options.

1.2 Legal baseline

1.2.1 Summary of findings

Table 1 summarises our assessment based on the reviewed questionnaires and earlier official material with regard to general rules governing the early repayment rights and principles of compensation. The table uses a wide definition of legal sources, including (Roman) law, case law and codes of conduct where universally applied. The table does *not* refer to common market practice, however; deviations of practice from law are mentioned in the text. Where conflicting information was received, the table provides the feedback from official bodies; such cases are commented in the text.

The table already gives an intuition of the distances of individual jurisdictions from the proposed policy options.

Table 1: Early repayment legal baseline and policy options[ab] – summary -				
	No specific legal rules	**Unconditional contractual option (Policy Option 1)**	**Conditional contractual option (Policy Option 2)**	**Universal right (Policy Option 3)**
Harmonisation of the scope of the early repayment right	CY	AT[1], EE[1], LU[1], GR[1] PL/CZ/LT/LV/HU[3] RO, SK[9]	DE[1] SI	ALL OTHERS AT[4], DE[4], DK[5], EE[4], GR[4] , CZ, HU[6]
	No specific legal rules[c]	**Fair and objective value reference[d] (Policy Option 1-3a)**	**Cap on compensation volume[d] (Policy Option 1-3b)**	**CCD transposition (Policy Option 5)[f]**
Harmonisation of limits imposed on compensation payable to lenders	LT, LU, PL, CY, GR[1]	AT, BE[7], BG, CZ, DE[1], DK, EE, ES[1], FI, HU, IE, LV, NL, SE, SI, UK.	BE, DE[4]., FR, ES[4], IT, GR[4], PT, NL, SK	None[8]
	Implied[e]	**Excluded by national rules**		
Mutual recognition (Policy Option 4)	CY	ALL OTHERS		

Country notes: 1) for FRM, in the case of DE < or = 10 yrs, 2) for non-callable FRM, < or =10 yrs, 3) for loans financed by mortgage banks / bonds under special law, 4) for ARM 5) bonds financing loans can always be delivered to the investor, 6) all other situations except those mentioned under 3), 7) deviates from market practice, 8) excluding plans to transpose CCD, which were communicated by Bulgaria, Hungary and Slovenia, 9) conflicting statements by regulators, see text.

Source: Finpolconsult. Context notes: a) analysis assumes € 100,000 outstanding loan amount. b) based on LE questionnaires, government and stakeholder responses, referring to Roman Law, Case Law, Codes of Conduct, where universally applied. c) The Impact Assessment used the term 'No legal limits', suggesting potentially unlimited compensation. We find that most cases either have no specific law, or do have law that implies legal limits. d) Policy Options 1-3a and 1-3b/5 are non-exclusive. The entry of a jurisdiction's name in all three columns of this row is possible. e) Neither scope of early repayment right nor compensation is codified. An alternative would be a combination of unconditional contractual early repayment option and absence of legal limits on or codification of compensation (empty set). f) see above for general transposition planning and text for comment.

1.2.2 Early repayment right - detail

Contractual option or universal right (Policy Options 1-3)

We find that a large majority of Member States apply a universal early repayment right (Policy Option 3).

The countries that allow for a conditional or universal contractual option (Policy Options 1 and 2) all feature historic or recent mortgage bond legislation and / or are transition countries with legislation under development.

However, not all countries with a historic mortgage bond tradition do permit early repayment as a contractual option (e.g. France, Spain). Moreover, even among most countries that do permit a contractual option for FRM, the universal early repayment right for ARM contracts is granted (Austria, Germany, Greece; implicitly Denmark[3]).The jurisdictions where the early repayment right (and also compensation rules) are not specifically codified or where conflicting interpretations based on unspecific law exist are identifiable as emerging European mortgage markets in Eastern Europe as well as Cyprus. The nature of emerging markets is that legislation is only developing over time, as usually law develops from a growing body of case law which in these countries does not yet exist.

Observations:

- Unconditional contractual option: Austria, Greece and Luxemburg are cases for which we can unambiguously identify an unconditional contractual option for FRM. However, ARM in Austria and Greece carry a universal early repayment right.

  A contractual early repayment option has been created as a standard in mortgage bank or mortgage bond legislation (Hungary/Poland/Czech Republic/Lithuania/Latvia), during the early years of transition influenced by advisors from the German Pfandbrief system that were worried about inability of lenders to charge sufficient compensation. At the time these countries had no general consumer protection legislation in financial services; the subsequent CCD transposition has generally been made only for consumer loans (subject to loan volume ceilings).

  - For example, Article 21(1) of the Polish Mortgage Bank Act of 1997 stipulates that the lender may exclude early repayment for loans backing mortgage bonds for up to 5 years.

  Of the above list, Hungary[4] and Latvia today apply a universal option for non-mortgage banks.

[3] ARMs in Denmark are fixed for 1 year. The product is part of the non-callable FRM product set and interest rates are adjusted via an auction that takes place once a year (usually in December). As the new interest rate is determined, borrowers have the early repayment option; however, not so within the 1-year period.

[4] OTP Bank (dominant Hungarian lender) states in European Commission (2006b): "According to the Hungarian civil code borrowers are allowed to repay earlier. Only mortgage banks are authorized to reject early repayment by law, but they prefer using indemnity fines to rejection."

Other delimitations exist, too: Polish regulators also report a universal early repayment right for all loans greater than 1 year maturity. In Estonia, differentiation is made between FRM and ARM.

- Conditional contractual option: Germany keeps a contractual option governing FRM prepayments for circumstances other than move or house sale, for which a universal right exists. The Slovenian regulator quotes a conditional contractual option as legal regime, without specifying the circumstances.

- Universal right: Non-callable FRM in Denmark cannot be, technically, prepaid to the lender, but through the delivery option – a universal right of the borrower – they can be delivered to the investor. This establishes a universal prepayment right.

- Conflicting information[5]: the authors received in some cases conflicting official information:

    - Lithuanian consumer agency (affirmative) and bank regulator (negative) gave conflicting information about the existence of a universal early repayment right.

    - Romanian regulators report an "unconditional right in accordance with the terms established by the parties of the mortgage contract".

    - Slovakia states "early repayment is a legal right in specific circumstances, which are specified individually in each contract".

- In Cyprus, there is no specific consumer protection legislation concerning the right of early repayment.

[5] See Legal Baseline Annex B.

Deviations from earlier Commission analysis:

We note deviations from earlier Commission analysis[6]:

- Czech Republic/Hungary/Lithuania/Latvia/Poland: there is considerable doubt that outside mortgage bank or mortgage bond legislation early repayment as a contractual option is permitted, see discussion above.

- Netherlands: the universally applied Code of Conduct establishes a universal early repayment option.

- United Kingdom: the Council of Mortgage Lenders states in her survey reply that the courts will take the view that early repayment is always possible. Also Köndgen (2000) finds that case law will support a universal option.

- In Denmark, non-callable FRM and ARM loans can be 'delivered' to the capital market investor at the market price. This can be seen to create a de-facto universal early repayment right (see also Köndgen (2000) even as the contracts technically do not carry the prepayment option.

Differences between law and universal market practice:

- In Greece, the banking association reports that invariably FRM contracts carry the early repayment option.

Mutual recognition (policy option 4)

Based on the available legal documentation we are unable to (definitively) answer the question whether there is any jurisdiction that practices full mutual recognition (acceptance of all other consumer protection regimes).

However, given the breadth of European legal regimes shown in Table 1, a logical argument suggests that only those jurisdictions that have established both no codification of or an unconditional contractual option and no or undefined legal compensation limits can qualify for being presumed to apply mutual recognition. The only country that we find that fulfils these conditions is Cyprus. All other jurisdictions have restrictions in place that pre-empt full mutual recognition.

[6] Reference is made to Table 14 in Annex 3 (page 57) of the Impact Assessment of 18.12.2007 (European Commission, 2007c).

CCD transposition (policy option 5)

Concerning Policy Option 5 (transposition of CCD rules), we note the intention of Cyprus to transpose the new CCD to mortgage lending including Article 16. In addition, several transition countries can be seen as intending to transpose the CCD as a whole. As with the old CCD, most Member States will only selectively transpose the CCD - absent of further regulations, and, as in the past, a large number of countries may not transpose Article 16.

1.2.3 Early repayment compensation or fee computation and limits - detail

For the cost-benefit analysis, especially the identification of suitable case countries for detailed analysis, it will be necessary to further specify the operability of 'fair and objective value' in terms of the type of prepayment exercise price – compensation or fee - , the computation formulae applied, as well as the scale and the nature of caps (e.g. volume vs. fixed-rate time limits).

Table 2 summarises our more detailed findings in this area for countries for which sufficiently differentiated information is available. We hasten to add that not all surveyed law and questionnaire responses yield sufficient information to fill all brackets in the table. This means, for example, that a country that communicated a fair value principle or similar formulation ('reasonable costs' 'actual costs'), but gave no further computation detail, may nevertheless practice a formula-based standardised computation.

While we found fairly uniform approaches regarding the scope of the early repayment right among EU members, concerning limits placed on compensation the picture arising from Table 1 and Table 2 is greater nuanced. Of 22 countries, for which information is sufficiently detailed:

- 5 countries – Czech Republic, Hungary, Lithuania, Poland, Luxembourg and Cyprus - have no specific legislation concerning compensations for either ARM or FRM.

- A fair and objective value reference (Policy Option 1-3a) is the guiding legal principle in 12 countries.

  Here the number of countries applying specific formulae by law seems to broadly equal those just establishing the principle.

  In terms of components of a fair value computation all countries applying the fair value reference do allow for lender reinvestment loss, however only Denmark practices a fully symmetrical compensation regime allowing for a further reduction of early repayment costs (repayment below par) for the consumer in case of reinvestment profit. All other systems therefore can be seen to apply only a partial fair value concept. We will come henceforth use the terms 'partial' and 'full' fair value to denote both cases.

  Administrative costs of the exercise of the option can be charged by a majority of countries.

  Some legislation makes specific reference to foregone lender profit (Germany, Sweden) or equivalently recapture of loan closing cost discounts (Spain) while other specifically excludes such cost items (Netherlands, Denmark).

- A cap on the compensation or fee volume (Policy Option 1-3b) is applied in 9 countries.

  In 3 of these countries (Spain, Greece, Netherlands) the cap and fair and objective value reference do simultaneously apply, which establishes a dual constraint on compensation.

- In Belgium, France, Italy, Portugal and Slovakia, the cap appears to be the exclusive limit (i.e. no fair value reference in law), which enables de-facto a fee model. As will be shown below, fees can be above or below fair value, depending on the interest rate and other cost scenarios.

  - It is interesting to note in this regard that in Portugal, while the previously high fee level has been reduced, with the 2007 reforms, the fair value principle has not been established (in contrast to parallel reforms in Spain that introduced such a reference).

  - There remains ambiguity about Belgium, where we find a fair value reference in law but the market nevertheless practices the statutory cap in the form of a fee model, which e.g. applies also when interest rates have risen and lenders make a reinvestment profit.

- We presume that countries without specific legislation (e.g. most transition countries) or no mathematical caps in place nevertheless have general civil code or other law provisions that implicitly limit the levels of compensation that banks can charge, such as general fairness rules between contract parties.
    - For example, the Czech banking association suggests that a fair value principle is imposed on compensation, citing that 'any party to the contract cannot get disproportional benefit from the fact of an early repayment'. The association also refers explicitly to reimbursement of reinvestment loss as a compensation principle. However, the Czech regulator does not mention any such principle and independent Czech mortgage experts interviewed say that prepayment penalties are high and also very similar among mortgage lenders, despite different refinancing practices and cost levels.
    - In the UK we find similar references to fair value in FSA regulation while there is no clearly established mathematical limit.
- Full clarification of such legal status questions in countries with developing law requires detailed law and case law review is beyond the scope of this report.

After identifying the countries without specific law it is fair to conclude that a majority of EU countries give preference to the fair value principle over a fee principle where fees may exceed the fair value (12 countries over 22, i.e. 54% of country cases under review). Caps on compensation are widespread, and where no volume caps are applied often implicit caps through constraints placed on formulae (such as limiting the applicable fixed-rate period) are used. However, seven countries do not use any mathematical constraints.

Table 2: Early repayment compensation or fee legal baseline

	..fair and objective value reference, standardised cost formula (ex-post)	**..fair and objective value reference, other (ex-post)**	**..contractual option (ex-ante, fee model)[c]**
Compensation is set as..	DE[2], DK, ES, FI, GR, NL, SE	BG, EE, IE[2], LV, UK	BE, CZ, FR, HU, IE[1], IT, LT, PT, RO, SK
	Volume limits[a]	**Fixed-rate period limits[b]**	**No mathematical limits**
Type of formula or cap constraints	BE, ES[1], FR, IE[1], IT, NL, PT, GR, SK	DE, DK, IE	CZ, ES[2], FI, HU, IE, RO, UK

	Lender	**Lender**	**Foregone**	**Loan closing**	**Administrati**

Table 2: Early repayment compensation or fee legal baseline					
	..fair and objective value reference, standardised cost formula (ex-post)		..fair and objective value reference, other (ex-post)		..contractual option (ex-ante, fee model)[c]
	reinvestment loss	**reinvestment profit** (symmetric compensation)	**lender intermediation profit**	**cost discounts and other discounts given to the borrower**	**on costs incurred due to the act of early repayment**
Types of costs included in fair and objective value reference (formula or otherwise specified)	AT, DE, DK, EE, ES, FI, GR, IE, NL, SE	DK	DE, EE, ES, SE	ES, GR	BG, CY, DE, DK, EE, ES, FI, GR, LV, SE, SI
		In certain cases		**Never**	
Compensation waivers[e]		**BY MOTIVE** **Move and house sale:** EE, FR, NL **Other financial management purposes (e.g. life insurance payment, inheritance):** BE, NL **Financial difficulties of the borrower:** FR, PT **BY CHARACTER OF LOAN** **Exceptionally high interest rate level of the loan:** **ARM loans:** DE, IE, GR **Seasoned loans:** ES **BY LENDER IDENTITY** **Lenders other than mortgage banks:** **Loan assignment to another creditor:** EE		**FOR FRM** DE , DK, FI, SE **FOR ARM[d]** UK	

Notes: a) % of outstanding or number of instalments, b) for FRM or hybrid ARM, implying variable compensation levels, amplitudes depend on the length of the fixed-rate period (see below). c) i.e. potentially above fair and objective value, including if zero value, d) including hybrid ARM. For other notes see Table 1. e) or reductions. 'Fair value' may include partial fair value. Country notes: 1) ARM, 2) FRM.

Source: Finpolconsult

Going further into detail, the existing statutory computation formulae for reinvestment loss approximating fair value appear quite diverse. We discuss the subject in some detail in the microeconomic empirical section below: for example we find asset-asset (e.g. Netherlands[7]) or an asset-liability (e.g. Germany, Sweden, since 2007 also Spain) interest rate differentials as the basis for compensation. Moreover, the scale and type of deductibles for saved lender costs in the case of asset-liability comparisons vary significantly. For instance, Germany leaves some room for lenders to determine their saved costs for administration and credit loss; however, consumers have contested such determinations in the courts. Sweden solves this problem by decreeing a lump-sum deductible. Spain after her 2007 reforms so far has still not determined any deductibles.

With regard to case differentiations for compensation waivers, the picture is more diverse. Concerning borrower motives ('hardship cases') those countries using tight compensation caps have unsurprisingly further reduced them for certain cases. A newcomer here is Estonia for the case of move and house sale.[8] Concerning specific loan features, several countries continue to interdict compensation on ARMs. [9] Germany should be mentioned here as a country that at the same time practices one of the strictest regime on FRM. We record one country establishing a compensation waiver for early repayment in the case of a loan assignment. Interestingly and in stark contrast to the U.S. where during the sub-prime crisis early repayment compensations have been de-facto eliminated for sub-prime lending, we find no European jurisdiction that has limited compensation for high-interest rate loans. Spain and Portugal now differentiate admissible ARM compensation levels by prepayment date between the first 5 years of loan life and later dates.

Deviations from earlier Commission assessments[10]

- Cyprus: No reference was found by the team to an existing early repayment compensation cap.

[7] Also the market practice in Luxemburg, which has no formal compensation / fee regulation.

[8] See Annex B Legal Baseline.

[9] Arguably the German prohibition of early repayment compensation for ARM, as other elements of German banking legislation (e.g. prohibition of indexing), is a relict of the country's hyperinflation history in the early 20th century.

[10] Reference is made to Table 14 in the Impact Assessment undertaken by the European Commission (European Commission (2007c) page 57).

- Denmark's negative experiences with very long-term non-callable FDM loans in the 1980s (20 years and longer) has led to de-facto legislation limiting the maximum applicable fixed-rate term for non-callable FRM (contractual option, implicit yield maintenance compensation) to 10 years. The enabling legislation for ARM of 1994, which in the Danish context also refers to non-callable FRM, only defines such loans for up to 10 years of interest fixing. In practice, non-callable FRM are not issued for fixed-rate terms over 5 years.

- Finland: the Finnish Consumer Protection Act does not establish a cap, it rather establishes a fair value formula. The components of the formula do not appear to be limited in their values.

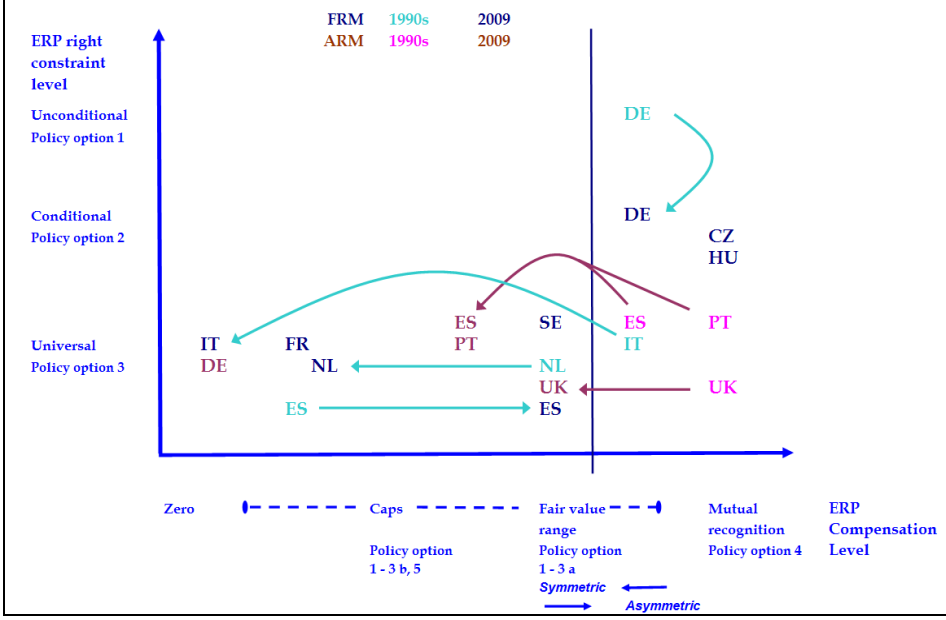
- Netherlands: the universally applied Code of Conduct determines a specific cap for compensation (4 months interest).

1.3 Legal baseline distance

Table 1already provides a visualisation of the current distances of the legal baseline to the policy options, for both areas scope of the early repayment right and ceilings imposed on compensation. We proceeded by detailing our findings on compensation in Table 2.

Figure 1puts these findings for a sample of markets into the historical context, comparing the 2009 legal situation with the legal situation as of the mid-1990s. This context is important since it gives an idea about the trajectories of law-making in the area without EU intervention (baseline).

Figure 1: Early repayment legal rules right and compensation rules in selected Member States by loan type (ARM, FRM): long-term trajectories and policy options



Note: in the case of FRM assumes falling interest rates and a reinvestment loss and foregone intermediation profit for lenders. Points to the right of 'fair value level' indicate compensation in excess of fair value, to the left correspondingly below fair value. Picture may change if rising interest rates are assumed.
Source: Finpolconsult

In the area of the scope of the early repayment right during the time, Germany has moved from an unconditional contractual option situation (policy option 1) to a conditional contractual option situation (policy option 2). This shift was forced by a Supreme Civil Court judgement in the mid-1990s ruling in favour of an early repayment right in the case of a house sale and/or move. Czech Republic (and other transition countries, see above) started in the 1990s with legislation placing themselves into a conditional contractual option context.

Note for the interpretation of the compensation dimension that Figure 1assumes falling interest rates (vis-à-vis the closing coupon interest rate) and foregone intermediation profit. The picture would look different in case of an early repayment exercised after interest rates have risen.

For compensation limits, the general trend has been a tightening, in some cases to levels that are severely below fair value (assuming moderate interest rate declines).

- In the FRM world this was related to the high starting interest rate levels (especially in Southern Europe and France) and strong interest rate decompression trend under the Maastricht process. The starting point was France, which in the Scrivener Law of 1979 limited early repayment compensation to 3% or 6 months interest payments. France was followed by Belgium, Spain (early 1990s) and Netherlands. The culmination point of this trend is 2007 Italian legislation that sets the compensation levels to zero (and significantly reducing administration costs).

  Also, in transition countries such as Hungary and Czech Republic with earlier unspecified law, there is an active legal debate over limits to compensation, which so far has produced the establishment of a fair value reference.

  We note finally that in the more advanced countries the fair value reference is increasingly specified by computation formulae, and within formulae by specific limits (such as on the time of the fixed-rate period, or applicable types of interest rates).

- Compensation applicable to ARMs and hybrid ARMs (here usually affecting the short fixed-rate teaser periods) have also been curtailed over time.

  - United Kingdom practiced de-facto unlimited early repayment compensation for teaser periods in the 1990s (see Dübel/Lea (2000)), which since through case law and a 2004 FSA regulation has been reduced to fair value (or slightly below fair value).

  - Portugal and Spain only in 2007 limited compensation payments for ARM to 0.5% – in the Portuguese case from market practices partly far above fair values (according to MFEG findings 5% were not unusual), in the Spanish case compensation were halved from 1%. In both cases, such amounts can be considered slightly below fair value, as the loss of a client (and thus foregone lender profit and loan closing discounts) usually means higher cost levels than 0.5% for lenders.

Contrasting with the trend to tighter limits, we note also an important reverse movement in Spain in the 2007 reform, which for FRM moves back from a cap to fair value levels.

- Spain: The new compensation regime promulgated into law in December 2007 splits the early repayment compensation into two components. We interpret the compensation for "withdrawal" (Article 8) as aggregated compensation for foregone lender intermediation profit, loan closing costs and administrative costs. This component amounts to 0.5% of the prepaid capital within the first five years of the credit and to 0.25% thereafter.

  The second component – the compensation for "interest rate risk" (Article 9) – corresponds to the compensation for the lender's reinvestment loss. It applies to FRM exclusively and requires proof of a capital loss incurred by the lender, where capital loss is defined as the difference between the outstanding loan amount and the market value of the loan. The capital loss must be positive in order to entail compensation (partial fair value). This compensation can be agreed in the loan contract as either fixed percentage of the outstanding loan amount or the lender's total or partial capital loss.

When interpreting the Spanish movement into and out of caps for FRM early repayment compensation (as well as similar movements to cap compensation), it is important to bear the interest rate and credit risk context in mind. When FRM early repayment compensation caps were introduced in the early 1990s, FRM interest rates stood at 15%, threatening high default rates as rates declined without a financially viable option to prepay. 2007 FRM rates instead were in the range of 5-6%, and the vast use of ARM, result of the factual disappearance of FRM from the market, had been increasingly regarded as contributing to rising default rates.

An aspect of compensation that was highlighted by a recent national competition authority ruling against Hungarian bank OTP is that early repayment fees fixed ex-ante under the contractual option cannot be changed ex-post during contract terms.[11] Such rulings may further expedite a transition to a formula-based compensation regime.

It is unclear finally whether there is an independent trend towards greater case differentiation for compensation waivers since the patterns here resemble the general cap policies on compensation that a country adopts.

Table 3 and Table 4 repeat our findings concerning distance from the proposed policy frontier for all EU Member States except Malta, which did not supply information.

[11] See GVH decision Vj-12/2006, http://www.gvh.hu/gvh/alpha?do=2&pg=11&st=1&m5_doc=5595.

Table 3: Distance from proposed policy frontier – early repayment right

	Unconditional legal right (policy option 1)	Conditional legal right (policy option 2)	Universal right (policy option 3)
AT	FRM		ARM
BE			ARM, FRM
BG			ARM, FRM
CY	ARM, FRM		
CZ		ARM, FRM	ARM, FRM
DE		FRM	ARM
DK		ARM, FRM	ARM, FRM
EE		FRM	ARM
ES			FRM, ARM
FI			FRM, ARM
FR			FRM
GR	FRM		ARM
HU		FRM, ARM	FRM, ARM
IE			FRM, ARM
IT			FRM
LT		FRM, ARM	
LU	FRM		
LV		FRM, ARM	
MT			
NL			FRM
PL		FRM, ARM	
PT			ARM
RO	FRM, ARM		
SE			FRM
SI		FRM, ARM	
SK	FRM, ARM		
UK			ARM

Note: no information supplied by Malta
Source: Finpolconsult.

Table 4: Distance from proposed policy frontier – early repayment compensation rules

	Capped compensation or fee (policy option 1 – 3b, 5)	Fair value compensation (policy option 1 -3a)[1]	No specific rules (~policy option 4)
AT		ARM, FRM	
BE	ARM, FRM		
BG		ARM, FRM	
CY			FRM, ARM
CZ			ARM, FRM
DE	ARM	FRM	
DK		ARM, FRM	
EE		ARM, FRM	
ES	ARM	FRM	
FI		ARM, FRM	
FR	ARM, FRM		
GR	FRM	ARM	
HU			ARM, FRM
IE		ARM, FRM	
IT	ARM, FRM		
LT			FRM, ARM
LU			FRM, ARM
LV		ARM, FRM	
MT			
NL	ARM, FRM		
PL			FRM, ARM
PT	ARM, FRM		
RO			
SE		ARM, FRM	
SI		ARM, FRM	
SK	ARM, FRM		
UK		ARM, FRM	

Notes: 1) including full (symmetric) and partial (asymmetric) fair value compensation. No information supplied by Malta.
Source: Finpolconsult

1.4 Selection of case countries for detailed study

After reviewing the legal baseline and stakeholder positions, and understanding the scope and reasons for recent reforms in the early repayment area, we are establishing a list of countries to be covered in detail by the cost-benefit analysis.

Our selection criteria are:

- Legal model character of the case for the policy options, and distance from policy options. Because of greater variance of both policy options and legal baseline this implies more cases than in other policy areas.

- Important economic events such as recent reforms or risk realisations that shed light on the costs and benefits of the proposed policy options for stakeholders.

- Market indicators such as size, geography, system maturity (emerging, mature), risk levels, structural factors (homeownership rate, role of intermediaries).

- Data availability and accessibility. Accessibility of consumer associations, lender groups and individual financial institutions for interview.

We have selected the following cases selected by those criteria:

- Denmark (classical mortgage bond jurisdiction with de-facto universal right, prepayment at the market price for non-callable and at par for callable loans, delivery option – full fair value compensation, complete market). Denmark is also of interest due to her experiences in the 1980s and early 1990s when the long-term non-callable mortgage market ran into difficulties (since then lenders apply time limits to the non-callable market [implicit]).

- Germany (classical mortgage bond jurisdiction with conditional contractual option, early repayment at partial fair value compensation/asymmetric, time limits in the compensation formula).

- Belgium (fixed-rate mortgage products similar to Germany, but universal early repayment right, compensation cap / fee model and numerous case differentiations for waiver). Belgium has similarly tight restrictions on early repayment compensation, transaction cost issues (notary system), and a similar level of market completeness (material co-existence of ARM and FRM) as France.

- Italy (FRM product as France, but stronger relevance of ARM; universal early repayment right and recent compensation reform with cap zero). Italy is particularly relevant due to the radical compensation cap approach for FRM.

- Spain (universal early repayment right, compensation caps for FRM were lifted after recent reform to re-establish the FRM product vs. the ARM dominance, example of ARM compensation).

- Portugal (universal early repayment right, keeps compensation caps for FRM but has reduced ARM compensation from above fair value levels; an evaluation of 2007 reforms by the Central Bank has been announced).

- United Kingdom (teaser rate ARM with varying compensation practices, at or below, historically also above fair value). United Kingdom has the only European sub-prime market which may allow insights into compensation practices of high interest rate loans.

- Czech Republic (emerging market with dominant non-callable FRM and conditional contractual option, unregulated/above fair value early repayment compensation).

With regard to the cases mentioned in the proposal we have dropped the Netherlands and France due to increasing similarity of model with Belgium, and given greater emphasis to Portugal and Spain with their recent reform programs. It would have been an option to analyse Austria or Greece (cases with unconditional contractual option) in greater detail, but the detail analysis for Germany and Czech Republic (conditional contractual option) will cover very similar situations.

1.5 Conceptual and empirical basis for the cost-benefit analysis

1.5.1 Introduction

In this section we review what existing theoretical concepts and empirical evidence - mainly from Europe and occasionally from the US - tell us about the relation between the legal (and other transactions costs) regime of early repayment and important inputs for the cost-benefit analysis such as consumer early repayment behaviour, loan (interest rate risk protection) pricing and loan (interest rate risk protection) demand and supply both in quantitative terms and between different loan products. We also present evidence pointing to expected cost-benefit analysis outputs such as lender costs/losses and redistributions of costs and benefits between consumer groups.

We focus on microeconomic aspects of the mortgage and labour markets. There is insufficient research on the interaction between prepayment and macroeconomic issues, such as consumption, the pension system and the financial sector and its stability. We also do not integrate these aspects into the quantitative cost-benefit analysis below.

Earlier studies

The cost-benefit impact of early repayment on lenders and consumers has been a subject for study in the U.S. ever since callable 20-year FRM were introduced under the 1934 National Housing Act as a government-guaranteed product. Before 1934, U.S. mortgage loans were short-term FRM (5 years) and non-callable, a highly risky combination for consumers. The

reform meant a major increase in consumer benefit; consumers were relieved both of interest rate risk and liquidity risk (a new financing had to be sought after 5 years). Until today, due to its benefits the social goal of widely offering the product as such is not subject to serious debate in the U.S., so research mainly focused on adequately calibrating its costs.

Intensive research sponsored by investment banks, housing finance agencies (especially Fannie Mae and Freddie Mac), rating agencies and academia on early repayment started in the 1980s when the Savings and Loan institutions were forced to sell large portfolios to investors via investment banks, creating the secondary mortgage market. At the time, individual investment banks made large profits through such transactions.

The huge initial economic success of the U.S. secondary mortgage market stimulated intensive research interest in mortgage credit and early repayment risk studies. Early analytical papers trying to understand the options-theoretic nature of mortgage contracts (e.g. O'Keefe and van Order (1990) and Chinloy (1991)) during the 1990s became mainstream analysis reprinted in standard bond market textbooks such as Fabozzi (1999). With an estimated high double-digit number of PhDs working on Wall Street on early repayment-related issues, and continued strong academic interest, progress continues to be made, e.g. in innovative modelling techniques (Kalotay et. al. (2004)) and empirical research supporting the joint mortgage termination (default, early repayment) literature initiated by Deng, Quigley and van Order (1999).

In Europe, as to be expected, Denmark has been the source of early early repayment related research, e.g. Graven Lasen (1993) or Jakobson (1994). In contrast to the U.S., research capacity became concentrated at institutional investors that hold most of the country's mortgage bonds. Researchers in France had also started to assess early repayment costs as a result of the strict caps imposed by Scrivener Law, e.g. Mouillart (1995).

Dübel and Lea (2000) and Köndgen (2000) prepared the first empirical and legal international comparison of early repayment conditions in four EU Member States (France, United Kingdom, Denmark, Germany) with the United States. They found that the transactions costs of early repayment including compensation regimes significantly reduced credit costs in situations where fair value compensation were applied, and that the caps of compensation in France were indirectly circumvented through keeping legal transactions costs high. They also calibrated the option values for the countries in question. Subsequent European comparative research includes Mercer Oliver Wyman work for the EMF quantifying the options-adjusted price of mortgage loans across borders (and indirectly valuing the early repayment option), and an update by Dübel (2007b) on early repayment option cost and prepayment speeds.

Structure of the analysis

This study presents microeconomic conceptual analysis together with available empirical evidence from the case countries in four steps:

1. A basic conceptual analysis of interest rate risk protection, product choice and pricing. The focus here is on identifying the risk-price trade-offs associated with the early repayment right and compensation constellations between the three main products ARM, non-callable FRM and callable FRM.

2. Early repayment compensation analysis, i.e. loan pricing analysis under capped and uncapped compensation formulae for lender loss, and a fee model as the fundamental alternative to a compensation. In terms of applicable costs we analyse both reinvestment loss / gain and foregone lender intermediation profit. The latter includes implicitly loan closing costs, discounts given etc. We also deal with the compensation symmetry issue.

3. Scope of the early repayment right analysis. In this third step we focus on the microeconomic impact of absolute (quantitative) constraints being placed on the ability of consumers to prepay when prepayment requires the consent of the lender (contractual option). The section is placed after the compensation analysis, since we can interpret a quantitative restriction economically as a special case of price (fee) setting.

4. Transactions costs analysis, i.e. the scope of interaction of compensation with (especially legal/notary) transactions costs, which in practice are often an alternative form of reducing prepayment speeds. The aspect is often overlooked in the consumer protection discussion.

5. Analysis of other issues, including the relation between the early repayment regime and consumer confidence, customer mobility, product diversity and cross-border lending.

1.5.2 Conceptual analysis: interest rate risk protection, product diversity and pricing

Basic costs and benefits of the prepayment option for consumers

Technically, the early repayment option is an American[12] call option whose value in simple terms is determined by five factors:

[12] An American option can be exercised at any time, a European option can be exercised only at maturity.

- the strike price (which may differ whether a prepayment can be made at face value of debt [par] or at the market price of debt),
- the exercise price (legal/notary costs, fees charged by the new lender, compensation or fees payable to the old lender),
- the term of the fixed-rate period (in ARM lending equivalently the term of the spread fixed over an index),
- the volatility of (mortgage) interest rates and spreads, and
- opportunity costs of the supply and demand side (especially interest rates paid by the lender on debt financing the mortgage, and the deposit rate to be received by the borrower for investing cash on hand, e.g. derived from an inheritance, and not prepaying, but also preference and other factors).

At typical combinations of those factors, a call option is not cost-free to supply by a lender or investor. This translates into the consumer having to to pay an additional option cost premium as an interest rate mark-up.[13]

In the context of analysing the proposed policy options, we are interested particularly in the option cost pricing impact of varying exercise prices, everything else being equal. As a rule, the lower the exercise price, the higher the option cost to be priced as an interest mark-up.

Low exercise prices render the option more frequently 'in the money', i.e. worth exercising by the consumer. The key value of the early repayment option in this constellation for the consumer is lowering her debt service burden and protecting against a possibly rising risk of default if a high debt service burden persists.

By exercising early repayment rights when the option is 'in the money' (i.e. rates have declined sufficiently), consumers may not only systematically reduce their housing costs over time (as e.g. U.S. consumers have done in the past two decades) but also generate more disposable income for other purposes, alternatively borrow more from the lender for other purposes.

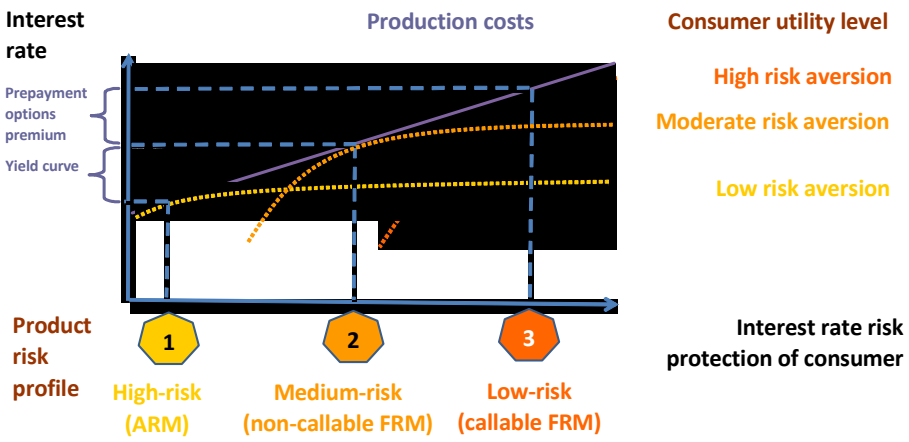
For a wide range of values of the exercise price, the option also provides the consumer with additional financial flexibility, e.g. easing moving and financial management decisions (depending on the constellation of opportunity costs). These benefits are not available if the lender can contractually exclude a prepayment.

[13] An exception is when consumers prepay in situations in which the lender makes a profit from reinvesting the cash, in which case interest rate discounts are possible.

Application of the Capital Asset Pricing Model

The key issues surrounding the legal regime of early repayment can be generalised as those affecting the choice between contracts with high and low risk protection levels, which is the theme of the Capital Asset Pricing Model (CAPM) popularised by Sharpe (1964). While the CAPM is usually applied to the investment context, it can be as easily be interpreted in the mortgage finance context. The key mechanics of the model is the matching of consumer risk-price preferences with the supply costs of risk protection options by the financial industry. Figure 1 visualises a version applicable to the three main mortgage products, ARM, non-callable FRM and callable FRM.

