

## AGENCY FIXED RATE PREPAYMENT MODEL UPDATE

### Adjustments for HARP and TPO

October has been an interesting month for agency prepayments, especially for IO investors, who may feel like they have experienced three ancient Chinese curses: “May you live in interesting times”; “May you come to the attention of those in authority”; and “May you find what you are looking for”.

First, the October 6 prepayment report showed faster-than-expected prepayment speeds on some lower-coupon conventional cohorts. This caused the offending coupons to underperform their hedges markedly. Soon after, the focus shifted to potential changes that the administration/FHFA might make to the Home Affordable Refinance Program (HARP). Then, on October 24 the market got what it had been looking for over the past several months: clarity on changes to HARP. The latest event has caused further re-pricing and underperformance of higher coupons. Against this backdrop, we will release an update to the agency prepayment model at the close of business on Friday, October 28. We believe the update addresses all the aforementioned issues.

When we released our latest prepayment model, in March 2011, we promised to respond quickly to any changes in the prepayment landscape by introducing a Production-Beta model. This model update will not affect the production/default model (used to calculate index durations) on Barclays Capital Live. Users will have to explicitly choose this model in the preference page to access it. The key updates to the model include the following:

- Incorporating the prepayment impact of changes to the HARP program.
- Adding third-party originations (TPO) as an additional factor affecting model prepayment projections.
- Eliminating most of the differences in prepayment performance across securities issued by Fannie Mae and Freddie Mac.
- Running the FHA and VA portion of GNMA pools as separate aggregates.
- Updates to the primary-secondary spread model.

We should get more clarity on the implementation details of the HARP changes next month. At that point, we will revisit the assumptions made in this release and make any necessary adjustments. The production model will be updated only after we have seen all the details of the new program and are comfortable that we have adequately addressed them.

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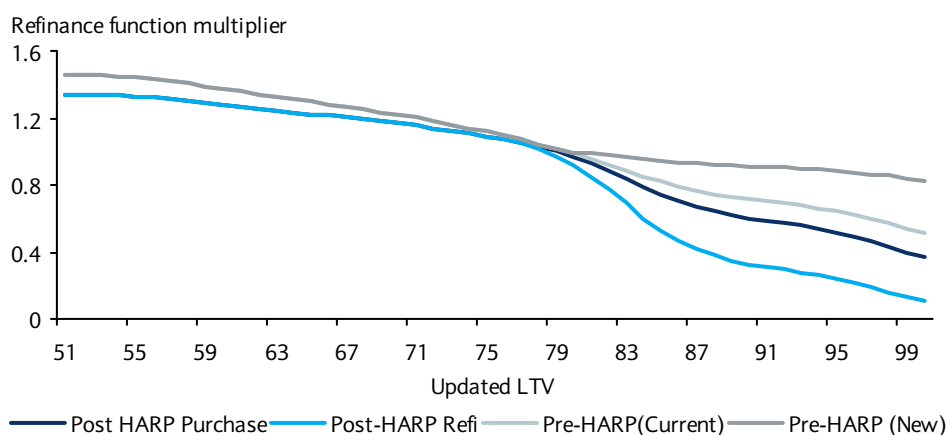
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## Model updates to incorporate the changes to HARP

From a model perspective, the changes to HARP fall into four categories: 1) the increased use of AVM in place of appraisals and the elimination of the 125 LTV cap; 2) harmonizing the HARP program across the GSEs and streamlining the refinancing process; 3) decreases in LLPA and refinancing costs; and 4) more widespread availability of mortgages for lower-credit borrowers.

The equity position and HARP eligibility of borrowers substantially alter their prepayment performance. In the conventional model, we use a combination of updated LTV, HARP eligibility and loan purpose to duplicate this behavior. Figure 1 shows the change in refinancing efficiency (i.e. refinancing function multiplier) conditional on Updated LTV. The increased use of AVMs is likely to make the mark-to-market LTV of the loan less of a friction in refinancing a borrower. We address this in the model by increasing the refinancing efficiency of HARP-eligible borrowers with mark-to-market LTV greater than 80 (Pre-HARP (New) in Figure 1).

