Dynamic Risk Management

Education Session

IASB Meeting, June 2017
Agenda Paper 4

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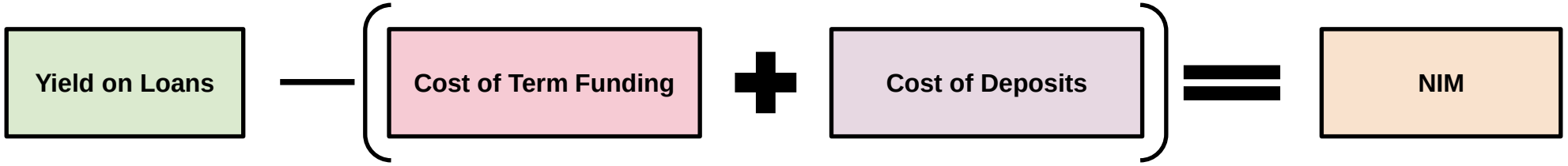
Meeting Objective

- Highlight events that give rise to a change in the portfolio
- Discuss how new originations impact the target profile; and
- Discuss how dynamic risk management reacts to changes in the portfolio.

May Board Recap

Numerically, net interest margin (NIM) is defined as:

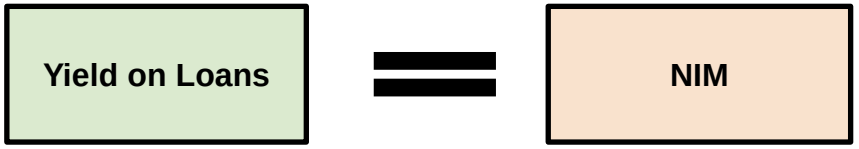


Dynamic risk management (DRM) attempts to stabilise changes in NIM by aligning the re-pricing of assets (loans) and liabilities (funding).

However, when an institution has significant amounts of deposit funding the NIM equation changes.

May Board Recap

If the cost of deposits is zero, and will always be zero, then the equation is further changed:



As such, when an institution has significant amounts of non-interest bearing deposits, managing NIM re-pricing poses a challenge because:

- NIM is dominated by loan yields; and
- Loan yields will change over time as maturing loans are replaced by new loans.

DRM is focused on managing rather than eliminating changes in NIM.

May Board Recap

As loan yields are the only aspect of the equation that can change, managing NIM requires an asset focus.

As the assets must mature and re-price, the DRM perspective has two parts:

- What is the target profile for NIM re-pricing? How quickly should NIM respond to changes in the interest rate environment?
- What actions are required to align the originated loan portfolio with the target profile?

By aligning the asset profile against a target profile, it is possible to manage NIM fluctuations.

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Dynamic in DRM

The DRM portfolio, consisting of loans and funding, changes frequently because new exposures are originated and existing ones mature.

As the portfolio changes often (daily), the process of comparing the asset profile against the target profile is repeated often. This leads to frequent changes in the derivative portfolio as management reacts to changes in the asset profile.

The volume of resulting transactions can be significant however, there are four main ‘events’ that impact the composition of a portfolio:

- Product maturity;
- Product growth;
- Time; and
- Product prepayment.

Prepayment will be discussed in a separate Board Session.

Product Maturity

Product Maturity

Given DRM is attempting to align the asset profile with a target profile, what is the impact when an asset matures?

In order to align asset re-pricing with the target profile, it is necessary to consider the maturity of existing products as part of the risk measurement process.

Therefore, if products mature as expected there is no impact on DRM.

Case Study #1, discussed in May and re-produced in Appendix 1, demonstrates the above and two related concepts:

- If the target profile assumes the re-investment of a matured product, then the specifics of the assumed product are not critical. The re-invested product can be aligned to the target using derivatives priced at the time of origination; and
- If the matured product is at the end of the profile (end T^{10} in the case study) then the resulting re-pricing of NIM will occur as desired by management.

Product Growth

Product Growth

As the yield on loans and the cost of funding is determined at or near origination, how does portfolio growth impact DRM's management of re-pricing risk?

