Agency Prepayments Part Two:

Concepts in Agency Valuation

Two Harbors Investment Corp.
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Two Harbors Investment Corp. is proud to present: Agency Prepayments Part Two: Concepts in Agency Valuation, the second segment of a two part series on prepayments. The company believes periodic webinars will provide an opportunity to share more in-depth insights on various topics which may help investors, analysts and the media develop a deeper understanding of the residential mortgage and housing markets and the company.

Concepts in Agency Valuation

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WELCOMING REMARKS

July Hugen: Thank you for joining us today. I'm July Hugen, Director of Investor Relations for Two Harbors, and with me today is Bill Roth, Two Harbors' Co-Chief Investment Officer.

We are pleased to launch the third segment in our webinar series. Through this series we intend to share more in-depth insights on various topics and help investors develop a deeper understanding of the mortgage and housing markets and our company.

The presentation to this webinar is also available via download by clicking the "Event Resources" tab in the lower left corner of your screen. Click "Presentation Slides" or right click and save, to download a PDF of the slides. Please note that this webinar is pre-recorded. We encourage you to contact Investor Relations if you have additional questions or would like to discuss this topic further. Contact information for the Investor Relations team can be found on Slide 30.

SAFE HARBOR STATEMENT

Before we begin, I would like to take a moment to remind you that remarks made by Two Harbors' management during this webinar and the accompanying slide presentation may include forward-looking statements. Forward-looking statements reflect our views regarding future events and are typically associated with the use of words such as anticipate, target, expect, estimate, believe, assume, project, and should, or other similar words.

We caution investors not to rely unduly on forward-looking statements. They imply risks and uncertainties, and actual results may differ materially from expectations. We urge you to carefully consider the risks described in our filings with the SEC, which may be obtained on the SEC's website at www.sec.gov. We do not undertake any obligation to update or correct any forward-looking statements if later events prove them to be inaccurate.

TWO HARBORS' COMPANY OVERVIEW

By way of introduction, Two Harbors is a hybrid mortgage REIT that invests in the residential mortgage and housing sectors. Our common stock is traded on the New York Stock Exchange under the ticker, "TWO", and we have a market capitalization of approximately $3.4 billion. We utilize a relative value investment approach across the residential mortgage and housing universe to identify the most attractive investment opportunities. This approach enables us to shift our asset allocation with changing market conditions in effort to maximize stockholder returns.

Our mission is to be recognized as an industry leading mortgage REIT. We'll accomplish this by achieving excellence in four areas:

- First, through superior portfolio construction and fluid capital allocation using rigorous security selection and credit analysis;

- Second, through unparalleled risk management with a strong focus on hedging and book value stability to our portfolio;
- Third, through targeted diversification of our business model;
- And finally, through leading governance and disclosure practices.

Our mission guides us as we strive to deliver value to our stockholders. As the largest hybrid mortgage REIT, we manage an investment portfolio of more than $15 billion. We are proud that our portfolio performance has enabled us to deliver a total stockholder return of 88% since we commenced operations in late 2009.

Last quarter we launched a webinar entitled "Primer on Agency Prepayments." This webinar presented an overview on Agency prepayments and provided insights into how we think about borrower prepayment behavior in the context of constructing our Agency portfolio. This primer was designed to be viewed as the first of a two-part series. If you haven't already done so, we encourage you to view this introductory segment by accessing the Executive Insights section in the Investor Relations portion of our website.

Today's webinar is the sequel to this primer. In today's presentation, Bill will lead us through an advanced discussion on Agency RMBS, with a focus on concepts in Agency prepayments and valuation. I would now like to turn the webinar over to Bill.

DEFINITION OF TBAS AND SPECIFIED POOLS

Thanks, July. I would like to begin today by providing an overview of TBAs and specified pools.

The TBA market was established in the 1970s to facilitate forward trading of Agency securities. The term "TBA" is a reference to the trading process. In TBA trading, the originator does not provide the precise characteristics of the pool until a few days before the delivery date. The mortgage pool and its characteristics are, in essence, "to be announced" to the buyer.

