

Recoveries

Although a defaulted asset generates a loss, there is often an opportunity to recover cash. Repossessing the asset and selling it is the primary method to achieve this recovery. The cash received from the sale flows into the structured transaction from which the asset came and is available for liabilities. While this process is very straightforward, a number of details need to be understood in order to model recoveries accurately.

The best approach to explain the nuances of recoveries is to first understand the relevant terminology. In Chapter 4, a gross loss was defined as an asset that is defaulted and assumed not to pay. Once that asset is repossessed and sold, the cash recovered can be subtracted from the original loss amount. The gross loss minus recovery is known as a net loss.

$$\text{Net loss} = \text{Gross loss amount} - \text{Recovery amount}$$

Related to net loss are two terms that are often confused: *loss severity* and *recovery rate*. These are actually inverse concepts. The recovery rate is the amount recovered divided by the gross loss amount. Loss severity is the ratio between net loss and gross loss amount. For instance, assume that an asset defaulted and created a \$100 loss. If \$80 is recovered from the sale of the asset then there is an 80 percent recovery rate or a 20 percent loss severity.

$$\text{Recovery rate} = \text{Recovery amount} / \text{Gross loss amount}$$

$$\text{Loss severity} = \text{Net loss} / \text{Gross loss amount}$$

A final term to define is *recovery lag*. A recovery does not take place immediately since certain legal proceedings need to occur, the asset physically needs to be repossessed, and the sale process executed. A recovery can take from a few months to a number of years before cash is actually realized. The length of time it takes from the default date to the recovery of actual cash is known as recovery lag.

An excellent method to understand recoveries is to take a loan from default to recovery and build a timeline of events. For this example, assume that a U.S. auto loan begins missing payments in May 2005. The loan continued to miss payments

and was classified as a default in August 2005. The balance of the loan at that time was \$1,580. At this point, from a transaction point of view, a default has occurred and a gross loss of \$1,580 would be recorded for August 2005. In the same month, legal action to repossess the asset begins.

For auto loans in the United States, the legal action can proceed relatively quickly and a judgment can take place within a few months. Assume in this example that the servicer gets the repossession ruling in two months. Once a repossession ruling is in hand, the asset has to be physically seized and in the case of vehicles and equipment, transported to a liquidation or auction site. Depending on the type of asset, it can take some time to sell the asset and realize the cash. In this example assume that the asset is seized, auctioned, and sold for \$850 in one month. See Figure 5.1 for a summary of events.

The above example is only partially complete because some costs need to be deducted. The most significant costs for nearly all assets are liquidation expenses. Hiring a company to repossess an asset costs money. So does physically moving the asset to a liquidation or auction location and having the asset liquidated. These costs can become very significant, particularly if assets are scattered internationally. Structured transactions often put restrictions on certain locations if the area is deemed to be difficult or costly to repossess in and liquidate.

Another cost that is not always included in the recovery assumption is the cost of carry. When a loan is considered defaulted there is an interest cost to the outstanding loan until the asset is liquidated and cash is received. This is sometimes not reported and not included in recovery assumptions. For the purposes of this example there will be no carry cost assumption.

Going back to the example, the cost of liquidation needs to be deducted from the recovery proceeds. In this case assume that liquidation costs \$200. The net amount recovered is \$650. The recovery rate in this case would be 41.13 percent ($\$650/\1580) otherwise quantifiable as the loss severity at 58.86 percent ($\$930/\1580).

While industries have developed typical recovery rates and lag times, a historical study of recoveries should be completed. This would involve aggregating the data that was mentioned above and coming up with average recovery amounts, liquidation

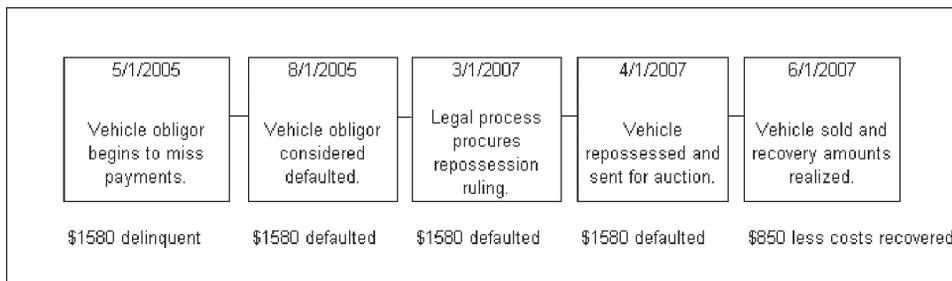


FIGURE 5.1 A timeline for the recovery process of a typical defaulted auto loan.