Growth will be discussed from two perspectives:

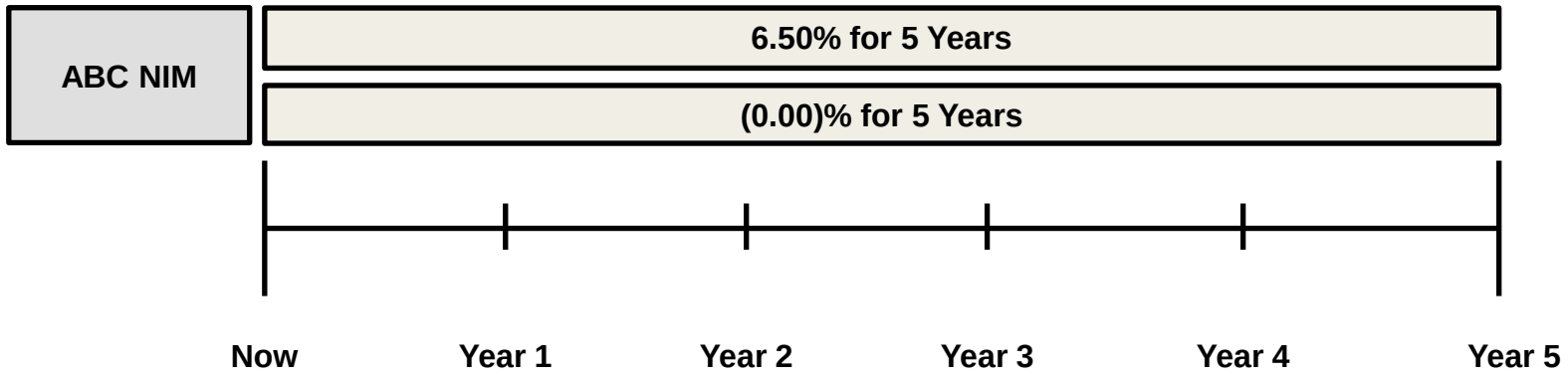
1. Loan growth funded by growth in core deposits; and
2. Loan growth funded by term debt.

Deposit Funded Growth – Case Study

Deposit Funded Growth - Case Study

ABC Bank's balance sheet and NIM profile is as follows. All products are non-amortizing.

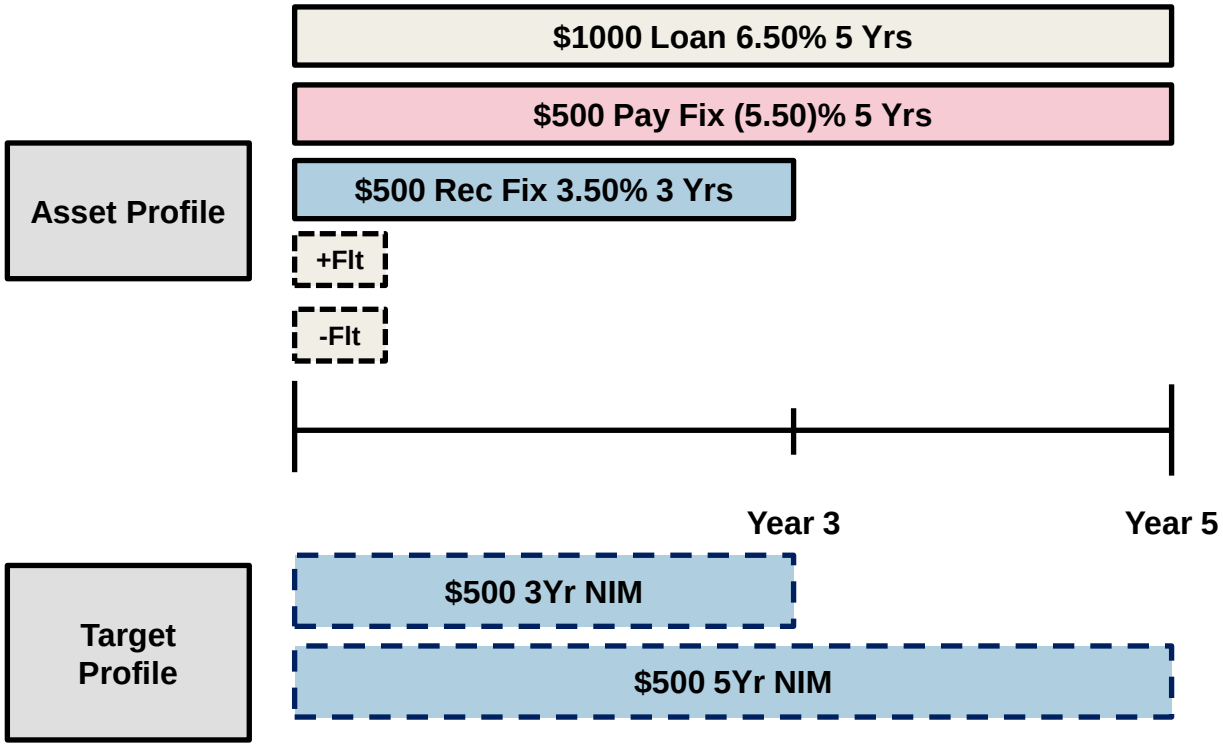
Product	Balance	Yield
Assets		
5YR Fixed Loans	1,000.0	6.50%
Liabilities		
Core Deposits	1,000.0	0.00%