Figure 2: Analytical framework for the three main mortgage product types in the interest rate risk dimension leaning on the Capital Asset Pricing Model



Note: see product definitions in terminology section (Annex 2).
Source: Finpolconsult

Consumers can be broadly classified as risk-averse (say, free lancers who might face a sudden income drop tomorrow) or risk-neutral (say, civil servants with a guaranteed stable income stream), with the former showing additional willingness to pay for greater risk protection while the latter are basically indifferent to varying protection levels.

No two consumers' preferences are the same. However, lenders cannot offer very large numbers of different contracts that match all consumer's individual tastes (for example combinations of prepayment compensations and interest rate mark-ups). With a standard argument of insurance theory, lenders in this situation will either pool or separate consumers depending on

their cost structure and the degree to which sufficiently large consumer groups are distinguishable by similar preferences. Figure 2 shows a typical result.

Interest rate risk in mortgage finance can be very high, as a result of the long interest rate fixing periods or equivalently duration. Lenders will be highly exposed to this risk unless they find proper funding instruments to pass it through to savers:

- Lenders lacking such funding instruments will by default pass on prevailing market conditions, including all (interest rate) risk, without protection to consumers. This explains why historically many mortgage finance systems have produced only ARM, for example in the US until the 1930s and in Britain until the 1990s.

- FRM products historically become available where long-term savings and capital (bond) market development were too, in Denmark and Germany since the 18th century and in France since the 19th century.

Today, lenders in most markets will offer several interest rate risk protection products. Figure 2 visualises this through a production function for risk protection with a slope that determines the interest rate mark-up coming with a greater risk protection level.[14]

In the case of a fixed-rate loan (FRM) compared to an adjustable rate loan (ARM) that mark-up will be proportional to the yield curve (long minus short rates of government bonds), in the case of a callable FRM minus a non-callable, or call protected, FRM the prepayment option price.

Note here that the mark-up may also be less than the additional costs due to reduced default costs resulting from higher risk protection levels. We use these relations between pricing and risk protection below for the cost-benefit analysis.

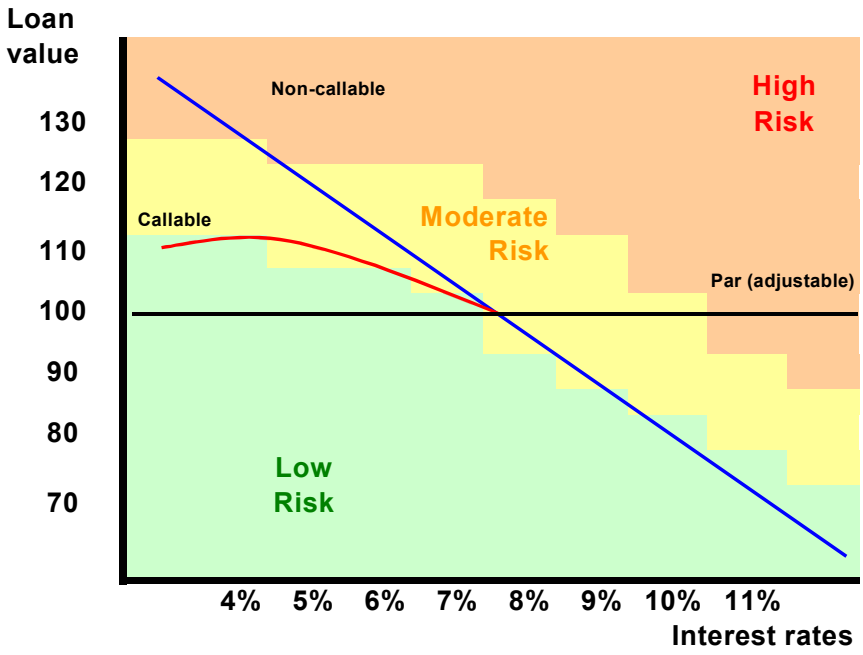
Duality of interest rate risk and credit risk in mortgage finance

From a lender's perspective, the key long-term cost factor behind contract choice next to risk protection production costs (narrowly defined as the costs of taking interest rate risk plus administration costs) is credit risk. For consumers, credit risk may mean insolvency, loss of capital in the house and possibly residual debts and reduced net incomes for an extended time during life.

[14] The relation does is not necessarily linear, as risk protection costs for lenders may increase more than proportionally with risk levels. For example, many high inflation countries do not have fixed-rate markets with fixing periods exceeding a few years as investors shy the price risk for loan and bond instruments carrying long fixed rates.

Credit risk correlates strongly with payment shock risk and thus the amount of interest rate risk passed on by lenders to consumers. Hence, at least partially, lower credit risk will be bought by a lender through higher interest rate risk, and vice versa. Total lender insolvency risk then depends on striking the right balance, or finding capital market investors that shoulder some of the risk (e.g. in the presence of bond instruments).

Figure 3: Stylised default risk profile of the three main mortgage products used in the EU



Note: a non-callable FRM loan rises (falls) in value with market rates falling (rising) vs. the coupon. An ARM loan remains broadly constant in value as coupon equals market rates. A callable FRM combines features of a non-callable FRM (if rates rise) with those of an ARM (if rates fall). Lines represent large pools of loans. In the case of callable FRM (red line) in such pools some consumers will fail to prepay with falling rates even if it is in their best interest, which keeps the loan pool value above par (100). Figures are illustrative only. We consider 'value' here as an opportunity cost concept rather than indicating a sales price.

Source: Finpolconsult.

All three main mortgage products used in the EU carry certain credit risk drivers, however to vastly differing extents.

- ARM may experience strong upward interest rate increases and thus payment shocks, especially if combined with low initial teaser rates (hybrid ARM). Default problems historically occurred in the United Kingdom (1990s), during the U.S. sub-prime crisis (since 2007) or during recent Western European downturns in Spain, Ireland and the United Kingdom (since 2008). Another default contributor is that predominant ARM systems tend to feature considerably higher house price risk (see literature review).

- Non-callable FRM may become very expensive for consumers, if market rates decline and income growth slows, especially if fixed-rate periods are very long. Problems existed here in particular in the 1980s, when Denmark and Norway still used 20-year non-callable FRM and, as market rates declined swiftly, experienced high levels of defaults.[15] From a present value perspective, a long-term non-callable FRM has a high value to the lender in this circumstance, but the high default likelihood reduces the value of a portfolio of such loans.

- Callable FRM finally, the product with the highest degree of interest rate risk protection, warrant an option premium. Such an interest rate mark-up will raise debt service burdens. However, once the borrower can afford to pay the premium, the product is the safest of the three discussed here.

Figure 3 summarises these points in a graphical presentation that compares the market value of the loan and the risk scenarios discussed. Clearly, the greatest default risk for the ARM borrower arises when interest rates rise, along with debt service (cash flow risk). Conversely, the greatest default risk for a non-callable FRM borrower occurs when interest rates fall and the market value of the loan (i.e. the opportunity costs of paying high interest rates when market rates are low) becomes large, possibly higher than the house price (negative equity risk). Yet, still the non-callable FRM borrower is protected against rising interest rates (against a premium paid over ARM).

The safest product insuring against both cash flow risk and at least partially negative equity risk is the callable FRM, albeit only against an additional option premium to be paid over the non-callable FRM, which may possibly bring higher initial loan defaults.

1.5.3 : Empirical analysis: loan pricing under different forms of early repayment compensations or fees

A loan (pool) pricing framework

Influenced by U.S. and Danish research, the mortgage capital markets today use a standardised risk-cost assessment framework for mortgage loan pool pricing, in which the options (credit, prepayment costs) and options-adjusted (administration, funding costs) elements of the price are separately quantified.

[15] The reasons for default on the cash flow side were high interest rate levels locked in by the non-callable loan that were ultimately not affordable for many borrowers. Moreover, there was an option-theoretic default motive for Danish borrowers as the market value of the loan exceeded in many cases the house price. House prices in Denmark fell between the mid-1980s and 1994.

Despite these advances, everything else being equal the estimates of the costs of prepayment option vary considerably, depending on the specific prepayment model that the investment bank or investor uses to price the loan pool. These proprietary models combine interest rate estimates, data about borrower responsiveness to interest rate signals and exercise costs (early repayment compensation or fee, legal transactions costs) to arrive at prepayment speed estimates for mortgage pools (also called conditional prepayment rates or CPR). Once prepayment speeds are identified, the pool's expected maturity (or duration) can be computed, and a benchmark for the pricing of the pool can be derived.

In the cost-benefit analysis context, the compensation or fee element of the exercise costs is of particular interest as their largest element. Within early repayment compensations we differentiate between:

- Lender reinvestment loss or profit, as a result of changes in the interest rate level of mortgages in which he can reinvest cash received from a prepaying borrower.

- Foregone lender intermediation profit and opportunity to claw back loan closing cost discounts, as a result of truncation of the margin received from a loan through an early repayment.

- Administration costs incurred by the lender through the act of an early repayment.

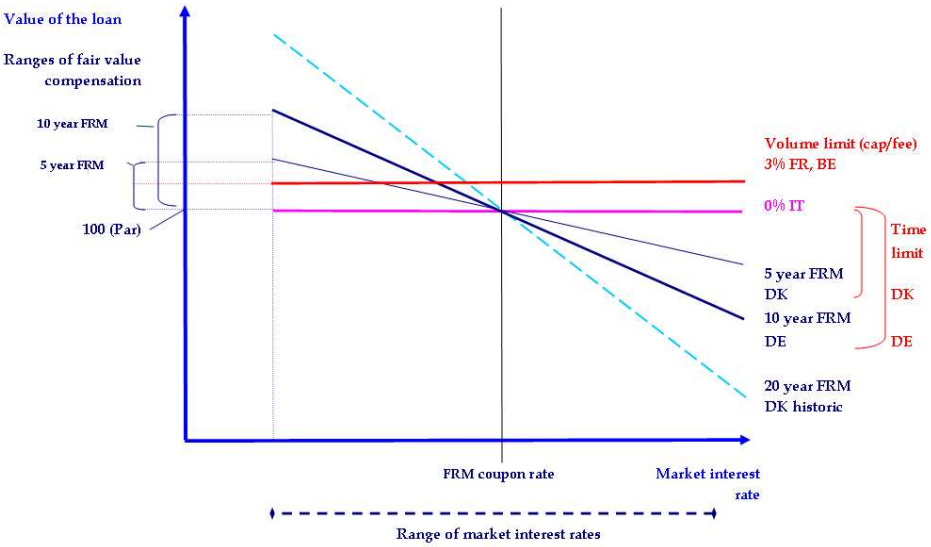
We will devote the rest of this section to evaluate the pricing impact of different formulations of compensation for the first two of the three elements in the list, via their impact on lender profit and losses given an early repayment and borrower prepayment speeds. The administration costs of the act of early repayment can be empirically neglected.

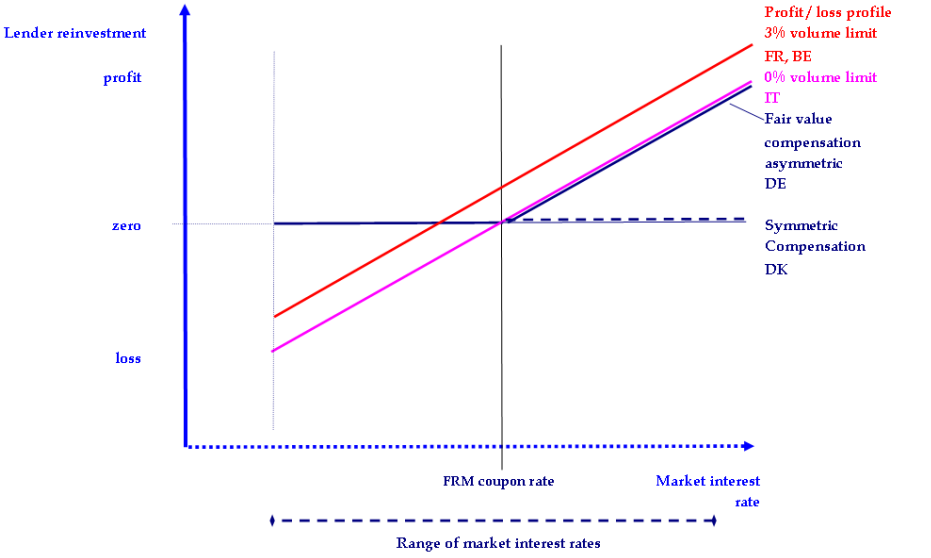
A particular important question of interest is under which constellations and to what extent caps imposed on fair value compensation give rise to an option price charged by the lender. This is of interest in particular since in singular contract environments, the option cost will be charged to all borrowers while the benefits of exercise at below fair value costs will only accrue to the prepaying borrowers.

Analytical framework option cost

We concentrate on non-callable FRM with fixed-rate terms between 5 and 20 years. Figure 4 develops the basic concepts of their pricing as well as provides an indication of the impact of volume limit (fee) and fair value compensation models based on time limits for FRM as we can identify them for the EU.

Figure 4: Pricing of non-callable FRM: impact of different legal regimes for compensation or fee limits on lender profit/loss distribution





Notes: figures denote loss given an early repayment only. To arrive at loss estimate, multiply with likelihood of borrower making an early repayment. The likelihood depends on the interaction of the financial incentive (interest rate decline) with the compensation regime. A fair value compensation will lead to a flat early repayment distribution, a capped compensation or fee model to an early repayment distribution that has a fat tail when interest rates fall.

Source: Finpolconsult

Start with assuming a fixed coupon rate (say, 5%) and then consider the pricing of loans carrying different remaining fixed-rate periods (5, 10 and 20 years) as displayed in Figure 4. When market rates drop below the coupon,

the market (present) value of such non-callable loans rises; the longer the fixed-rate period, the steeper is the increase in value. Similarly, if market rates rise, the value of such non-callable loans drops. The slope in bond market jargon is called 'duration', and describes the price risk that investors/lenders hold on their books in response to changes in interest rates.

Now we determine the lender profit and loss profile: if a prepayment is made at market interest rates below the coupon (loan) rate (e.g. 4%), a reinvestment loss for the lender occurs that is higher, the higher the length of the remaining fixed-rate period (the steeper the slope of the dark curves in the upper graphs). The loss of a lender receiving cash from a borrower is equal to the difference between the value of the loan and 100 (par), the value of the cash. The maximum amount of loss that a lender expects depends on the range (volatility) of interest rates expected.

No compensation vs. (uncapped) fair value compensation

We start the empirical discussion with Danish data on callable FRM option pricing. Denmark prices the option in the capital market, and options-adjusted spread models for the most liquid bond series can be used to derive the option cost with very limited potential for distortions. Figure 5 shows these data – over the time period of 2001 to 2009, the option cost on 30-year FRM have varied between 0.20% or 20 basis points, and almost 2% or 200 basis points reached during the recent financial crisis. If we discount the extremes as anomalies, we still see very elevated option cost levels of 80 to 120 basis points during the financial crisis[16], and 20-80 basis points during normal times. The mean option cost for the 8-year period under review is 61.4 basis points.

[16] The options-exercise behaviour of the Danish borrower population has not shown anomalies during the financial crisis. Rather, the high levels of option premia is likely triggered by capital supply constraints with regard to the available investor base and other liquidity issues, such as availability and pricing of hedging instruments.

Figure 5 Empirical prepayment option cost (interest rate mark-up) in Denmark, 30-year callable FRM, 2001 - 2009

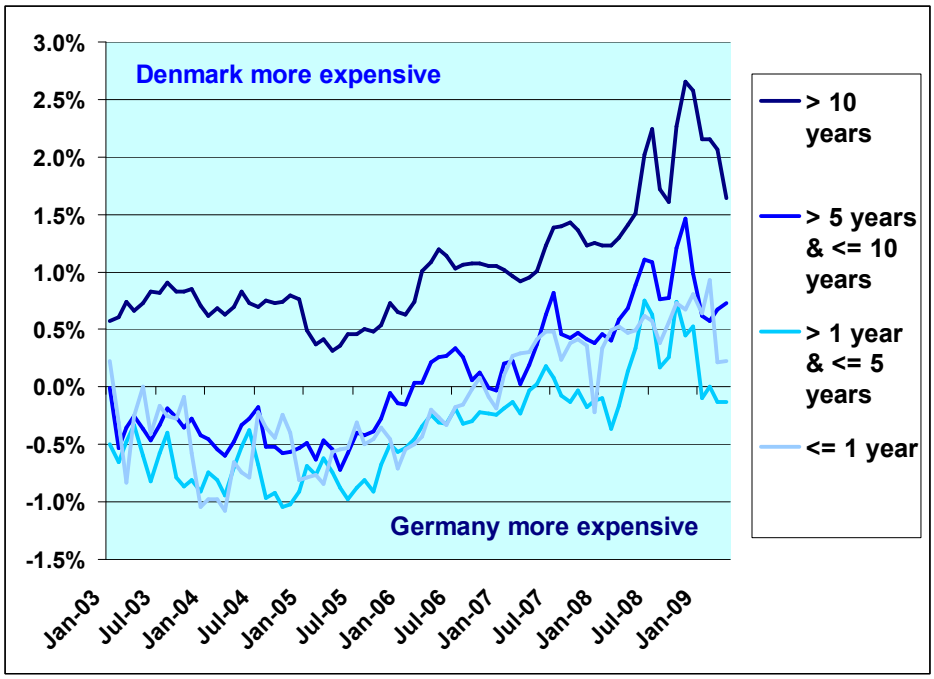
Notes: Option cost are derived from options-adjusted spread models underlying each bond. Bond series have varying bond coupons – series are named in the chart.
Source: Realkredit Danmark.

In Figure 6 we compare Denmark and Germany for an approximation of the pricing differences between callable and non-callable (fair value compensation) FRM, the latter being characteristic for the German market.

A direct comparison of the Danish callable and non-callable products is not useful, as the Danish non-callable market is very short-term (5 years, usually lower). In contrast, the typical interest-rate binding period of German mortgage loans has considerably risen in recent years and now is somewhere between 11 and 14 years. Such loans in Germany carry the call option from the 11th year on, which tends to reduce price differences slightly.

While using different funding structures (exclusively bonds in the Danish case and to a large extent – probably 80% - deposits in the German case), both countries have very liquid FRM markets. De-facto German FRM loans, although carrying nominally shorter fixed-rate period than Danish 30-year FRMs, have a longer 'duration' or expected life because they are usually non-callable for the first 10 years. Again, under normal yield curve conditions this should reduce price differences slightly. Yet, the historical German tradition of pricing loans over comparable capital market benchmark curves – especially the Pfandbrief curve - has recently suffered with the increasing dominance of deposit funding, and there is the possibility of inflated price differences.

Figure 6 Denmark and Germany mortgage interest rates by fixing period compared



Source: ECB, Danish central bank.

Despite all these caveats, it would seem as if the option costs measured in Figure 5 are also reflected in the international comparison. It is fair to conclude that non-callable FRM, i.e. those FRM that are call protected by fair value compensation or early repayment exclusion as in the German case, carry considerably lower interest rates.

The option cost will decrease with shorter fixed-rate periods than the Danish. During recent bank and insurance initiatives to introduce callable FRM in Germany, within some limits (e.g. exclusion of early repayment for the first year), options prices between 20 basis points and 40 basis points were quoted for German 10-year FRM (rendered thus partially callable).[17] It should also be noted that the non-callable benchmark is moving in Germany as a partial early repayment option offering 5% of the loan amount per annum without a compensation payment as of 2009 has become a market standard.

[17] Source: Survey undertaken by Planethome, a credit broker, published in Berliner Morgenpost on October 24, 2009.

Analytical framework compensation limits

Figure 4 shows immediately that most consumer credit as short-term fixed-rate credit (usually fixed-rate periods between 3 months and 3 years) is not as much affected by limits imposed on compensation as FRM mortgage loans - such loans have a very small slope (duration) only.

We now analyse two basic options for regulating compensation for non-callable FRM with longer-term fixed-rate periods (for ARM and hybrid ARM loans, see discussion further below):

1. Volume limit (cap or fee): in France, Belgium or Portugal the lender can charge a fixed prepayment fee which reduces the loss of the lender (red line in the lower chart).

   Since there is no fair value constraint in these jurisdictions, we see immediately from the lower chart in Figure 4 that this approach produces lender revenue departing from fair value: if a prepayment is made when market interest rates have fallen it does not cover the lender loss - unless interest rates show very low volatility, and if a prepayment is made by the consumer when interest rates have risen it actually delivers the lender an additional reinvestment profit.

   We note at this point that the Italian solution of capping compensation at zero level does still not pre-empt lender profits in case of rising market interest rates (see magenta diagonal line in the lower chart).

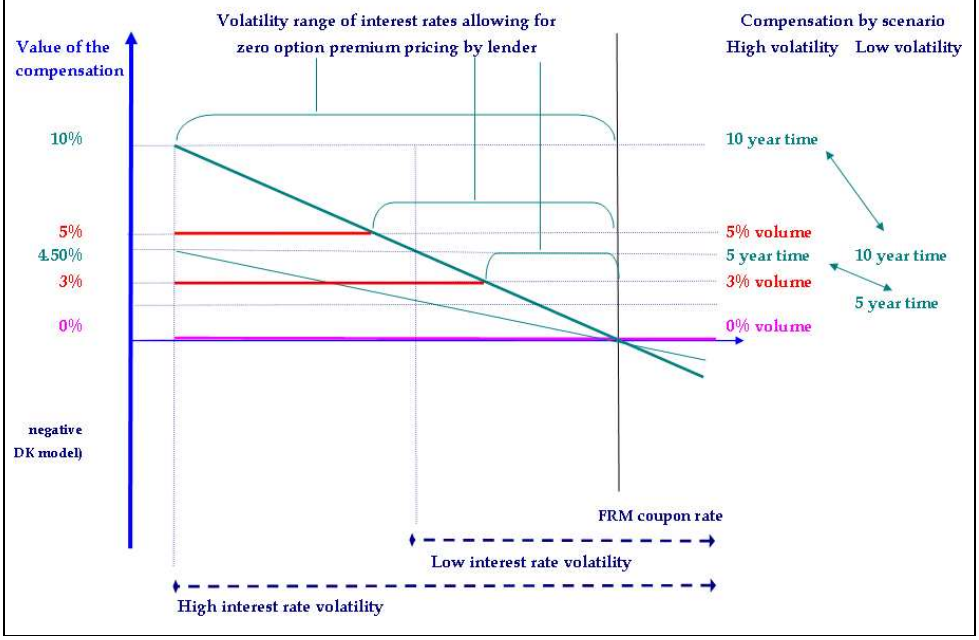
2. Time limits imposed on fair value (yield maintenance compensation). Fair value compensation are computed in a way that eliminates losses or profits when interest rates drop or rise (horizontal solid then dotted blue line in the lower chart, which is *identical* for both 5-year and 10-year loans). This is the Danish compensation model.

   Outside Denmark, e.g. Germany, all yield maintenance compensation models are asymmetric, however, in not letting the borrower participate in a reinvestment gain of the lender (see kinked first horizontal then diagonal blue line in the lower chart) if he prepays in a context of rising interest rates.

   Time limits imposed on the formulae determining fair value compensation will implicitly limit the volume of compensation paid, by putting a limit on the maximum value that a non-callable FRM can obtain (compare thin and thick dark blue lines in upper chart). Historically, when no limits on the time of the fixed-rate period over which fair value compensation could be charged were in place, e.g. in Denmark in the 1980s, the result were very high implicit prepayment compensation and high default levels. As a result, Denmark moved to introduce limits, as Germany has operated with limits since the non-

callable FRM was created (in the early 1970s). In both countries, the legal time limit is 10 years.

Figure 7: Pricing of non-callable FRM: impact of interaction of volume and time limits on compensation levels and incidence of early repayment option pricing



Notes: see Figure 4
Source: Finpolconsult.

Given our findings from the legal baseline it is important to consider the impact of combinations of both volume and time limits as simultaneous constraints. As Figure 7 shows, time limits will control the scale of the increase of compensation with declining market rates (interest differential) while volume limits will control the total compensation volume. A mix of both will thus lead to mixed pricing structure (kinked green and red lines):

- If interest rate volatility is high, even a moderately high compensation cap may render the early repayment option to come 'into the money' as the statutory cap may soon be lower than the fair value compensation (e.g. upper red line in Figure 7, at 5% compensation cap). This means that the lender needs to price the option partially as an interest rate mark-up.

- The same holds true if interest rate volatility is low and when the cap is also low (e.g. France, 3%). In the Italian model of a zero cap, the option will always have to be priced.

A mixed pricing structure makes it typically more expensive for lenders to refinance a loan, since the capital markets and banks alike prefers clean pricing structures for loan pools (either callable, or non-callable). Lenders will thus prefer fair value compensation. If caps must be put in place in order to reduce default risk preference usually goes to relatively high cap values. Consumers in turn will want safety from very high compensation levels which they no longer may be able to finance with the new lender, e.g. due to loan-to-value constraints, and which puts a burden on their affordability.

Clearly, a pure fair value compensation model will become more digestible if interest rate volatility is sufficiently low (which historically was the case in Germany and Denmark) – but this cannot be guaranteed, so the question of optimum policy response in terms of setting volume or time limits is to be solved.

In order to arrive at expected lender loss estimates from a particular legal configuration and contract type (5, 10 non-callable FRM) as described here, we need in addition to consider:

- the distribution of interest rates, which we can assume as symmetric (e.g. distributed under a Gaussian [normal] distribution) and

- the prepayment exercise behaviour of borrowers, which will be asymmetric, i.e. higher when market rates fall than when market rates rise. A complication is that the asymmetry of exercise behaviour depends on the type of compensation limit:

    1. under a volume limit (here: fee model), the likelihood of consumers prepaying when market rates drop will increase substantially as they stand to make a financial gain from the early repayment. This higher likelihood then multiplies with the gain of the transaction which is the lenders loss to a higher expected lender loss. The lender partly compensates by making a profit when consumers prepay as interest rates have increased through the higher than fair value level of the fee.

    2. under a time limit imposed on the fixed-rate period to be applied in a fair value compensation formula, such multiplicative effects do not occur. Also, the fair value character of the compensation will dampen the prepayment incentives of the borrower and reduce prepayment speeds to so-called non-financial prepayments. As a result, the lender will have to price only for the minor impact of non-financial prepayments, and since a fair value compensation is charged

and no loss occurs on these there is no need to adjust loan pricing.

Clearly, the fact that standard fair value compensation approaches are partial and do not consider a payout from the lender to the consumer in case of a reinvestment profit of the lender (symmetry, only in Denmark) will introduce some distortion.

Even under perfect competition assumptions, any aggregate lender loss potentially incurred through a particular legal regime will result in loan pricing changes through interest rate mark-up (option cost). In other words, a departure from fair value compensation will increase loan spreads for all borrowers, including non-prepaying, i.e. partially socialise the loss (see also Figure 7). The values can be significant as we will discuss further below.

Pricing impact: compensation / fee limits

With limits imposed on compensation or fees, we are moving into territory where early repayment pricing is partially via an exercise price and partially via an interest rate mark-up. This suggests that ceteris paribus we should be able to measure lower option cost, the higher the exercise price is. We discuss three countries ranked by their compensation or fee ceilings permissible, France, Belgium and Italy.

- France: In the middle of the 1990s, when interest rates were falling drastically in France, the banking association Association française des banques estimated the margin costs due to the prepayment option to be about 38 basis points, 19 basis points thereof were covered by the admissible levels of indemnity payments.[18] Empirical comparisons of French and German mortgage rates are impossible due to data problems (interest rate brackets reported by France are limited to under and including 1 year, and over 1 year). Several studies also suggested that French mortgages are extremely aggressively priced and possibly more strongly cross-subsidised as entry product than elsewhere, which may render a comparison difficult.[19] Deposits, which carry tax subsidies, are a greater funding source in France than in Germany.

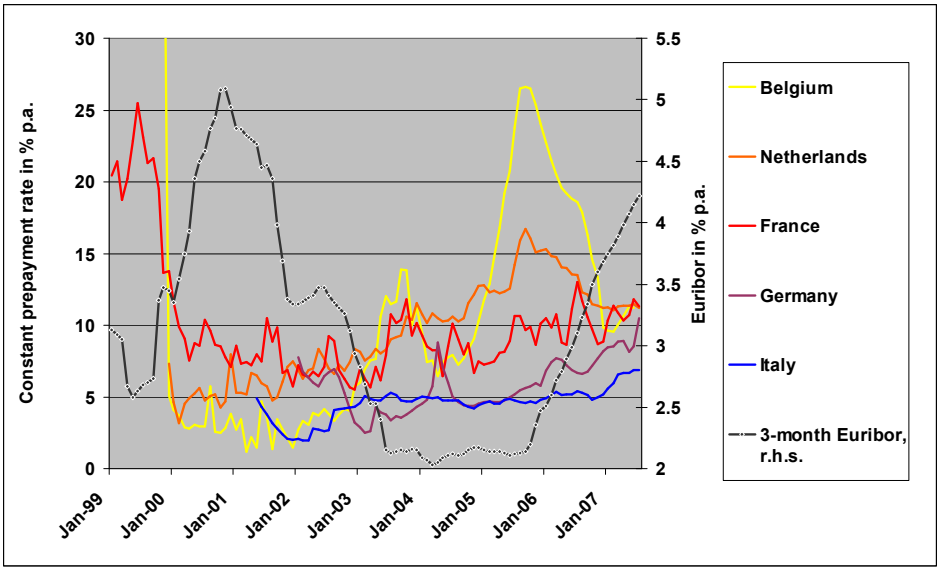
  Yet, while French prepayment speeds are higher than Germany's, they are substantially lower than in other fixed-rate markets – most notably Belgium, see Figure 8. At comparable legal transactions costs levels for external refinancing due to similar legal systems (notary-managed land registers),[20] the likely answer are differences in compensation levels and less elevated internal refinancing.

[18] See Dübel and Lea (2000, p. 226).

[19] See Low, Dübel and Sebag-Montefiori (2003) and follow-up study Mercer Oliver Wyman (2007).

[20] A French expert interviewed speaks of a minimum of 2% interest decline necessary to amortize transactions costs of an external refinancing.

Figure 8: Selected Euro area prepayment speeds compared, Fitch loan pool data January 1999 – July 2007



Notes: pools may contain both ARM and FRM, pool characteristics may differ from economy-wide loan portfolio. Prepayment speeds are measured as Conditional prepayment Rates (CPR), i.e. the annualised rate at which a given mortgage pool's outstanding balance has declined through prepayments.
Source: Finpolconsult computations based on data provided by FitchRatings.

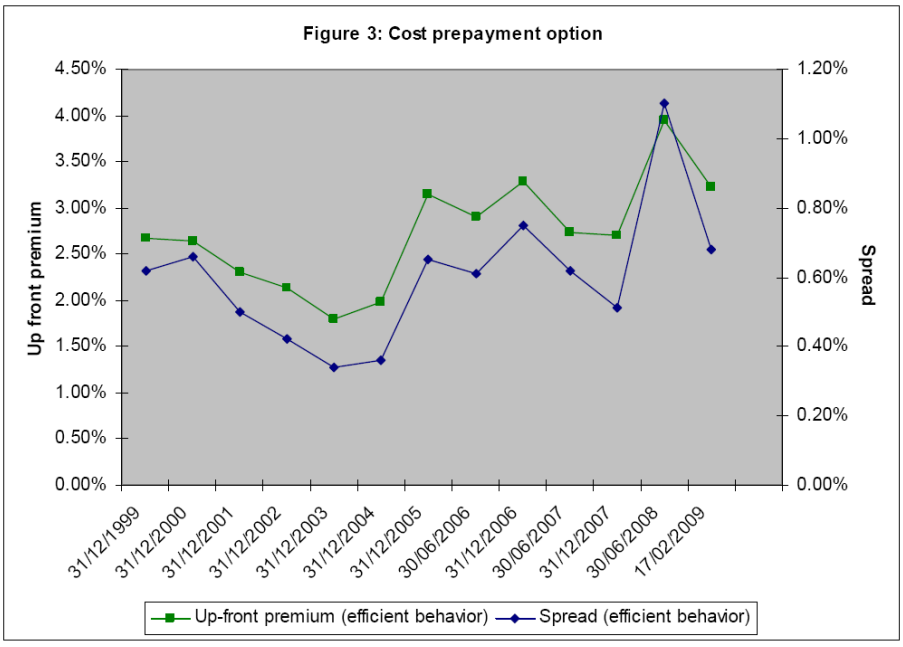
- In Belgium, the admissible early repayment compensation since 1994 is half the French level, 3 months interest. Internal refinancing transactions costs are also considerably lower than in France – such re-financings including simple interest rate adjustments make up for the bulk of prepayments. This combination substantially increases the reaction of demand for prepayments to a given interest rate signal. As Figure 8 shows the Belgian market has consequently been hit by large prepayment waves and showed also strong cyclicality of ARM vs. FRM demand – see Figure 19.

  Pricing data on Belgian prepayment costs is somewhat inconclusive. KBC bank, the Belgian commercial bank, in a memo distributed for the current policy debate containing proposals to further cut back fees (to one month interest)[21] has computed the hedging costs of a universal lender for Belgian FRM prepayment risk. The bank assumes the use of so-called swaptions for hedging, swaps that float-fixed swaps that lenders can partially or fully cancel as prepayment cash

[21] See Delbrouck (2009).

proceeds come in, under assumptions reflecting past Belgian consumer prepayment behaviour. The result is a synthetically obtained options price estimate in the range of 40 – 60 basis points, or 0.4-0.6% interest rate mark-up, for the time period of 1999-2009. Still, probably for the same reasons that we discussed for France, it is hard to find evidence of higher credit costs in Belgium for FRM compared to the German market that are evident in the Danish case. On average, between July 2003 and March 2009 – the available data window - Belgian long-term fixed-rate mortgages (>5 years) have been 0.25% cheaper than German, which has contributed to their ongoing popularity in Belgium.

Figure 9 KBC analysis of swaption costs for 20-year FRM, 1999 – 2009



Note: a swaption is a swap that can be cancelled, including partially, by the counterparty buying protection.
Source: Delbrouck (2009).

Nevertheless, the conclusion that the prepayment option is free of charge to Belgian consumers must be rejected. One explanation for the low price of the product is a possible greater shift of the funding benchmark from fixed to float, i.e. deposits and floating-rate bonds.

Lenders faced with highly cyclical prepayment behaviour are forced to 'open' up the balance sheet by funding long-term loans with short-term debt. Otherwise they would run into the risk of negative maturity transformation.[22] A second explanation is that, as will be demonstrated in the quantifications below, the fee model practiced in Belgium gives lenders some extra revenues from early repayments in the case of ARM (significant market share) and in the case of FRM when interest rates have risen and the lender not only enjoys a reinvestment profit but also can still charge a fee. In Germany or Denmark where the fair value concept is practiced prepayment revenues for lenders in such cases are zero or close to zero.

[22] French lenders were hit by this risk in the 1980s when loans after Scrivener Law were prepayable with only a small compensation while those loans were still funded with mortgage bonds. As a result of near bankruptcies of lenders, the French mortgage bond market collapsed in the mid-1990s, and French lenders changed their main funding instrument to deposits.

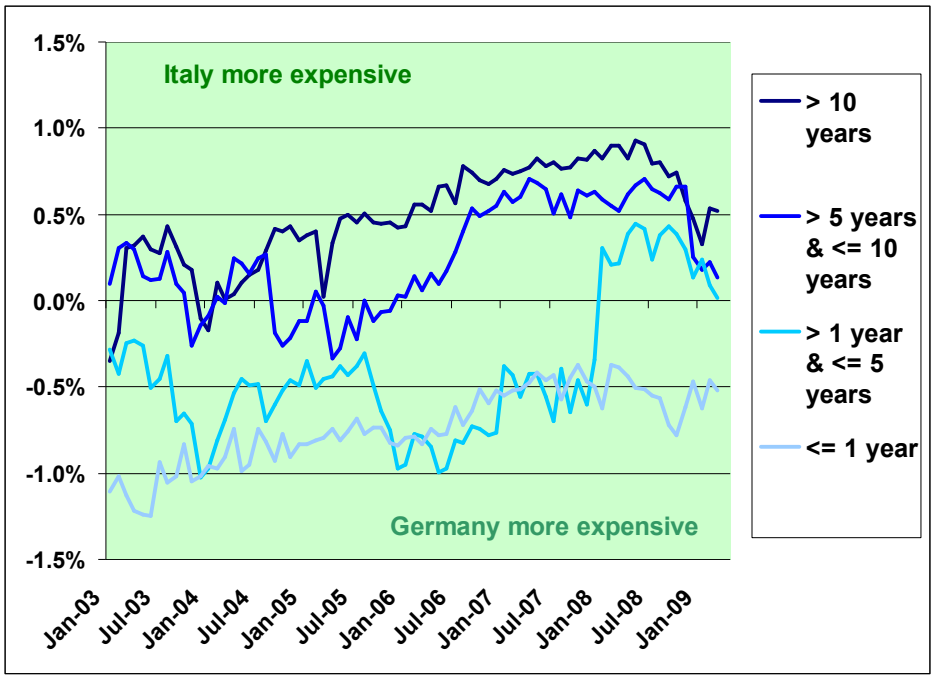
Funding prepayable loans through deposits alone is risky, however, if loans start to extend (low prepayments) and deposit rates increase. This creates the reverse risk associated with positive maturity transformation. In mortgage finance the most famous case of such risk materializing and destroying a lending system is the US savings and loan crisis in the early 1980s.