**Figure 1: Changes to the HARP program alter the effect of updated LTV**



Source: Barclays Capital

The streamlining of the refinancing process by providing more clarity on rep and warranties, income documentation and debt-to-income ratios is likely to increase the number of servicers participating in HARP. However, we do not expect any of these changes to have a material impact of on the prepayment performance of servicers, such as Chase, that have already adopted HARP. The wider adoption of HARP should increase the efficiency of the HARP program. When we released the new conventional model in March 2011, we had already assumed that with the passage of time more servicers would adopt HARP and that HARP efficiency would increase<sup>1</sup>. For the most part, this expectation has not materialized, causing model projected prepayments to be elevated relative to actual prints. With this new initiative, we expect HARP efficiency to align more closely with our model. Absent this new initiative, we would have had to reduce HARP efficiency in our model.

The model explicitly accounts for LLPA and closing cost. Users have the option to turn off LLPA and decrease the closing cost in the preference page. In this update to the model we have not made any changes to closing cost or LLPA. Although there has been some discussion that these costs are likely to decline, at this stage we do not know what the

<sup>1</sup> For more details please refer to page 18 of the publication Inside Mortgage Valuations – A guide to models, published on March 18, 2011.

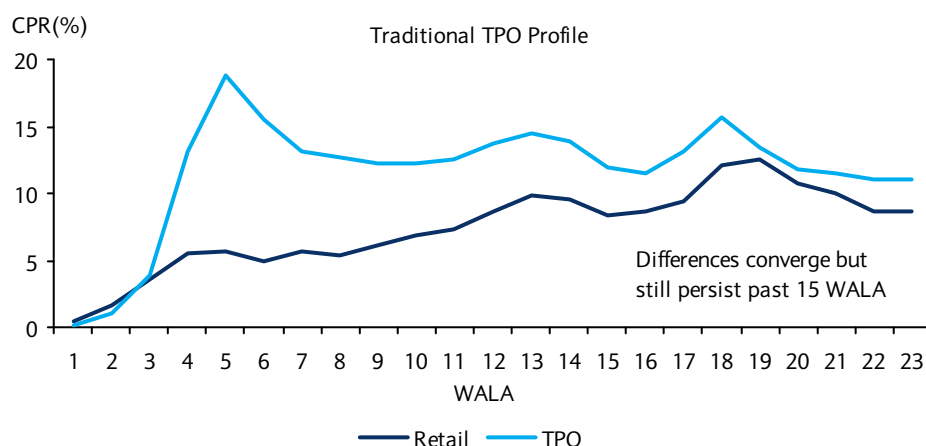
magnitude of the decline is likely to be. More important, we are not convinced it will be a decline for all HARP-eligible borrowers. Currently, the LLPAs are based on the LTV and FICO of the borrower. If this were replaced by a flat fee, it is possible that, on average, the costs would be lower, though they could be higher for borrowers with certain FICOs and LTVs.

The model uses the average FICO of a given pool relative to the average FICO of GSE originations as a proxy for the percentage of the pool that is refinancable. If mortgages become more widely available to lower-credit HARP-eligible borrowers, the average FICO of originations through the HARP channel will decline, increasing the efficiency of the HARP program. So far, there has not been a marked change in the average FICO of HARP originations, even among servicers that have adopted HARP more aggressively. In our opinion, this is mostly because originators are still skittish about the reps and warrants that they have to provide to the GSEs on the new loan. It is clear that reps and warrants associated with appraisals have been significantly mitigated under the new HARP guidelines. However, it is less clear that there will be any relief on the other reps and warrants beyond what was already available in the original HARP program. As we get more details on the new program we will address this in the model by potentially decreasing the average FICO of future GSE originations for HARP eligible loans. Users looking to run what-if scenarios for this possibility can do so by inputting their own vector of the average FICO of future GSE originations.