Here's how it works. On the trade date, the buyer agrees to purchase a pool of mortgages at a predetermined date in the future. At that time, the buyer is promised to receive a pool of mortgages based on a few agreed upon characteristics. These include the pool's face value, maturity and coupon. Forty-eight hours prior to the settlement date, the pool information and the precise characteristics of the underlying collateral are communicated to the buyer. The securities are then delivered and paid for on the settlement date. This TBA transaction allows for the delivery of any pools meeting the generic characteristics, hence the term "generic" pools.

Specified pools, or "spec pools," trade differently than TBAs. Buyers of spec pools know the precise characteristics of the pool at the time of purchase. Spec pools may have desirable characteristics sought out by investors, such as low loan balances. Many of these pools are more valuable than generics, because they provide better protection against extension risk and reinvestment risk than TBAs. Because of this inherent protection, it's common to see spec pools trade at a premium, or "payup," to TBA prices.

EXAMPLES OF PREPAYMENT PROTECTION

You may be familiar with the various types of prepayment protection listed on this slide. At Two Harbors, we spend a great deal of time analyzing all different types of specified pools to find value.

As a refresher, let's take a look at a spec pool we reviewed in our last webinar, the LLB pool. As you can see from the chart on the right, a borrower with a $50 thousand loan balance on his mortgage has less incentive to prepay compared to a homeowner with a $500 thousand balance. This is a result of refinancing costs, which are predominately fixed, so the larger balance borrower is in a better position to recoup his refinancing costs sooner than the LLB borrower. The table on the right shows that it will take the borrower with the $500 thousand loan only 3.7 years to recoup the refi costs. This compares to 12.5 years for the lower loan balance borrower. For a more detailed review on prepayment protection, I encourage you to view our previous webinar, "Primer on Agency Prepayments."

ORIGINATORS OPTIMIZE PROFITS WITH SPECIFIED POOLS – PART 1

Let's take a look at how specified pools come into existence. Mortgage originators try to maximize their profits by packaging loans with certain characteristics into different pools and selling these pools at a premium to TBAs. First, the originator identifies the characteristics that may be preferred by investors. They then create pools containing loans with these characteristics and sell them into the market at a premium to TBAs. All other loans that do not have a special characteristic would be pooled into a generic pool. These generic pools are also referred to as "cheapest to deliver," and would be delivered into a TBA contract.

ORIGINATORS OPTIMIZE PROFITS WITH SPECIFIED POOLS – PART 2

Based on given loan characteristics, the efficiency of borrower refinancing will range anywhere from low to high. The lower the borrower's likelihood of responding to refi incentives, the more stable the cash flow and the more valuable the security. Essentially, lower refinance efficiency equates to lower prepayment variability, and that in turn is worth more to the RMBS investor.

SUPPLY OF SPECIFIED POOLS

The market for specified pools is a large. Total Agency production is running north of $100 billion a month, or over $1 trillion a year. You can see that even though the Fed is purchasing securities currently, there is still a substantial supply of both generic and specified pools available. Total specified production averages about $15 billion a month or about $180 billion a year. This presents a large supply of paper with different types of coupons and loan characteristics for our investment team to sift through for potential opportunities.

COLLATERAL SUMMARY BY POOL

Let's take a look at a few types of specified pools to see what the underlying collateral looks like. The chart on this slide provides a comparison of generic, low loan balance and MHA 80 pools. I would like to point out a few things here. The average loan size for the generic pool is substantially higher than the low loan balance pool. Also, California origination represents a large percentage of the generic pool due primarily to the higher mortgage balances that are characteristic of that state. It is also worth noting that the loan-to-value, or LTV, for the low loan balance pool is meaningfully lower than the generic. Clearly these borrowers are able to refi, given the right incentive.

MHA 80 represents borrowers who have refinanced through HARP and whose LTV is greater than 80%, but less than 90%. Consistent with our expectations, the FICO score is lower and LTV is higher for MHA, because this was the type of borrower the HARP program was designed to help.