Management has assessed their core deposits and is comfortable they are zero rate perpetual funding.

Deposit Funded Growth - Case Study

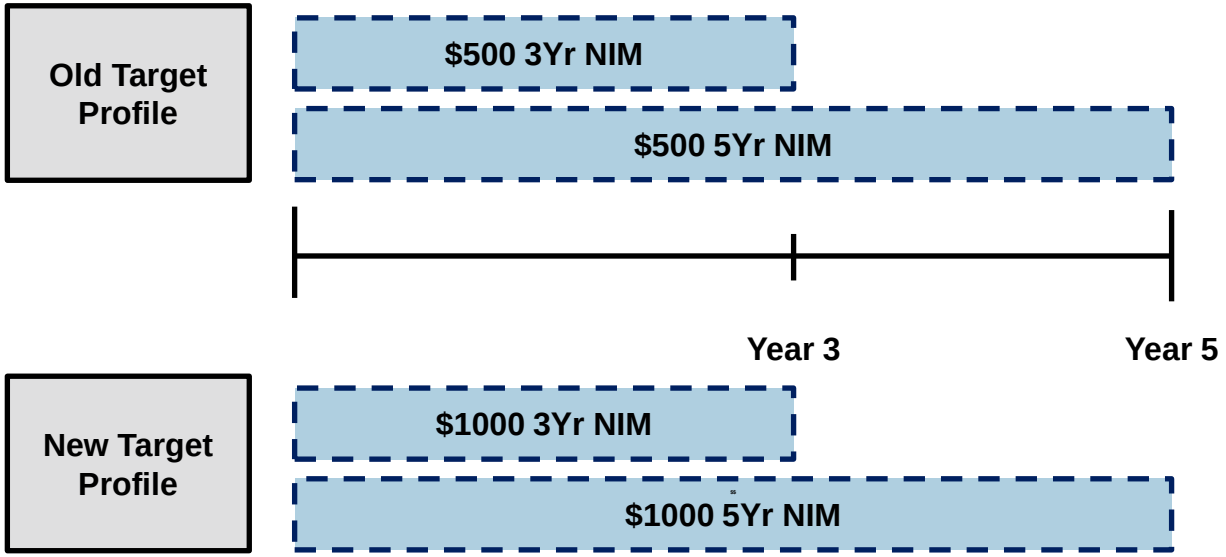
ABC Bank has decided they would like NIM to re-price 50% at the end of year 3, and 50% at the end of year 5. The bank has executed the necessary derivatives to transform the portfolio as per below:



NIM is 5.50% after the profile has been transformed.

Deposit Funded Growth - Case Study

After a short period of time passes, the bank originates another $1000 of core deposits which are immediately assessed and deemed to be zero rate perpetual funding. The new deposits are added to the risk measurement systems resulting in notional growth of the target profile.