### **Third Party Originations (TPO) and their effect on prepayments**

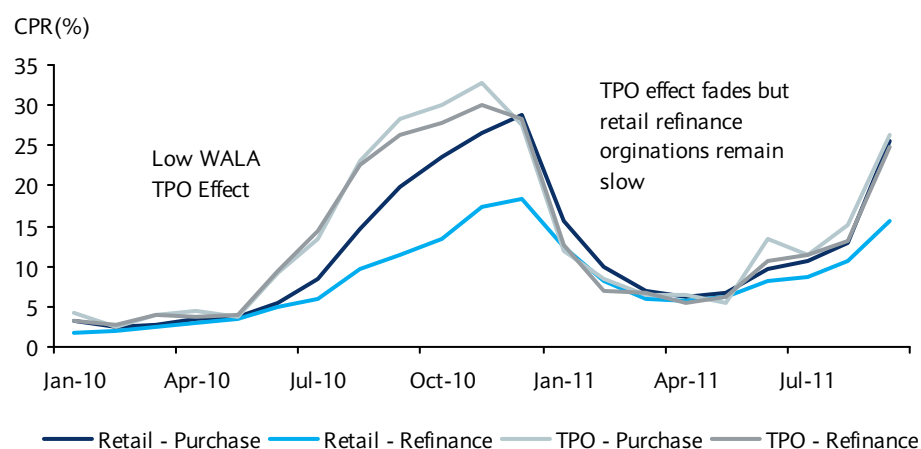
TPO loans are originated by brokers and correspondents, who are usually compensated on commission, typically a percentage of the loan amount. This commission usually has some claw-back provision for the first three months after origination. This creates a unique set of incentives for third-party originators. For recently originated loans, the correspondent already has almost all the required documentation from the borrowers and can refinance the loan with minimal effort. This allows the correspondent to work for less and thus give the borrower a more attractive rate, as long as the loan is past the claw-back period. Moreover, the fee paid out is proportional to the loan amount; thus, the larger the loan the more attractive the rate can be. As the loan seasons, the TPO effect on prepayments tends to fade as the documentation is no longer fresh and the additional incentive to refinance the borrower decreases (Figure 2, low WALA). This has always been part and parcel of the mortgage market. Initially, we chose not to add this effect to the model for two reasons: 1) it is a transient effect and, as such, the valuation impact tends to be small; and 2) media reports suggested that originators were cutting back on TPO loans, which would imply that the TPO effect would decrease over time. Alas, the last prepayment report showed that the TPO effect may still be dominant. Moreover, some aspects of the TPO effect for post-HARP originations persist beyond the early months – a relatively new phenomenon (see Figure 2, high WALA). So, in this update to the model, we have added a TPO effect.

To capture the faster prepayment speeds on lower WALA TPO originations, we mimic the behaviour of the third-party originator by adding an elbow shift conditional on loan age and loan size. This factor starts to decline after 12 WALA and completely disappears by the time the pool is 18 months seasoned.

**Figure 2: Seasoning profile of TPO vs Retail for loans with 0-50bp of incentive**

Source: Freddie Mac, Barclays Capital.; Sample period – Oct 2010 to Oct 2011; post-HARP originations; 200 to 400K Loan size

We have highlighted before that refinanced loans originated after June 2009 (post-HARP) have a lower propensity to prepay, mostly because many of these borrowers were refinanced through the HARP channel and hence have less than complete documentation. This introduces additional frictions/hassle costs when these borrowers try to refinance through the full underwriting process required for post-HARP originations. This is already part of the model<sup>2</sup>. What we failed to incorporate is that the majority of HARP refinancing happens through the retail channel and, thus, loans refinanced through the TPO channel are less impacted (Figure 3). To adjust for this, we have decreased the effect of post-HARP refinance on third-party originations and increased the effect on retail originations. In aggregate this change makes very little difference for most cohorts and vintages, but it can be quite important for some. For example, FNCL 5s of 2010 have almost 70% retail originations compared to only 35% for 3.5s of 2010. Thus this, update would flatten the refinancing profile of FNCL 5.0s and steepen the profile for 3.5s.