SPECIFIED POOLS PROVIDED PREPAY PROTECTION IN 2003

Do these differences in loan characteristics matter to performance? Well, let's take a look at two periods of time characterized by high refinancing activity to see how the prepayment speeds for specified pools compare to generics. This slide illustrates the 2003 experience for generic and LLB pools originated two years earlier in 2001, based on the borrower refinancing incentive. The left side of the y-axis shows that speeds were slow when there was a negative refi incentive. Note how speeds are not zero. Some borrowers sell their home and move, generating a prepay, and some prepays are from borrower refinancings, even at a higher rate, in order to take cash out of their homes. On the right side, you can see that as the refi incentive increased, prepays increased for both generic and LLB pools. At a 150 basis point refi incentive, generic pools reached 68% CPR while LLBs only experienced a CPR of 42%. Clearly there is a strong correlation between prepayment speeds and the refi incentive. The LLB borrower with less incentive, however, paid more slowly.

SPECIFIED POOLS PROVIDE PREPAY PROTECTION TODAY

In the previous slide, we saw how LLB pools experienced lower speeds during the highly efficient refinancing cycle of 2003. However, the refinancing process and the housing market have changed quite a bit since then. Let's look at speeds today and see how prepay protected securities have fared as compared to generics.

The circles and triangles in the graph show the 2012 prepay speeds for 2010 generic and LLB production pools. The information on this slide shows a similar pattern to what we observed previously, whereby low loan balance pools once again paid slower than generics The 2003 and 2012 periods both illustrate how prepayment protected securities provide better call protection in different refi environments

SPECIFIED POOLS PROVIDE MORE STABLE SPEEDS

Another advantage of prepay protected securities is that their realized speeds tend to be much more stable, meaning that they fall within a tighter range. As a result of this, the investor receives more stable

cash flows. Different types of variability are associated with different characteristics, and this slide illustrates this concept by comparing the expected lifetime CPRs of 30-year 4% generic, MHA 80 and LLB pools. For a down 150 to up 150 basis points change in rates, the projected lifetime speeds for LLB come in between 9% and 14%, or a range of 5% CPR. The speeds of MHA are similarly low, with a narrow range. These both compare favorably to TBAs with a substantially wider range of speeds at 28%. The graph shows how prepayment protected pools not only provide for lower CPRs, but also for lower volatility. I would also note that these lifetime speeds obscure the even faster speeds that occur during refinancing peaks, which more acutely affects generic pools. Additionally, this stability of the MHA and LLB pools makes them easier to hedge, a concept we will discuss in our next webinar.

RALLY IN SPECIFIED POOL PAYUPS

Slide 14 provides an overview of the performance of LLB payups compared to the current coupon mortgage rate and 10-year Treasuries since the beginning of the year. As a result of falling mortgage rates, payups have increased across the board because generics are expected to pay faster in this environment. It is important to note that payups are related to expected prepayment speeds, and the mortgage rate is what matters, not the Treasury rate. We saw in the previous slides that the prepay volatility for spec pools tends to be lower, and investors pay a premium over generics for this attribute. So, while Treasury rates are relatively unchanged, mortgage rates have fallen, so it is not surprising to see that prepays have gone up and pools with prepayment protection are now worth more because of this stability. The question now becomes: “Is the protection you receive worth the payup?”

BASIC CONCEPTS IN MORTGAGE ANALYTICS

In order to help us answer this question, let’s take a minute to review some mathematical concepts that relate to mortgage valuation. Compared to other fixed income instruments, mortgage-backed securities are unique in that the borrower has the option to prepay anytime or keep the loan as long as he wants. As RMBS investors, we have to be able to account for the value of this option we have effectively sold to the borrower. In the following slides, we will review some basic analytical concepts including: yield-to-maturity, nominal yield spread, zero-volatility spread and option-adjusted spread, or OAS. There are other valuation techniques worth discussing as well, including “percentage of breakeven” analysis and scenario analysis.