- Italy has gone through two major mortgage market reforms in 2007 and 2008. Faced with interest rate increases, the government in 2008 decreed that for all ARM contracts interest rates had to be frozen at the average level of 2006; earlier, a long-standing dispute about FRM early repayment compensation was solved in April 2007 by a radical solution which banned such compensation for new lending, significantly reduced them for existing loans retroactively, and also almost eliminated legal transactions costs (Bersani decree).[23] Fitch Ratings reports during an interview that the conditional prepayment rates a result of these measures have increased from 5-8% posted in the 2007 study (see Figure 8) to 12-15% as of early 2009. According to FitchRatings (2009b) Italian prepayment rates in RMBS transactions, after having peaked at 20% in the first half of 2008, have stabililised during the financial crisis as a result of lower availability of credit, but are still above 15%.This would be higher than Belgian and French figures (considering the stage of the interest rate cycle). Unicredit confirms an increase in conditional prepayment rates from 3.13% in 2004 via 5.97% in 2007 to 8.9% in 2008 for their portfolio, ascribing the acceleration to the legal changes. Going forward, however, Italy must be expected to experience prepayment speeds in the range or higher than Belgium, depending on how much fixed-rate lending portfolio remains.

  We have no direct options price indications from Italy. However, we note eye-catching developments in the spreads of Italian mortgage products to Germany, as reported in Figure 10. In particular, interest rates on loans with interest-rate fixing periods under or equal to 5 years jumped by almost a full percentage point around early repayment compensation reform date in December 2007. This loan class, which represents most of today's early repayment market is hardest hit by the elimination of early repayment indemnities. It should expected that the spread increase will decline somewhat since the fair value costs of the prepayment option for a 5-year fixing period should be in the range of 20-30 basis points only.

[23] Law decree No. 40/2007. An agreement between Italian Banking Association ABI and consumers associations complemented the decree and set early repayment compensation thresholds. For details (in Italian)
http://www.abi.it/doc//doc/home/attivitaOpinioniABI/comunicatiNoteStampa/doc/tmp1178124441748_10MutuiAccordo_2_5_2007.pdf.

Figure 10 Italy and Germany mortgage interest rates by fixing period compared



Source: Banca d'Italia, Bundesbank.

Analytical framework foregone intermediation profit / closing subsidies

A numerical example[24] can illustrate the lender loss and loan pricing impact if compensation for foregone intermediation profit and loan closing costs (analogous for administration costs of early repayment exercise) is prohibited, as appears to be the case in a fairly large number of EU jurisdictions (see Table 2 and Annex B Legal Baseline).

[24] The example is taken from Dübel (2007a).

- A lender is assumed to spend 1% on loan (customer) acquisition, leaving it with a loss of 0.5% after deduction of a loan origination fee charged to the consumer of 0.5%. This subsidy is planned to be recovered via the profit margin (interest rate mark-up) over time. For a 30-year loan a targeted return on equity of 15% (assuming 4% capital level) is achieved after 10 years, the resulting additional profit margin is 0.13%. If the consumer makes an early repayment after 6 years, the return on equity, however, is only 9% below the lender's willingness to make the loan.

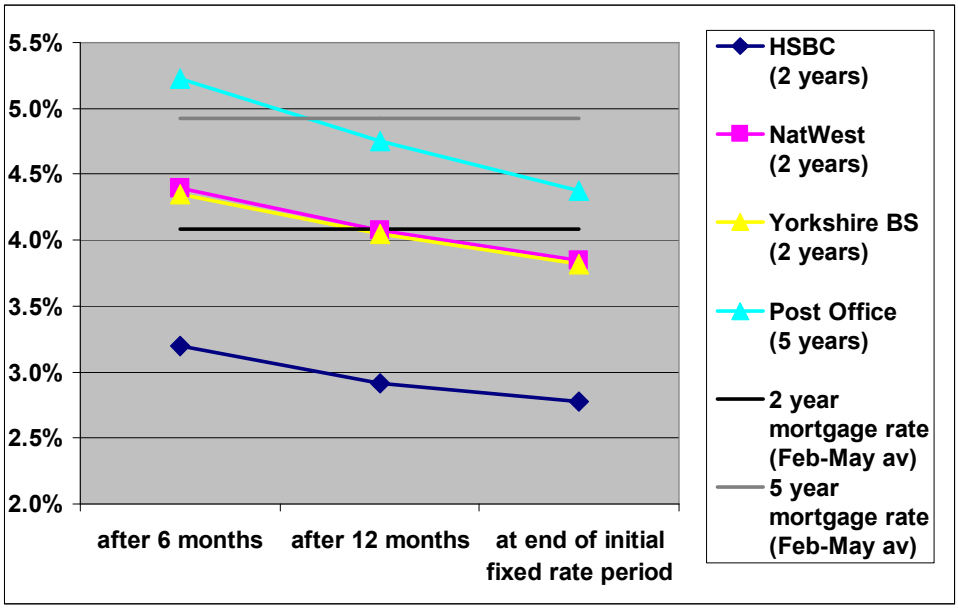
- How would the lender have to change his pricing policy if the loss of four years of additional profit (10 minus 6 years) could not be recovered by compensation? In order to obtain the same capital return of 15%, initially planned after 10 years, already after just 6 years, the lender would have to change the relation between loan origination price and the profit margin (interest rate mark-up); in the example, the margin will be reduced from 0.13% to 0.05%, and the loan origination price rises drastically from 0.5% to 0.85%. This results in the initial loan acquisition loss for the bank being reduced to only 0.15%.

The example implies that inability to reclaim loan origination subsidies or foregone intermediation profit via compensation will lead to higher loan closing costs for the consumer. More generally, shorter expected loan durations will lead to larger front-loading of the loan pricing. This increase in the initial debt service burden has the undesirable effect of reducing consumer affordability.

If the market is unable, for competition reasons, to increase upfront pricing, the result will be generally higher interest rates (and possibly also an increase in prepayment speeds with another feedback effect on rates via option cost).

Finally, without compensation for loan origination costs, mortgage brokers in many countries tend to 'churn', i.e. maximise turnover of consumers by approaching them more frequently for a loan refinancing with a new lender (see also chapter on responsible lending). In jurisdictions greatly affected by the phenomenon, such as the U.K., prepayment fees tend try to reduce churn by clawing back the discounts given upon loan origination or during the initial phase of the loan in order to eliminate the prepayment advantage for the consumer.

Figure 11 Early repayment compensation clawing back loan closing and initial fixed-rate discounts in the UK - internal rate of return when consumer prepays a loan closed in May 2009



Notes: includes all relevant early repayment indemnities and other charges. Note: benchmark mortgage rates are nominal, effective mortgage rates for 1-5 years fixing during Feb-May 2009 averaged 4.83%.
Source: individual bank websites, Finpolconsult computations.

At the same time, if consumers are forced to pay a compensation for such foregone intermediation profit this can be unfair in individual cases, e.g. if the consumer is refinancing with the same lender, or if only his contract conditions are changed, and he pays intermediation profit twice. Internal refinancing and contract adjustments seem to dominate early repayment in particular in smaller European jurisdictions, or where transactions costs differences are large (see below).

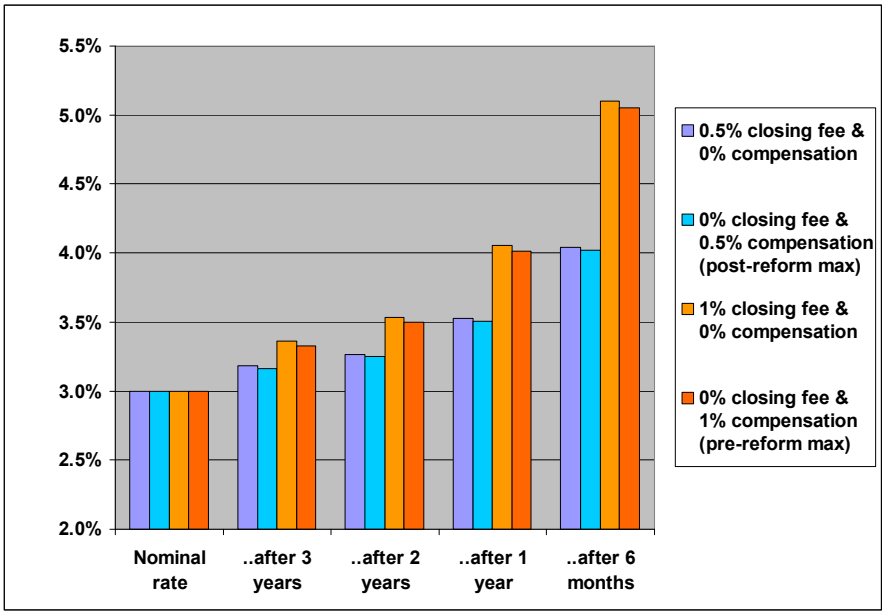
Moreover, fair value compensation levels for foregone intermediation profit are hard to establish and even harder to verify unless a mortgage profit centre accounting exists within the bank, lender micro cost data are properly collected and made available. Some jurisdictions react to this challenge by defining de-facto lump-sum limits to compensation (e.g. Spain on ARM).

Pricing impact of compensation for foregone intermediation profit / subsidy claw-backs

- Figure 11 shows the case of typical compensations charged today in the UK. The market features the largest broker distribution share in Europe and already since the 1990s has practiced aggressive loan closing and initial interest rate discounting policies by lenders hunting new clients. This resulted in high de-facto subsidies for the 'front book' of new borrowers through zero closing fees and initial fixed rate periods below market levels.

  British lenders, however, do charge compensations for prepayment during the initial fixed-rate period in order to keep borrowers from switching, i.e. claw back the closing subsidies. Our observation from the data snapshot taken in May 2009 is that the costs for consumers to prepay during the initial fixed-rate period are broadly in line with market interest rate levels for a comparable alternative market financing. Only when prepaying after a very short period of time, the internal rates of return do slightly exceed market rates. This should reflect closing costs, which take time to amortise. Overall, fee policies – while complicated to evaluate - can be deemed to be approximately at fair value.

Figure 12 Impact of Spanish 2003 early repayment compensation reform on closing cost subsidy policies, internal rate of return when consumer prepays



Note: 3% nominal interest rate assumption.
Source: Finpolconsult simulation.

- In Portugal and Spain early repayment compensation charged on ARM effectively only cover foregone intermediation profit / closing subsidies.[25] Prior to the reforms in 2007, in Portugal such compensation was legally unlimited, and lenders routinely charged compensation in the range of 3-5%, after Decree-Law 51/2007 those became legally limited to 0.5%. In Spain, compensation had been reduced from 1% to 0.5%in a 2003 change of the 1994 enabling law for ARM already. In 2007, the 0.5% became restricted to the first 5 years of the loan, followed by a 0.25% admissible charge if a prepayment occurs later.

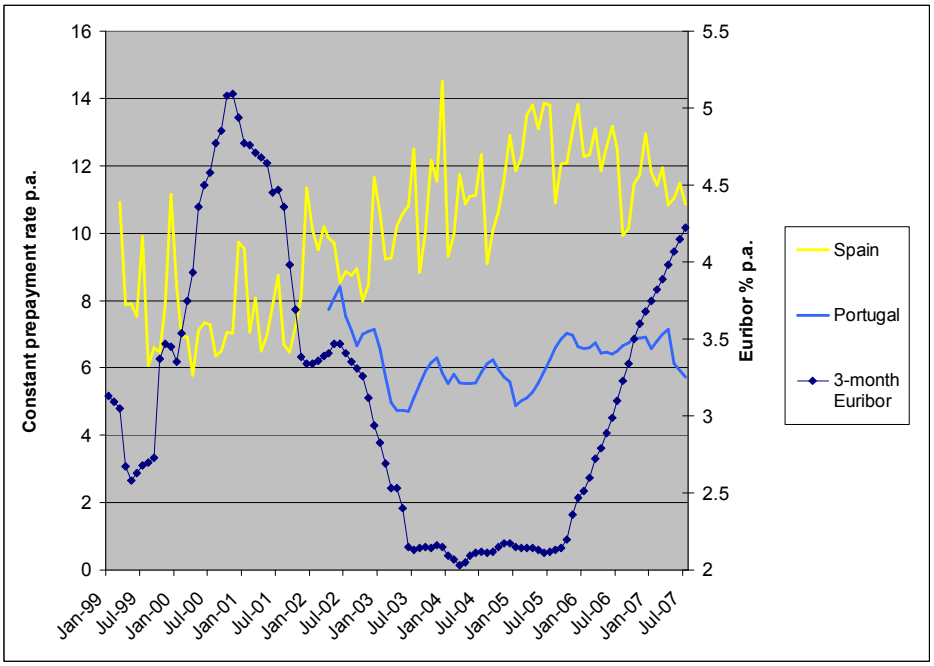
  Figure 12 demonstrates the effect that this policy change had in the Spanish case. In the first year of the financing compensation levels of 1%/0.5% of the outstanding loan amount are broadly sufficient to claw back a loan closing subsidy of the same amount. Assuming that 1% are the true costs of attracting a new client and that the margin does not change, the new reduced compensation regime hence implies an increase in closing costs for the borrower by ~0.5%, i.e. he either finances 100.5 or receives a payout of 99.5. However, with the numerical examples discussed before, it is likely that the lender cannot keep the same margin, in order to compensate for the increased likelihood of prepayment by lowering the prepayment incentive, and that therefore the increase in loan origination costs will be beyond 0.5%. For the Spanish case, this effect seems to be confirmed by the noticeable increase in prepayment speeds – see Figure 8 – and strong spread decline after 2003.

  We can only make inferences about the corresponding effects on the Portuguese ARM market – a central bank study evaluating the 2007 law has been announced, but it has not yet been published. The effects are likely further inflated vis-à-vis Spain since a) the pre-reform compensation levels were much higher, and b) correspondingly prepayment speeds were much lower. Considering the Fitch data in Figure 13 between 2003 and 2007 when Portuguese compensation were legally unlimited and Spanish limited to 0.5% after the 2003 legal change prepayment speeds in Spain ran at almost double the Portuguese levels. FitchRatings (2009) reports a jump in conditional prepayment rates in the second half of 2007 in Portugal from 10% to 20% - the previous long-term average (2003-7/2007) had been 6% only. Also, spread analysis between APRC and nominal ARM rates as well as in comparison between Portugal and Spain that there was at least a temporary effect of the 2007 reduction of the

[25] There is an element of reinvestment loss in those countries stemming from mismatches between funding and lending benchmarks (so-called basis risk). For example Spain is using 1 year Euribor as lending benchmark and 3 to 6 months Euribor as funding benchmark. During 2006 and 2007 Spanish lenders suffered from mismatches between the rates on both indices.

compensation to 0.5%, in the form of higher loan closing costs, also initially an increase in spreads. All effects are overlaid later by those induced by the financial crisis (i.e. lower prepayment speeds and higher and more volatile spreads).

Figure 13: Spanish and Portuguese prepayment speeds compared, January 1999 – July 2007



Notes: see Figure 8. Prepayment speeds = conditional prepayment rates.
Source: FitchRatings. Finpolconsult computations.

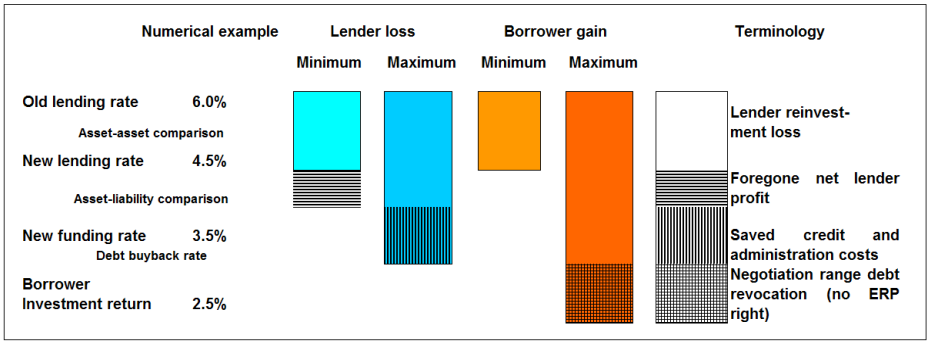
- In Germany, ARM foregone intermediation profit / closing subsidy compensation are prohibited by law. In combination with other factors (see discussion on market completeness) this may help to explain why German ARM are both significantly more expensive than in neighbouring countries (see charts above), and in relation to FRM see Figure 19. See also Coco (2006), for a comparison of ARM spreads in Spain and Germany.

Fair value for whom? Opportunity costs of lenders vs. opportunity costs of borrowers

The fair value definition used so far focused on lenders reinvesting into new mortgage assets (reinvestment loss/profit) and losing the customer to another lender (foregone intermediation profit).

It is not a digression to raise the awareness of the fact that each early repayment scenario carries a different constellation and hence such definitions are first approximations only. Figure 14 may be helpful to understand the principal issues.

Figure 14: Different early repayment compensation perspectives, terminologies



Note: data for illustration only
Source: adapted from Dübel and Lea (2000) and further enhanced.

- As discussed before, lenders arranging an internal refinancing (or just adjusting contract rates) may have reduced costs as they keep receiving the intermediation profit. This situation is highlighted by the light blue bar in Figure 14. In this case, a fair value compensation would consist of a simple asset-asset comparison without further adjustment.

- However, a lender faced with a switching borrower faces lost additional foregone intermediation profit:

    - There are two routes that arrive at a fair value compensation level in this situation: either via asset-asset comparison plus mark-up for the foregone intermediation profit, or via asset-

liability comparison minus saved costs from the lender no longer having to service and take the credit risk of the loan.

The latter method is used for example in computing the German compensation. Also, the Swedish computation standard uses this approach, for simplicity it fixes the minimum administration and credit costs to be deducted (from a government bond benchmark) at 1%. In the 2007 Spanish law, the pendulum swings in the other direction by just assuming the government bond benchmark without any further deductions, which creates a high potential compensation level (see dark blue bar in Figure 14). All of the above methods are contested between lenders and consumers.

A similar situation is given when a lender does not have the opportunity to invest in new mortgage loans, but rather buys back his own debt or invests in comparable securities.

- Similarly, borrower situations differ. Borrowers that simply switch financing or even increase their debt tend to have smaller benefits from early repayment than borrowers that refinance with cash which usually has lower investment returns, especially in countries where the investment universe of borrowers is restricted. The argument plays a role in case differentiations of the legislation concerning the scope of the early repayment right.

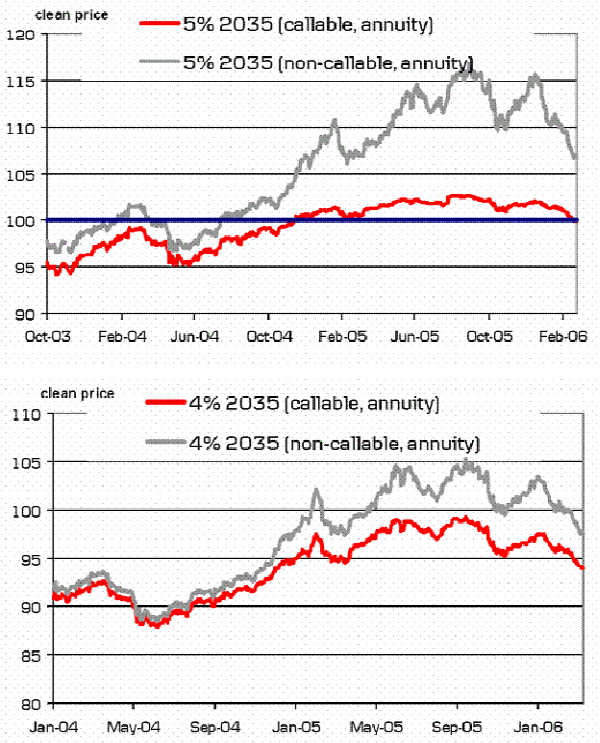
Compensation benchmarks – synthetic vs. market pricing

Synthetic asset-liability comparisons, despite allowing lesser arbitrariness when determining foregone lender profit compensation by explicitly calibrating deductible lender costs, have been suffering from dispute about which funding (or debt buyback) cost levels to reasonably assume. Depending on the funding strategy of the lender, his true opportunity costs may vary substantially from the typically used benchmark indices, such as government bonds or Pfandbriefe. Synthetic asset-asset comparisons have met less criticism, but are vulnerable to lending spread changes and may still have to synthetically calibrate the foregone lender profit. Hence all compensation formulae used in practice are one-size-fits-all solutions that do not exactly match 'fair value'.

A compromise line, at least as far as reinvestment loss/profit is concerned, might lie in the Danish system of market loan pool/bond pricing. Essentially every Danish loan is part of a loan pool that is daily traded on the Copenhagen stock exchange. This allows banks to always quote a market price, which in the case of non-callable loans may exceed par and thus establishes an implicit prepayment compensation. Figure 15 compares the

pricing of callable and non-callable bonds for a phase of strong interest rate decreases in 2004 and 2005.[26] Quoting market prices has the advantage of implicitly assuming the market's average refinancing costs, rather than fishing for a specific lender's cost structure.

Figure 15 Price dynamics of callable and non-callable FRM loan pools in Denmark as interest rates decline



Note: 2035 is the year of the legal maturity of the bond series, 4% is the coupon of the loans issued into the bond series.
Source: Realkredit Danmark.

However, there are also pitfalls of the approach: a pricing inefficiency in the Danish non-callable bond market led to Danish government intervention in 1995 and a temporary switch from market pricing to synthetic pricing. The inefficiency was due to tax issues and the fact that non-callable bond series

[26] Danish loans are issued in fixed-coupon classes, lower coupons are used to implicitly call-protect the portfolio, compensating for the fact that Danish lenders do not charge for foregone intermediation profit.

were small and tightly held by a few institutional investors, of which some refused to sell to the banks or borrowers.

As a result, the prices for some series of non-callable bonds were considerably higher than what the market interest-rate level indicated, and it became therefore very expensive for the borrower to prepay.[27] In 1995, the Danish Parliament - Folketinget - passed a law in order to facilitate prepayment for borrowers with mortgage loans whose non-callable bonds were listed at excessive prices.[28] The borrowers became entitled to ask the public Mortgage Bank of Denmark - Hypotekbanken – to step in as a substitute debtor of the bonds. In return, Hypotekbanken charged the borrower a bond price on a synthetic basis by taking comparable government bond yields plus an extra charge of 1.5 percentage points to cover risk and administration fees. Hypotekbanken then kept paying the remaining instalments to the bond investors, which resulted in no losses for government as of maturity date of the bonds.

Symmetric (full fair value) vs. asymmetric (partial fair value) compensation

We have seen that Denmark is the only EU country practicing implicit payments from lenders/investors to consumers in case of rising interest rates. For example, a Danish borrower whose loan is part of the two 4% coupon pools displayed in Figure 15 could have bought it back from the market during the high-interest phase of the summer of 2004 for just 88, instead of the 100 he would have had to pay in France, Britain or Germany. With the arguments presented in Figure 14, his personal benefit could have been even substantially higher than the savings of 12% of the loan amount, depending on his own opportunity cost scenario.

The borrower will indeed through this so-called 'delivery option' – named after delivering the bond documentation to the investor – be able to operate just like a corporation or fund and optimise his financial portfolio according to market circumstance. Aided by suitable advisory capacity, also less financially astute consumers would benefit from the symmetry. Market inefficiencies due to investor concentration as discussed above in the benchmark discussion could be reduced through appropriate bond market making arrangements.

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[27] These loans had been issued during a short spell during 1986/87 for tax reasons, which explains the small size of the bond series used to finance them. Even without the buyback problem, prepayment was already quite expensive as bond prices after strong interest rate declines stood at very high levels (ca 140). This led to the de-facto legal limitation of non-callable loans to 10 years, in market practice to 5 years.

[28] "Act on Measures to Prevent Lock-in Effects related to Non-callable Mortgage Loans" (Act No. 354 of 6 June 1995), in Danish: "Lov om imødegåelse af indlåsningseffekter på inkonverterbare realkreditlån m.v." (Lov nr. 354 af 6. juni 1995).

Compared to the current asymmetric situations in the rest of Europe, the Danish market solution also generates a natural hedge between house prices and market values of debt: both vary in the same direction with changing interest rates. For example, if house prices fall 10% when interest rates rise, bond prices are likely to fall proportionally.[29][30] By keeping thus the market loan-to-value ratio, the ratio between market value of loan and market value of house, less volatile through this arrangement, a key trigger for default is kept low – which creates an automatic credit risk stabiliser.

The bill for this arrangement is paid by investors or lenders, which tend to benefit from the asymmetry in the standard arrangements, where prepayment is only possible at par/100. The most likely group to lose are lenders with a mismatched funding strategy (e.g. funded by short-term debt that is priced at par while borrowers of their long-term loans would be able to prepay below par). Yet, as mentioned before, the likelihood of exercising the early repayment option is asymmetric with low or no call protection, and hence the impact on the interest rate level of a callable loan will be limited. It will be somewhat greater on a non-callable loan, where margins do not carry the prepayment option cost. However, the reduction in credit risk costs should be deducted from this spread increase. We will calibrate these effects in the quantitative analysis below.

Beyond broader cost-benefit considerations, opponents of a mandatory symmetry arrangement for compensation have a number of practical arguments on their side, some with greater and some with lesser validity. Most can be seen as additions to lender costs:

- Loans are usually not traded in Europe - outside MBS markets and the Danish mortgage bond market, so a symmetric compensation formula would have to be constructed synthetically with lender opportunity cost benchmarks. There is risk that a benchmark does not match true lender opportunity costs (see example of mismatched lender above). Yet such benchmarks need to be chosen anyway for implementing an asymmetric fair value compensation concept, and they will typically co-vary closely with loan pool market prices.

- Lenders in the rest of Europe typically do not practice the issuance of loans below par as Danish lenders often do (see the 4% coupon bond in Figure 15) in order to slow down prepayment speeds and protect

[29] This is of course a stylized description of empirical reality. In the US, two mortgage market segments coexist: in the government-sponsored segment (Fannie/Freddie), mortgage interest rates have not risen substantially during the current crisis, while in the private/Jumbo market they have done so quite substantially. Yet, most European markets do not possess such heavy government intervention mechanisms.

[30] In ARM systems such as the UK or Spain, the delivery option is of limited value as prices for loans are always close to par.

their intermediation profit against erosion. In order to do so, Danish lenders exploit the fact that Danish bonds (and thus loans) are issued at constant coupons and offer consumers lower margins if they chose higher coupons for their loans. Yet this arbitrage reaction speaks rather in favour of strictly combining a symmetric reinvestment loss/profit compensation concept with a foregone lender intermediation profit compensation concept, in cases of external refinancings (lender switching) where such loss of profit margin actually occurs.

- Other large, de-facto fixed-rate markets (such as renting, where rents in existing contracts tend to diverge from market conditions over time) exist in which contract covenants do not foresee symmetric payouts when the contract is terminated prematurely. However, typically the termination periods that would be subject to compensations in those markets are very limited, 3 months or 6 months, and the absence of a symmetric model does not matter in practice.

- From a legal perspective, a negative compensation concept does not exist. This might increase the administration costs of transition.

It should be realised that going forward – with the historic interest rate decompression trend of past 30 years likely having come to an end, or at least future interest rate scenarios showing more evenly distributed phases of increases and declines - the symmetry question may become more relevant than in the past.[31] The quantitative analysis below will shed further light on this issue.

1.5.4 Empirical analysis: pricing impact of the scope of the early repayment right

The economics of the scope of early repayment right can now be developed as a subcase of the general compensation analysis. The case of early repayment right exclusion can be seen as a situation in which a price is negotiated for a second (revocation) contract. The range of feasible prices can be derived with the help of Figure 14 which shows the different economic perspectives of lenders and consumers.[32]

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[31] See the findings in Dübel (2005). The study is based on a compensation simulation model. It compares the levels of compensation realised under historical German mortgage rate data (1982 bis) with a trendless interest rate forecast (2005 bis). Using three different residual maturities it is shown that in the changing interest rate environment average compensation decline substantially, and especially so if a symmetric compensation model is assumed.

[32] Technically, we discuss here the core of a bilateral trade economy in which the lender sells his right of keeping the loan contract intact against the borrower's willingness to pay for revoking the contract.

- Lenders may be ready to accept a cash prepayment against an ex-post negotiated (as opposed to contractual [ex-ante] or legislated) fee for the revocation of the existing loan contract. The level of this fee should be at or above the lender's fair value loss to win the lender's acceptance. In this case, a contract will be closed as long as the consumer continues to have a financial advantage (including financial equivalents of non-financial motives) from the early repayment due to sufficiently low opportunity costs.

  For example, in the case of receiving a cash inheritance the consumer may have only a low-interest alternative for investment as displayed in the dark orange bar in Figure 14. In this case, a fee that is somewhat larger than yield maintenance (asset-asset comparison) might still make him better off than simultaneously paying down a high-yield mortgage loan and receiving from a low-yield investment.

  The situation is comparable to any market negotiation scenario[33], however it is likely that the negotiation power and information sets are asymmetrically distributed to the detriment of consumers, leading to systematic excess profits for lenders.

[33] Technically, the two parties explore fee options along the 'core' of the economy generated by the lender and the consumer.

- However, the case of early repayment exclusion includes situations in which lenders may refuse to accept an early repayment at fee levels that match the borrower's willingness to pay.

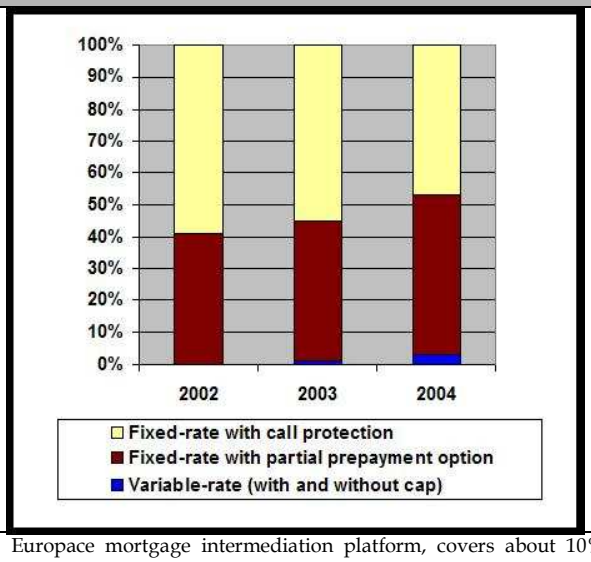
  A typical circumstance driving the lender to this decision will be legal constraints to replace the loan in a mortgage pool by an equivalent cash amount (e.g. in an RMBS or covered bond transaction[34]). In most practical cases this would simply raise the lender reservation (minimum required) compensation to a somewhat higher level (i.e. increase the blue bars in Figure 14). Yet the increase will be limited: if a legal limit is really hit, the lender usually can purchase a loan on the market with the cash received to substitute for the loan removed from the pool. Investors tend to prefer safe cash to unsafe mortgages in such pools, even if high cash levels may alter their character.

  An outright refusal to accept an early repayment at a level close to lender costs will reduce consumer utility substantially - an exclusion of the right imposes a potentially extreme opportunity cost level on the consumer, e.g. if a financing is failing and insolvency and long-term financial decline is looming. Therefore, courts have regularly intervened in countries practicing contractual early repayment rights to ensure a minimum of financial flexibility of the consumer.

  In the German case, two Supreme Court rulings in the 1990s, enshrined later in law by civil code reform of 2002, has ruled that borrowers intending to sell a house or move are allowed to always prepay (at a fair value compensation level, whose rules were defined by additional court orders). Yet no such option is available to borrowers managing an inheritance or severance payment, or borrowers with variable incomes wishing to invest a larger windfall into a prepayment. Until the very recent appearance of callable FRM offered currently by some insurers, routinely German consumers with preference for the early repayment right were forced to take out riskier ARMs, where law establishes the universal right (seeTable 1). The broader mortgage market is slow to fill the gap – a recent trend has been the appearance of partially pre-payable loans, allowing typically for some 5% non-scheduled repayments per annum (see Figure 16).

[34] Such maximum cash limits are wide in practice, however. Note that Denmark solves this problem through the delivery option, i.e. investors/lenders commit themselves to always accept cash.

Figure 16: Germany – introduction of partially callable FRM products during the early 2000s



Notes: data source is Europace mortgage intermediation platform, covers about 10% of the German mortgage market. 'Call protection' means fully non-callable FRM.

Source: Hypoport AG, Finpolconsul.

The empirical evaluation of these scenarios requires empirical calibrations of the opportunity costs of consumers (which differ, e.g. by motive of early repayment – inheritance [low investment interest rate] vs. move [gain in salary level, avoidance of unemployment]) and of lenders (tightness of legal constraints to accept cash as a substitute to mortgages, costs of the alternative). Also, deadweight loss in the form of increased court and other litigation case load matters.

1.5.5 Empirical analysis: The role of transactions costs[35]

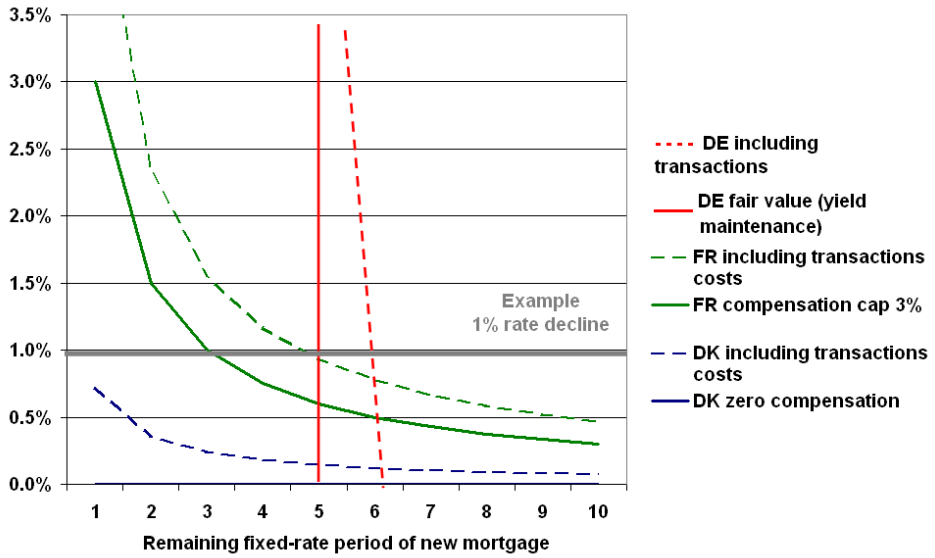
early repayment compensation interacts with transactions costs (especially legal/notary, also new lender origination costs) to dampen prepayment speeds. Historically, there has been a correlation between countries that severely capped early repayment compensation and high levels of legal/notary transactions costs in these countries.

For example, Spain, Belgium and France, which have capped compensation historically to low levels, are among the countries with the highest mortgage transactions costs in the EU. Figure 17 shows the implication of elevated

[35] See EMF (2007) for numbers used in this subsection.

transactions costs in comparison of France with Germany and Denmark with the help of a simulation.

Figure 17 Compensation regime and break-even interest rate decline and fixed-rate periods for a new loan rendering early repayment advantageous for the consumer, impact of different transactions cost levels (external refinancing)



Note: Assumes 5 year of remaining fixed-rate period. Fair value (yield maintenance) renders break-even maturity of new loan inelastic to interest rate change
Source: Finpolconsult.

In the simulation, the loan to be prepaid is assumed to be an FRM loan with 5 year remaining fixed-rate period. The borrower takes up a new loan after interest rates have declined. The question answered in Figure 17 is what minimum length of the new fixed-rate period or equivalently what level of interest rate decline is needed in order to generate a financial advantage from the prepayment for the borrower.

Consider for example that interest rates have fallen by 1% (see grey horizontal line in Figure 17):

- In our constellation, a fair-value compensation will invariably result in a threshold fixed-rate period of the new loan of 5 years. Low transactions costs in the German case (0.8% on a € 100, 000 loan) will extend the break even to some 5.8 years.

- The French 3% compensation cap per se would result in borrowers being able to benefit from the 1% rate decline already after 3 years. However, French transactions costs are roughly double the German scale (1.7% on a € 100,000 loan), so the break even is pushed well into year 5.

  The French transactions costs situation may help to explain why European comparative studies have been unable to identify significant option cost interest rate mark-up in the French case, despite the severe cap imposed on early repayment compensation. [36]

- Only the Danish callable FRM product will deliver profitable early repayment already by year 1, against payment of an option premium though.

It is a matter of historical debate whether high transactions costs have motivated governments to act on curtailing compensation to reduce at least one exercise price component, or vice versa lenders retaliated to low compensation levels by blockading reductions of legal transactions costs through legal and notary system reforms. The French and Spanish cases – where until today resistance in the industry against relaxing the strict accessoriness of the mortgage is high - seem to point to the latter hypothesis. French lenders were so pressed by early repayments in the 1990s that a large group of them even colluded against accepting borrowers; they were fined by the French antitrust authorities in 1999 for doing so. In contrast, German and British lenders partly resist giving up compensation because legal transaction costs are extremely low in those countries.