**Figure 3: Prepayment performance of Post-HARP 2009 FHLMC 4.5s**

Source: Freddie Mac, Barclays Capital

<sup>2</sup> For more details please refer to page 18 of the publication Inside Mortgage Valuations – A guide to models on Barclays Capital Live, published in March 2011

## Convergence in speeds across Fannie Mae and Freddie Mac

Historically, even after adjusting for collateral attributes, Freddie Mac pools have exhibited a steeper refinancing profile than comparable Fannie Mae cohorts. The March-2011 prepayment report showed a sharp convergence in prepayment speeds across Fannie Mae and Freddie Mac cohorts. Initially, we assumed this was driven by changes to the Freddie Mac LLPA matrix. However, as it persisted through the summer it became increasingly hard to ignore that there has been a more fundamental change. The most recent prepayment report, in our view, provides fairly conclusive proof of convergence, given the historical low in mortgage rates. We have had many conversations with the GSEs and other originators on the potential reasons for this sudden convergence in speeds. Although we are still unclear as to what changes were made to achieve this, the effect is undeniable. Moreover, all the recent changes made by the FHFA to HARP have eliminated many of HARP-related sources for the difference in prepayment performance.

We currently have two slightly different versions of the agency model to capture the historical differences in the prepayment profile across GSEs. With this update we have effectively collapsed the two models into one.

## Separating out the VA and FHA portions of the GNMA Pool

Since October 2010, the running mortgage insurance premium for FHA loans has increased from 50bp to 110bp but has remained unchanged for VA loans. The model accounts for this when calculating the economic incentive that GNMA borrowers have to refinance. However, rather than calculate a weighted average of FHA and VA projected prepayment rates, we were calculating a single prepayment rate using the weighted average mortgage insurance based on the FHA pct of the pool. This leads to errors for cuspy coupons, where the refinancing function is very non-linear. With this update, we now calculate different prepayment rates for the FHA and VA portion of the pool and take the weighted average SMM based on pool composition. This method has the added advantage of allowing us to project changes in pool composition. On cuspy coupons, this adds 2-4 CPR to our prepayment projections.

## Updates to the Primary-Secondary Spread Model

Through the rally in rates in August and September, the model projected primary-secondary (P-S) spread was, on average, 10-15bp wider than that suggested by the mortgage rate survey. The P-S spread represents the originator's margin in IO-equivalent terms. For example, consider an originator that is targeting a \$3 margin plus 50bp of servicing and g-fee. When the coupon swap just above par is trading at a 4 multiple, the \$3 of margin translates to 75bp, for a total P-S spread of 125bp. However, if this coupon swap were to rise to a 5 multiple, this would decrease the P-S spread to 110bp. Typically, given the slope of the yield curve and the relative attractiveness of rates (both factors of the P-S spread model), coupon swap multiples remain relatively stable. However, given the more muted prepayment environment, coupon swap multiples are now much wider than before. In this update to the model, we refit the P-S spread model to more recent data. This does two things: 1) it flattens out the P-S functions (ie, P-S spreads widen more slowly in a rally than they have in the past); and 2) the floor on the P-S spread rises by about 10bp. For a more detailed discussion of recent trends in P-S spread, please see [\*"What is keeping the lid on refis?"\*](#) (September 23, 2011)

## Valuation Impact of the model changes

OAS on IOs generally tightened across most cohorts. Valuations on the lower coupons were hurt by the changes to the P-S secondary spread model and the introduction of the TPO

effect, while the higher coupons were hurt by changes to the HARP program. The increase in the floor on the P-S spread helped some coupons.