YIELD-TO-MATURITY

The valuation of a mortgage-backed security is determined like all fixed income instruments, as the net present value, or NPV, of the expected future cash flows. The yield is the internal rate of return that makes the price of the bond equal to the NPV of its cash flows. Since the yield is based on the security’s cash flows, prepayment assumptions are incorporated into this calculation. However, this approach is limited. It assumes that the cash flows will be realized as modeled, and it does not account for reinvestment risk, average life or prepayment variability.

NOMINAL YEILD SPREAD

The nominal yield spread is the difference between the MBS yield and the yield of a benchmark security. Investors typically reference Treasuries or swaps as the benchmark, and for today's discussion, we will be analyzing our securities against the swap curve.

Let's walk through the example on this slide. You can see that Fannie 2.5s have the highest yield, but that is because it's a much longer security. Fannie 3s and 3.5s, while having a lower yield, both have a higher nominal spread. This example shows that the asset's average life and maturity are accounted for. However, this approach still does not account for reinvestment risk or any cash flow variability.

ZERO-VOLATILITY SPREAD

The zero-volatility spread, or ZV-spread, is calculated by discounting each cash flow by its own discount rate based on when you receive the cash flow. This is achieved by adding a constant spread to each forward rate so that the NPV of future cash flows equals the security's market price. Note that the ZV-spread uses various points along the forward curve as opposed to one point on the swap curve like the nominal spread does. Although this approach accounts for the timing of each cash flow, the ZV-spread only incorporates one interest rate path in its calculation and assumes no prepay variability. In today's discussion, when we use the term ZV-spread, we are referring to the forward curve and not the spot curve.

OPTION-ADJUSTED SPREAD

The option-adjusted spread, is the compensation the investor receives for assuming the additional risk pertaining to the prepayment option held by the borrower. Mathematically, it is the difference between the ZV-spread and the cost of the options sold to the borrower. To calculate the cost of these options, we use a model to simulate future outcomes in interest rates and, therefore, prepayments as well. Unlike ZV-spread, which only use one interest rate path, the OAS is generated as a function of many simulated rates.

As a result of this simulation process, the OAS is model dependent. Mortgage rates and resulting prepayment rates are generated by the model to calculate projected cash flows. These cash flows are then discounted at the forward rates along each interest rate path. The OAS is then calculated by setting the average NPV of cash flows under all the simulations to the security's market price. Given two bonds with similar characteristics, the bond with a higher OAS implies that it has more value on a relative basis than the bond with a lower OAS. For this higher OAS bond, the options sold to the borrower are less valuable, therefore providing the MBS investor with a higher prospective return. In theory, if the prepayment outcome in a bond was known with certainty, then the option cost would be zero. The primary benefit of OAS over the other methods we reviewed is that this approach accounts for both interest rate and prepayment variability.

POTENTIAL ADJUSTMENTS TO VALUATION MODELS

Because valuing mortgage-backed securities using OAS is model dependent, when analyzing an individual security it is our practice to look at two or three different models. Even then, we don't just accept the model as presented.

There are many factors that impact the OAS. To account for these factors, we can go in and adjust the model, or turn the dials if you will, to develop a more encompassing valuation model and sensitivity analysis. Some of the inputs we might modify are listed on this slide.

Reviewing model inputs is an essential step of the security selection process. There are times when our investment team adjusts the dials and there are other times when we need to account for missing variables. It is not uncommon for models to be updated from time to time, but typically these adjustments are late in accounting for changes in the market. For example, today it is important to account for the impact of tighter underwriting standards, which have evolved since the housing crisis.

VALUATION EXAMPLE: YIELD ANALYSIS

Let's get back to the question of the valuation of TBA versus spec pools. We just reviewed a number of valuation methods that are fundamental to the security selection process, but it is important not to rely on only one metric. You don't just go out and buy the highest yielding asset or the one with the highest OAS. Valuation is based on a combination of factors, including the stability of the yield, the stability of the OAS and other variables. As we like to say on the trading desk, it comes down to your ability to earn the OAS.