- It is interesting to note in this context that the 2007 Italian Bersani decree appears to be the only case so far in which a dual attack on both early repayment compensation and transactions costs was launched. Banks in Italy now have to inform land register authorities directly about an early repayment (change of creditor identity), which significantly reduces notary fees for consumers.

Non-legal or notary transaction costs may also affect the break-even point of an early repayment, such as e.g. the Danish practice of discount originations. Here, the loan is issued below par carrying rates below market level. Moreover, borrowers pay all closing costs directly to the lender and do not finance them. As a result, everything else equal, the break even interest rate decline must be higher than if loans are issued at par. Danish callable FRM as a result have considerably lower prepayment speeds as the broadly identical U.S. callable FRM, which is usually issued at a premium (in order to get the bond market to finance transactions costs).

[36] See Low, Dübel and Sebag-Montefiori (2003).

1.5.6 Empirical analysis: other areas

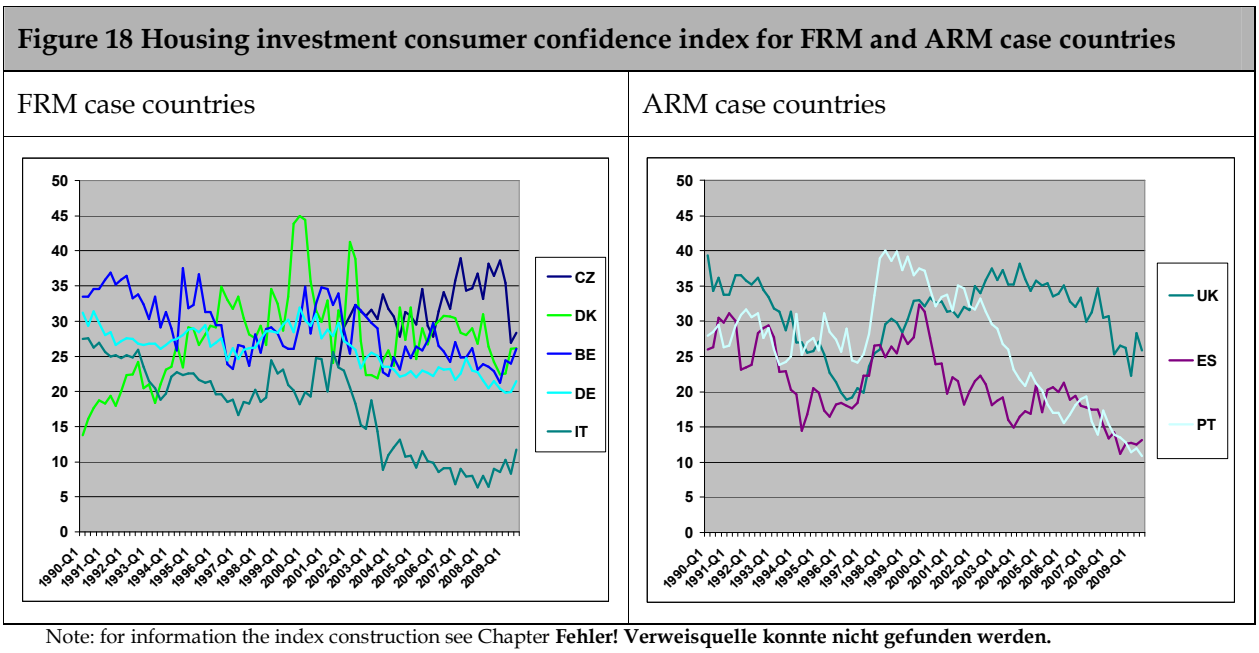
Consumer confidence

Absent clear indications from the surveys undertaken we have only very limited almost no data that could create a link between early repayment legal regimes and practices and consumer confidence. We can use time series data from the European Commission / DG ECFIN to see whether inferences can be made about the impact of the early repayment regime on the latent demand for housing investment as approximated by an index we constructed in Chapter 2 (see Figure 18).

Two types of hypotheses are worth further exploration:

- From a macro perspective, consumer confidence can be assumed to correlate - especially where homeownership rates are high - with the debt service burden level of mortgage borrowings. The latter is the product of interest rate levels and house price levels. An inference could be made that the more stable both factors are, the greater (and more stable) confidence levels are, and also that such stability is influenced by the early repayment regime.

Figure 18 Housing investment consumer confidence index for FRM and ARM case countries



Note: for information the index construction see Chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**
Source: European Commission / DG ECFIN, Finpolconsult computations.

With the help of some reverse engineering one might argue that interest burden stability is safeguarded most where a low-cost mortgage products with limited autonomous house price impact ('pass-through') prevails. Longer-term non-callable FRM have the

lowest pass-through of interest rate signals, such as monetary policy rates, of all mortgage products. Figure 18 shows that indeed Germany in our case sample features the most stable - although, in line with EU average slightly negative - housing investment consumer confidence trend. However, Belgian confidence levels are quite comparable despite the different early repayment regime - as we have shown above interest rates do not differ much from Germany and house price volatility is comparatively low. A closer look at the Belgian chart yields a confidence spike coinciding with the 2005/6 prepayment wave in the market. Danish confidence levels, after having been depressed due to a housing market crisis until the prepayment wave of 1994, are now consistently higher than in Belgium and Germany, but also more volatile. An important depressing factor here has been the strong house price inflation of the past years.[37]

Concerning ARM countries or countries with recent strong recent FRM-ARM product menu shifts, such as Italy, clearly the strong sensitivity of confidence with regard to house price levels comes out – in all ARM countries confidence has declined as house prices have increased. It is interesting to note in that regard that the change in the Italian early repayment regime in 2007 coincides with a strong change in trend, probably due to the greater competition levels unleashed by the measure while the pricing impact is still not fully passed through to consumers increasingly borrowing in ARMs.

- From a micro perspective, consumer confidence is sensitive to publicised realisations of consumer detriment, in particular where financial mobility of consumers is seen as arbitrarily constrained by lender behaviour. An example of this is Hungary where when competition and prepayments accelerated in the mid-2000s at least one tried to increase apparently too low contractually agreed prepayment fees ex-post. This widely publicised practice was ruled unlawful by the national competition authority. [38] With regard to the still widespread contractual exclusion, German media frequently publicise cases in which financial mobility seems arbitrariyly constrained by lenders refusing to offer a second contract. It is unclear to what extent those cases affect consumer confidence permanently, or at all if aggregate measures of confidence are considered.

[37] See Dübel and Lea (2000) for a discussion of how changes in Danish prepayment-related tax legislation helped turn around housing market and the economy in 1995.

[38] See footnote 4.

Customer mobility

There are two aspects of early repayment regimes that specifically determine customer mobility: the impact of the regime on early repayment levels (or prepayment speeds) – i.e. the ability to exit from an existing contract, and within early repayments the ability to switch the lender.

We have shown above that broadly prepayment speeds are higher, the larger the financial incentive after deducting prepayment compensation and transactions costs is. Average prepayment speeds broadly correlate by country with indications made in consumer surveys about the ease of lender switching.

Table 5: Average conditional prepayment rates 2003-7/2007 and Eurobarometer results concerning mortgage lender switching

	Conditional prepayment rates		Eurobarometer survey results	
FRM countries	Average 2005 (peak early repayments)	Average Jan 2003 - July 2007	Failed and difficult switching attempts in the past two years*	Current mortgage contract makes switching difficult
Italy	4.68%	5.05%	*83.3%*	*6.8%*
Germany	5.19%	5.79%	44.4%	16.5%
France	8.90%	9.23%	50.0%	4.3%
Netherlands	13.98%	11.71%	40.0%	8.7%
Belgium	20.74%	13.77%	41.7%	6.2%
Denmark**	37.00%	23.16%	53.3%	2.6%
ARM countries				
Portugal	6.01%	6.05%	23.1%	3.1%
Spain	12.84%	11.61%	15.0%	6.4%
Ireland	16.57%	14.42%	63.0%	5.7%
UK hybrid ARM	17.47%	23.31%	28.6%	14.5%

Notes: *households indicating difficulties to switch, failed attempt to switch, and non-attempt to switch because of difficulties divided by all households minus households who did not try to switch because they were either not interest or did not switch for other, unspecified reasons. **Conditional prepayment rates for Denmark reflect callable FRM.

Source: Eurobarometer (2009a, Q3 on p.48 – l.h.s.) and (2009b, table 19a – r.h.s.). Finpolconsult computations of conditional prepayment rate averages based on data provided by FitchRatings and Danish central bank.

The survey fieldwork of Eurobarometer presented in Table 5 was undertaken in June-July 2008 and covers consumers who attempted to switch mortgage lenders during the past two years. The questions whose results are

summarised on the right side of the table asked about the generic main reasons that caused consumers to remain with the mortgage providers and in addition the incidence of difficulties related to the current mortgage contract forcing the consumer to stay with the mortgage credit provider.

We note that both countries with the lowest prepayment speeds feature significant upward deviations with regard to consumers indicating difficulty in switching. Such difficulty, related to contract features, is also seen in the UK where during the teaser rate phase of the hybrid ARM product prepayment compensation is levied. Some lag effects of recent reforms appear to be present, e.g. in Italy and Portugal where the question asking for the past two years include pre- and post-reform phase.

Considering both cost elements of an early repayment jointly – early repayment compensation and legal transactions costs – it also appears that in many jurisdictions switching to another lender tends to be systematically more expensive than internal refinancing – staying with the same lender.[39]

As a result, customer retention rates when making an early repayment tend to be high. We have no systematic data on this point, but note some interview results:

- In Belgium, due to high notary costs, an external refinancing is considerably more expensive than an internal re-financing cost. Since January 2005, between 50% and 75% of re-financings are internal, with the peaks reached during early repayment waves.

- With Danish lender Nykredit, in normal years (i.e. years with low prepayment and refinancing activity) 60-70% of all refinancing are internal, while in high early repayment years 80% of all re-financing were internal. While transactions costs of early repayment are very low in Denmark, relative transactions costs between external and internal refinancing are high as switching borrowers need a new appraisal of the property and lose time.

The degree to which transactions cost differences lead to greater retention may also affect the competition environment, and vice versa highly concentrated systems show higher levels of retention.

Product diversity

We look at the question of correlation between the early repayment regime and product diversity from two angles:

[39] See Dübel and Lea (2000) for a comparison of five countries differentiating between internal and external re-financings.

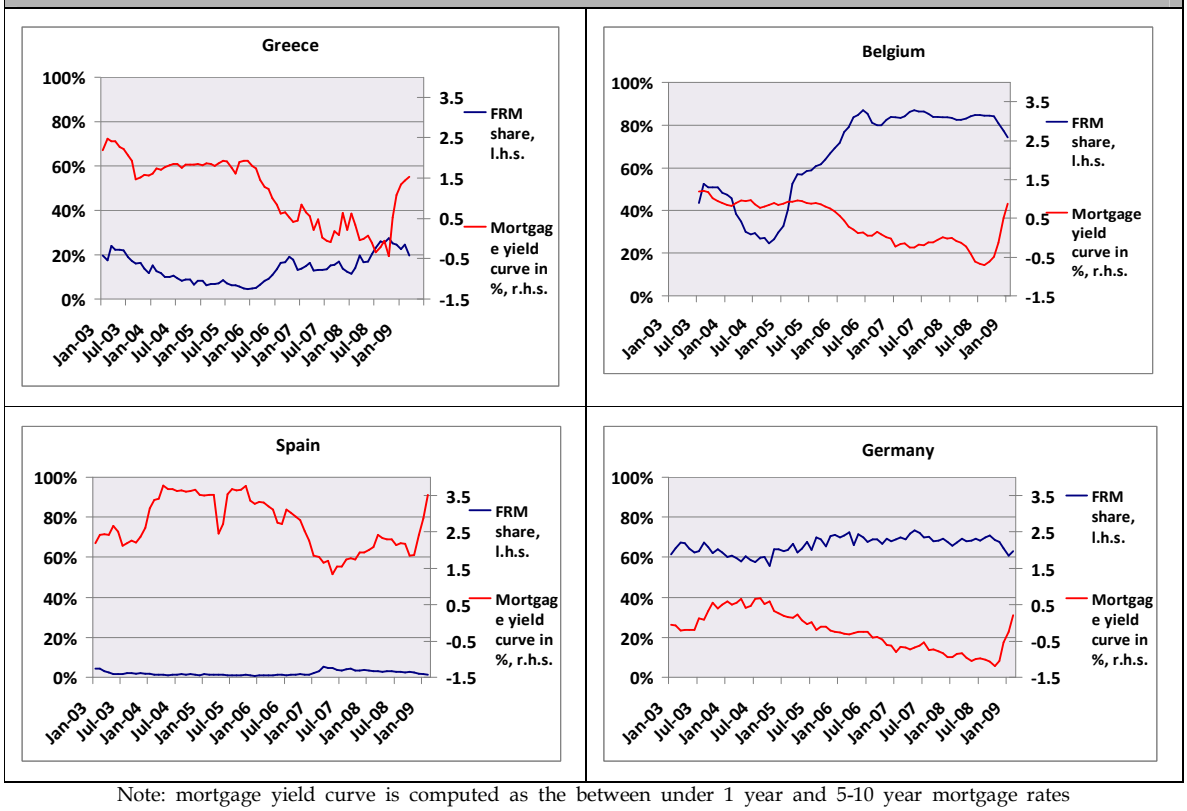
- Incomplete markets or markets with dominant product bias may be the as a result of market effects as well as regulatory intervention. The question to address is to what extent the early repayment regime contributes to incompleteness or bias.

- The early repayment legal regime may interact indirectly with product diversity via an impact on competition levels.

Legal vs. market incompleteness

We have shown in Chapter 2 that incompleteness and product bias are a common feature of European mortgage markets. Moreover, secular factors have produced a trend towards greater use of ARMs, and a great degree of inertia of single-product-dominated markets is observed against a change the product menu.

Figure 19 Mortgage product choice in selected European markets in the interest rate risk dimension – FRM market share and mortgage yield curve incentive



Note: mortgage yield curve is computed as the between under 1 year and 5-10 year mortgage rates published by the ECB. FRM market share is approximated as the share of all loans over 5 year fixed-rate period. FRMs in jurisdictions shown are almost exclusively non-callable.
Source: Finpolconsult based on ECB data.

Figure 19 points to the strong relevance of pricing differences in explaining incompleteness and bias in the sense of the capital asset pricing model presented in Figure 2. It compares the relative price of fixed- vs. adjustable-rate mortgages ('mortgage yield curve") and their market shares for four countries, two of which feature bias (Spain, Germany) and two of which not or less so (Belgium, Greece).

An inspection of Figure 19 by comparing the country charts reveals that the higher the ARM market share is the more expensive FRM are relative to ARM, and vice versa. Spanish ARM are consistently cheaper than FRM by 2-3.5% points, while German FRM are broadly priced equally to ARM and at times even considerably cheaper. In the smaller markets, Belgium and Greece, the same relative price-market share hierarchy holds. However, there is considerably greater fluctuation in market shares as a result of prices not being tilted to one or the other product.

Strong bias in favor of single products, such as seen in Spain and Germany, may be caused by market forces (e.g. liquidity effects which play out more strongly in large markets, consumer preferences) or government intervention such as the early repayment regime. A deeper analysis goes beyond the scope of this study.[40] However, it is noteworthy to point to certain interaction effects through lobbyism by interest groups for legal protection of a predominant product. The clearest example for that is offered by a comparison of predominant product and legal solution for early repayment compensation in Spain and Germany (see also Table 2Table 2):

- Spain prices mortgages over Euribor as adjustable-rate and allows for prepayment indemnities on these ARM loans, which are strictly forbidden in Germany.

- Germany prices mortgages over the swap or Pfandbriefe curve and practices yield maintenance compensation, which until the 2007 reforms were capped in Spain to very small levels.

Since price hierarchies for interest rate risk protection – whether caused by market factors or regulation - do so strongly influence FRM demand in what are usually non-callable loans, we expect the same to happen with regard to the relation between the pricing difference of callable vs. and non-callable FRM and their relative demand. Unfortunately – as discussed above – we have no jurisdictions in which we observe both benchmarks, 30-year callable FRM and 10-year non-callable FRM, simultaneously as liquid submarkets to make an exact inference – neither in Denmark and not even in the US where the 10-year non-callable is missing. Recent evidence from Germany suggests that demand for early repayment features in FRM is a function of not only

[40] See Low, Dübel and Sebag-Montefiori (2003) for a more extensive discussion of market vs. regulatory causes of incompleteness.

yield curve but also interest rate levels – if the latter are low, consumer preference for greater flexibility has a greater chance to be financed.[41] We explore below in a box why fully callable FRM are so rare in Europe, and basically limited to Denmark.

Beyond tipping the relative price balance between products, early repayment regulation can be used directly to influence the product set, as e.g. is the case in Italy after the 2007 reforms. A more subtle, but similarly effective approach is applied in the US where the large refinancing companies Fannie Mae and Freddie Mac with mid-2009 market shares of 80% refuse to purchase non-callable FRM from originators.

The question is whether this forced change in the product menu towards a more protective product – callable FRM - is successful, or whether it does not enforce the trend of the use of the even less protective product ARM.

- For the US case, with strong quasi-government intervention in the form of implicit guarantees behind Fannie Mae and Freddie Mac (enhanced since the 2008 collapse of both firms also by government equity capital), the question of success of the callable FRM can be answered to the affirmative. However, clearly, the even larger relative price difference between callable FRM and ARM as compared to between non-callable FRM and ARM has contributed in the US to the large cyclical product swing in the uprun to the sub-prime crisis. ARM products were in particular bought by those groups with high vulnerability – sub-prime borrowers, and near-prime borrowers who could no longer afford yield curve and option cost premium that make up for the price difference, given high house price levels.

- We confirm this story with data for Denmark below (see Figure 22), which during the latest house price increase has seen a secular increase in the ARM share when house prices increased. Denmark produces non-callable FRM, however, the reset periods are quite short only and there is not really a mezzanine product (such as, e.g. with reset periods of 5, 10 or 15 years).

- In the Italian case, the non-callable product was removed by legal fiat in 2007. The Italian central bank does not publish data allowing to analyse market share changes by reset period. Moreover, we have a signal extraction problem as already before the reforms the ARM share had started to increase substantially, also on the back of increasing house prices and credit supply. Italian lenders have

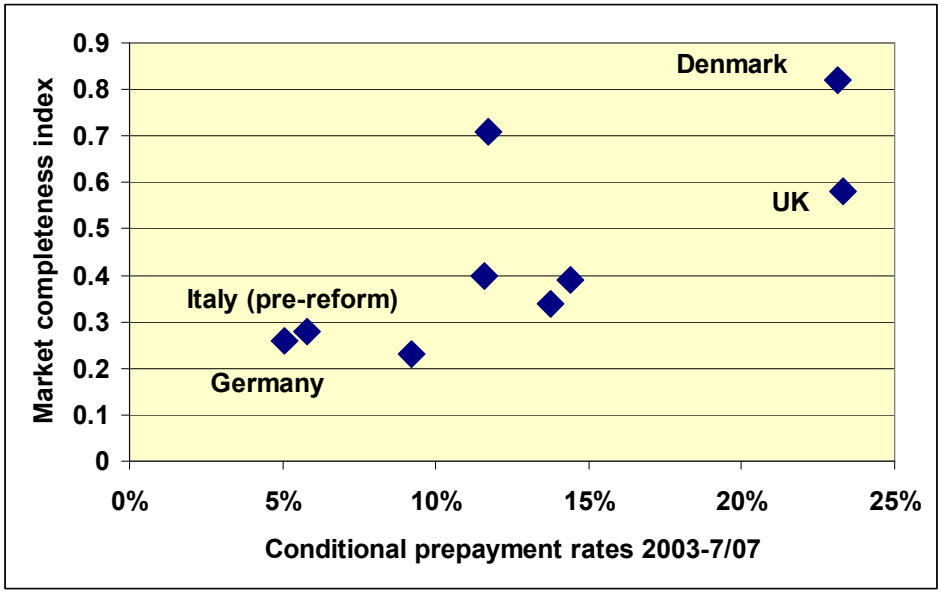
[41] According to a Planethome (credit broker) consumer survey quoted in Berliner Morgenpost of October 24, 2009, 87% of German respondents see the interest rate level as the decisive closing argument followed by early repayment options with 68%.

expressed concern that the callable FRM product now enforced will be too expensive for consumers relative to ARM.

Early repayment and competition

An important indirect channel of product diversity is a higher likelihood of new product creation as a result of a higher share of early repayments in loan originations. We have some indication of this effect from the correlation of prepayment speeds and our market completeness indicator presented in Chapter 3 that Figure 20 presents.

Figure 20: Correlation between conditional prepayment rates 2003-7/2007 and market completeness indicator



Notes: market completeness indicator indicative of mid-2000s. ARM and FRM-dominated jurisdictions pooled. Denmark: callable FRM prepayment rates.
Source: LondonEconomics market completeness indicator indicator (see Chapter 3), FitchRatings for conditional prepayment rates, Finpolconsult computations.

We caution against over-interpretation of these data by pointing out that the front-runners, Denmark and the UK, have strong product incompletenesses in their own way – Denmark in the credit risk dimension, and the UK in the interest rate dimension. However, taken together with the customer mobility results a consistent picture of relative impact of the likelihood of a prepayment and the dynamism of a market arises.

Cross-border lending

The question to what degree early repayment legal rules contribute to the pre-emption of cross-border lending cannot be properly answered empirically. Our lender survey yields responses suggesting greater activity - should mutual recognition or a contractual option be enforced - by the few lenders that are already in the cross-border business. Moreover, we know that lenders widely use product innovation, by implication also in the area of early repayment, to contest foreign markets – the most prominent example being the market in foreign currency lending promoted by foreign entrants e.g. in Poland and Hungary (see also discussion in the Responsible Lending chapter).

In terms of concrete cases, much of the historical legal debate on the failure of the internal market in financial services in mortgages since the 1980s was generated by failed attempts of lenders from non-callable FRM product environments, most notably Germany, to penetrate neighbouring markets, in the German case prominently Belgium and France.[42] There are other legal dimensions than early repayment in which core products, in which entrants may be suspected to have a competitive advantage, pre-empted trades across borders: for example the British standard variable-rate product that is unilaterally reviewable is not permitted under Spanish legislation. We lack an empirical review, or at least systematic case collection, of such frustrated attempts at the EU level.

In terms of *potential* as opposed to actual pre-emption of cross-border trades, an inspection of Table 1 suggests a deep market segmentation in the dimension of early repayments. The non-callable FRM product (with universal prepayment option), for example, can broadly only be traded across borders in Central Europe, Scandinavia, Britain, and via some special rules put into mortgage bank legislation also in a number of transition countries. Even in this range of countries varying prepayment compensation rules create an uneven playing field, and the tradability of products excluding prepayment outside Germany is close to zero. Where a level playing field existed, e.g. between the United Kingdom and Germany, this still was not a sufficient condition in the sense of producing cross-border activity. Other factors, such as relative price distortions between ARM and FRM or low profitability of mortgages in combination with need to adjust production processes (servicing) deter trading. Tradability of ARM in the early repayment dimension is greater than in the case of FRM, although a number of countries limit compensation to zero. It would seem that the few successful entry attempts – e.g. the French-Spanish joint venture's UCI's activities across

[42] Dübel, Lea and Welter (1998) in their first comprehensive review of mortgage consumer protection regulation for DG Sanco of the European Commission discuss some of these cases.

borders in Southern Europe – have been facilitated by the use of easier to trade and pool (e.g. in RMBS) ARM.

1.6 Qualitative evaluation of the policy options

After having established a conceptual framework and reviewed the European microeconomic evidence available concerning early repayment right and compensation policies, we are now proceeding to evaluate the proposed policy options qualitatively.

It is useful at this stage to return to our main conceptual framework charts in Figure 2 and summarise our findings by element of the European mortgage market product menu, consisting of ARM, non-callable FRM and callable FRM:

- ARM carry the highest credit risk of the three products, but have nevertheless gained market share supported by the Maastricht process and relative price distortions that discouraged FRM (see Figure 19).

- Non-callable FRM defined within suitable fixed-rate period limits carry moderate credit risk and are surviving, if not as an exclusive product as in the 1980s, but as an important anchor product for many markets in Europe. These products suffer from a combination of pricing and other (e.g. bank regulatory) disadvantages. They have been in a number of jurisdictions altered in their character by regulatory interventions into early repayment compensation levels that force lenders to charge partially an options premium and partially an early repayment exercise price.

- The lowest credit risk product - callable FRM – in Europe is basically only offered in Denmark and fetches a substantial and volatile options premium. The question is unsolved how this product could reach greater relevance for the European market, as it has, for instance, in the United States (see Box 1 for a discussion).

We have thus three products sorted by their degree of interest rate risk protection and protection production costs (see Figure 2): ARM (low-protection-low-costs), non-callable FRM (mezzanine-protection-mezzanine-costs), and callable FRM (high-protection-high-costs). An analogy would be the car market consisting of economy, middle-class and luxury cars.

All these assessments stand under the caveat that a clean pricing of the three products cannot be observed in Europe outside Denmark. The main reason for this fact are funding costs and funding strategy differences of lenders and regulatory negligence in the banking sector in general, most notably the implicit acceptance of open balance sheet positions of banks by the Basel

capital rules that allow banks to take considerable interest rate risk when doing long-term lending. However, the evidence presented before leaves no doubt that a price-risk hierarchy exists for the European mortgage market.

1.6.1 Evaluation by proposed policy option

Policy options 1-3: Harmonisation of the scope of the early repayment right

- An unconditional contractual option – policy option 1 - could potentially – if contracts carrying the early repayment right are not offered as lenders routinely do exclude the right – leave consumers with considerably too low levels of risk protection, in particular the mobile and those willing to flexibly manage their financial situation. It could also seriously limit competition by slowing down prepayment speeds.

  It is unclear in that regard how the policy option would be made operational. It is possibly intended to cover only non-callable FRM or hybrid ARM during the initial fixed-rate periods, but in the way specified the proposal seems to also cover ARM or hybrid ARM during their adjustable-rate period. Also, no time limits have been suggested for rendering the policy option operational, which means for example that a contract could exclude an early repayment for 30 years. Moreover, no EU Member State practices a fully unconditional concept of the contractual option as the possible appearance of the extreme situations described is evident.

  Even if we assume that the contractual option solution remained limited to a narrower definition of non-callable FRM (including possibly hybrid ARMs), our perspective from the above review is that a scenario of predominance of contractually excluded prepayment will be more likely than a complete market scenario where the early repayment right is made available contractually in parallel (allowing consumers to self-select). The main source evidence here is Germany, where almost the totality of FRM feature exclusions of early repayment up to 10 years, and consumers that prefer to take out the option were routinely forced in the past to to take out riskier ARMs which carry the universal early repayment right. While Germany is starting to complete the product set currently through contracts containing the option, smaller jurisdictions are likely to struggle to do so. Also other EU markets with more diverse product menus could move back to a pooling situation, if individual lender incentives - especially avoiding lender switching in the case of universal banks; opportunity costs of asset substitution in the case of covered bond issuers - are taken into consideration. In almost all situations (by countries and FRM product), consumers would face a changed legal

regime. Litigation – especially with regard to pre-contractual information and responsible lending rules – would likely balloon.

- The problem of lenders converging to offer only contracts that exclude an early repayment could in theory be addressed by forcing lenders through another piece of law to offer both types of contracts, those that exclude the early repayment right and those that provide the early repayment right, simultaneously. Still, other restrictions as those discussed above – e.g. will there be an exclusion of early repayment also for ARM or time limits - would likely have to be imposed in such a case.

Box 1 Why are callable FRM so rarely offered in Europe and what can be done to introduce the product?

At key motive for the intervention desire from consumer representatives into early repayment right and compensation levels is the absence of a callable FRM in the relevant local jurisdiction that would allow self-selection of consumers. As we have shown, many markets show inertia in producing new classes of products, for a variety of reasons: absence of funding instruments; inability of lenders and refinancing institutions to take the risk; and lack of demand from consumers. Introducing a more costly product offering greater protection is particularly difficult when there is risk amnesia with consumers, but also occasionally bank regulators.

Providing the universal right and eliminating the compensation, as in the Italian case can be seen as one possible government strategy. However, assuming that the fixed-rate supply is kept upright, it comes at a high costs: the non-callable or call-protected product disappears by regulatory fiat. This, however, is a product that is inexpensive to produce and sufficiently suitable for many borrower classes (e.g. salaried employees).

The alternative would be the American and Danish route of creating a market in callable FRM through material, rather than legal, government intervention. In the US, the main executors of that policy are the semi-public specialised refinancing institutions Fannie Mae and Freddie Mac which simply refuse to purchase and refinance non-callable FRM. In Denmark, the prepayment option was publicly supported for decades by a requirement for Danish institutional investors to buy Danish bonds. Absent a meaningful government bond market, those investors had to buy mortgage bonds and as a result drove down their prices. Other types of loans appeared only in the early 1990s. Yet, since the liberalisation of the European pension fund market in the 1990s, Danish institutions increasingly invest abroad and the prepayment option subsidy has disappeared.

During the current crisis, considerable differences can be identified between the US and Denmark. While in both countries the price of the prepayment option has increased substantially, in the US Fannie Mae and Freddie Mac have decided to partly internalize the risk and provide an implicit subsidy to the price. This institutional option is no longer available in Denmark (although a government pension fund has intervened into the ARM market recently). As a consequence, the Danish market is shifting quickly to ARM. This raises the general question whether a stabilizer is needed for a product whose funding conditions tend to be volatile, as investors need to be familiar and comfortable with managing the options risks and those special investors themselves may be confronted with challenges during crisis. Funding is easier in the case of the non-callable FRM, which essentially attracts government bond investors.

It is noteworthy that despite these issues, structural demand changes in Europe are supportive of introducing callable FRM, most importantly the change of income profiles towards greater volatility, but also greater mobility, which both raise the value of the option. In Germany, insurance companies such as Hannover Leben and Allianz, as well as mortgage banks, such as Muenchener Hypothekenbank and DG Hyp, offer a callable FRM product with minimal restrictions.

A less rigid third support strategy would therefore be to support market initiative by acknowledging from the bank regulatory side the clear credit risk advantages of a callable FRM product that became again apparent during the US sub-prime crisis. Lower capital requirements by product will not completely level cost differences, however, they may reduce the current unequal playing field between risky and less risky products at least to some extent. Also, existing public-private partnership institutions – such as guaranty funds or public credit agencies - could support the introduction of the product through liquidity facilities, swap (swaption) or (highly rated) securitization programs.

- A conditional contractual option giving the early repayment right under certain circumstances – policy option 2 - could potentially release some risk averse or vulnerable consumers groups from the threat of a uniform offering of contracts excluding prepayment. The greatest beneficiaries of such a statutory regime split would be consumers with high income or mobility risk. In this case, the question of contract choice is transferred from the legal to the economic level, i.e. to the level of prepayment compensation or fee for the subset given the universal early repayment right.

    - If the level of such compensation is close to fair value (including asymmetric, if cost differences to symmetric are minimal), i.e. commensurate with costs, consumers economically will still remain exposed to interest rate risk – especially if they have fixed interest rates for a long time. However, depending on their own opportunity cost level, which may be far lower than lender's (e.g. alternative deposit rates for investing an inheritance, opportunity costs of moving and accepting a higher paid job – see Figure 14), their utility levels should be generally enhanced.

    - To the degree that the early repayment compensation level charged is below fair value or even at zero levels, consumers that fall under the conditionality will be forced as a group to move towards the higher-protection-higher-cost contract (callable FRM).

    - A general problem in practice with conditionality is that borrower or product characteristics that may arise as the most likely candidates for conceding an early repayment right are often not covered by them. For instance, German legislation provides the early repayment right to a household moving and/or selling the house, but not to a self-employed with volatile income or to somebody in need of restructuring his finances. As a result, conditionality tends to create undesirable corner solutions, and as a result of political pressure building up is unlikely to stay.

- Conditionality also implies that lenders who are unable to distinguish ex-ante between the consumer types or preferences they underwrite – e.g. with regard to the likelihood of moving - will have to offer a certain mix of pricing of contractual and statutory early repayment right, as well as have to adjust their funding strategies. Since almost all EU Member States at least apply a conditional contractual option (e.g. there is an almost universal EU-wide right to prepay if the borrower moves house), this means that almost all EU lenders already are bearing some of the additional early repayment right costs. The cost impact itself then is almost entirely a function of the compensation regime.

- Conditionality finally means that if lenders are unable to identify risk clearly some consumers will cross-subsidise others, i.e. those who do not exercise the prepayment option subsidise those who do exercise the option. However, again, the amount of cross-subsidisation is a function of the compensation regime – under fair value it is lowest, under a zero cap it is highest.

- A universal right – policy option 3 -

  - If coming with a fair value compensation even a universal prepayment option will leave FRM borrowers economically with interest rate risk; however, with the additional benefits of greater economic flexibility and potential individual gains from differing opportunity cost. The changes for ARM borrowers will be rather marginal (claw-back of loan closing subsidies).

  - However, if combined with statutory capped or zero compensations or fees a universal right will move the *entire* FRM borrower population towards and up to the high protection high cost contract. Note that in the conditional contractual option scenario only those parts of the borrower population are moved to the high protection contract that are subject to the conditionality (see Figure 2).

- The extreme form or protection is represented by the U.S. and Danish callable FRM products with de-facto zero prepayment compensation. Yet, even in those countries, low-protection-low-cost ARM are the readily available alternative, and hence borrowers will start to switch between the high protection high cost and very low protection low cost contract (see Figure 2) with no mezzanine product in between. This, in short, has been the key US sub-prime problem, and it is becoming an increasing problem in Denmark (see Figure 22 below).[43]

- The key difference to the conditional contractual option obviously is that a legal regime with a universal right does not discriminate between specific consumer or product characteristics, i.e. the likelihood of the lender charging an interest-rate mark-up increases versus the conditional contractual option to the degree that additional consumers now receive the prepayment option. The key filter, however, is again the level of prepayment compensation or fee.

- For the case of compensations or fees capped or set to zero, the conditional prepayment option still offers implicitly several contracts (although in a predetermined fashion). In case of an unconditional prepayment option now the entire borrower population would now be pooled into a single contract. This could mean a potentially large cross-subsidisation between consumers of different prepayment characteristics.

The discussion leads to the observation that many of the discussed legal options force lenders to apply mixed pricing – especially of an FRM portfolio, i.e. charge some percentage, but not the full, option cost.

The pricing mix depends on the likelihood of presence of consumers with a universal early repayment right multiplied by a measure reflecting lender loss incurred from a gap between prepayment compensation or fee levels and fair value.

A fundamental, and significantly more efficient, alternative could be to realise all product types – low, mezzanine, and high protection – simultaneously in a clearly defined fashion, and avoid mixed pricing

[43] As US coastal house prices became inflated during the mid-2000s and prepayment option cost remained at high levels, callable FRM became unaffordable for lower-income (and many middle-income) households. This was the only product, however, that the public guarantors and securitization firms for low-income housing finance FHA and Ginnie Mae would support. As a result, the private sector took over the securitization of these loans and started supplied low-income groups with ARMs. Since non-callable FRM are de-facto not offered in the US, low-income borrowers self-selected from the highest protection to the lowest protection contract.

altogether. This is currently the case only in the Danish mortgage market (although somewhat imperfectly, as non-callable fixed rate periods are very short).

Policy options 1-3 a), b) and 5: harmonisation of prepayment compensation limits

- If prepayment compensation or fee is charged above fair value levels compensating for lender losses, this will lead to a reverse cross-subsidisation of non-prepaying by prepaying borrowers, i.e. lower interest costs for the ARM and non-callable FRM, but higher exercise costs. The resulting systematic lender profit will lead to an interest rate discount compared to a fair value situation (zero option cost).

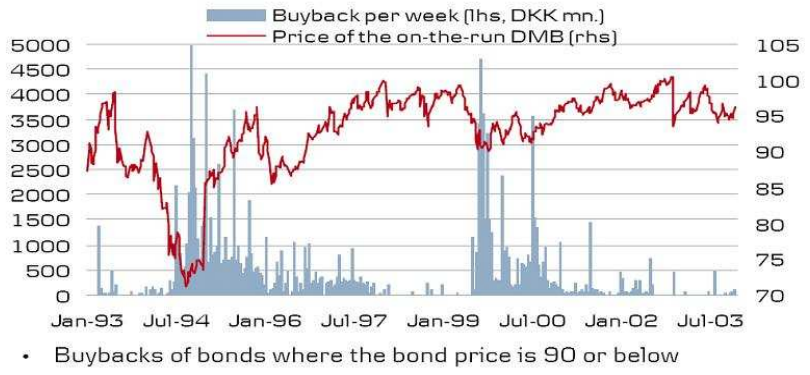
- The frequently applied asymmetric prepayment compensation (partial fair value) as well as the prepayment fee model (Belgium, France) are sub-cases generating exercise costs above fair value when interest rates have risen. This leads to cross-subsidisation not only in the above described form but also between prepaying borrowers.