costs, and lag times. This historical data analysis differs from those in Chapters 3 and 4 because it is more simplified. Recovery data is often difficult for issuers to accurately put together on a loan level basis. While that methodology would be ideal and should be used if available, a simpler approach is often sufficient.

MODEL BUILDER 5.1: HISTORICAL RECOVERY ANALYSIS

1. From the CD-ROM open the file *MB5-1_Raw_Data* from the Ch05 folder on the CD-ROM. Save this file as **Recovery Data.xls**. Notice that this data is the loss information from the previous chapter, with the addition of some incomplete recovery information below the loss data. See Figure 5.2 for more detail.
2. In this example, the recovery amounts have been given based on origination year. Look at cell D39. The 18,603 is the amount that has been recovered for loans originated in 2004. To make a comparison to the loss amounts, the aggregated loss for each year is necessary. Using the SUM function and starting in cell C33, sum up the loss for each vintage month.
3. The SUM function adds up the loss for each month, but the loss for each year is necessary to compare to the yearly recovery information. This can be achieved using a SUMIF formula. However, first a YEAR formula is necessary. In cell C34, use the YEAR function on cell C6. The formula should look like:

= YEAR(C6)

Copy and paste this formula over C34:AA34. This will give the year that each vintage is associated with and allow the SUMIF to be completed.

4. Go to cell C39 and create SUMIF for the total losses depending on the vintage year. The formula should read as follows:

= SUMIF(\$C\$34:\$AA\$34,B39,\$C\$33:\$AA\$33)

Copy and paste this formula in cell C40 to get the total for 2006.

	A	B	C	D	E	F	G	H	I
33									
34									
35									
36		Recovery Analysis							
37									
		Vintage Year	Vintage Loss	Liquidation Proceeds	Liquidation Costs	Net Proceeds	Recovery Rate	Avg Months to Liquidation	
38		2004		18,603	3,755			5	
40		2005		4,222	788			3	
41									
42									

FIGURE 5.2 In addition to the loss data a section on recovery information is contained on the sheet.

	A	B	C	D	E	F	G	H	I
35									
36		Recovery Analysis							
37									
38		Vintage Year	Vintage Loss	Liquidation Proceeds	Liquidation Costs	Net Proceeds	Recovery Rate	Avg Months to Liquidation	
39		2004	36,806	18,803	3,755	14,848	40.34%	5	
40		2005	7,290	4,222	788	3,434	47.11%	3	
41									
42									

FIGURE 5.3 The recovery analysis is shown completed.

- Liquidation proceeds and costs have been provided in the raw data. Typically this may require data manipulation to aggregate, but for now assume that it is presented in this format. The next step is to calculate the net proceeds from liquidation. This is a simple subtraction formula. In cell F39, enter the following formula:

$$= D39 - E39$$

Copy and paste this formula down to cell F40.

- The next step is to calculate the recovery rate by dividing the net proceeds by the amount that was considered lost. This is done in cell G39 using the following formula:

$$= F39/C39$$

Copy and paste this formula down to cell G40.

- The final part of the analysis is to notice the recovery lag. This is provided in H39 and H40. Typically the lag should be reported by the servicer or can be calculated by a more granular analysis. Refer to Figure 5.3 for a look at the completed section.

The takeaway from this analysis is the recovery rate and lag. In this case, there are only two years of data, so it is questionable to use averages. With limited data, it is more conservative to take the lowest recorded recovery and the longest lag. In this example that would be 40.34 percent and five months.