At this point, let's go through a valuation example by analyzing the pools we looked at earlier in the presentation. Let's start with a simple yield analysis, which is summarized on this slide. The chart shows how the low loan balance and MHA pools both have expected yields of 2.2%, which compares to only 1.6% for the generic pool. Both prepay protected pools offer better yields and lower projected CPRs, so at first glance one might assume that either one of these securities may be a better option over generics That may or may not be the case.

VALUATION EXAMPLE: SWAP SPREAD ANALYSIS

The information on Slide 22 sheds additional light by presenting the average life and nominal spread to swaps. As we have just seen in the previous slide, LLB and MHA yields are more attractive than the yield on the generic. But this slide shows us that the average lives are very different. The LLB pool is expected to be a year and half longer than the MHA, leading to a swap spread that is not as attractive, especially as our hedges need to be longer, and therefore costlier, for this bond. In fact, the nominal spread to swaps for the generic is meaningfully higher than the LLB. At this point, it appears that the MHA pool may be best, but it's difficult to determine value between the LLB and the TBA.

VALUATION EXAMPLE: ZV-SPREAD ANALYSIS

Looking at the ZV-spread confirms that the MHA appears to be more attractive than the LLB. The MHA ZV-spread is greater than the ZV-spread for LLB and generic, while the latter are fairly similar. At this point it appears that the MHA pool still offers the best value but we still don't know anything about the variability. You may recall from Slide 13 that the MHA was pretty stable, but let's take a look at the option cost and OAS to determine if this is in fact the case.

VALUATION EXAMPLE: OAS ANALYSIS

The last two columns on Slide 24 present the option cost and the Libor OAS. We see that the option cost is substantially higher on the generic because of the tremendous variability in potential prepays. As a result of this, the generic has the lowest OAS. The MHA pool, with its more stable prepays, has a smaller option cost and with a high ZV-spread ends up with the highest OAS. Even though the option cost on the LLB is the lowest, the OAS comes out lower due to the much lower ZV-spread. This slide confirms that the MHA pool is the most compelling security, but we're still not done yet.

"PERCENTAGE OF BREAKEVEN" ANALYSIS

On Slide 25 we take a look at the "percentage of breakeven" analysis. This method compares the value of specified pools to TBAs by looking at the payup over TBAs for the spec pool as a percent of the theoretical payup required for the spec pool to trade at the same OAS as the TBA. What we see here is that at zero payup to TBA the expected yield and OAS of the spec pools are substantially higher. In short, you would be getting something for nothing. Rarely do you see spec pools trade at the same price as TBAs.

At the current market prices, shown in yellow, the payup for LLB is at 75% of theoretical value, while the MHA is at about 50%. This indicates that the MHA is cheaper than the LLB relative to its theoretical value. Note that the yields and OAS of both spec pools are still higher than the generic. At theoretical value, or 100% of breakeven, shown in green, the OAS, by definition, is equal, but both of the spec pools still have higher yields. Additionally, because the specified pools have less negative convexity, as we'll see shortly, there is a higher likelihood of earning this OAS versus the TBA. Finally, you can see that as you go above theoretical value, both LLB and MHA become less interesting.

Despite these valuation techniques, showing that spec pools are mathematically more attractive than TBAs, spec pools do involve some risk because you are paying more than TBA prices. Your risk is the amount you payup over TBAs, also known as "payup risk." While spec pools rarely trade at TBA prices, there are scenarios where they might.

One key point to consider in valuing specified pools and potential risk is the confidence you have in your model. As prices go higher and the payups over TBA expand, model error can be damaging to realized returns. This is especially important when mortgage bond prices trade at a substantial discount or premium to par, such as they do today, since any variations from expectations can have a meaningful impact to results.

In addition to model risk, which in this case is largely due to prepayment risk, there is also the risk that payups could erode if refinancing becomes more efficient or available to borrowers in those pools. This could happen due to a much cheaper and faster refi process, such as in 2003, or the implementation of government policies to benefit borrowers in prepay protected pools. We take these and other risk factors into consideration when assessing the value in both generics and prepay protected pools.