  Under the Belgian and French fee model, for example, borrowers prepaying when interest rates have risen cross-subsidise those prepaying when interest rates have fallen as well as non-prepaying borrowers whose option cost fall somewhat. ARM borrowers in Belgium subsidise FRM borrowers, since in the ARM case the fee is particularly high above fair value. As discussed before, interest costs for non-callable FRM ceteris paribus are lowered by fee arrangements while the exercise costs are increased for some prepaying borrowers.

- If prepayment compensation is generally capped at below fair value levels, the result will be mixed pricing and cross-subsidisation of prepaying borrowers by non-prepaying borrowers. Interest costs for ARM and non-callable FRM will increase while exercise costs will decrease. Non-callable FRM will gradually move to the callable FRM product features.

- The argumentation line with regard to conditional compensations (e.g. limitation of compensation to zero upon moving such as in France or Netherlands) is parallel to the one on the conditional early repayment option when compensation is limited or set to zero. Pricing distortions in the ARM and non-callable FRM portfolio are the necessary result, even as these are limited to a predetermined subset of the borrower population. Non-exercising borrowers cross-subsidise the option exercisers and some exercisers subsidise others – in the Dutch and French case movers, in a second jurisdiction those receiving an inheritance, in a third jurisdiction (potentially financially well-to-do) widows, in the next jurisdictions permutations of the before list. Increased political pressure by lobby groups to receive similar redistributions is a likely outcome and it is hard to see how social policy and financial stability goals can be met by such an approach.

Figure 21 Debt buyback behaviour of consumers in Denmark through the delivery option – establishing an implicit symmetric early repayment compensation



Note: bond prices below par / 100 imply that interest rates have risen relative to the coupon rate.
Source: Realkredit Danmark.

- If prepayment compensation or fee is limited to zero (and the early repayment right is universal), the non-callable FRM product disappears. Only the low-protection-low-cost ARM (with a somewhat higher price) and the high-protection-high-cost callable FRM survive (see again our introductory CAPM chart in Figure 2 above for reference). However, there is a risk that the production costs of callable FRM will be too high and volatile - see Figure 5 above showing large swings in Danish option cost - and with the disappearance of the mezzanine-cost-mezzanine-protection product non-callable FRM a new pooling solution of an exclusive offer of ARM appears.

If prepayment compensation are defined product-specifically either at the (full) fair value level or at zero with no intermediate solutions, all products along the entire price-protection hierarchy can be obtained. There is still some risk that callable FRM will not be produced (see Box 1).

Policy option 4: mutual recognition

We interpret mutual recognition as a set of policy measures being adopted to enforce the Second Banking Directive, which already enshrines the principle.

- Mutual recognition (as opposed to a maximum harmonisation strategy of the above evaluated proposals) unleashes strong redistribution forces and arbitrage behaviour between jurisdictions. Lenders in tightly regulated jurisdictions would face greater supply of less regulated or unregulated products and lenders and would likely considerably lose market share if consumers reacted mainly to interest rate signals, and not to additional risk.

  It is likely that in a first step the characteristics of products in jurisdictions with legal room for manoeuvre would shift to the characteristics of the least regulated jurisdiction, and in a second step that legal change would be enforced upon the remaining jurisdictions standing to lose products or lenders in order to avoid negative discrimination (i.e. of domestic lenders).

- The most likely outcome would be an EU-wide large market share of unconditional contractual option contracts, as long as this is practiced in a single Member State (e.g. Cyprus). The scale of the market share depends on whether Member States with tighter regulation continue to have options to deter market entry.

- A variant could be to regulate a universal early repayment right and allow compensation or fee arrangements to be subjected to mutual recognition. The likely outcome here would be a a high EU-27 market share of products with ex-ante determined fees above fair values.

1.6.2 Evaluation by impact on other areas

Impact on consumer confidence

While we have potentially conflicting signs concerning the macro effects - as both boom-bust and less volatile housing and credit cycles may boost confidence at least temporarily – we can assume with the Eurobarometer data presented above that extreme forms of boom-bust markets systematically lower confidence levels. This speaks in favor of products that limit pass-through of shocks, especially volatile monetary policy signals, such as non-callable FRM.

Consumer confidence in the early repayment dimension is maximised by a combination of financial flexibility and low credit costs as well as safety. Absent a 'golden' product fulfilling all conditions simultaneously this speaks in favor of a complete market in the early repayment dimension with some protective safeguards such as payment shock protection (discussed in greater detail in the Responsible Lending chapter) and protection against excessive levels of early repayment compensation or fees.

The policy options individually determine the future product world in which consumer cost-benefit optimisation will occur. We see the following net impacts:

- negative on financial flexibility and positive on stability and cost determinants of consumer confidence for the contractual option – policy options 1 (full) and 2 (partial) - and likely also after some iterations, as discussed in the preceding section, policy option 4 (mutual recognition). We see the net effect as slightly negative for full contractual option and mutual recognition, and neutral for the partial contractual option, provided those groups receive the universal early repayment option that are most in need of financial flexibility. We consider this as difficult to realise in practice, however.

- positive on financial flexibility and negative on cost and stability with a neutral net effect for the universal option with low or no prepayment compensation (policy options 5, and 3 with tightly capped compensations or fees).

- neutral to slightly negative on financial flexibility and positive on stability and costs for universal option under a fair value compensation concept (neutral for symmetric fair value, slightly negative for asymmetric fair value), i.e. policy option 3 without or considerably wider compensation caps. This results in the only unambiguously positive mark concerning consumer confidence going to the universal option with symmetric fair value compensation.

Impact on customer mobility

In terms of lender switching ability we found a strong constraining impact in countries where an early repayment can be denied contractually and relative neutrality with regard to the compensation regime within the range from zero to fair value compensation level.

We therefore see the following impacts:

- Policy options 1,2 and 4 – full and partial contractual option as well as mutual recognition – if implemented might substantially weaken customer mobility in markets using the universal option. Again, the degree of impact of policy option 2 depends on which groups are targeted as subject to universal option how the matching to their likelihood of switching lenders is.

- Since within a reasonable range of compensation or fee there is broadly indifference of consumers between levels, which moreover trade against credit costs, once the universal right is established we see policy options 3 and 5 as broadly equivalent. There are some subtle differences, though:

- Technically, as long as cap levels for policy option 3-related compensations or fees are not specified, policy option 5 – transposition of the CCD - will lead to the highest prepayment speeds and thus lender switching behaviour.

- A fee model will make early repayment switching asymmetrically more difficult when interest rates have risen compared to a compensation model. We therefore assume lower switching rates for different specifications, as discussed in the quantitative analysis below.

- Potentially higher fair value compensations can be subject to an absolute refinancing constraint if higher outstandings need to be financed and e.g. loan-to-value constraints of new lenders are violated. However, especially the transparent symmetric fair value compensation seems to be highly accepted from a mobility perspective in Denmark. The open question is the level of mobility if interest-rate fixing periods become long and thus potential compensation levels high. This supports the notion of imposing a time limit (e.g. 5 or 10 years, depending on the interest rate volatility assumption going forward).

Impact on product diversity

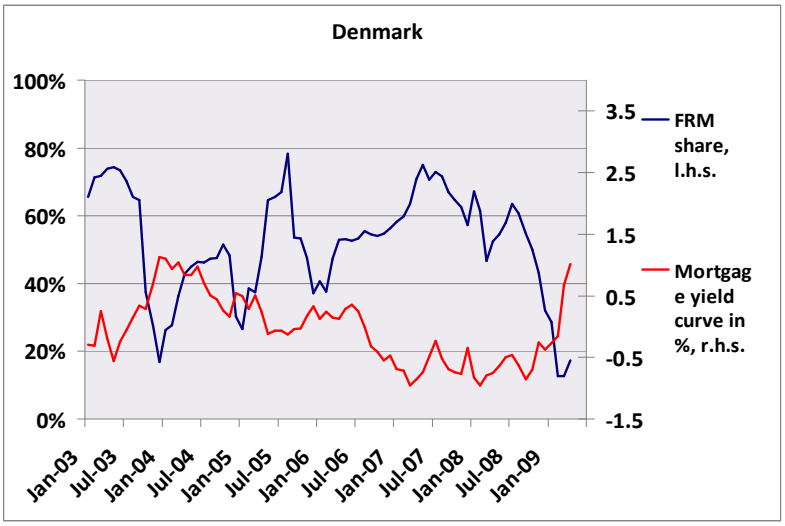
Broadly we find empirically a positive impact of an early repayment regime enforcing greater prepayment speeds (e.g. by severely limiting compensation

or fee) on competitiveness and product innovation and a negative impact on product choice.

An additional overlooked dimension in a dynamic perspective may be credit risk. The key problem of an excessively tight legal early repayment regime will be that if the mezzanine product non-callable FRM disappears – either de-jure or de-facto - the result will be a market with two main products in the interest rate risk dimension: ARM and callable FRM. Those products are far apart in terms of their relative price difference – yield curve plus option cost.

If the mezzanine product non-callable FRM disappears or is weak, as in the Danish case, the results are drastic cyclical market share changes between ARM and FRM. We report this for Denmark in Figure 22, which has been constructed with the same methodology as Figure 19 and thus in the Danish context in the FRM definition contains only callable loans. The Danish non-callable FRM product has fixing periods of typically 1-3 years and almost qualifies as an ARM. The changes in market shares shown in the figure by far exceed the variation seen in the other analysed markets, including the volatile Belgian market where FRM are close to callable, and mirrors similarly large swings seen in the US market with similarly missing mezzanine non-callable fixed-rate product.

Figure 22 Mortgage product choice in Denmark in the interest rate risk dimension – fixed-rate mortgage market share and mortgage yield curve incentive



Note: see Figure 19
Source: Finpolconsult based on ECB data.

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This raises the point that de-facto or de-jure disappearance of non-callable FRM might lead to lower, and not higher, interest rate risk protection for consumers - unless that is also ARM are further constrained, e.g. by the use of mandatory interest rate caps. In fact, this risk already has materialised for many EU markets which have imposed legal constraints on non-callable FRM, and has prompted Spain to reverse the trend in the 2007 reforms.

What assess be the impacts of the proposed policy options as follows:

- Highly negative for the case of CCD implementation – policy option 5 – which would de-facto eliminate the non-callable FRM. Product diversity would also be cut back extremely under tight compensation or fee caps considering policy option 3.

- Neutral for policy options 1, 2 and 4. The contractual option comes with the risk of a high lender bias in favour of customer retention and lower competition, which is lowering product diversity via the competition channel and trading against the positive impact on diversity via greater freedom to design products.

- Positive for policy option 3 universal option if combined with a fair value compensation concept which will allow for the non-callable product to continue to exist (e.g. within time to reset limits) while allowing for sufficient competitive dynamics via the universal option.

Impact on cross-border activity

Any maximum harmonization of the early repayment regime can be assumed have a positive impact for cross-border activity. Contractual option and mutual recognition could in theory have the strongest impact on cross-border trade. Theoretically a 'Delaware' effect is possible where all product supply is undertaken from one location (e.g. where other fringe conditions are most suitable, such as taxation) and the market operates almost exclusively across borders. However, outside extreme constellations, the contractual option may also be used in individual jurisdictions as a customer retention instrument, which will limit cross-border entry. We do only slightly differentiate our assessment of policy options in this dimension in the competition dimension, i.e. see a greater positive impact for solutions that increase prepayment speeds (policy options 3 and 5).

Table 6: Qualitative assessment of policy options in the dimensions of stability, product diversity consumer confidence, customer mobility, and cross-border lending

Area	1 contractual option	2 partial contractual option	3a), asymmetric (partial) fair value compensation	3a), symmetric (full) fair value compensation	3b), asymmetric (partial) fair value compensation cap 3%	3b), fee cap 3%	4 mutual recognition	5), asymmetric (partial) fair value compensation cap 1%
Stability	-	o	o	+	o	o	-	o
Product diversity	- -	-	o	+	+	o	- -	+ +
Consumer confidence	o	o	+	+	-	-	o	- -
Customer mobility	+	+	+	+ +	+ +	+ +	+	+ +

Notes: no negative signs used for stability contribution, consumer confidence – see text for greater differentiation of assessment. We add the impact dimension stability only for the responsible lending discussion, reflecting the fact that the explicit goal of responsible lending is stability.
Source: Finpolconsult analysis.

Evaluation by implementation form: Recommendation or law

A recommendation will lead to a very similar outcome compared to the status quo since it will unlikely achieve political arbitration in countries where stakeholders are far apart, e.g. on compensation (Italy, Belgium, Spain, Germany) while cases with greater stakeholder consensus will remain unaffected. A recommendation might provide direction to jurisdictions where legislation is under development, i.e. transition countries and Cyprus, but the impact for the European market as a whole will be minor.

A law will in contrast alter the status quo substantially in both new and established markets, as we will further explore in the quantitative analysis below. We note from our survey that even where stakeholders, especially lenders, are wary of such changes they prefer a law over a recommendation, given the material relevance of the subject for mortgage lending.

1.7 Quantitative evaluation of the policy options

1.7.1 Introduction

We have developed a detailed mortgage sector model that allows us to simulate the quantitative impacts of the policy options on the stakeholders, with inputs and assumptions being motivated by the empirical and conceptual review presented above.

The discussion of modelling approach and results in this section is organised as follows:

- In order to render a quantification feasible, the legal regime transitions to be analysed need to be rendered operational and simplified, the early repayment compensation/fee - option pricing structure to be used for the model be calibrated, and stakeholder economics and cost-benefit indicators be identified. This is the subject of the first three subsections.

- We then pause to demonstrate the dynamics of the model for two country case examples – Belgium and Germany - in some detail in the fourth subsection.

- The fifth and sixth subsections present the full results of the cost-benefit analysis based on concentrated indicators: the fifth subsection delivers these values for all case countries for all economic scenarios and policy options, the sixth extrapolates these results to EU-27 by using the policy distance discussion above and provides a quantitative ranking of the policy options.

1.7.2 Further specification of the policy options for the analysis

We start with a few additional specifications of the policy options that are needed in order to render cost-benefit computations operational.

- Policy option 1 is translated into an early repayment fee model specification. While in theory the contractual option may lead to an indefinite fee, in practice lenders will negotiate with the borrower a fee that may be assumed to lie somewhat above fair value levels on average.

- Policy option 3a) is split into a symmetric and an asymmetric compensation specification, reflecting basically the legal situations in Denmark and Germany.

- Policy option 2 is not explicitly calibrated, but assumed to represent a portfolio mix of policy option 1 and 3a), asymmetric.

- Policy option 3b) is split into a fair value compensation cap and a fee model specification. In the former, compensations drop to zero when interest rates fall while in the latter – as is the case in Belgium, Portugal and France – lenders universally charge the fee in all interest rate scenarios. For policy option 3b) we do not assume symmetry, i.e. the floor for compensations is zero.

- Policy option 5, CCD transposition, can be seen as a special case of policy option 3b) fair value cap when the cap is 1% for non-callable FRM and 0.5% for ARM

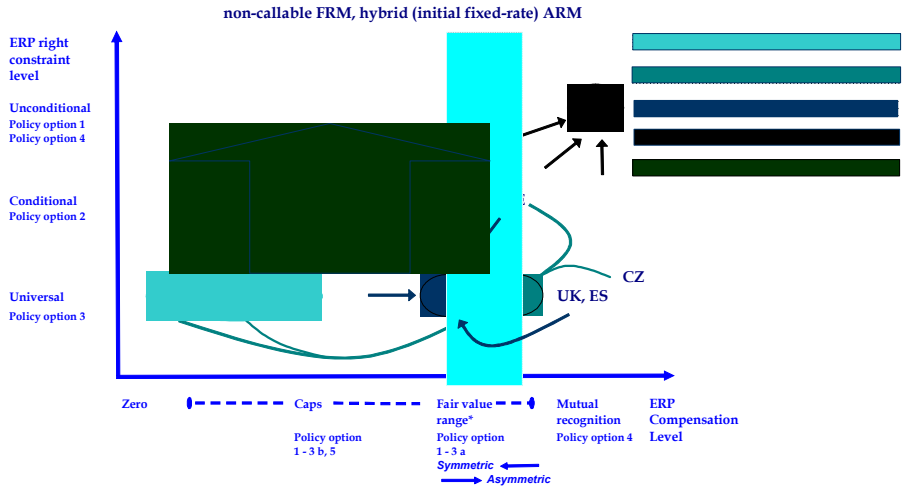
- Policy option 4 - mutual recognition - degenerates with the arguments made above to all other countries accepting the regime of the case country with the regime that is 'most favourable' to lenders. In our case study sample this is the Czech Republic.

We hence extend the options to be calibrated empirically thus from 5 to 8 (including the status quo). With this range we represent a fairly large subset of the theoretically possible under the proposed wordings of the policy options. Obviously, since the policy options are not specific on certain points – e.g. the level of a cap - arbitrary assumptions are required and the potential number of sets to be calibrated could be several multiples of 8. We do not think however that this would lead to significantly greater precision of the analysis.

Importantly, however, we need to make separate computations for non-callable FRM on the one hand and ARM on the other hand. For the latter we do not assume reinvestment risk while for the former we do, also legal regimes tend to differentiate between the cases (and possibly, down the road, policy options) between the two.

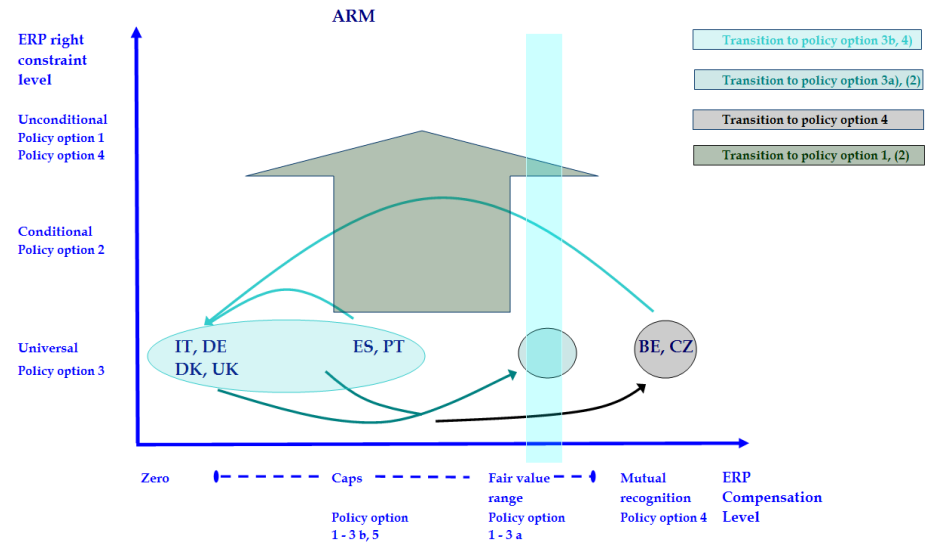
We leave out of the analysis a discussion of hardship case differentiations. We consider hardship cases to be covered partially by policy option 2 that aggregates two sub-portfolios with separate early repayment right regimes. In most countries the discussion would be about compensation or fee cap differentiations (e.g. Netherlands) – those cases may be approximated by choosing a different point on the compensation/fee – option cost line which we present in the following subsection.

Figure 23 Early repayment policy options – visualisation of reform interventions for each of the case countries, non-callable FRM and hybrid ARM (initial fixed-rate)



Note: *symmetric fair value compensations over the interest rate cycle tend to produce lower average compensation costs compared to asymmetric fair value compensations. Chart assumes falling interest rate trend, fair value levels may decline relative to other values when interest rates fall less or remain constant or rise.
Source: Finpolconsult.

Figure 24 Early repayment policy options – visualisation of reform interventions for each of the case countries, ARM



Note: No specific interest rate trend assumed
Source: Finpolconsult.

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In total we therefore model 8 policy options and 8 case countries (who individually never entirely match a policy option, as specified). This makes 64 reform interventions to be analyzed. Figure 23 and Figure 24 portray some of these interventions for our 8 case countries for both relevant classes of products, non-callable FRM and ARM.

1.7.3 Calibration of model parameters

General early repayment option pricing structure

We have discussed in detail in the microeconomic analysis the relations between prepayment behaviour, early repayment option cost levels and compensation/fee arrangements for both reinvestment loss and foregone intermediation profit. We use these findings to identify assumptions for the quantitative analysis based on three logical steps:

- First, we identify full option cost for both types of risk, reinvestment loss/profit and foregone intermediation profit, for the 10-year FRM benchmark.
- Secondly, we apply observations concerning the 'option cost yield curve' to that benchmark in order to identify full option cost for

contracts with differing fixed-rate periods. This is only needed for reinvestment risk.

- Thirdly, we analyse the type (compensation, fee) and level of call protection that is legally admitted or practiced and with that information determine the ratio of full option cost that a lender prices, given those constraints on his ability to fully recover costs. We do this for both types of risk.

Figure 25 and Figure 26 visualise our results and allocate these to the case countries, Table 7 shows the numbers. The product cases of non-callable FRM and hybrid ARM with initial fixed-rate periods feature reinvestment loss risk, for ARM the option cost issue is reduced to the foregone intermediation profit.

We start by discussing the pricing extremes full option cost and zero option cost.

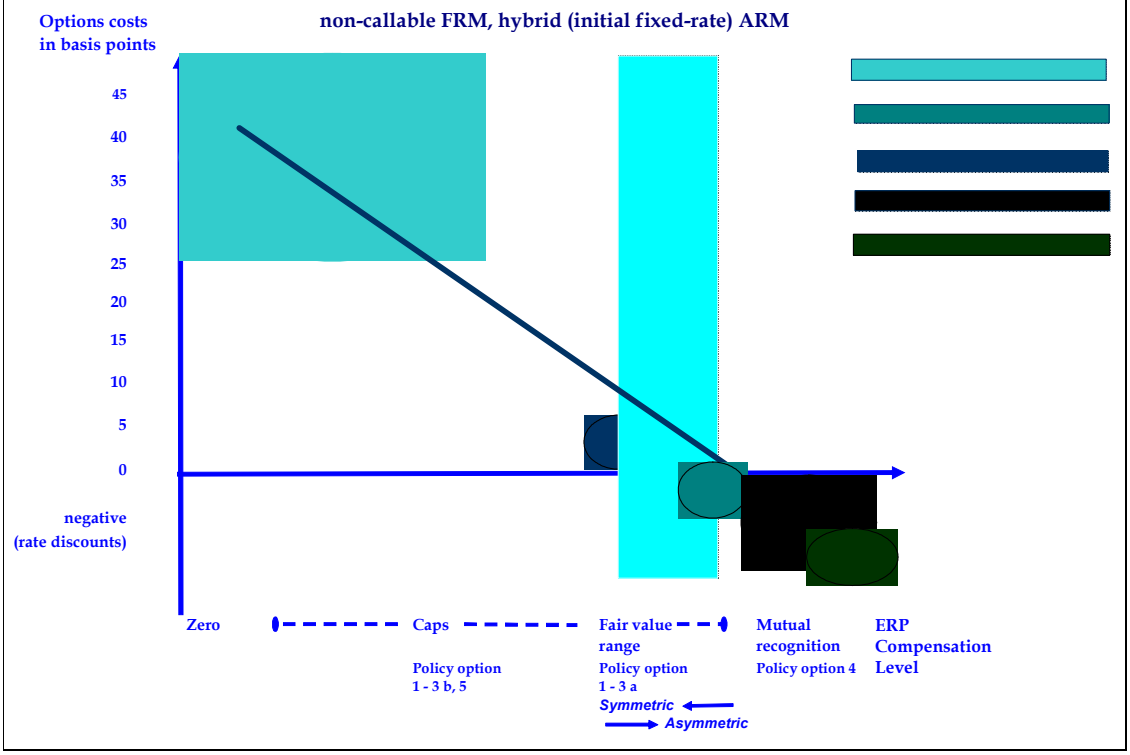
- We assume full early repayment option cost of 45 basis points for a 10 year FRM, consisting of 43.4 basis points for reinvestment loss and 1.6 basis points for foregone intermediation profit[44] to be passed on to consumers at zero compensation level as an additional interest-rate mark-up.

  Based on the evidence collected above and in earlier studies[45], we consider the reinvestment loss option cost level as representative for a long-term historical Euro area (and Denmark) situation with regard to interest rate volatility, the interest rate fixing term considered and typical options exercise behaviour seen. A few caveats should be expressed at this point:

[44] The assessment of foregone intermediation profit option cost is based on the assumption of 5 basis points of profit lost over a residual fixing period of 10 years. If all borrowers were leaving the lender those costs would stand at some 6.5 basis points; however, empirically ¾ of consumers are retained by the same lender, which significantly reduces the loss assumption we make (to 1.625 basis points).

[45] Batchvarov et. al. (2003), Dübel and Lea (2000), European Commission (2006b),Dübel (2007b).

Figure 25: Model calibrations for non-callable FRM and hybrid ARM (initial fixed-rate), option cost hierarchy (10-year fixing period)



Notes: Uk and CZ option pricing varies as a result of predominance of contractual early repayment fees. Assumes falling interest rate trend. Policy option 2 assumed to be a hybrid of policy option 1 and 3a), asymmetric.
Source: Finpolconsult.

- Option cost can only be observed directly in a fully capital market based system with low transactions costs, which in Europe exists only in Denmark. RMBS markets are too shallow and servicing niches, and where they are not they do focus on funding ARM assets (UK). We have extensively discussed in the empirical subsection the sources of bias introduced in data stemming from bank-based systems, from yield curve factors via transactions costs to internal cross-subsidisation.

- Our pricing benchmark for the analysis is a 10-year non-callable FRM, a product that does not exist in Denmark where the typical fixed-rate period is 30 years for callable FRM and 3 years for non-callable FRM. Historical option cost for the 30-year FRM product were around 60 basis points– see Figure 5 and text discussion above, in the Danish case they include an element of foregone intermediation profit.

- Option cost change as a logarithmic function of the fixed-rate period, so decline very fast as the length of the fixed-rate period declines. Figure 26 below shows this function which reflects our assumptions over the full range of maturities. We go down to 2 years, the typical initial fixed-rate period of the hybrid ARM predominant in the UK. Full option cost are only 17 basis points for a 2 year fixed-rate period.

- Moreover, historical option cost values are a function of the interest rate trends prevailing over the observation period, which for the Danish example (2001-2009) was between constant and slightly negative. Values are likely to change when interest rate trends change (declining when interest rate rise, increasing when interest rates drop), even though it has to be said that standard options theory does not consider interest rate trends as a factor in option pricing formulae[46].

- However, standard options theory assigns a high role to interest rate volatility, which in exchange drive option cost volatility. We emphasise in that regard that in Denmark the option cost have displayed considerable volatility over time – see Figure 5 and Figure 6. Phases of tightening capital market conditions, such as occurring during the current financial crisis when key investor classes in prepayment risk had to deleverage, can lead to a considerable increases in the option cost due to changes in demand. Vice versa, with sufficient availability of investors willing to purchase loans or securities containing the option the option cost may drop to low levels. This leads to an additional margin of error of the option cost assessment even in capital market based systems.

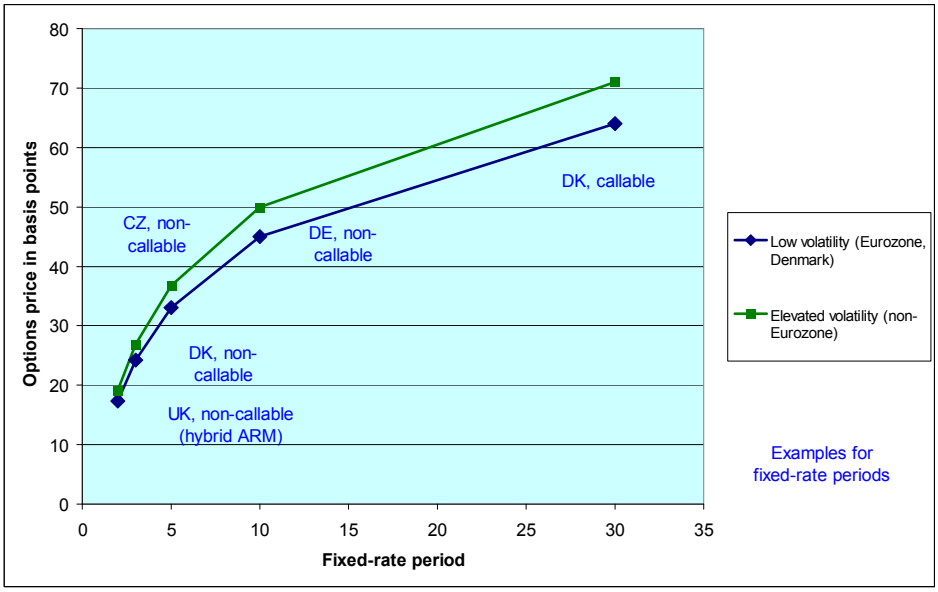
  As changing abundance of investors may lead to an upward shift of the option cost – fixing period curve, so does increased interest rate volatility according to standard options theory. In Figure 26 we assume such a (moderate) upward shift for financial systems outside the Euro area, especially those in Central and Eastern Europe that feature higher interest rate volatility.

- Full option cost levels are reached in Italy, where the early repayment compensation/fee level has been set by law to zero.

[46] See discussion in any textbook, such as Baz and Chacko (2004).

- Backed by basic theoretical arguments, only a small level of option cost – namely the 1.6 basis points assumed for foregone intermediation profit - will arise in the case of a symmetric fair value compensation. If compensation for that type of loss can be charged, option cost can be brought down to zero. This is technically not the case in Denmark, however among all country cases the Danish non-callable FRM early repayment regime comes closest to a zero options price and considering reinvestment risk alone it is zero. 0 option cost is assumed for policy option 1-3 a), symmetric fair value compensation.

Figure 26: Model calibrations for non-callable FRM and hybrid ARM (initial fixed-rate), impact of length of interest rate fixing period and interest rate volatility, no compensation or fee



Source: Finpolconsult.

Early repayment pricing structure in the case countries and policy options

After having determined two points on the option cost – compensation / fee regime curve displayed in Figure 25, we now motivate our assumptions for the remaining case countries and the policy options.

- We assume partial early repayment option cost to be passed on to consumers between 0 and 43.4 basis points in proportion to the degree to which legally admissible early repayment compensation or fees produce revenue in case of an options exercise by the consumer that lie systematically below lender costs. We assume that relation to be broadly linear, i.e. with fees ranging from 0.78% (Belgium, 3 months interest of 4.63% - the average January - March 2009 fixed rate per annum) via 1% (CCD, Policy option 5) and 2%(Portugal fee limit) to 3% (France fee limit) the share of option cost to be priced declines. At the 3% level of France, 50% of full early repayment option cost are charged (i.e. 21.7 basis points plus 1.6 basis points foregone intermediation profit), at the Belgian 0.78% level 88% of the full option cost level is charged (i.e. 38.2 basis points plus 1.6 basis points foregone intermediation profit). Portugal (68%, 29.3 basis points plus 1.6 basis points) and the CCD (83%, 36 basis points plus 1.6 basis points) lie in between.

Table 7: Early repayment option cost parameter assumption for country cases and policy options

REINVESTMENT RISK

Compensation or fee in %	Options cost pricing ratio	Options costs in basis points	Country cases NC FRM	Country cases ARM	Policy options
0	100%	43.4	IT		
0.78	88%	38.2	BE		
1	83%	36.0			Option 5
2	68%	29.3	PT		
2.5*	60%	26.0			Option 3b), FV
3	50%	21.7	(FR)		Option 3b), fee
5.5*	0%	0.0	DK	ALL	Option 3a), sym
6*	-5%	-2.2	DE, UK		Option 3a), asym
6.5*	-8%	-3.5	ES		
7.5**	-12%	-5.2	CZ		Option 4
10**	-15%	-6.5			Option 1

FOREGONE INTERMEDIATION PROFIT

Compensation or fee in %	Options cost pricing ratio	Options costs in basis points	Country cases NC FRM	Country cases ARM	Policy options
n.a.	100%	6.5			
0	25%	1.6	BE, DK, IT, PT	DE, DK, IT, UK	Option 3b)
0.14	0%	0.0	DE, UK		Option 3a)
0.5	-40%	-2.6	ES	ES, PT	Option 5 (ARM)
0.71	-50%	-3.3		BE	
1**	-60%	-3.9	CZ	CZ	Option 1,4

Notes: FV – fair value, sym – symmetric, asym – asymmetric, NC FRM – non-callable FRM. Non-callable FRM definition includes initial fixed-rate periods of hybrid ARM (UK case). 'Negative option cost' imply interest rate discounts. 25% ceiling on pricing of foregone intermediation profit reflects 75% internal refinancing assumption. Convexities in both assumption sets reflect changing exercise behaviour. * fair value assumption, may move with interest rate trend, ** fee assumption.
Source: Finpolconsult.

- Policy option 3b) – compensation and fee cap – assumes the French fee cap of 3% and a slightly lower compensation level for a 3% fair value cap of 2.5%, since in contrast to the fee model compensations may decline to zero if interest rates rise. For the 2.5% average we assume that 60% of option cost need to be priced, i.e. option cost of 26 basis points.

- We proceed by assuming slightly 'negative option cost' – i.e. an interest rate discount - for jurisdictions applying an asymmetric (partial) fair value compensation. The reasons are reinvestment gains made by lenders when interest rates rise while reinvestment losses occurring when interest rates fall are equalised by fair value compensations. As prepayments are broadly limited in the case of rising interest rates to 'non-financial' motives, such as moving, we cannot simply extrapolate the linear curve – below the zero option cost line the relation becomes flatter. We assume a discount of 5% of the full option cost, i.e. minus 2.2 basis points, for the case of Germany.[47] This pricing ratio is also assumed for the UK (adjusted for the lower cost levels in the case of shorter interest rate fixing periods) and generally policy option 3 a), asymmetric (partial) fair value compensation. Spain now applies a less restricted compensation model (mortgage-loan to government bond yield difference) than Germany and is assumed to pass through a negative 8% of the full option cost, i.e. minus 3.5 basis points – on the non-callable FRM portfolio.

- We finally assume also somewhat larger interest rate discounts still for jurisdictions that allow ex-ante determined contractual fees without legal limits and above fair value, such as those practiced in the Czech Republic. We assume for these cases a discount of 12%, i.e. an interest rate discount of 5.2 basis points. This pricing structure will also be likely the result of policy option 4 (mutual recognition), which copies the most 'favourable' regime for lenders. Our prepayment fee assumption in the Czech case is 7.5% - above fair value in most scenarios.

- For policy option 1 (contractual option) we assume a further increase of the fee level to 10% and in exchange a pricing discount of 15% of the full option cost, i.e. 6.5 basis points.

- The pricing assumptions for policy option 2 (partial contractual option, partial universal option) are indirect. We arrive at results for policy option 2 by computing results for policy option 1 and 3a), asymmetric and giving each a 50% weight. For example, movers would benefit from the universal option 3a), asymmetric, as in the German case, and non-movers would be constrained to paying considerable fee levels if they wanted to prepay early (policy option 1). Hence we attach no explicit assumption figures to policy option 2.

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[47] This is a somewhat stylized description of the German case, which in strict term applies policy option 2, i.e. a mix of contractual option and asymmetric (partial) fair value compensation. We justify this approach with two arguments: a) in terms of simulation modeling it is difficult to create two sub-portfolios on top of many other complications, b) empirically the cases where banks reserve the contractual option and demand higher fees for a second contract is likely to be small. However, we fully model policy option 2 further below.

To put the assumptions made on fair value and uncapped fees into perspective, consider the results of the simulation model presented in Dübel (2006) with historical German mortgage rate figures. For loans originated in the decade of the 1990s, which were characterised by interest rate compression preceding the European Monetary Union, asymmetric fair value compensations averaged roughly 10%. This may also be representative of a transition country today where domestic currency interest rates are expected to decline prior to EMU accession. In contrast, we assume here far lower fair value levels – if interest rate trends reverse they may even fall below the option cost associated with some of the statutory caps. In theory, under a stationary interest rate trend, with symmetric specification and fully symmetric exercise behaviour they may fall to zero.

In the case of ARM our primary concern is foregone intermediation profit, which we also need to compute as an add-on to the non-callable FRM option pricing where they are legally limited. Table 7 has the details of our assumptions.

Since the bulk of consumers – we assume from our interviews and punctual empirical evidence 75% - sign a new contract with the same lender, only a quarter of the full option cost of 6.5 basis points needs to be priced in the worst case for the lender. The interesting cases here are:

- those that are not allowed to charge for foregone intermediation profit for ARM (Denmark, Germany, Italy, United Kingdom) and have to pass on these costs - 1.63 basis points (6.5/4) - to consumers.

- those where foregone intermediation profit charges are permitted, but capped (Spain, Portugal at 0.5% or 50 basis points). However, we note that the present value of 1.63 basis points over 10 years at our initial long-term interest rate of 3.5% is only 13.56 basis points, i.e. the fair value level expressed in policy option 1-3a) lies *below* the actual Spanish and Portuguese caps, which are the only specific caps other than zero on record. Hence these caps should come with an interest rate discount which we calibrate at some minus 3 basis points.

  This is also the case when applying the CCD (Policy option 5) which allows for a 0.5% fee in the case of ARM expressis verbis.

- We therefore do not use the CCD level but rather assume a 0% compensation cap or fee limit as the assumption behind policy option 1-3b) for the case of ARM.