Figure 4: Impact of Model Change on IOS

Security	Price	Production Model						Beta Production Model						OAS Change
		OAS	OAD	ZV	1-Yr	3-Yr	Life	OAS	OAD	ZV	1-Yr	3-Yr	Life	
IOS-33510 IO	\$ 17.91	565	-12.8	788	6.8	8.7	10.0	473	-18.9	754	10.3	10.5	11.3	-91
IOS-34010 IO	\$ 16.69	810	-19.0	1034	12.1	14.0	13.9	679	-23.0	923	18.0	17.0	15.8	-131
IOS-34009 IO	\$ 15.33	637	-32.7	943	18.9	20.8	19.2	591	-31.6	863	24.0	22.2	19.6	-46
IOS-34510 IO	\$ 16.22	839	-23.1	977	20.9	19.6	17.1	778	-23.0	876	25.4	21.6	18.5	-61
IOS-34509 IO	\$ 14.19	899	-30.7	1061	26.9	24.5	21.2	789	-31.3	894	32.7	27.0	23.0	-110
IOS-35010 IO	\$ 18.86	747	-16.7	812	19.6	18.2	16.4	815	-14.3	845	20.3	17.9	16.3	68
IOS-35009 IO	\$ 16.89	875	-19.0	929	23.4	20.7	18.3	879	-17.3	896	25.1	21.3	18.8	4
IOS-35008 IO	\$ 13.39	572	-28.2	512	38.1	33.5	32.0	577	-27.8	478	40.0	34.3	32.1	5
IOS-35005 IO	\$ 15.05	689	-22.2	717	29.7	26.3	24.0	595	-23.3	584	33.1	28.6	25.6	-94
IOS-35003 IO	\$ 15.27	624	-25.3	653	30.9	26.0	22.6	473	-29.1	468	35.7	28.9	24.9	-151
IOS-35508 IO	\$ 13.05	1133	-18.7	1010	33.6	31.1	29.6	1135	-18.8	973	35.0	31.7	29.3	2
IOS-35505 IO	\$ 15.42	1233	-12.0	1235	23.9	22.1	20.2	1105	-13.0	1069	26.7	24.1	21.6	-129
IOS-35503 IO	\$ 14.83	1179	-16.9	1162	27.5	24.2	21.5	1033	-18.7	967	31.1	26.9	23.5	-146
IOS-36008 IO	\$ 14.23	1377	-10.7	1262	29.0	27.1	25.4	1349	-10.8	1193	30.6	28.0	25.4	-28
IOS-36567 IO	\$ 16.70	1462	-3.1	1412	23.2	21.7	20.0	1270	-4.3	1180	26.1	24.1	21.6	-192
IG2-34010 IO	\$ 21.92	410	-4.3	527	7.9	8.9	9.3	381	-6.5	535	8.9	9.7	9.7	-29
IG2-34510 IO	\$ 21.08	608	-8.8	772	9.6	10.6	10.7	511	-13.0	693	13.9	13.6	12.3	-97
IG2-35010 IO	\$ 20.67	701	-14.4	879	12.9	13.7	13.1	591	-17.3	768	17.5	16.5	14.6	-111

Source: Barclays Capital, Pricing date: October 26, 2011

The OAS impact on pass-through is much more muted than IOS, but the pattern is very similar.

Figure 5: Impact of model changes on Fannie Mae TBA and cohorts

Security	Price	Production Model						Beta Production Model						OAS Change
		OAS	OAD	ZV	1-Yr	3-Yr	Life	OAS	OAD	ZV	1-Yr	3-Yr	Life	
FNCL 3.5 TBA	\$101.16	49	6.2	94	6.3	7.6	9.4	45	6.0	92	7.3	8.5	10.5	-5
FNCL 3.5 10	\$101.16	50	6.2	94	6.3	7.6	9.4	45	6.0	92	7.3	8.4	10.5	-5
FNCL 4 TBA	\$103.39	54	4.9	113	12.9	15.0	14.8	48	4.6	110	18.8	18.0	16.9	-6
FNCL 4 10	\$103.44	58	5.2	114	10.9	12.9	13.1	53	5.0	111	15.6	15.5	14.9	-5
FNCL 4 09	\$103.42	56	4.8	113	15.3	16.2	15.1	54	4.7	111	19.1	18.0	16.5	-2
FNCL 4.5 TBA	\$105.23	55	3.4	123	24.3	22.3	19.4	51	3.4	117	29.4	24.9	21.7	-4
FNCL 4.5 10	\$105.33	64	4.0	128	18.8	18.2	16.2	62	4.1	124	22.9	20.2	17.7	-3
FNCL 4.5 09	\$105.33	62	3.8	125	20.8	19.4	17.0	59	3.7	121	25.5	21.9	19.0	-4
FNCL 4.5 03	\$105.73	44	2.2	100	30.5	26.3	22.8	33	1.9	91	36.3	29.4	25.2	-10
FNCL 5 TBA	\$107.22	50	2.8	111	30.7	26.7	24.4	39	2.5	99	35.8	30.0	27.1	-11
FNCL 5 10	\$107.81	73	3.7	129	19.7	18.2	16.5	78	4.2	130	19.8	17.6	16.2	4
FNCL 5 09	\$107.50	76	3.6	131	21.2	19.1	17.1	77	3.9	130	22.8	19.8	17.8	1
FNCL 5 08	\$107.28	13	1.6	76	39.0	34.6	33.3	21	2.0	79	39.3	33.9	31.8	8
FNCL 5 07	\$107.28	47	2.7	102	30.8	28.3	27.1	38	2.5	90	34.8	30.6	28.4	-8