PROJECTING RECOVERIES IN A CASH FLOW MODEL

Since recoveries are not a guaranteed cash flow, they are often looked upon with skepticism among risk adverse analysts. Even with data some analysts don't give credit for recoveries. However, when there is a recovery assumption it is important to implement the cash flow correctly. This includes achieving the correct timing of cash flow depending on lag and directing the cash in a manner consistent with the transaction structure.

MODEL BUILDER 5.2: INTEGRATING RECOVERIES INTO PROJECT MODEL BUILDER

1. Start at the Inputs sheet in cell J17 and label that cell **Recovery Rate**. Label cell K17 **Recovery Lag**. In cell J18 enter 40% as an approximation of the recovery rate. Name this cell **pdrRecovRate1**. In cell K18, enter 5 for the recovery lag. Name this cell **pdrRecovLag1**.
2. Switch over to the Cash Flow sheet. Earlier Column U was designated as the area for recoveries. The formula for the recovery amount has to take into account the recovery rate and the lag. This can be achieved using an IF statement in conjunction with an OFFSET function. An IF statement is required first to make sure there is no calculation prior to the first possible recovery period. Cell U7 should start as follows:

$$= \text{IF}(A7 \leq \text{pdrRecovLag1}, 0)$$

Without such a statement, there would be an error in the periods prior to the lag period when the OFFSET is implemented. With the IF statement in place, the OFFSET needs to reference the defaulted amount that occurred in the past. The periods back should be the recovery lag. Once that defaulted amount is determined, it should then be multiplied by the recovery rate to get the recovery amount. The following formula does exactly this:

$$= \text{IF}(A7 \leq \text{pdrRecovLag1}, 0, \text{OFFSET}(N7, -\text{pdrRecovLag1}, 0) * \text{pdrRecovRate1})$$

The OFFSET starts with the current period's defaulted amount (cell N7) and goes back in time using the recovery lag. The lag variable has a negative in front of it so it seeks a reference cell that is back in time, versus forward in time if it was positive. Finally, the defaulted amount is multiplied by the recovery rate to get the recovery amount. Copy this cell down the range U7:U366.

Occasionally, the question of seasoned loans brings up a debate in recoveries when using the above formula. The debate is that by using this formula one assumes that no loans default prior to the start of the transaction. Some will argue that loans could have defaulted in the month prior to the transaction and if they were in the pool their recovery amount would come in earlier than the IF statement allows. The deciding point on this debate is that most structured transactions do not include defaulted loans in the pool of assets. This would mean that all loans going into the pool are current and the IF statement assumption holds, even with seasoned loans.

3. At this point the recovery section is complete, but to finish the entire Asset Amortization section one more column on the Cash Flow sheet needs to be created. Column X is the final column and is where all the cash flow that is generated each period will be aggregated. Label cell X4 **Total Cash Flow Available for Liabilities**. In cell X7 enter the following formula and copy and paste it over the range X7:X366:

$$= Q7 + R7 + T7 + U7$$

Scheduled Principal, Prepaid Principal, Interest, and Recoveries are real cash flows in each month and are what are available to the waterfall of liabilities. An important point about recoveries is that they are included as cash flow for the waterfall, but do not amortize the asset principal. This means that the cash is similar to interest in that it helps create excess spread.

FINAL POINTS REGARDING RECOVERIES

The reason the recovery analysis is not as detailed as prepayments or defaults is that recovery values can be very volatile depending on asset type, geographic region, and general economic environment. More advanced methods exist for assets, such as *market value decline* (MVD), which focuses on home values depending on specific regions or *Automotive Lease Guide* (ALG) values for estimating lease residual value, but these are all advanced analyses that are very dependent on highly detailed research in a specific industry.

Also, structured transactions are traditionally based on cash flow from the assets, not recoveries from defaults. As competition increases, newer deals have been giving more and more credit to recovery values, which can be dangerous if not properly analyzed. These types of deals begin to look like transactions that should be done by *nonperforming loan* (NPL) groups. Structured professionals seeking to do such deals should understand the recovery analyses performed by NPL groups, because they are often very comprehensive and detailed. In most instances, those analyses include loan level recovery and specific collateral analysis. For general modeling purposes or when first starting out, a more basic, conservative approach should be taken.