- In contrast, jurisdictions charging fair value compensation of 13.56 basis points would charge no option cost and grant no interest rate discounts. This is our assumption for policy option 1-3a). We add here that there is considerable debate in Germany, where the fair value principle for foregone intermediation profit is enshrined in law *for FRM*, about whether such compensation component can be charged in the case of a prepayment with the same lender. If the answer would be affirmative, the

fair value compensation level would quadruple, and the Spanish/Portuguese/CCD fee limits levels would be surpassed.

- those where in the case of ARM the same fee limits apply as in the case of FRM, with the result of above fair value levels of compensation and even deeper interest rate discounts. This is in particular the case in Belgium, where our fee assumption is 0.71% and the rate discount derived from this fact is assumed to be minus 3.3 basis points.

- accepting higher than fair value levels for foregone intermediation profit and hence ARMs also is assumed to be the substance of policy option 4 (mutual recognition), policy option 1 (contractual option). Absent practice data we also assume 1% (the historical Spanish figure) to be the level charged in the case for ARMs in the Czech Republic and for both policy options.

Foregone intermediation profit works in our model as an add-on to either option cost or exercise pricing, depending on the legal configuration. Treatment differs between ARM and FRM in Germany and the UK (explicitly FRM charges allowed under fair value principle). We also assume for those countries with tightly capped FRM reinvestment loss (Belgium and Portugal) that they need to price a margin for foregone intermediation profit as the caps are very unlikely to cover reinvestment loss. In contrast, jurisdictions practicing the contractual option (Czech Republic, policy options 1, 4) are assumed to price in excess of fair value on foregone intermediation profit.

Non-financial prepayments and mobility

In the presentation, initially the same low amount of non-financial prepayments of 3% p.a. will be assumed. The figure reflects a minimum of early repayment resulting from house moves or inheritances and other windfalls that typically is assumed as inelastic to the refinancing incentive. Prepayments fall to the non-financial level when the financial incentive (interest rate differential between loan coupon and current interest rate) is zero or when financial gains from prepayment are eliminated by a fair value compensation charged from borrowers.

Please refer to the conditional prepayment rates displayed in Figure 8 and Figure 13 for a motivation of this assumption.

We will later assume a general non-financial prepayment rate of 6% in order to stress the results for the case of a more mobile society. The lower non-financial prepayment rates for the high fee situations described before move upwards proportionally.

1.7.4 Stakeholder economics specific to the early repayment sub model

Consumer economics

Consumers will be confronted with a given options price – compensation/fee policy allocation for the non-callable FRM and ARM product. They are price takers and in the computations presented do not change their relative product demand as a result.

This is a highly stylised assumption, as our discussion in the empirical and qualitative review shows. The model is capable to take the impact of product pricing changes on demand into account; however, we opt – on the quantitative side – for calculating with constant product demand patterns in order to clearly show the impact of the options on a status quo economy.

Consumers in our computations do react to changes in the pricing setup, however, as far as their early repayment behaviour is concerned. When they face a low cap on compensation or fees and as a result higher interest rate levels (due to partial or full option cost pricing) they will be more inclined to prepay in reaction to changes in the financial prepayment incentive than when they are faced with fair value compensation, and vice versa.

Lenders economics

Lenders of callable and non-callable FRM collect an options spread and early repayment compensation as revenues and face reinvestment risk from prepayments, which we model as equivalent to a fair value compensation as the present value of asset-asset interest differences over the remaining fixing period of the loan. The fixing periods for non-callable FRM is generally 10 years, except for 3 years in the Danish case and 2 years in the UK case.

We similarly model foregone intermediation profit as the present value of the options-adjusted profit – generally 5 basis points (50 basis points options-adjusted revenue minus 45 basis points administration costs). Here we assume 10 years as typical duration of the profit (for all products, ARM, non-callable and callable FRM).

Table 8 Product market share assumptions for the case countries

Market share assumptions		"FRM countries"				"ARM countries"			
		Belgium	Czech republic	Denmark	Germany	Italy	Portugal	Spain	United Kingdom
by credit risk	Subprime	5%	5%	10%	5%	5%	5%	10%	10%
	Prime	95%	95%	90%	95%	95%	95%	90%	90%
by interest rate risk	Callable FRM	0%	0%	40%	0%	0%	0%	0%	0%
	Non-callable FRM	60%	90%	20%	90%	40%	10%	10%	30%
	ARM	40%	10%	40%	10%	60%	90%	90%	70%

Notes: sub-prime and prime distributions by interest rate risk protection mechanism are identical. UK non-callable FRM figure reflects hybrid ARMs (initial fixed-rate period).
Source: Finpolconsult

The discount factors applied over the difference are the contemporary risk-free long-term interest rates. We make no further differentiations for credit risk.

While the loans are modelled as prepayable (subject to the early repayment regime) the liabilities are non-callable. This may lead to a negative maturity transformation risk. In response to this we use two funding instruments for lenders: short-term (1 year) and long-term (10 year). Lenders vary the mix according to their interest rate risk preferences as a reaction to interest rate incentives (yield curve). In our model lenders are universal banks with a high elasticity of demand for short-term funding instruments with respect to yield curve.

The actual funding cost structure of the lender has no impact on the reinvestment loss calculation for the loans, which is subject to an asset-asset comparison.

We assume that all prepaid amounts are reinvested within the national portfolio, i.e. every borrower receives a new loan, from a new loan cohort, including in the case of non-financial prepayments. This means that 'external' refinancing remains within the portfolio while the profit margin goes to some new lender.

We assume no administration cost impact of reform for lenders.

Intermediary economics

No specific assumptions for early repayment. Early repayment adds to intermediary profit via a higher level of new originations.

Government economics

Government is (almost) not directly involved in the risk-pricing trade-off of early repayment, although in principle government subsidies (esp. for

callable FRM whose supply may be unstable) are conceivable and de-facto they are present.

The 2001-2009 Danish figures that we use as a basis for our computations can be considered as largely free of government subsidies from a supply side perspective. In the 1980s there was still considerable government influence on the willingness of investors to buy callable FRM via regulations that forced Danish pension funds to invest in the domestic bond market. Those are gone in the meantime.

However, an effect of mortgage interest deduction in Denmark on the data used is present – the larger interest rates (option cost transferred to borrowers), the larger the value of the tax deduction. We abstain from modelling such direct government interventions, however.

There is an indirect effect of the early repayment regime on government, which in our simulation keeps subsidising lender credit losses. Credit losses are lower, the higher prepayments of high interest rate loans are, i.e. decline with the degree of option pricing. We have minimised this effect by assuming a parallel reduction in credit risk cost charged with the amount of option cost pass-through.

1.7.5 Early repayment cost-benefit dynamics – an example

Before we condense the quantitative simulations into single net present value figures that allow us to calibrate the impact of the policy options for all country cases and the EU-27 at large we will for improvement of understanding demonstrate the operation of the model with an example.

The best country cases for this demonstration are Belgium and Germany. Both use fixed-rate mortgages, which produce larger reinvestment risk and options and compensation or fee revenue flows compared to adjustable-rate mortgages. Belgium also practices a tightly capped fee model and the universal right, and Germany the (partial) fair value compensation and in addition a partial contractual option, which sets both countries at extreme ends of the option cost pricing – compensation / fee level curve of Table 7.

To improve visibility further we assume grandfathering of the pre-reform loan cohorts. This avoids abrupt changes in revenue and cost post-reform in year 2. The full cost-benefit analysis below will present all results for both grandfathering and no grandfathering assumptions. In order to keep the discussion manageable, we finally limit the discussion to two scenarios: the stability and the volatility scenario.

We start with empirically most relevant transitions to different models of compensation or fee under a universal early repayment right assumption - policy option 3a) and b) - and later approach the transition from a universal early repayment right to early repayment as a contractual option, which affects policy options 1, 2 and 4.

Policy option 3b), fee cap: transition from partial (asymmetric) fair value compensation and capped fee models to a zero fee cap model

For better visibility of the effects, we assume in this example the introduction of a fee cap zero. This differs from the politically more realistic assumption made for capped fees in the cost-benefit computations below (3%).

We use our above market and option pricing parameters to compute how a change in the early repayment regime from a fair value compensation regime to a zero compensation regime would affect consumer and lender costs and benefits.

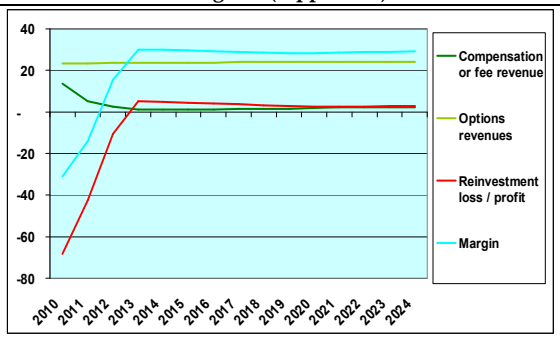
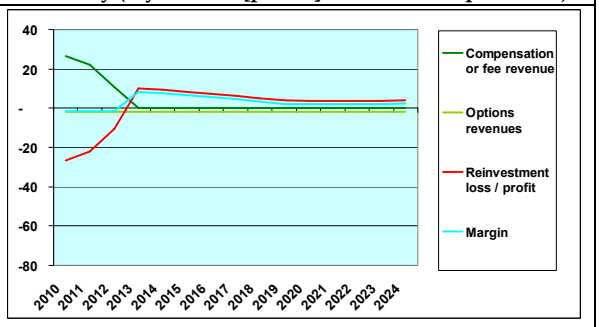
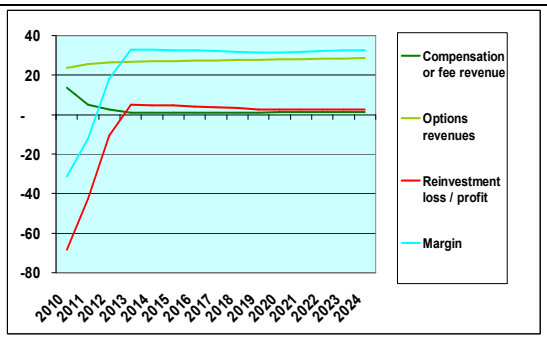
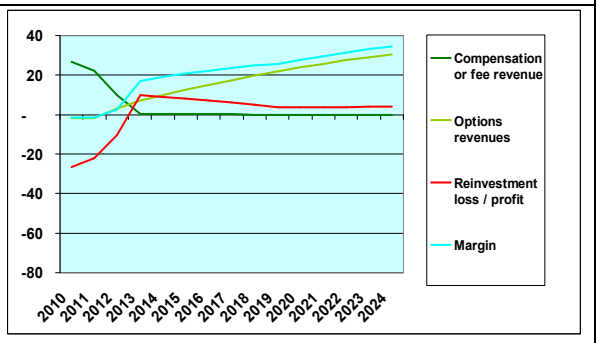
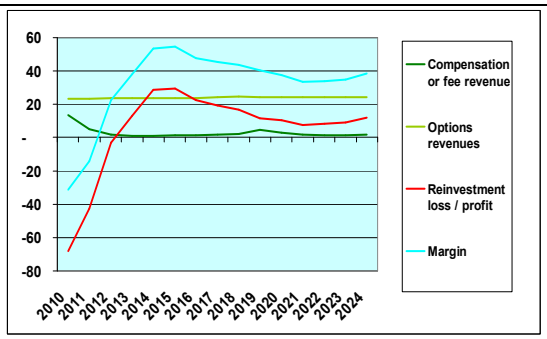
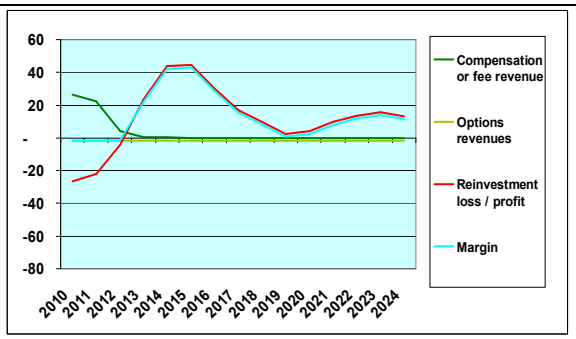
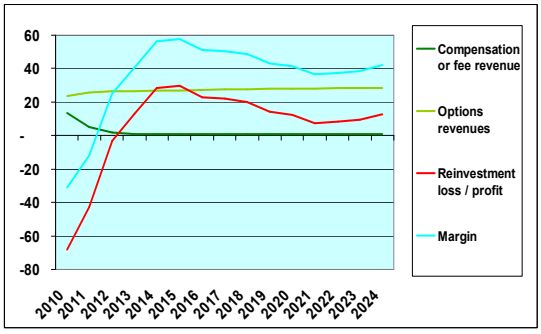
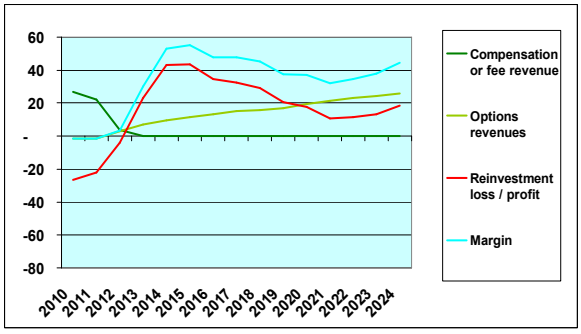
Figure 27 details the revenue and cost profile from the early repayment profit centre for lenders in both countries, i.e. reinvestment loss or profit, options revenues, compensation (Germany) or fee (Belgium) revenues and the net margin from early repayment operations. All data are expressed in percent of the outstanding mortgage portfolio. Lender costs and benefits are mirroring corresponding costs of credit and gains from prepayment (via lower interest payments of the portfolio) positions of consumers.

- The status quo for both countries differs: Belgian lenders charge the 38 basis points options premium for non-callable FRM while German lenders offer a small discount. Considering the high ARM share in Belgium, the total early repayment options revenue in Belgium is some 23.5 basis points initially. Since interest rates fall immediately in both scenarios – a result of the ongoing financial crisis, both jurisdictions face some reinvestment losses for lenders: however, in the Belgian case those are considerably larger, due to higher financial prepayments - adding to non-financial prepayments to which the German case is essentially restricted - while Belgian lenders only charge a third of the compensation revenue of their German counterparts.

- Both countries then differ in Scenario 1 (stability) and 3 (volatility). As interest rates increase and reinvestment losses turn into reinvestment profit, Belgian lenders under the fee model that even covers ARM still are able to reap early repayment revenue, and in addition options revenue. They are hence making a considerable profit margin on the early repayment option (reduce their losses under the under pricing assumption). German lenders, due to the asymmetric nature of their compensation formula, make a profit, too – however, due to the absence of any cash charges it is limited to reinvestment profit (which is larger in Germany given the larger share of FRM than in Belgium).

- Both scenarios differ essentially by the volatility of interest rates. To the extent that in the future interest rates fall drastically again, the same picture as in the early years of the cost-benefit analysis re-emerges.

Figure 27: Lender early repayment profit centre: impact of a transition from capped fee and asymmetric (partial) fair value compensation to zero fee – cases Belgium and Germany

	Belgium (capped fee)	Germany (asymmetric [partial] fair value compensation)
Stability scenario - Status quo		
Stability scenario – Reform		
Volatility scenario – Status quo		
Volatility scenario – Reform		
Assumptions	60% FRM, 40% ARM, universal bank, 0.382% option cost pricing and 0.78% (of outstanding, approx 3 months interest) early repayment compensation pre-reform, 100% option cost pricing and 0% fee post-reform.	90% FRM, 10% ARM, universal bank, -5% option cost pricing and asymmetric (partial) fair value early repayment compensation pre-reform, 100% option cost pricing and 0% fee post-reform.

Note: grandfathering of pre-reform cohorts.
Source: Finpolconsult computations.

Let us now consider the impact of reform – introducing, as Italy did in 2007, a zero compensation / fee limit on both the Belgian fee and the German asymmetric fair value compensation model (see Figure 27).

- Belgian lenders will now be faced with an elimination of the fee model for new loans underwritten from January 1, 2011, f year 2, (e.g. 2011) onwards. Fee income is therefore gradually declining to zero. It is possible that grandfathering for loans underwritten prior to January 1, 2011, is not granted, which would ground fee income to zero immediately. This is actually our assumption for the full cost-benefit analysis whose results are shown below. Belgian lenders will then 'retaliate' by charging now the full 43.4 basis points option cost rather than only 38.2 basis points, on new loans originated. The total effect is that their profit level from early repayments is somewhat reduced in both scenarios.

- German lenders are more radically forced to alter their early repayment business model. Given that interest rates in both scenarios rise towards the middle of the decade and that old loans are grandfathered, not much is happening to fee income. However, they start now to charge option cost from January 1, 2011, onwards, providing them with significant additional revenue towards the end of the decade.

In summary, Belgian lenders are the losers and German lenders the winners of this reform. At least the latter result is contrary to a common argument made by the industry that routinely ignores – or denies – the ability of the bank to charge an option cost mark-up. The source of such claims is the uneven competition between universal banks and mortgage banks that puts pressure on mortgage margins. It should thus be considered when interpreting our result that we model universal banks (adjusting their liability mix to the yield curve) which given their greater use of short-term funding can absorb some of the reinvestment loss via yield curve profits.

- Mirroring the effects on the lender side, German consumers will lose and Belgian consumers will win as a result of the reforms under the two scenarios. Arguably then, the 43.4 basis point assumption for full option cost is unrealistic if lenders are able to make a systematic profit, as they do in the options-pricing situations described. The core point however is that interest rates in the two scenarios described above change the trend of the past 20 years and tend to remain stable or rise. Surely, as new data make their way through bank interest rate forecast models, there will be an ex-post adjustment of option pricing.

- At the same time, it cannot be ruled out that even greater volatility or a depression scenario become reality, or that lenders remain fundamentally uncertain about interest rate trends. And whatever the level of options price charged, the revenue and cost dynamics described in the charts do not fundamentally change.

Intermediaries will benefit from greater prepayments in all scenarios as originations will increase as a result of a higher share of financial prepayments.

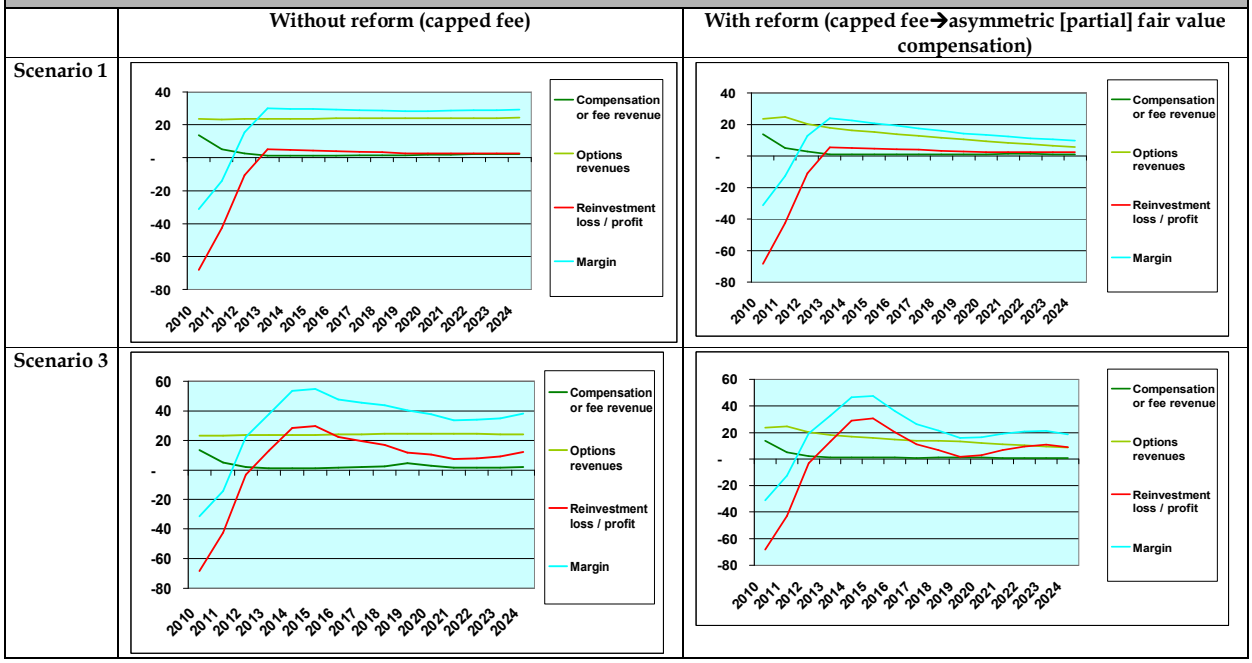
Policy option 3a), asymmetric: transition from a capped fee model to asymmetric (partial) fair value compensation model

We proceed to explore the next policy option, the introduction of maximum harmonisation to allow lenders to charge for the losses they incur by way of an asymmetric (partial) fair value compensation. Figure 28 portrays the Belgian case – Germany already practices that solution.

- We note first that a compensation model will deprive Belgian lenders of their current ability to charge early repayment fees from prepaying FRM borrowers if interest rates have risen, and also from charging when an ARM borrower prepays. This eliminates the profits made on non-financial prepayments in such situations.

- Moreover, as the asymmetric compensation is introduced, new loans underwritten in Belgium after January 1, 2011, drop in price by 40.4 basis points – the option cost of 38.2 basis points plus an additional discount of 2.2 basis points for the fact that the compensation is asymmetric, see Table 7.

Figure 28 Lender early repayment profit centre: transition from capped fee to asymmetric (partial) fair value compensation – case Belgium



Notes: grandfathering of pre-reform cohorts. For assumptions, see Figure 27 and Table 7.
Source: Finpolconsult computations.

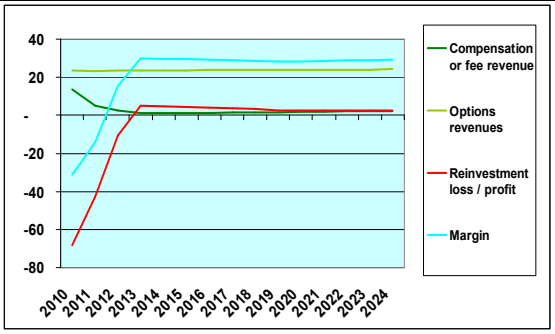
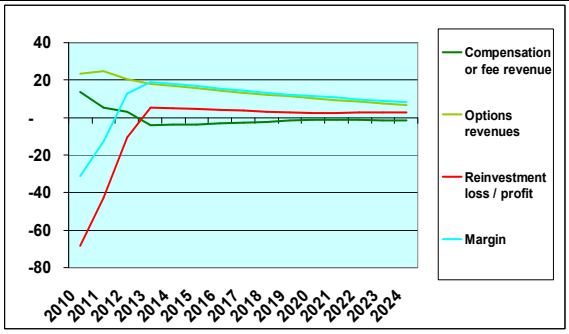
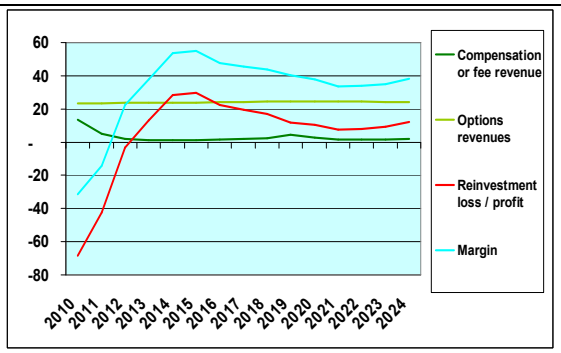
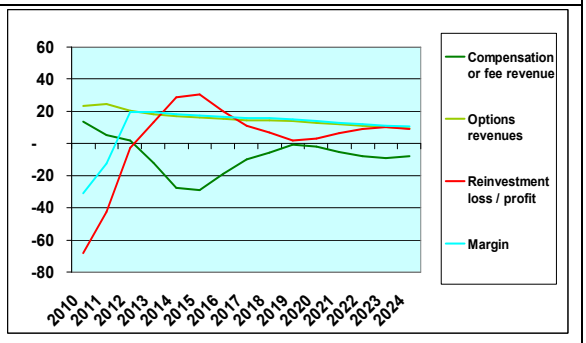
As a result of these changes, in both scenarios, Belgian consumers are now in the comfortable situation of having saved some 10 basis points in overall credit costs, a substantial reduction considering that total spreads are in the range of 1.5-2% (FRM, ARM).

Obviously, however, those Belgian consumers that wish to prepay during falling rates beyond the time horizon of the analysis would have to face additional compensation cost.

Policy option 1-3a), symmetric: transition from asymmetric (partial fair value) compensation and capped fee model to symmetric fair value compensation model

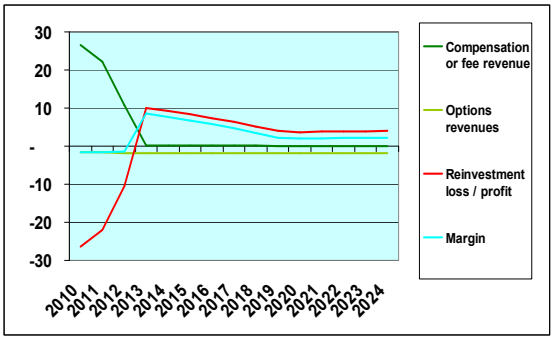
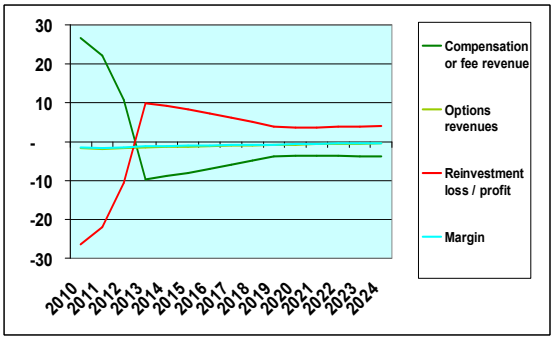
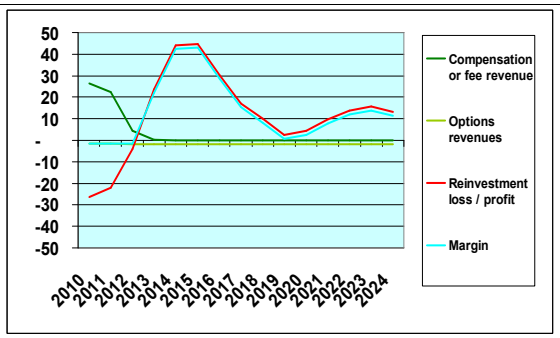
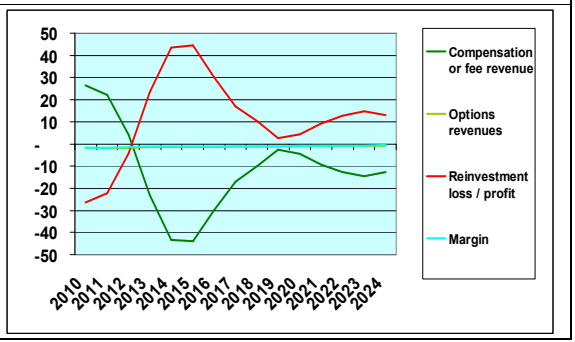
We finally consider what happens if both countries, the one practicing a fee model and the one practicing an asymmetric compensation, would switch to a full fair value compensation model with symmetric payouts from/to consumers to / from lenders. In reality, lenders do not pay anything in cash – they just receive a proportionally lower prepayment proceeds.

Figure 29: Lender early repayment profit centre: transition from capped fee to symmetric (full) fair value compensation – case Belgium

	Without reform (capped fee)	With reform (capped fee→symmetric [full] fair value)
Scenario 1		
Scenario 3		

Notes: grandfathering of pre-reform cohorts. For assumptions, see Figure 27 and Table 7.
Source: Finpolconsult computations.

Figure 30 Lender early repayment profit centre: transition from asymmetric (partial) fair value compensation to symmetric (full) fair value compensation – case Germany

	Without reform (partial fair value)	With reform (partial fair value→full fair value)
Scenario 1		
Scenario 3		

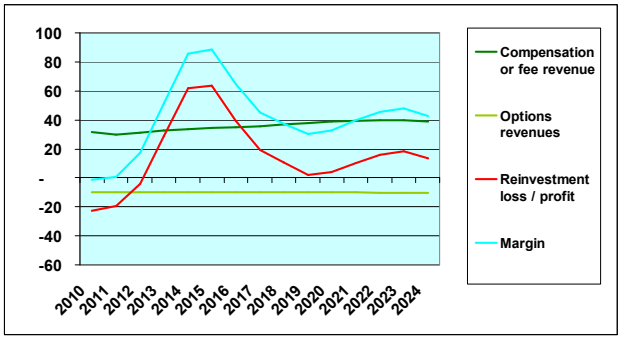
Notes: grandfathering of pre-reform cohorts. For assumptions, see Figure 27 and Table 7.
Source: Finpolconsult computations.

Figure 29 and Figure 30 show the results for Belgium and Germany respectively.

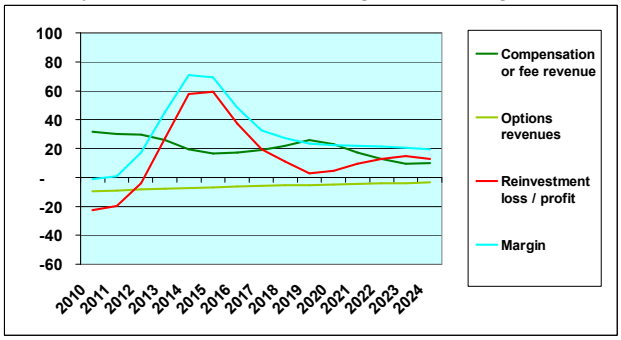
- In the Belgian case, a symmetric compensation would cut back lender profits from early repayment even more substantially than in the asymmetric case, given that we face a tendency of increasing interest rates and overall reinvestment profit outlook for lenders. Note that lenders reinvest the cash profitably and do not make losses – only their profit level decreases. Belgian lenders now reduce their option cost from 34 basis points to 5 basis points, so some long-term pricing penalty for consumers in exchange for the symmetry remains. The inertia of the portfolio ensures that the overall price reduction takes time to materialise.

Figure 31 Lender early repayment profit centre: transition from contractual option to universal early repayment right and symmetric (full) fair value compensation – case Germany – and grandfathering effect

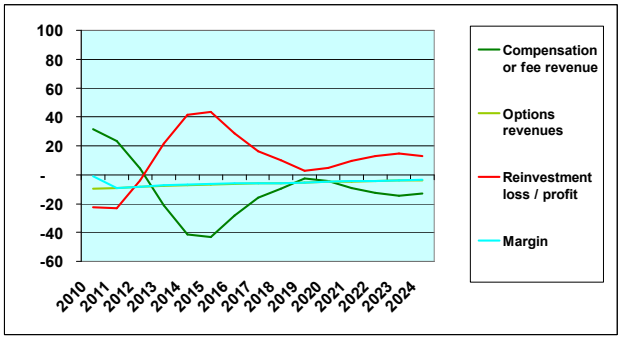
Status quo – contractual option



Post-reform – symmetric fair value, WITH grandfathering of 0 and 1 cohorts



Post-reform – symmetric fair value, WITHOUT grandfathering of 0 and 1 cohorts



Notes: For assumptions, see Figure 27 and Table 7.
Source: Finpolconsult computations.

- All that changes in Germany is the symmetry of payouts. However, the effect on early repayment profits is remarkable, as Figure 30 demonstrates. For German lenders start with a zero profit line the options to gain from reinvesting the prepaid cash at higher interest rates disappear. The early repayment profit line becomes flat, it rises only gradually as the 5 basis points interest mark-up for the cost difference between symmetry and asymmetry of compensation permeates to the bottom line.

Again, we emphasise that the level of option cost charged may vary with the interest rate scenario – this holds also true for the 'symmetry' premium, which might be larger, depending on the scale of foregone reinvestment profit of lenders. We note, however, that increasing rates also may mean increasing credit risk and there is a limit to this argument.

Policy option 3b), symmetric: transition from unconditional contractual option to symmetric fair value compensation

We may approximate the situation of a country practicing an unconditional option with a fee level that under the assumed economic scenarios typically in most circumstances will be above fair value. We assume a 10% fee (see Table 7), derived as the result of a negotiation of a second contract that buys the consumer the right to prepay. We use German data to compute the effects, because borrowers wishing to prepay that are not moving house remain subject to a contractual option.

We also ignore that such a fee policy could have a further dampening effect on our non-financial prepayments, which are low at 3% however, and assume that borrowers would still trade at such high fee levels because of higher opportunity costs of not prepaying on their side. Figure 14 had discussed this argument.

Clearly, lenders would substantially benefit from such a contractual option in our interest rate scenarios. The early repayment margin in the status quo shown in the upper chart of Figure 31 would exceed 80 basis points in the Scenario 3 in certain years. Such fee levels divorced from the true cost basis of the lender would become a base for stable profits, unless borrowers significantly scaled down non-financial prepayments.

The middle chart in Figure 31 further explores the early repayment profit centre dynamics when the system is moved towards universal early repayment right and symmetric fair value compensation. As before, introducing symmetric fair value substantially reduces early repayment profit – numerically by roughly a quarter.

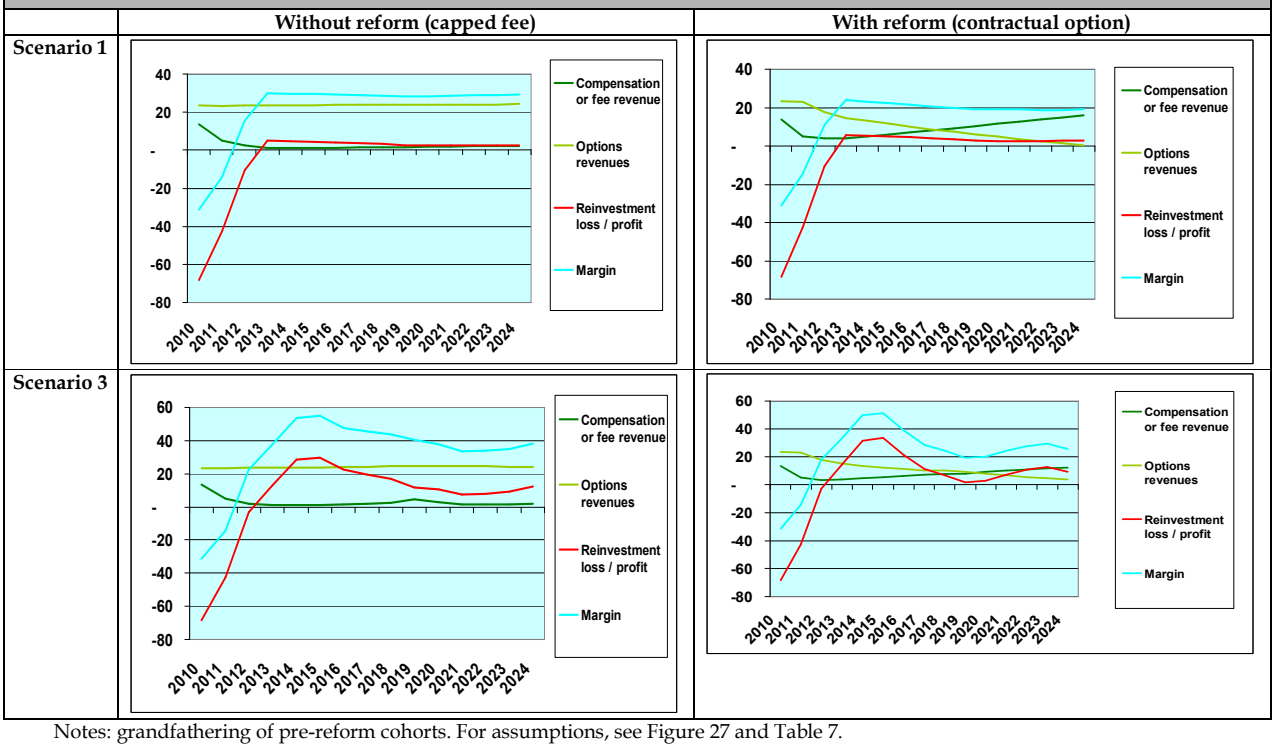
It is instructive to test the effects of grandfathering with this example. Grandfathering implies that the loan cohorts originated prior to reform remain unaffected by it; if we lift this assumption, the first two cohorts in the model can immediately be prepaid subject the new fair value compensation.

The effect is shown in the lower chart of Figure 31. Any early repayment profit is removed after reform on January 1 of year 2, in fact, depending on whether the pricing advantages of the pre-reform cohorts subject to the contractual option change or not (which means changing the interest rates in an existing contract) lenders even could face small losses.