Security	Price	Production Model						Beta Production Model						OAS Change
		OAS	OAD	ZV	1-Yr	3-Yr	Life	OAS	OAD	ZV	1-Yr	3-Yr	Life	
FNCL 5 06	\$107.28	47	2.5	102	31.4	28.3	26.6	44	2.5	96	33.8	29.6	27.2	-3
FNCL 5.5 TBA	\$108.25	39	2.0	92	35.5	33.5	32.4	46	2.1	93	36.4	33.0	31.1	6
FNCL 5.5 08	\$108.31	46	2.1	100	34.0	32.2	31.0	51	2.2	100	35.2	32.0	29.9	5
FNCL 5.5 07	\$108.31	80	3.0	126	27.8	26.4	25.3	67	2.6	110	32.4	29.5	27.2	-13
FNCL 5.5 06	\$108.31	81	2.9	127	27.5	26.4	25.1	72	2.7	115	31.4	28.6	26.4	-9
FNCL 5.5 05	\$108.50	100	3.2	141	24.5	22.8	20.8	94	3.1	134	26.9	24.5	21.9	-6
FNCL 6 TBA	\$109.41	75	2.4	117	31.6	30.1	28.9	79	2.6	115	33.0	30.3	28.2	4
FNCL 6 08	\$109.47	89	2.6	132	29.2	27.9	26.5	93	2.8	129	30.8	28.3	25.8	3
FNCL 6 07	\$109.50	111	3.1	147	26.4	24.5	23.2	93	2.8	126	31.0	28.1	25.5	-18
FNCL 6 06	\$109.50	116	3.2	152	25.2	23.8	22.3	102	2.9	136	29.3	26.6	24.1	-14
FNCL 6 05	\$110.03	141	4.0	168	19.3	18.6	17.1	131	3.7	157	22.2	20.6	18.5	-10
FNCL 6.5 TBA	\$110.13	152	3.4	181	24.5	23.3	22.3	137	3.1	163	27.9	25.9	24.0	-15
FNCL 6.5 07	\$110.31	170	3.8	190	22.7	21.1	19.3	156	3.5	176	25.5	23.4	20.9	-13
FNCL 6.5 06	\$110.31	175	3.8	198	21.3	19.9	18.5	164	3.6	185	24.0	22.1	19.8	-12
FNCL 6.5 05	\$110.50	187	4.1	203	19.1	17.8	16.4	175	3.9	191	21.8	19.9	17.9	-12