VALUATION EXAMPLE: SCENARIO ANALYSIS

The last valuation method we will discuss is scenario analysis. This is a review of the ability to realize your yield, as well as the expected price path of the security. The graph on the left shows the expected realized yields for the generic and MHA pools given various interest rate scenarios. Consistent with our expectations, the MHA yields are projected to fall within a tighter range of outcomes. It is also interesting that the MHA is expected to outperform the generic in all scenarios except for an up 150 basis points movement in rates, despite paying approximately a two point premium to the TBA price for this pool.

The right side of this slide presents the expected price paths of the generic and the MHA pool. You can see here that despite paying more for the MHA pool, the price path is less negatively convex, meaning that the shape of the price path is more linear than that of the TBA. This is extremely important because it provides an investment profile that enables us to more effectively hedge our portfolio to protect book value. We'll talk more about the importance of this and hedging in our next webinar.

TWO HARBORS' AGENCY PORTFOLIO

One of the benefits of the hybrid model is that it provides us the flexibility to allocate capital to sectors that we believe offer the most attractive returns for our stockholders. If you are familiar with our history, you may recall that we have shifted our portfolio between the Agency and non-Agency sectors numerous times to take advantage of investment opportunities as they became available. More recently, we have also been exploring additional opportunities within the mortgage and housing markets.

We also search for value by looking at all types of securities within each sector and the composition of our Agency portfolio has evolved over time as a reflection of this. For example, we introduced Ginnie Mae HECMs to our portfolio in the second quarter of 2011. We like these securities because they provide a stable stream of cash flows that are not impacted by changes in the residential mortgage rate. In short, they have a nice combination of yield, spread, OAS and convexity. As of September 30, HECMs represented 15% of our Agency portfolio.

MHA is another example of how we take into consideration the current market environment when constructing our portfolio. Given that these borrowers have recently refinanced through HARP and have an LTV greater than 80%, we believe that the likelihood for the borrowers in these pools to refinance again soon is a low-probability event. MHA at September 30 was the largest allocation in our Agency portfolio at 31%.

We are extremely proud of our Agency portfolio's performance. At September 30, 98% of the securities in our Agency portfolio had some form of protection against prepayment risk. We believe that the composition of our portfolio and its inherent prepayment protection has contributed to our performance over time.

TWO HARBORS' CPR VS. COHORTS

Before we conclude, I would like to highlight how we benefit from the diligent analysis we reviewed in this webinar. On Slide 28, you can see that Two Harbors' prepayment experience has been low and stable despite historically low mortgage rates and the general increase in prepay speeds. The graph on this slide illustrates how our Agency speeds, inclusive of IIOs, have outperformed the cohorts. We believe this is a reflection of our rigorous analytical approach during the security selection process.

SUMMARY

I hope that today's discussion has provided you a better understanding of what drives Agency prepays as well as provided a framework for mortgage valuation methods. I would like to conclude the webinar with a summary of the key points.

- First, specified pools provide prepayment protection during various refinancing cycles in addition to providing lower scenario volatility.
- Second, there are a number of different valuation techniques and it's important not to rely on just one. Mortgage security analysis is based on a combination of factors, including the OAS which accounts for interest rate and cash flow variability.
- Third, price paths for prepayment protected pools tend to be less negatively convex compared to those of generics. This profile allows for more effective hedging to protect book value.
- And last, we are pleased with how Two Harbors' low and stable prepayment speeds have outperformed the cohorts, which benefits our stockholders.

I would now like to turn the webinar over to July for her closing remarks.

CONTACT INFORMATION

July Hugen: Thank you for your participation in today's webinar. We hope that this webinar was an insightful continuation to our discussion on Agency prepayments.

We invite you to look forward to our next webinar, which will review our philosophy and approach to hedging the Agency portfolio. In the interim, please do not hesitate to reach out to us if you have any additional questions on the material covered today. The contact information for our Investor Relations department is available on this slide.

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