Policy option 1: transition from limited fee and asymmetric (partial) fair value compensation to unconditional contractual option

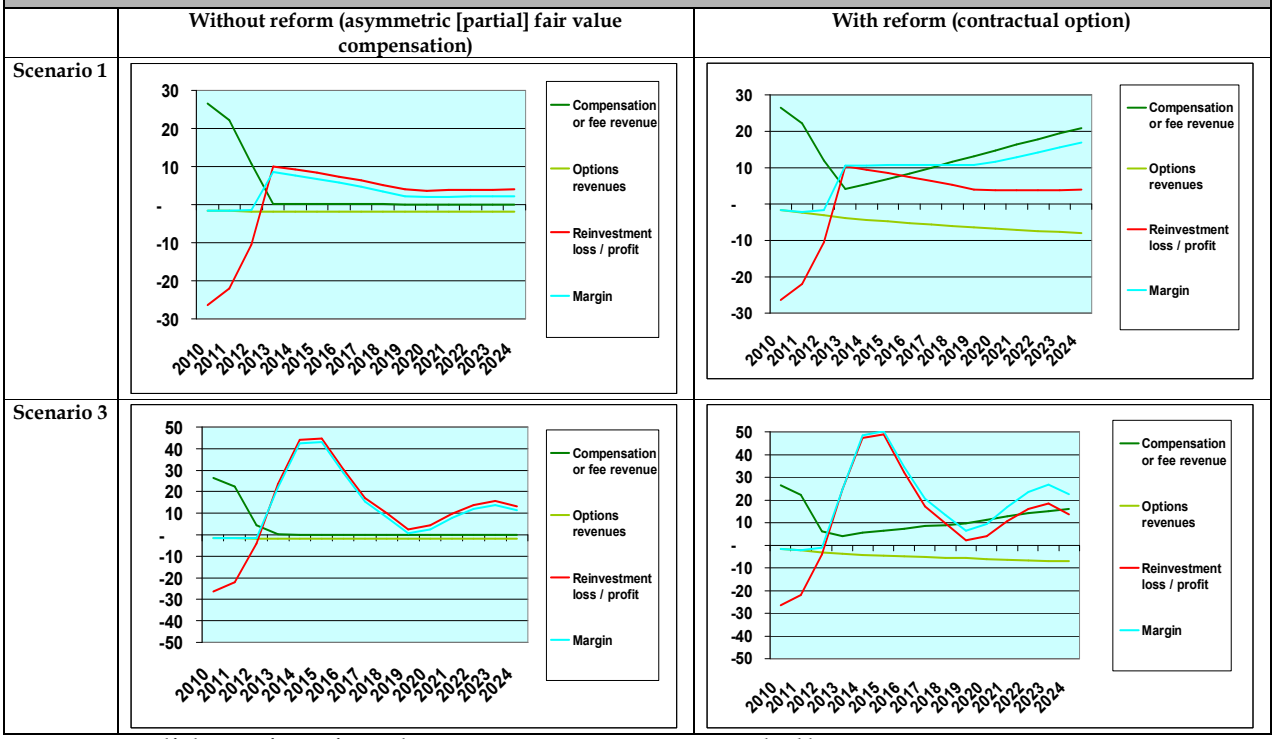
Our final simulation assumes the reverse transition – from the current Belgian and German legal situation (in the latter case for moving/house selling only) to an unconditional contractual option. We keep the 10% fee assumption in this case, which means in the Belgian case a more than 10-fold increase (for FRM only), and for Germany still roughly a doubling.

Figure 32 Lender early repayment profit centre: transition from capped fee to unconditional contractual option – case Belgium



Notes: grandfathering of pre-reform cohorts. For assumptions, see Figure 27 and Table 7.
Source: Finpolconsult computations.

Figure 33 Lender early repayment profit centre: transition from asymmetric (partial) fair value compensation to unconditional contractual option – case Germany



Notes: grandfathering of pre-reform cohorts. For assumptions, see Figure 27 and Table 7.
Source: Finpolconsult computations.

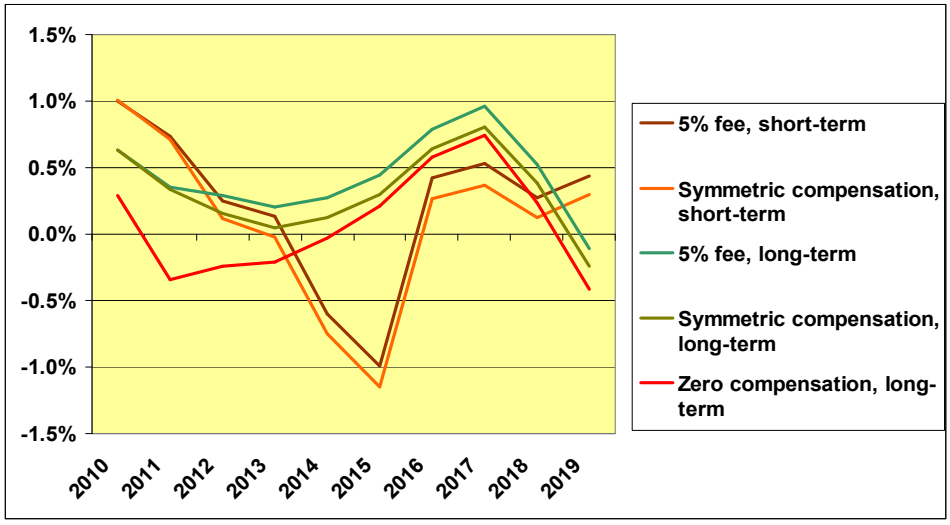
Figure 32 and Figure 33 show the results for both countries, which feature mirror effects of the before discussed transitions. In the Belgian case, and considering that there is no grandfathering assumed, profit levels of lenders from early repayment decline despite the optically improved compensation levels. The reason is falling options revenues from the new model under sufficient levels of competition (exacerbated if lenders from countries practicing contractual option enter the Belgian market, e.g. German for cases other than house selling and moving).

In the German case we record an increase in early repayment profits, especially because at rising interest rates in the middle of the period under observations lenders can now charge high fees from prepaying consumers, whereas compensations under the asymmetric (partial) fair value compensation concept are zero. The total effect is not fully compensated by the further decline in options revenues (further increase in discounts) on the German market.

Impact of lender funding structure, financial stability risks

We may still ask at this juncture what would happen to lenders applying different funding strategies. How material are early repayment revenues in stabilising a lender funding model, e.g. for issuance of covered bonds? For that question we simulate a long-term (95% long-term funding) and a short-term financed lender (between 50 and 100% short-term funding) and compare the above fee model results for Belgium and Germany in Figure 34 for Scenario 3, which promises the greatest problems for lenders.

Figure 34: Comparative impact of funding strategy and early repayment compensation model



Notes: grandfathering of pre-reform cohorts. For assumptions, see Figure 27 and Table 7.
Source: Finpolconsult computations.

Clearly, the type of funding strategy of the lender matters – yet, in a scenario of volatile (and potentially rising) interest rates, a long-term funded lender would be at a much safer position in mortgage finance than a short-term lender, whatever the early repayment compensation model. This avoids the US Savings and Loan crisis scenario – rising short-term rates risking the insolvency of a mismatched mortgage lender.

As Figure 34 shows, switching from a fee model – we assume here 5% as the average over the fees recorded - to a full fair value compensation reduces bottom line for the long-term lender somewhat, but not materially so. He should also be able to adjust margin pricing to compensate for lower excess profit when interest rates have risen. What is important for stability, though, is that the compensation model does not cut back compensation to zero. As

the red line in Figure 34 shows this would be bought by considerably higher profit volatility, which is a threat to the solvency of long-term lenders that as issuers of capital market instruments tend to operate with extremely thin margins. At least a longer transition period should be considered in such a case.

1.7.6 Key results for the case countries

In the complete cost-benefit analysis we use all four economic scenarios and eight case countries.

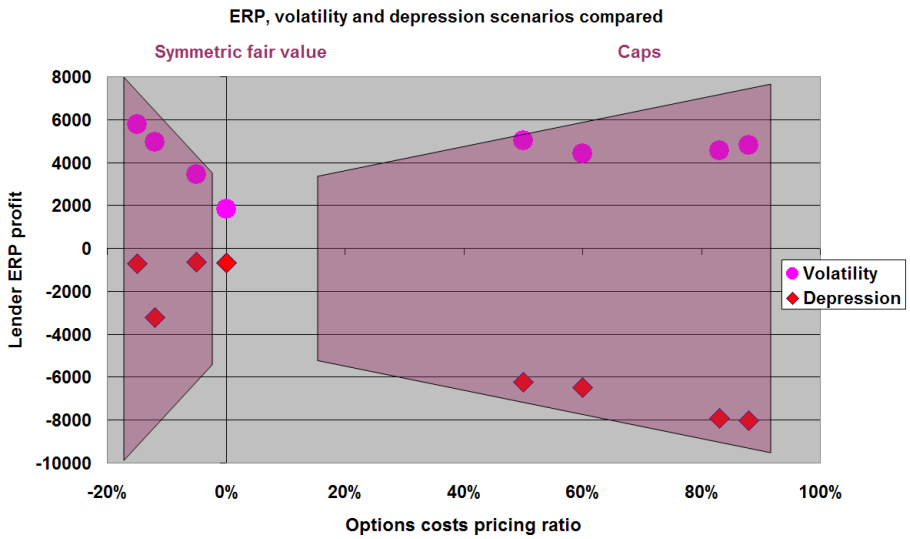
In the discussion we will initially present the (politically more likely) grandfathering of the pre-reform loan cohorts originated at the end of years 0 and 1. We will later present the full results for both grandfathering and no grandfathering.

Lender-consumer redistribution

As has been already demonstrated in the conceptual and empirical sections, any departure from the status quo early repayment legal regime for any given scenario and country implies a redistribution between lenders and consumers, and within consumer groups between those prepaying and those not prepaying. The maximum swings from lender and consumer benefits to the other side is reached at the extremes of the option cost – compensation / fee curve (contractual option, 0 fee cap).

Figure 35 demonstrates this point for the Belgian case by using two starkly contrasting scenarios – volatility and depression. The chart uses absolute lender profit numbers and sorts all policy options by the option cost pricing ratio for reinvestment risk (see Table 7 for detail). Up to relatively minor social changes (see discussion below), a loss for lenders is a profit for consumers in the aggregate, and vice versa.

Figure 35: Belgium – 15 year NPV of lender profits (€ million) by economic scenario and option pricing ratio of policy option for reinvestment risk – grandfathering of pre-reform loan cohorts



Notes: Policy option 2 excluded from presentation due to mixed character, see numeric results. Option cost pricing ratio 100% corresponds to zero fee or compensation, 0% to full fair value compensation, and negative values to fees or compensations above fair value level. See Table 7 for detail.
Source: Finpolconsult computations.

In the depression scenario, lenders confronted with severe prepayment compensation or fee caps and a large prepayment wave will make considerable losses, which will appear as gains on the consumer side. These lender losses made during phases of interest rate declines cancel out with reinvestment gains made when interest rates increase again in the volatility scenario.

If a depression scenario is likely, lenders will hence fare best with a fair value compensation or contractual option policy. In contrast, in a volatility scenario (and also in the stability and mixed volatility scenarios not displayed here, see figures below), lenders will fare better compared to depression with all policies except the fair value policy, which requires them to a reduction of the amount to be prepaid to consumers if a prepayment occurs when interest rates have risen relative to the coupon. All other policy options do not require such reductions below par and hence, given suitably adopted pricing policies (see Table 7), yield potential for systematic profits for the lender.

The least redistributive policy option in terms of lender-consumer redistribution is the symmetric fair value model. Consumers may gain in the depression scenario from capped compensations and fees, but they do not do so in the other scenarios. Consumers lose in the other scenarios from a contractual option. We will present the full case detail below.

Hence, while policy makers and stakeholders may attach different weights to each scenario and hence produce different hierarchies of policy options, the least volatility policy option over all scenarios is the fair value compensation model, and here in particular the symmetric version practiced in Denmark.

Economy-wide impacts

The primarily nature of early repayment as a lender-consumer redistribution channel implies that economy-wide cost and benefit changes due to shifts in policy options are minor – the maximum departure of social return from the status quo recorded in any case country is 6%, and the lender-consumer swing typically contributes some 90%. Table 9 resents the results for the eight case countries and four scenarios. **Fehler! Verweisquelle konnte nicht gefunden werden.** presents charts on the dynamics for each of the case countries.

Table 9 Economy-wide NPV of benefits / costs of policy intervention in the area of early repayment (€ million) – case countries, grandfathering of pre-reform loan cohorts, deviation from status quo

Country	Policy option		Scenario 1 Stability	Scenario 2 Mixed volatility	Scenario 3 Volatility	Scenario 4 Depression
Belgium	1	Full contractual option	331	515	488	22
	2	Partial contractual option	291	527	570	21
	3a), asym	Asymmetric fair value compensation	251	539	652	20
	3a), sym	Symmetric fair value compensation	254	557	695	29
	3b). FV	Fair value compensation cap 3%	32	134	197	- 11
	3b), fee	Fee cap 3%	67	220	306	- 18
	4	Mutual recognition	334	555	585	40
	5	CCD fee cap 1%	12	35	55	17
Czech rep	1	Full contractual option	4	- 0	- 8	4
	2	Partial contractual option	- 10	- 8	- 7	- 8
	3a), asym	Asymmetric fair value compensation	- 23	- 16	- 7	- 20
	3a), sym	Symmetric fair value compensation	- 28	- 20	- 9	- 24
	3b). FV	Fair value compensation cap 3%	- 98	- 220	- 265	- 83
	3b), fee	Fee cap 3%	- 88	- 177	- 209	- 74
	4	Mutual recognition	2	2	2	1
	5	CCD fee cap 1%	- 120	- 331	- 414	- 100
Denmark	1	Full contractual option	257	245	305	197
	2	Partial contractual option	167	162	204	128
	3a), asym	Asymmetric fair value compensation	77	79	103	59
	3a), sym	Symmetric fair value compensation	66	68	87	50
	3b). FV	Fair value compensation cap 3%	- 141	- 406	- 630	- 117
	3b), fee	Fee cap 3%	- 117	- 317	- 489	- 97
	4	Mutual recognition	251	244	308	192
	5	CCD fee cap 1%	- 88	- 542	- 888	- 71
Germany	1	Full contractual option	654	- 364	- 1,887	319
	2	Partial contractual option	352	- 155	- 909	180
	3a), asym	Asymmetric fair value compensation	51	54	69	40
	3a), sym	Symmetric fair value compensation	2	173	467	- 1
	3b). FV	Fair value compensation cap 3%	- 2,749	- 4,732	- 5,311	- 1,248
	3b), fee	Fee cap 3%	- 2,284	- 4,166	- 3,878	- 1,064
	4	Mutual recognition	640	- 13	- 965	324
	5	CCD fee cap 1%	- 3,688	- 7,284	- 8,861	- 1,606
Italy	1	Full contractual option	817	1,162	1,384	260
	2	Partial contractual option	705	1,119	1,437	215
	3a), asym	Asymmetric fair value compensation	593	1,075	1,489	169
	3a), sym	Symmetric fair value compensation	599	1,103	1,554	181
	3b). FV	Fair value compensation cap 3%	223	492	757	107
	3b), fee	Fee cap 3%	277	614	917	88
	4	Mutual recognition	823	1,223	1,534	288
	5	CCD fee cap 1%	309	430	620	249
Portugal	1	Full contractual option	66	81	83	30
	2	Partial contractual option	15	32	30	- 7
	3a), asym	Asymmetric fair value compensation	- 35	- 17	- 22	- 43
	3a), sym	Symmetric fair value compensation	- 35	- 15	- 18	- 42
	3b). FV	Fair value compensation cap 3%	- 101	- 108	- 132	- 82
	3b), fee	Fee cap 3%	- 97	- 98	- 119	- 81
	4	Mutual recognition	66	86	94	32
	5	CCD fee cap 1%	- 7	- 16	- 25	- 2
Spain	1	Full contractual option	229	146	174	184
	2	Partial contractual option	- 112	- 160	- 189	- 93
	3a), asym	Asymmetric fair value compensation	- 453	- 466	- 551	- 370
	3a), sym	Symmetric fair value compensation	- 457	- 459	- 529	- 373
	3b). FV	Fair value compensation cap 3%	- 908	- 1,085	- 1,300	- 679
	3b), fee	Fee cap 3%	- 876	- 1,015	- 1,209	- 666
	4	Mutual recognition	228	167	229	185
	5	CCD fee cap 1%	- 278	- 506	- 608	- 129
United Kingdom	1	Full contractual option	946	876	1,120	784
	2	Partial contractual option	595	555	708	493
	3a), asym	Asymmetric fair value compensation	245	234	297	202
	3a), sym	Symmetric fair value compensation	216	211	256	178
	3b). FV	Fair value compensation cap 3%	- 423	- 1,075	- 1,760	- 349
	3b), fee	Fee cap 3%	- 360	- 851	- 1,388	- 297
	4	Mutual recognition	929	873	1,116	769
	5	CCD fee cap 1%	70	- 1,060	- 1,988	56

Source: Finpolconsult.

Country-specific results, aggregation over four scenarios

We sort the case discussion by the cases' position on the option cost pricing – compensation / fee curve for reinvestment loss. For the ARM countries Spain, Portugal and UK we compare the results to the option cost pricing – compensation / fee curve for foregone intermediation profit, the dominant source of compensation / fee for these countries. Aggregation over the four scenarios is done by simple averaging.

We emphasise that using country cases rather than stylised ARM/FRM cases reduces visibility of the effects while enhancing realism of the results. Please refer to Fehler! Verweisquelle konnte nicht gefunden werden. for detail charts for each country case.

- Czech Republic: the status quo is de-facto contractual option applied to typically 5 year FRM. As a predominant FRM country, the Czech case shows the expected profile of consumer returns and lender profits. The least profit policy (highest return) option for lenders (consumers) is the symmetric fair value compensation. However, the highest social returns (by a narrow margin) can be achieved under this policy option in the grandfathering scenario, this hierarchy disappears if policy reforms are implemented immediately without grandfathering in favour of the status quo. The differences between the scenarios are less pronounced than in other FRM cases because of the lower interest rate fixing period (5 vs. 10 years as default). However, being situated at one extreme of the option cost pricing distribution, the maximum percentage change (to CCD implementation, policy option 5) is the largest of all cases.

- Spain: Spain is applying slightly above fair value compensations on both ARM and (post reform) also FRM. We observe similar correlations as in the FRM cases between consumer/lender return / profits. However, the symmetric fair value does not come out as the absolute best (worst) for consumers (lenders), as in the Czech case – lenders improve themselves while the consumer position deteriorates slightly. This is likely a result of the pricing assumptions for foregone intermediation profit, which in a competition scenario would be corrected over time. Total society returns hardly vary in both the grandfathering and the no grandfathering cases.

  We note here that the Spanish results will materially change with a future higher FRM share in the market, whose stimulation was a key intention of the 2007 reforms.

- United Kingdom: For the UK we assumed a higher non-callable FRM (here: hybrid ARM) market share than for Spain. Despite the fact that the initial fixing periods in the UK are short and hence changes are more moderate than in countries with longer fixed-rate periods, this somewhat distorts the results. However, for all metrics – consumer

return, lender profit and total society return – the same signs as in Spain are reached. Given our pricing assumptions, the fact that UK lenders need to price ARM foregone intermediation profit - as compensation in the UK is by law set to zero - does not materially affect their profit level. Also, the swings in lender-consumer redistribution originated with a departure to other policy options – fair value or a fee above fair value as in Spain (0.5%) are minor relative to the total economy.

- Germany: In the German case we obtain results that are comparable to the Czech case. The symmetric fair value policy option is optimal for consumers and least optimal for lenders. Lenders (consumers) could reap (suffer) considerable extra profit (loss) – especially in the no grandfathering scenario - if they could return to the full contractual option scenario. However, moving in the opposite direction to full option cost pricing is not optimal for consumers either as the additional pricing margin removes the benefits from reduced exercise costs. In other words, introducing a zero or low cap would lead to intra-consumer redistribution between those exercising the option and those not exercising the option. Assuming grandfathering the symmetric fair value compensation is slightly socially optimal.

- Denmark: the impact of legal transition materially affecting primarily non-callable FRM is cushioned by the high market shares of callable FRM and ARM, also the interest fixing periods of non-callable FRM are short. These factors and the central position of the Danish model on the option cost – compensation / fee line lead to very low absolute and percentage changes from the status quo. Non-callable FRM consumers are close to the optimum especially if reforms are introduced without grandfathering. Lenders might reap additional early repayment profit if the symmetric fair value compensation were abandoned in favour of higher option cost pricing and lower compensations; however, the product already exists in Denmark in the form of callable FRM. Under the assumed scenarios the Danish social return could slightly increase if the system moved to a contractual option, against a margin discount, but lenders would make a loss under this scenario compared to the status quo.

- Portugal: shows essentially the same patterns as Spain. Due to the dominance of ARM lending, the differences in permissible fee levels for FRM do not come out very clearly in the results. As in all cases with high ARM share, the percentage changes over the status quo are minimal only.

- Belgium: in Belgium, the status quo is at a high option cost pricing ratio which shifts the point of reference relative to Germany. Otherwise we observe very similar relations between the different policy options, the dynamics is somewhat reduced due to the higher ARM share (which also supports lender profitability as they can charge the same fees as in the case of FRM, which in the ARM case are

above fair value). The optimum for consumers is always the symmetric fair value policy option, although it is broadly at par with the status quo in the no grandfathering scenario. The social optimum is with the symmetric fair value policy option in the grandfathering scenario – results for no grandfathering are diverse.

- Italy: The Italian results are similar to the Belgian ones. The higher ARM share leads to lower overall sensitivity to the policy options and differences between the scenarios. As in the Belgian case the consumer optimum is the symmetric fair value compensation policy option, as is the social optimum in the grandfathering case.

Figure 36 Economy-wide NPV of benefits / costs of policy intervention in the area of early repayment (€ million) – individual case country results, grandfathering of pre-reform loan cohorts, deviation from status quo

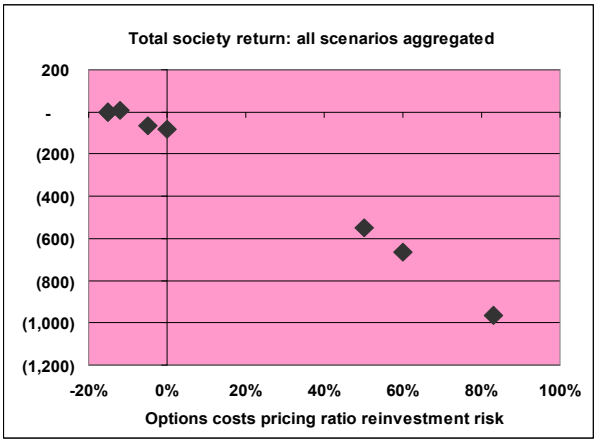
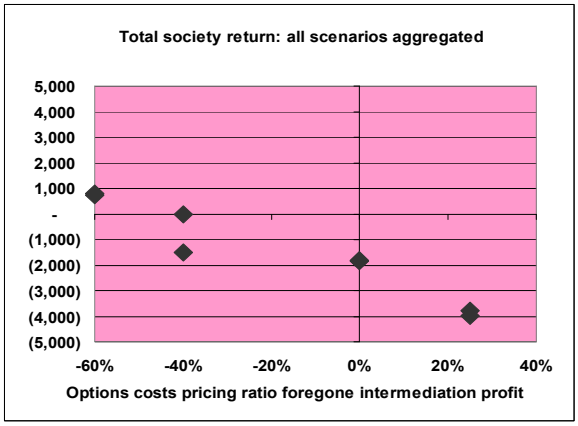
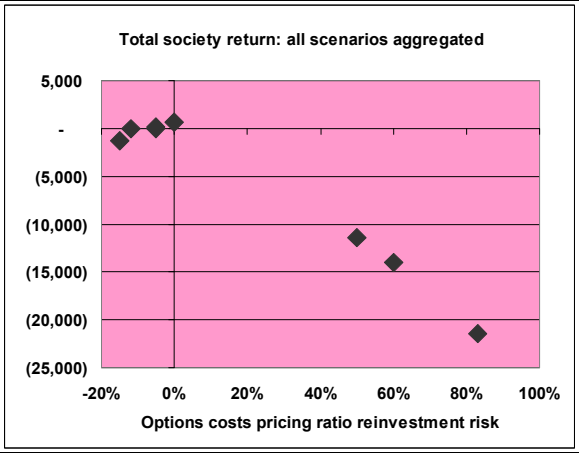
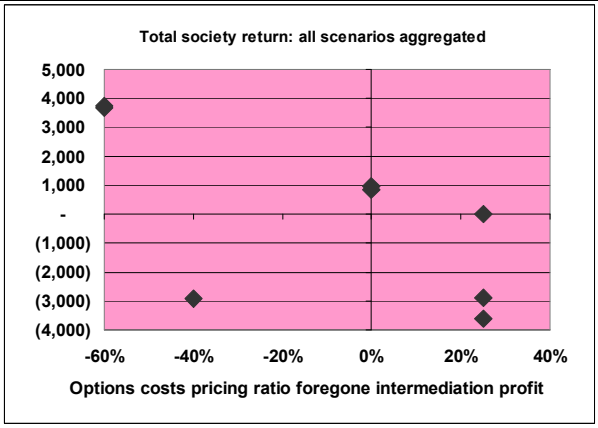
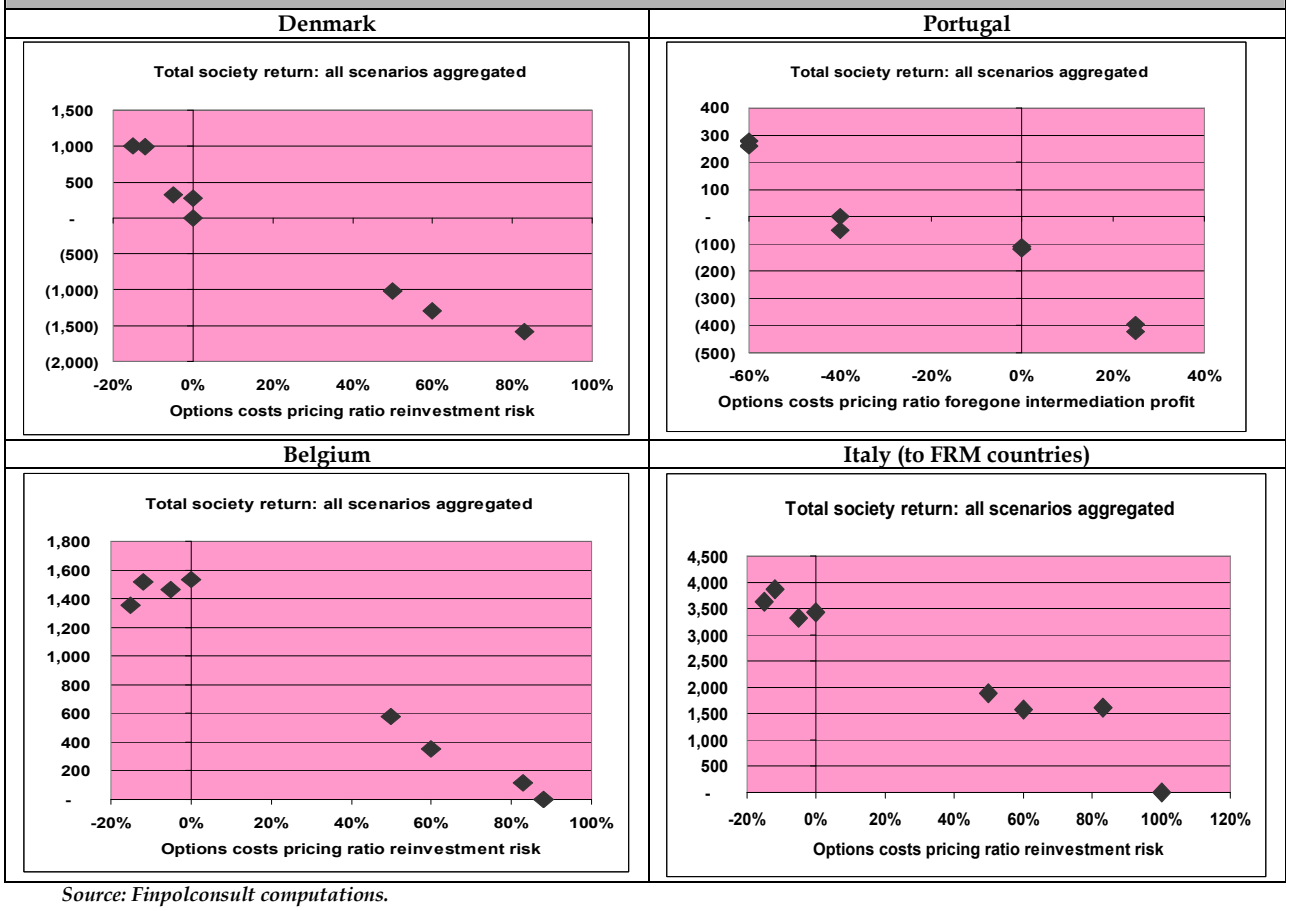
FRM countries (scale: option cost due to reinvestment risk)	**ARM countries** (scale: option cost due to foregone intermediation profit)
Czech republic	**Spain**
	
Germany	**United Kingdom**
	

Figure 36 Economy-wide NPV of benefits / costs of policy intervention in the area of early repayment (€ million) – individual case country results, grandfathering of pre-reform loan cohorts, deviation from status quo



Source: Finpolconsult computations.

1.7.7 Extrapolating to EU-27 for core stakeholders

Identification of country groups

The results from the detailed case studies are used to generate EU-27 results. To do so, we would typically use each country's distance from the policy frontier to generate an estimate of the NPV of the policy intervention for that particular country.

In the present case, we can regroup countries according to their proximity to one of the eight case countries. We broadly group countries with predominantly FRM products to the relevant cases (Czech Republic, Germany, Belgium) as we do with those using predominantly ARM products (United Kingdom, Spain, Portugal). This results e.g. in a high weight of the Belgian case, which represents also France and the Netherlands, or Germany,

which represents some Central and Northern European countries. This overlap is never perfect; however, we assume that differences to the policy frontiers cancel each other out. This assumption is supported by the fact that with 8 countries our detailed country cost-benefit analysis already covers a 4.1 trillion Euro submarket, or 67% of the EU mortgage market.

By using the information compiled in Table 3 and Table 4 we define the following country groups. The groups are sorted by the non-callable FRM option cost pricing ratios corresponding to their case country (see also Figure 37):

1. Group 1 – Czech Republic and all other transition countries not mentioned below as well as Cyprus;

2. Group 2 – Spain;

3. Group 3 – United Kingdom and Ireland;

4. Group 4 – Germany, Austria, Bulgaria, Estonia, Luxemburg, Sweden, Finland;

5. Group 5 – Denmark;

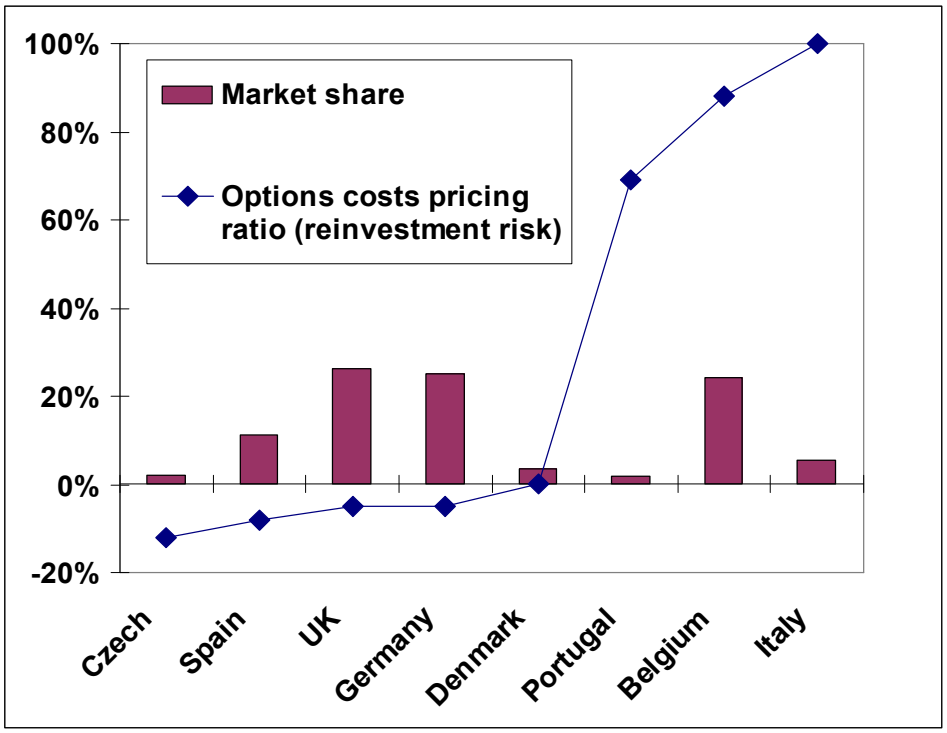
6. Group 6 – Portugal and Greece;

7. Group 7 – Belgium, Netherlands and France;

8. Group 8 – Italy.

Malta could not be allocated to a group since no legal baseline information was provided.

Figure 37 Market shares EU-27 allocated to case country groups, by reinvestment risk option cost pricing ratio



Note: jurisdictions sorted by non-callable FRM regulation, does not fully reflect overall option cost pricing distribution (e.g. Danish callable FRM market segment would be added to Italy bracket). For pricing assumptions, see Table 7.
Source: Finpolconsult computations.

The results of the extrapolation of the NPV by group of countries and type of policy intervention is provided in Table 10 for the case of grandfathering of the first loan cohorts. Table 11 summarises our results for the case of no grandfathering, i.e. when the existing portfolio on reform day January 1, year 2, is affected as well by the legal changes.

Table 10: Economy-wide NPV of benefits / costs of policy intervention in the area of early repayment (€ million) – EU-27 aggregation, deviation from status quo, GRANDFATHERING									
Country group	**0 Status quo**	**1 contractual option**	**2 partial contractual option**	**3a), asymmetric (partial) fair value compensation**	**3a), symmetric (full) fair value compensation**	**3b), asymmetric (partial) fair value compensation cap 3%**	**3b), fee cap 3%**	**4 mutual recognition**	**5), asymmetric (partial) fair value compensation cap 1%**
Group 1	64,040	0	-48	-97	-118	-970	-798	9	-1,404
Group 2	348,373	183	-138	-460	-454	-993	-942	202	-380
Group 3	859,395	1,026	648	269	237	-993	-797	1,015	-804
Group 4	851,449	-427	-178	72	214	-4,688	-3,804	-5	-7,159
Group 5	116,210	251	165	79	68	-324	-255	249	-397
Group 6	95,478	113	31	-51	-48	-184	-172	121	-22
Group 7	755,421	3,588	3,728	3,869	4,059	931	1,525	4,004	313
Group 8	164,210	912	875	837	865	398	477	974	405
Total	3,254,576	5,646	5,082	4,518	4,823	-6,824	-4,766	6,569	-9,449

Source: Finpolconsult analysis.

Table 11: Economy-wide NPV of benefits / costs of policy intervention in the area of early repayment (€ million) – EU-27 aggregation, deviation from status quo, NO GRANDFATHERING									
Country group	**0 Status quo**	**1 contractual option**	**2 partial contractual option**	**3a), asymmetric (partial) fair value compensation**	**3a), symmetric (full) fair value compensation**	**3b), asymmetric (partial) fair value compensation cap 3%**	**3b), fee cap 3%**	**4 mutual recognition**	**5), asymmetric (partial) fair value compensation cap 1%**
Group 1	64,040	-46	-37	-27	-52	-2,709	-2,163	9	-4,295
Group 2	348,373	-41	-208	-376	-282	-192	-837	78	921
Group 3	859,395	937	603	269	249	-2,669	-2,036	960	-3,782
Group 4	851,449	-7,021	-3,475	72	2,138	11,642	-2,125	-4,461	20,158
Group 5	116,210	239	167	95	71	-960	-727	247	-1,473
Group 6	95,478	32	-10	-53	-27	8	-157	66	310
Group 7	755,421	2,313	4,209	6,105	7,335	11,481	4,404	3,879	16,554
Group 8	164,210	737	962	1,188	1,371	1,939	934	971	2,752
Total	3,254,576	-2,850	2,211	7,273	10,803	18,540	-2,707	1,748	31,145

Source: Finpolconsult analysis.

Aggregation and findings by grandfathering / no grandfathering implementation forms

We proceed by aggregating the scenarios through an unweighted average. As we have pointed out before, this is a problematic procedure, and many alternative aggregation mechanisms are conceivable. For example, a consumer protection agency might pursue a 'Rawlsian' approach of weighting the scenarios with the greatest risks for the consumers (volatility) higher, a bank regulator might apply the reverse weight to the scenario with the greatest risk for lenders (depression).

After taking simple averages, we note the following findings:

- The decision whether to grandfather or not pre-reform cohorts leads to significant differences in the changes vs. the status quo. Understandably, changes vs. the status quo when no grandfathering is granted have the tendency to be inflated - by roughly factor 2; however they are not uniformly inflated by this amount, and for some policy options even signs differ.

- The absolute policy optimum for consumers in both cases – grandfathering and no grandfathering - is the symmetric fair value compensation, see Figure 39. In the grandfathering case it is followed by asymmetric fair value, mutual recognition and contractual option, in the no grandfathering case by the capped compensation or fee policies.