Source: Barclays Capital, Pricing date: October 26, 2011

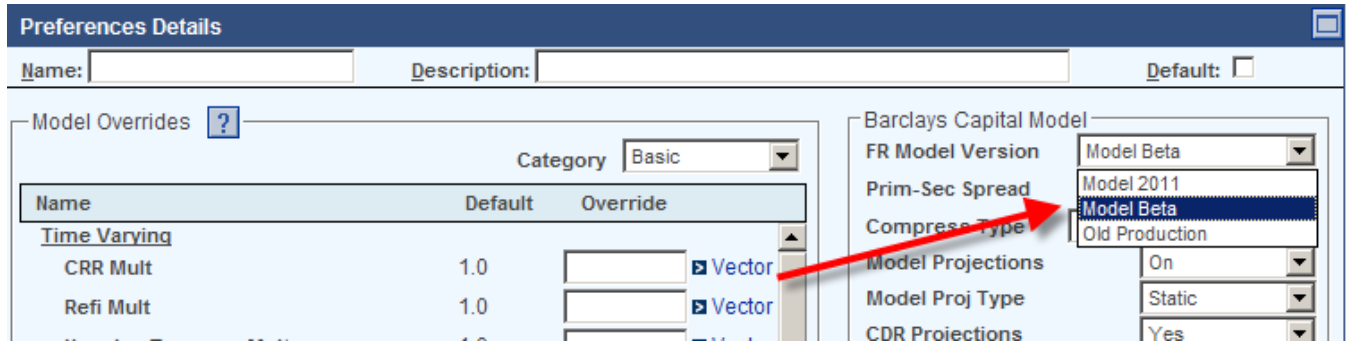
Figure 6: Impact of model changes on Ginnie Mae TBA and cohorts

Security	Price	Production Model						Beta Production Model						OAS Change
		OAS	OAD	ZV	1-Yr	3-Yr	Life	OAS	OAD	ZV	1-Yr	3-Yr	Life	
GNSF 3.5 TBA	\$103.08	44	6.5	68	7.4	8.2	8.5	42	6.4	67	7.9	8.4	8.5	-2
GNSF 4 TBA	\$106.06	29	5.3	78	6.9	10.1	11.2	25	5.1	77	8.6	12.0	12.4	-5
GNSF 4 10	\$106.09	46	5.9	76	8.2	9.1	9.4	43	5.7	75	9.2	10.0	9.8	-3
GNSF 4 09	\$106.13	43	5.5	75	9.1	9.7	9.9	39	5.3	74	10.7	11.3	10.9	-4
GNSF 4.5 TBA	\$108.09	39	4.5	89	12.0	14.7	13.9	34	4.5	87	14.7	16.8	14.9	-5
GNSF 4.5 10	\$108.22	50	4.9	92	10.0	10.7	10.7	44	4.6	88	13.2	13.1	12.0	-6
GNSF 4.5 09	\$108.23	48	4.7	89	10.9	11.5	11.4	42	4.4	85	14.3	14.1	12.9	-7
GNSF 5 TBA	\$109.58	50	3.4	97	18.4	18.3	16.4	45	3.4	93	20.8	19.5	17.1	-5
GNSF 5 10	\$109.58	68	4.3	106	14.8	15.0	13.7	67	4.4	106	16.2	15.6	13.6	-1
GNSF 5 09	\$109.58	58	3.7	100	16.3	16.8	15.3	51	3.6	94	19.0	18.4	16.3	-7
GNSF 5.5 TBA	\$110.72	45	2.6	85	24.8	23.8	21.7	32	2.4	73	28.0	26.3	23.8	-13
GNSF 6 TBA	\$111.53	56	2.3	88	26.8	26.0	23.8	43	2.2	76	29.2	27.8	25.5	-12
GNSF 6.5 TBA	\$112.44	78	2.8	95	27.5	26.3	24.1	75	2.8	92	28.2	26.9	24.6	-3

Source: Barclays Capital, Pricing date: October 26, 2011

### How to access the Beta Model?

The Production-Beta model may be accessed by going to the preference page on SSA and choosing “Beta” from the pull-down menu for “FR Model Version”. This is the first input field in the right-hand corner of the preference. Please feel free to contact us if you have trouble accessing the model or with any feedback on the model changes.



The screenshot shows the 'Preferences Details' window. On the left, there is a 'Model Overrides' section with a table. On the right, there is a 'Barclays Capital Model' section with several dropdown menus. A red arrow points to the 'FR Model Version' dropdown menu, which is open and shows 'Model Beta' selected.

Name	Default	Override
<u>Time Varying</u>		
CRR Mult	1.0	<input type="text"/> Vector
Refi Mult	1.0	<input type="text"/> Vector

Barclays Capital Model

FR Model Version: Model Beta

Prim-Sec Spread: Model 2011

Compress Type: Model Beta

Model Projections: On

Model Proj Type: Static

CDR Projections: Yes



#### Analyst Certification(s)

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