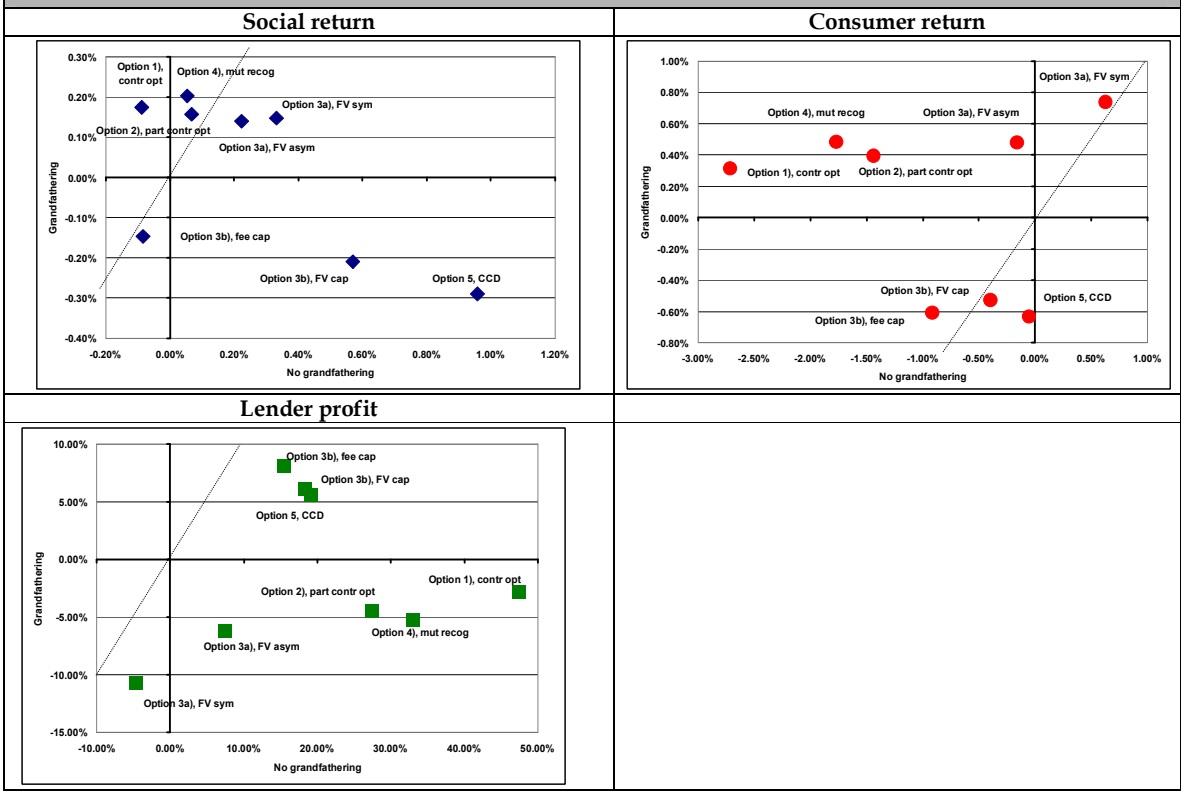
    - The reason for the former hierarchy is that if there is no grandfathering, prepaying consumers will be able to both save early repayment charges on existing loans and non-prepaying consumers will benefit from low interest rates, and vice versa. The hierarchy might disappear over time as loan pricing is adjusted to the new legal regime and the pre-reform cohorts disappear.

    - The result might be sensitive to different weights attached to capped compensations or fees, e.g. because of different weights attached to mobility, see discussion below.

- Lenders under grandfathering are able to keep their current option pricing policies for a while – see Figure 39 for the distribution - and hence are able to in parallel charge compensations and raise option cost when fees are capped. This makes fee caps appear favourable for lenders. Under no grandfathering lenders practicing contractual exclusion or other high fee options can immediately reap high early repayment revenues while losses and revenues from capped compensations cancel each other out. The most adverse policy option

for lenders leading to between 5 and 10% profit decline is the symmetric fair value compensation, followed by the asymmetric fair value compensation.

Figure 38 Economy-wide NPV of benefits / costs of policy intervention in the area of early repayment – EU-27 aggregation, deviation from status quo in % by grandfathering and no-grandfathering implementation forms



Notes: dotted line represents locus of equal deviations for both grandfathering and no grandfathering implementation options.
Source: Finpolconsult computations.

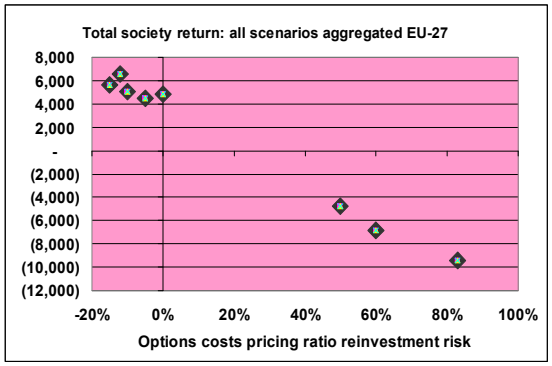
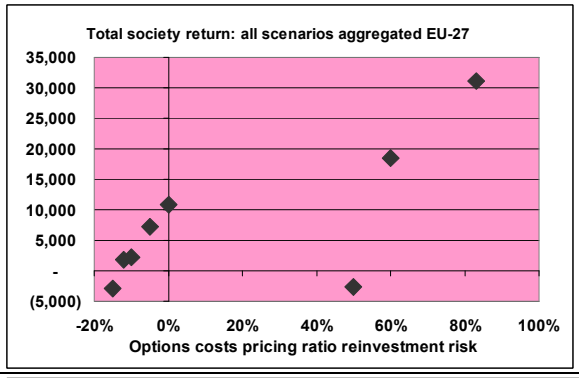
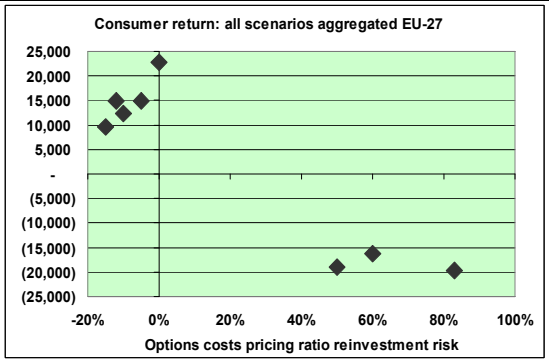
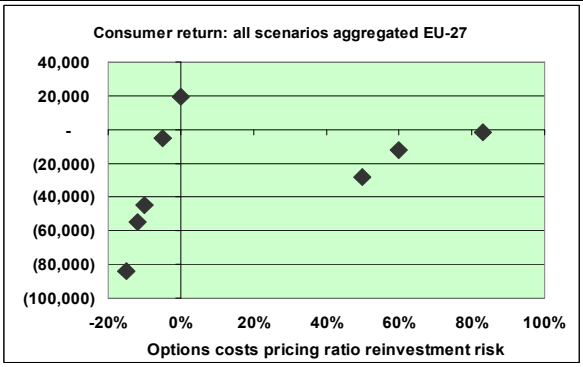
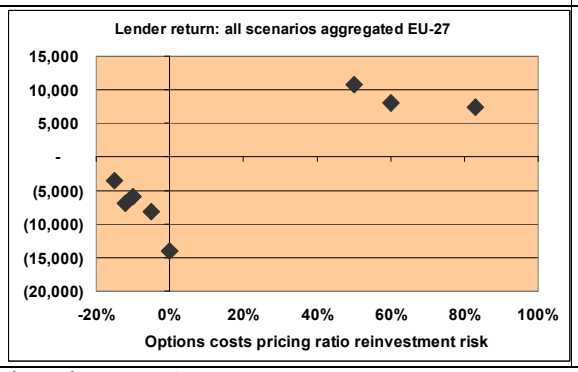
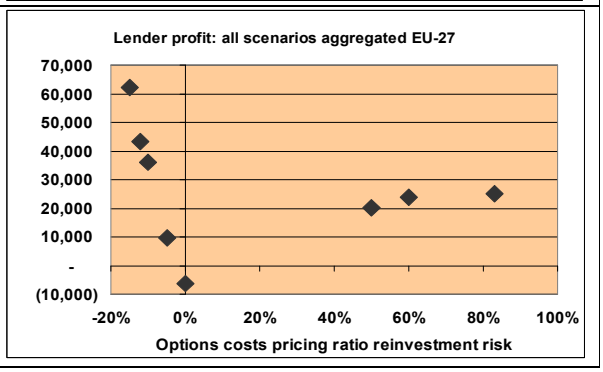
- The total society return is essentially the sum of both lender and consumer positions. It appears monotonic in the grandfathering scenario in favour of fair value compensations and high fee or contractual option models.

- Figure 39 shows the discrepancies between the policy options in the different implementation forms. Fair value compensations, mutual recognition and partial contractual option promise the greatest stability and positive returns in both implementation forms while

transposing the CCD or imposing tight fair value caps would lead to great swings between implementation forms.

- When interpreting the results it should be considered that the absolute changes for social return remain quite small – since simply loan pricing adjusts to a new policy option, and lender gains (losses) and consumer losses (gains) broadly cancel each other out.

Figure 39 Economy-wide NPV of benefits / costs of policy intervention in the area of early repayment (€ million) – EU-27 aggregation, deviation from status quo – simple averages over all scenarios

	Grandfathering	No grandfathering
Total society return		
Consumer return		
Lender profit		

Source: Finpolconsult computations.

Considering all stakeholder positions, we see thus our finding for Belgium discussed above confirmed for the EU-27 at large: fair value compensation policy options promise the least volatility in terms of necessary lender-consumer swings during transition from the status quo, of all options. The reason in the end is not so much to be it fair value nature – lenders being confronted with higher or lower statutory compensations or fees will adjust loan pricing – but the fact that it lies in the middle of all policy options concerning the pricing hierarchy, and thus minimises lender-consumer swing. In other words, the fair value policy options promises to minimise the political costs of establishing agreement between different European Member States.

Administration costs

Lenders in the surveys repeatedly pointed to differences in administration costs between applying fee versus (actuarially determined) compensation policies. A quantification would improve somewhat the cost-benefit balance of the fee models, which do not require detailed computations and discussions with consumers. However, since these administration costs are distributed across the entire curve (e.g. UK, Belgium) and the policy options do not differentiate between the fee versus compensation approaches we cannot find a systematic impact on the cost-benefit positions of the policy options. Moreover, while we find the arguments made plausible, we have no data substantiating the size of the cost advantages of a fee model.

Other potential lender administration costs in relation to the policy options are negligible.

1.7.8 Quantitative impacts: customer mobility

Customer mobility is the only of the four other areas of analysis for which we feel comfortable with drawing at least partial quantitative conclusions.

Alternative customer mobility assumptions (non-financial prepayments) in the simulation model

The main instrument that we can use in the simulation model to describe the impact of alternative customer mobility assumptions is the non-financial prepayment rate, which in practice to a large extent can be expected to reflect movers. We double our assumption from a 3% non-financial prepayment rate to 6%.

We expect ex-ante that higher mobility will lead to a smaller sensitivity of early repayment demand to interest rate signals, i.e. lower consumer returns (higher interest rate burden and compensation / fee payments) and higher lender profits.

Table 12: Policy options under different mobility assumptions (3% vs. 6% non-financial prepayment rates) in million €, % change from status quo

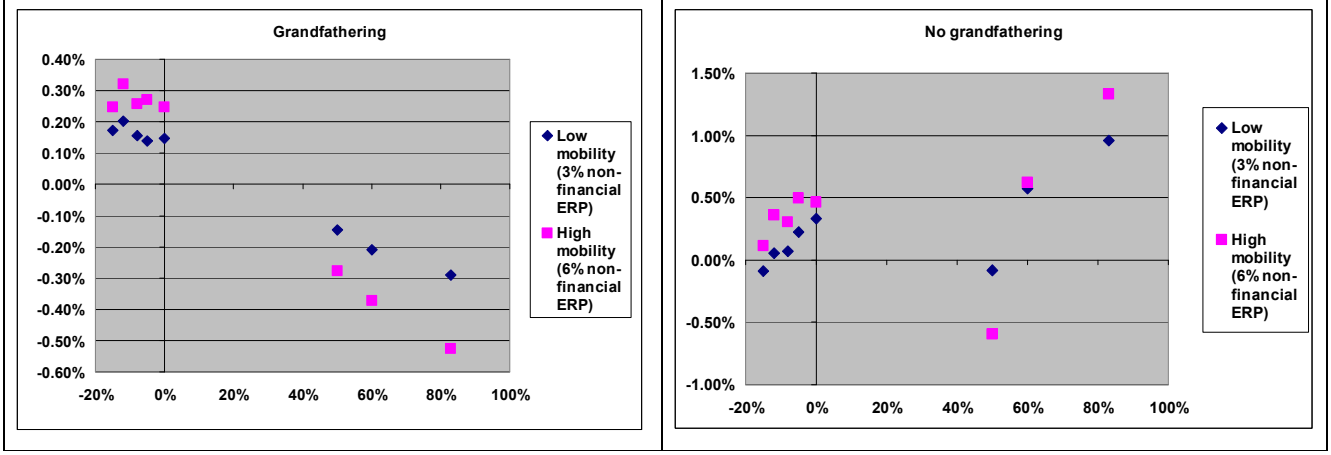
Mobility	Policy option	Low mobility (3% non-financial ERP)		High mobility (6% non-financial ERP)	
Grandfathering		abs.	percent.	abs.	percent.
Full contractual option	1	5,646.13	0.17%	7,449.08	0.25%
Mutual recognition	4	6,569.25	0.20%	9,734.41	0.32%
Partial contractual option	2	5,082.19	0.16%	7,806.65	0.26%
Asymmetric fair value compensation	3a), asym	4,518.25	0.14%	8,164.21	0.27%
Symmetric fair value compensation	3a), sym	4,822.53	0.15%	7,507.41	0.25%
Fee cap 3%	3b), fee	-4,765.99	-0.15%	-8,418.22	-0.28%
Fair value compensation cap 3%	3b). FV	-6,823.65	-0.21%	-11,305.26	-0.37%
CCD fee cap 1%	5	-9,449.22	-0.29%	-15,920.20	-0.53%
Status quo level		3,254,576.11		3,026,297.73	
No grandfathering					
Full contractual option	1	-2,849.96	-0.09%	3,502.64	0.12%
Mutual recognition	4	1,748.46	0.05%	10,886.21	0.36%
Partial contractual option	2	2,211.42	0.07%	9,226.16	0.30%
Asymmetric fair value compensation	3a), asym	7,272.80	0.22%	14,949.68	0.49%
Symmetric fair value compensation	3a), sym	10,803.02	0.33%	14,049.16	0.46%
Fee cap 3%	3b), fee	-2,706.78	-0.08%	-18,073.43	-0.60%
Fair value compensation cap 3%	3b). FV	18,540.19	0.57%	18,779.61	0.62%
CCD fee cap 1%	5	31,145.04	0.96%	40,304.96	1.33%
Status quo level		3,254,576.11		3,026,297.73	

Notes: Policy options sorted by option cost pricing ratio, see Table 7.
Source: Finpolconsult computations.

The first effect of higher mobility is an overall reduction of social return. The reason is that greater insensitivity to the interest rate situation leads to collectively non-rational prepayment decisions. This is from the isolated perspective of the mortgage sector, of course: labour market output may increase more than any losses incurred in the mortgage sector.

The second effect, which comes out clearer in the charts of Figure 40 is an enhancement of the variance of the social returns for the policy options. The greatest variance is reached in the CCD policy option 5 (grandfathering) and the fee option (no grandfathering). As before, the least variance policy option is symmetric fair value compensation (policy option 1-3a), symm).

Figure 40: Policy options under different mobility assumptions – deviation of social return from status quo in %



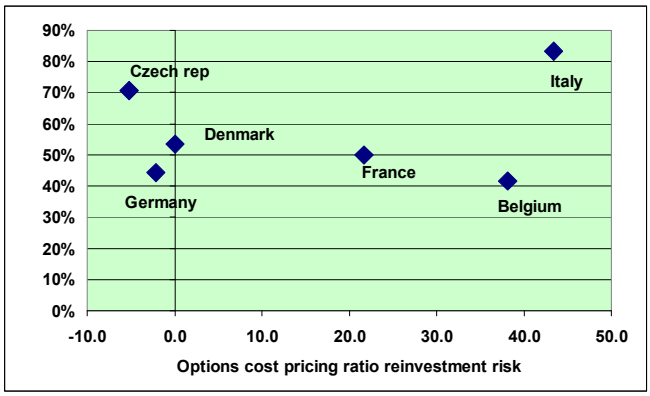
Notes: Policy options sorted by option cost pricing ratio, see Table 7 for detail.
Source: Finpolconsult computations.

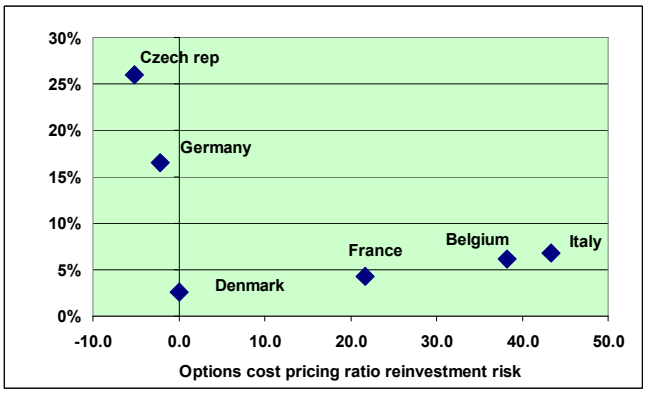
Some quantifications from the Eurobarometer survey results

As before we correlate consumer survey results from Eurobarometer survey concerning switching of mortgage providers, this time with the option cost pricing – compensation / fee level curve of Table 7. Figure 41 shows the result of this exercise for two different questions posed by Eurobarometer to consumers for a selection of countries. In **Fehler! Verweisquelle konnte nicht gefunden werden.** we present regression results for 21 countries for the entire set of responses made in Eurobarometer (2009b).

Figure 41: Customer mobility from Eurobarometer survey results and early repayment legal regime by option cost ratio (country cases) in FRM countries

Failed and difficult switching attempts in the past two years*	Current mortgage contract makes switching difficult





Notes: Policy options sorted by option cost-pricing ratio, see Table 7 for detail. *households indicating difficulties to switch, failed attempt to switch, and non-attempt to switch because of difficulties divided by all households minus households who did not try to switch because they were either not interest or did not switch for other, unspecified reasons.
Source: Eurobarometer (2009a, Q3 on p.48 – l.h.s.) and (2009b, table 19a – r.h.s.,. Finpolconsult computations.

The questions about failed and difficult switching attempts yield broadly a slightly negative correlation with the amount of prepayment protection imposed via the legal regime; a large mortgage market such as Germany appears to look favorable when no differentiation is made between e.g. between switching upon scheduled interest rate adjustments and prepayments. Consumer perspectives of difficulty in Italy appears high likely as a result of the historic difficulties for consumers to prepay that only the 2007 law changed, which may affect ongoing perceptions.

When specifying the question to specific switching problems due to the nature of the contract – see right-hand-side of the figure - ambiguity of the response is diminished. The countries practicing partial contractual option (Germany) and contractual option (Czech Republic) show far higher shares of negative consumer perception than those with universal prepayment option. Transition countries in general excel in the survey with the highest levels of switching problems associated with contractual issues, which correlates with the high incidence of contractual exclusion and above fair value compensation fees and generally the recency of consumer protection legislation in the region.

Interestingly, though, there is almost no difference in consumer perception between the symmetric fair value compensation case Denmark and the low and zero compensation or fee cases Belgium and Italy. Italy appears more in

line with expectations of facilitating mobility now, which was the intention of the 2007 reforms. The Danish system, although it may feature substantial levels of compensation, seems to be seen as facilitating switching from a contractual perspective.

Our regressions in Chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** confirm these results – the impact of the early repayment right on mobility are far more significant than the impact of compensation / fee caps. The regressions also reveal that awareness of the switching (early repayment) option is more limited in cases where no universal right is given. We comment that this is likely due to generally low awareness of switching options in transition countries where simultaenously the early repayment right so far is only weakly legally configurated.

1.7.9 Dynamic dimensions: pricing and product diversity, financial and house price stability

The first important dynamic response to any policy intervention chosen will be direct pricing changes along the lines of the option cost – compensation / fee curves defined in Table 7. Any statutory reduction in compensation along that curve will lead to higher pricing, and vice versa.

The curve itself will vary in slope depending on market conditions, interest rate volatility, astuteness and education levels of consumers and other factors, which themselves may vary over time. For example, in the US, in the middle of the 1990s lenders began to compete more strongly over borrowers willing to prepay as intermediaries had begun to raise awareness of the existence of the option in mortgage contracts.[48] Such an event would raise the slope of the curve. Vice versa, lower interest rate volatility would lower the slope of the curve.

A second dynamic response to interventions directly related to the first could be demand changes for products. The non-callable FRM offers a mezzanine interest rate risk protection level between callable FRM and ARM, and pricing changes might push demand to either alternative. We have discussed the Danish case above. Elsewhere in Europe, we have so far seen far lesser swings between essentially non-callable FRM and ARM products, with the exception of some smaller markets such as Belgium, Denmark and Greece. This justifies our decision to not model such a second round impact, however, it could exist and it could materially reduce the cost-benefit balance especially of those policy options that tend to turn the non-callable FRM into a callable FRM (policy options 5, 3b).

[48] See discussion in Dübel and Lea (2000) which compares the US, France, Germany, the UK and Denmark.

The third important dynamic dimension are changes in the funding and risk management approach of lenders needed to support a certain policy option, and the associated changes in the relative cost-benefit distance of the option socially due to the possibility of financial crisis. A banking crisis resulting from mis-adjustment of the funding menu to a new policy setup would pull social return of an otherwise optimal solution into negative territory by reducing the mortgage supply and raising government costs via bank bailouts after financial crises.

- The classic example in the EU is the crisis of the French non-callable mortgage bond in the early 1980s after the 1979 Scrivener law had essentially rendered all mortgage loans callable – policy option 3b) fee model. In the subsequent years, French lenders ran into so-called 'negative maturity transformation risk', i.e. the risk that in a falling interest rate environment, which was characteristic for the early 1980s, the duration of bonds exceeded substantially the duration of loans. This resulted in considerable lender losses. By 1984 the mortgage bond product had to be abandoned as a funding in, and since French lenders have primarily financed callable mortgage loans through short-term deposits.

- Funding mortgages through short-term liabilities may provoke the reverse problem, of 'positive maturity transformation risk', when interest rates rise and loans extend their durations. This was a key factor leading to the US Savings and Loan debacle in the 1980s.

- These factors mean that especially specialised banks operating on a matched funding basis are put at a disadvantage, unless they can come up with an efficient transfer mechanism of the prepayment risk to investors (e.g. through callable bonds, as in Denmark). Using the swap markets is often not an option since pricing there depends highly on the liquidity situation of a narrow list of counterparts. However, also universal banks would have to adjust their asset-liability management considerably and resort to greater use of complex products, e.g. derivatives, to manage the prepayment risk.

A fourth aspect is the feedback effects of policy interventions on house price volatility. Callable FRM and ARM due to their short durations and high 'pass-through' of falling interest rates may lead to higher house price volatility than non-callable FRM. The implication is that monetary policy influences a substantial part of the lending market directly, with all positive (greater effectiveness) and negative (subjectivity to political manipulation) ramifications.

In contrast, policy options supporting non-callable FRM such as fair value compensation schemes have certain default implications and might in the extreme case – i.e. if no time limit is imposed - lead to systemic inability to prepay and the need for a public bailout (see Danish case discussed on page

51). In case of selecting symmetric fair value compensation model an additional risk could lie in mismatches of benchmarks and funding instruments chosen, as discussed above. Proper implementation of reforms in the calculations presented before requires parallel changes in consumer protection and bank regulation.

The survey results and the stakeholder consultations confirm these qualifications. We are unable to quantify additional cost-benefit dimensions arising from changing lender insolvency risk profiles and fundamental supply changes or changing product preferences and fundamental demand changes in this study. However, the above computations have given some insight about the dynamic trade-offs as far as a normal supply curve of interest rate risk protection and the related price, option cost, are concerned.

1.7.10 Winners and losers by policy option

We summarise our above findings by policy option.

Policy options 1, 2, 4: full and partial contractual option, mutual recognition

Lenders

We have shown that in the short-term if lenders could switch immediately to potentially excluding early repayment via the contractual option or partial contractual option or via a mutual recognition channel (no grandfathering) they could reap a substantial windfall, even though they would offer partly substantially cheaper loans. However, this is no longer the case – in the European aggregate and given our scenario assumptions – in the case of grandfathering.

Specialised lenders would benefit most from the policy options as they could stabilise their matched-funding asset-liability management model. All lenders would benefit from higher customer retention and suffer from lower contestability of domestic and cross-border markets.

In the long-term, a relative price adjustment is likely to level out any excess lender profit. The overall long-term result is a substantially lower credit margin and greater customer retention and lower overall competition dynamics (the lower margin is a result of lower costs, not competition intensity).

Consumers

For consumers the mirror picture arises, they would lose in the short-term if lenders could switch immediately to a contractual option or mutual recognition and gain moderately in the case of grandfathering, supposing all price effects to materialise as detailed above.

Consumers would lose in terms of mobility and likely also product diversity, but generally gain by reduced credit costs.

Further and far more detailed modelling than what is within the scope of this study of different consumer groups would probably yield that negative consumer net benefits for the mutual recognition and contractual option policy options would increase if consumers with unstable incomes or high-interest loans would be taken separately into account. Both groups rely on high product diversity and mobility.

Intermediaries

Intermediaries will suffer from greater retention by lenders and be the losers of this policy option.

Government

Government will suffer in from lower customer mobility and possibly higher default risk, but will gain from greater financial stability – as lender cash flows are more stable - and lower bailout costs.

Policy option 3b, 5: universal right with capped compensation or fee / CCD transposition

Lenders

Lenders would moderately gain in transition if they were able to fully roll over the additional option cost to consumers.

The ability to roll over option cost will depend on the amount of additional competition that higher prepayment speeds bring, however, we do not assume that effect to be large in the long-term although lenders might continue to cross-subsidise mortgages in some jurisdictions.

In the long-term also excess profits will be levelled out through lower option cost. Since more complex funding instrument have to be used to price the option, callable bonds, derivatives and/or a complex-to-design funding mix strategy, there may be some additional funding costs, e.g. in the form of liquidity costs or higher costs for financial expertise. Also, a permanent risk premium might exist as lenders unable to complete hedge themselves face increased insolvency risk. Inside the lender community, specialised lenders unable to do so will be the losers (however, as the Danish case shows, investors can take the place of lenders as investors in the prepayment option).

Consumers

Consumers will be forced to buy the option and hence lose in the short-term and in the long-term face increased credit costs. As the non-callable FM

disappears, although default risk declines as callable FRM are more used, a possible switching reaction might be to greater use of ARM, which implies greater default risk.

Against these costs and risks, consumers gain in greater financial mobility. Apart from strongly negative effect of removing the non-callable FRM product there might be counteracting effects on product diversity through greater competition and cross-border lending.

In the end, however, enforcing the purchase of the option is a pooling of different consumer groups, and the question of matching with needs arises. Consumers with high propensity to prepay are not generally in need of greater flexibility, to the contrary: those with high degree of financial astuteness or good chances on the labour market are likely to be overrepresented among those prepaying. By the same token, where prepayment would truly socially matter, e.g. in high-interest rate lending to sub-prime risks, the likely choice will be ARMs due to the option cost effects.

Intermediaries

Intermediaries will generally be the winner of higher market turnover, i.e. options leading to higher prepayment speed.

Government

Government will benefit in some dimensions from greater customer mobility, but will suffer from greater financial instability as a result of lender funding problems and higher use of ARMs.

Policy option 3a: universal right with fair value compensation

Lenders

Fair value compensations are a double-edged sword for lenders. While they allow for keeping the non-callable product, and this would in particular keep specialised lenders issuing non-callable bonds in business, they are also the least profit options recorded in our simulation in the short-term, especially the symmetric version.

However, an advantage is that these options lie in the middle of the option cost – compensation / fee level curve and therefore carry the lowest adjustment cost for lenders. The fact that simple bond instruments can be used to fund the non-callable FRM may add moreover to system stability. In the case of symmetric compensations lenders would have to add to their loan pricing and funding infrastructure, e.g. by suitable bond instruments (Danish type of mortgage bonds subject to the balance principle) or alternative pricing benchmarks.

Consumers

The absolute cost-benefit optimum for consumers in both cases – grandfathering and no grandfathering - is the symmetric fair value compensation, which strikes a compromise between sufficient mobility, product diversity and costs.

In neither of these dimensions cost-benefit is individually fully optimised, however, consumers under these options should be able to self-select between products and chose greater mobility assuming that the callable FRM product is offered. There are signs that the market is doing so in larger Member States (esp. Germany), however, probably more needs to be done on the regulatory side to stimulate the product (e.g. bank capital requirements).

Asymmetric compensations come in with some distance, they burden in particular consumers forced to move or prepay if interest rates have increased.

Intermediaries

Intermediaries will benefit from the universal option, but suffer from lower prepayment speeds.

Government

Government will benefit from a compromise between customer mobility and financial stability.

1.8 Conclusions

Legal baseline

We have identified the early repayment legal regimes in the EU and gone through a verification phase of these regimes with local regulators. We feel comfortable with concluding that almost all EU Member States grant a universal prepayment option for FRM and the remainder can be explained by legacy effects of covered bond systems and lack of legal development in transition countries. In the case of ARMs, Europe practices a universal option de-facto everywhere.

A broad majority of Member States also makes a reference in legislation to either general principles of fairness, objectivity, reasonability or specific costs incurred by lenders that can be interpreted in the way of a 'fair and objectively justified compensation' that the policy options refer to with regard to early repayment compensation or fee levels. However, in most legislation we miss clear guidance towards nature and form of computation formulae,

and where such formulae exists no two pieces of legislation use the same approach.

In terms of levels of compensations for FRM, more specifically lender reinvestment risk, that are legally permissible, Europe is divided into three models: uncapped ex-ante fees – with a tendency of permitting above fair value levels transition countries, fair value compensations in Denmark, Germany and a few other Central and Northern European countries, and tight ceilings imposed on compensation levels in Western and Southern Europe (with the notable exception of the UK and Ireland). Surprisingly, legally such ceilings often appear as fee ceilings, which implies above fair value compensations when interest rates have risen (France, Belgium). Spain is an exception with her recent reform move back to fair value compensation levels for FRM.

In terms of compensation levels for ARM, more specifically foregone intermediation profit as ARM has very limited reinvestment risk, no clear pattern can be observed. Countries that tightly limit reinvestment risk-related compensations appear above fair value with regard to foregone intermediation profit (Belgium) and vice versa (Denmark).

Conceptual framework and empirical review

We discuss a broad set of microeconomic concepts available to analyse lender and consumer cost and benefits in the areas of early repayment right, compensation formulations, and transactions costs.

We also use a detailed empirical review to derive an option cost pricing – compensation or fee level curve that is the basis for the cost benefit analysis. We conclude from this that the early repayment option at zero compensation level can be assumed to have a cost in the range of 45 basis points in Europe, assuming the Euro area, a 10-year interest rate fixing period, and a functioning market of investors in products carrying the option. This figure contains only a small margin for foregone intermediation profit and is largely a result of reinvestment risk loss faced by long-term lenders or investors.

Our main substantiation for these figures are observations from the Danish mortgage market, which as a purely capital market based system has the least biased pricing structure of all European markets. However, we also use data from other European markets, including analysis by rating agencies and lenders.

We note that the market for callable FRM that contain the full option pricing has run into difficulty during the financial crisis, and regularly also after earlier spells of high prepayments, which raises the question about a broader strategy needed to ensure that FRM without compensation and option pricing are offered in the European markets (e.g. via capital requirements).

Our second empirical point of reference needed for the cost-benefit analysis is the zero option cost point, which is reached when symmetric fair value compensations can be charged since this is the only compensation approach that fully eliminates lender reinvestment risk (and mutatis mutandem foregone intermediation profit).

Almost all EU compensation formulae – with the exception of Denmark – however only establish a partial fair value compensation, i.e. fair value only applies when interest rates fall. When interest rates rise, the lender stands to make a reinvestment profit, which we translate into the assumption of a small margin discount given under such 'asymmetric' regimes.

Similarly, the regimes that limit compensation or fee between the two reference points of zero and fair value compensation or fee lead to higher interest rates via additional option cost. In the cases where the fee model is applied those cost are moderated by a small embedded discount in order to compensate for possible lender reinvestment profit (when interest rates have risen).

We also micro-economically analyze the policy option removing the universal early repayment right and introducing an unconditional contractual option and define it as a case where an arbitrary fees is charged for an early repayment as the result of a negotiation between lenders and consumers. In this way the concept is operationalised for the cost-benefit analysis. We proceed similarly with the mixed concept of an early repayment right in 'certain circumstances' (or conditional contractual option).

When looking into interactions between the early repayment regimes and consumer confidence we find in particular greater confidence in FRM than in ARM countries, the latter with more volatile house prices. Inside FRM countries, problems with financial mobility may reduce confidence, to an unclear extent however. We also empirically support the conjecture that the universal option increases customer mobility and contractual exclusion diminishes it. We then find that product diversity will decline with the scale of intervention into prepayment compensations or fees, but that competition dynamics run in the reverse direction modifying the impact somewhat. We finally see any harmonisation as supporting the cross-border market.

Cost-benefit analysis results

We limit the analysis to the microeconomic costs and benefits for stakeholders in the mortgage market, consumers, lenders, intermediaries and government. Our main tool is the option cost pricing – compensation / fee level curve for reinvestment risk and foregone intermediation profit defined based on the empirical evidence. Consumer mobility is addressed by assuming changing levels of non-financial prepayments.

We first analyse Belgium and Germany as two countries whose example can be taken to demonstrate almost all transition effects of the policy options. We show a few results that defy common wisdom: for example German lenders outside a depression scenario can improve their profit levels when confronted with a zero compensation fee; the crucial assumption here is that lenders may be able to charge an options premium commensurable to rising costs. Belgian consumers might similarly benefit under the most likely economic scenarios going forward from moving to a partial fair value compensation as in the German case where they can avoid the fee that Belgian lenders charge when interest rates have risen. Lender profit across the board tends to decline and consumer benefits to increase when moving to symmetric fair value compensation as practiced in Denmark.

We also show with an example that mismatched lending – the remedy of the past two decades to counter the declining asset maturities of FRM when prepayments occurred in such countries as France or Belgium – is an increasingly dangerous strategy in a rising interest rate environment. So, financial regulators should have an interest in supporting matched lending (which speaks in favour of fair value compensations) and in general co-ordinating their efforts with consumer protection reforms. In fact, there is danger that policy options that de-facto eliminate the non-callable FRM lead to follow-up problems with regard to more complex funding instruments and greater use of ARM by consumers, which was the case in the US.

When enhancing our analysis to the full set of eight case countries, eight policy options (expanded by further differentiating two of the original five and adding the status quo) and four economic scenarios we confirm the basic findings reported for Belgium and Germany.

As we have ranked both cases and policy options on the option cost pricing – compensation / fee curve our result is that any departure from a given model primarily results in a redistribution between lenders and consumers; intermediary and government positions play a minor role in the cost-benefit analysis in the early repayment case. The mentioned redistribution may result in large swings, for example in the case of the Czech Republic practicing an above fair value model, or the case of Italy where a zero compensation model would have to be given up in favour of higher compensations under all policy options except the unlikely sub-case of a zero cap. Hence, the policy options located in the centre of the curve – symmetric and asymmetric fair value compensations - show the least swing if EU-27 is taken into account. This finding also holds when we vary the scenarios (scenario weightings) or grandfathering assumptions.

Clearly, however, within that subset, the symmetric fair value compensation excels. Symmetry is an issue when interest rates rise, even though fewer households will prepay. But even under predominantly stable interest rate trends to be expected going forward (and dominating our scenarios), the issue of symmetry is becoming more important than in the past, as situations

of lender reinvestment profit will increasingly occur. For consumers using the non-callable FRM product the policy option represents an absolute optimum in our cost-benefit analysis; for lenders it does not, however, and means some adjustment of option cost pricing and also institutional / regulatory setup.

With regard to the early repayment right and equivalently above fair value fee models the outcome is somewhat arbitrary. Unless the competitive situation changes to the worse, general loan pricing discounts will compensate consumers in the aggregate for higher fee levels paid, and in our model both go into the same pool of aggregate costs and benefits. However, the identity of consumers willing to prepay will matter here more than with other policy options: if prepayment is denied or made very expensive for consumers locked in high interest rate contracts or for consumers with unstable incomes default and high social follow-up costs might be the result. Such effects are impossible to quantify with accuracy within the scope of this study, as their scale might also change swiftly with small changes in the fringe conditions, such as higher price and interest rate volatility, or a reduced supply of rental housing as the main alternative.

What we can say from the analysis, however, is that removing some of the potentially most adverse practices for those groups on that part of the option cost pricing – compensation / fee curve will not materially affect overall social welfare in the aggregate. Provided, that is, if the fair value principle for compensations remains preserved as an anchor for zero prepayment option cost (which speaks for maximum harmonisation of the compensation / fee elements of the policy options), and if sufficient regulatory safeguards are put in place to contain potential lender stability problems, especially for the matched-funded.

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