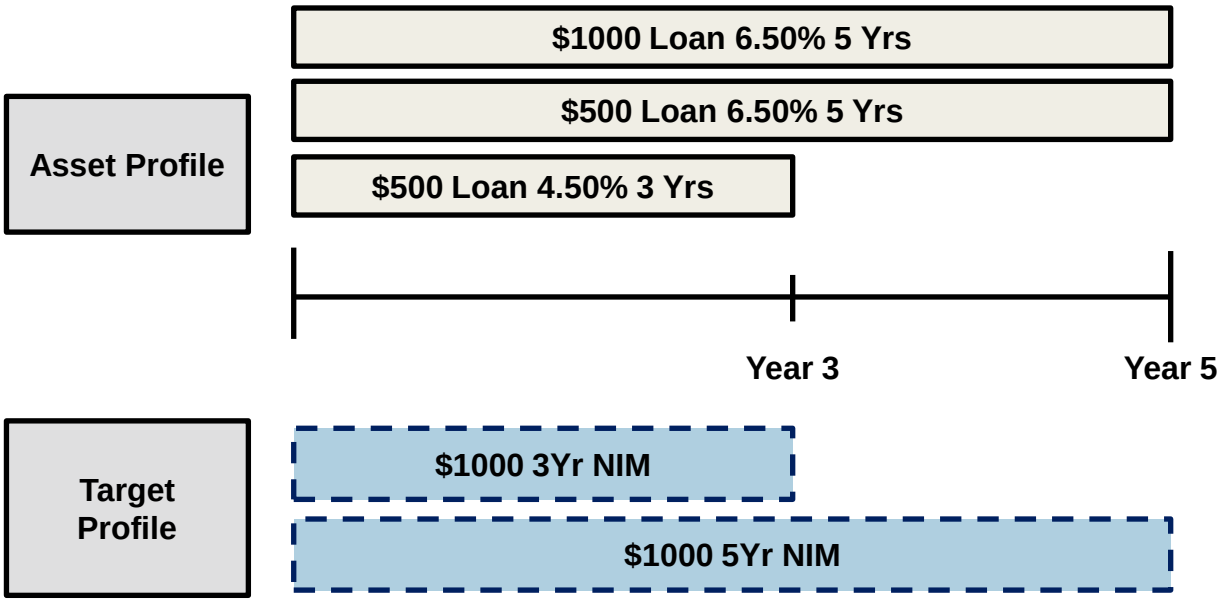


The growth in available core deposits does not change the target profile. It simply increases the notional of that target profile.

Deposit Funded Growth - Case Study

Management originates two new loans with the $1000:

- A $500 five year loan yielding 6.50%; and
- A $500 three year loan yielding 4.50%.



The asset profile has $1500 of assets re-pricing at end T^5 whereas the target profile indicates $1000 of assets should re-price at end T^5.

Mitigating actions are required to transform $500 of 5 year re-pricing to 3 year re-pricing.

DRM will periodically update the comparison of the asset profile against the target profile to assess alignment.

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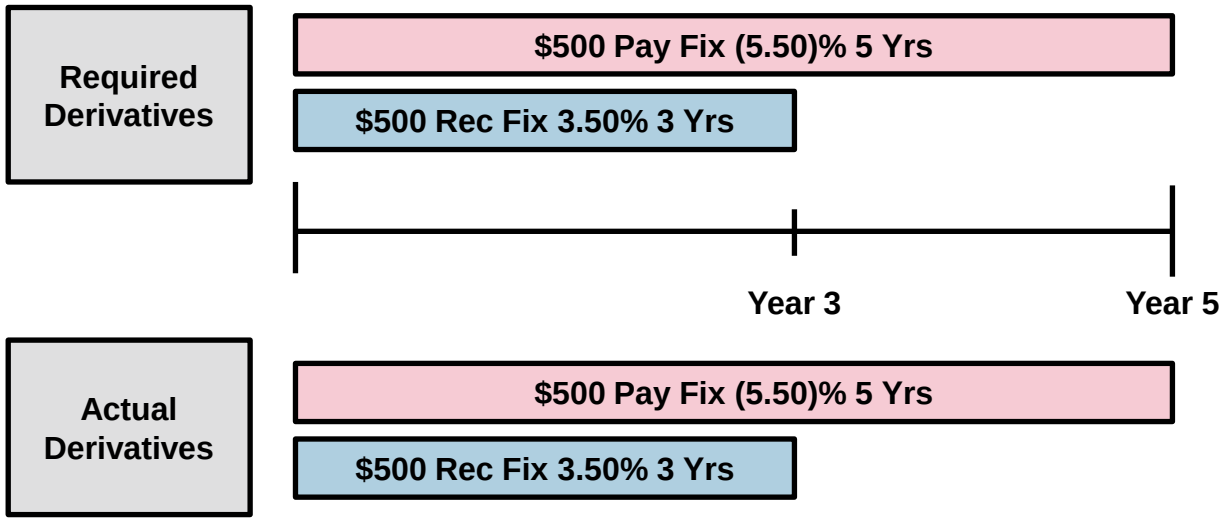
Deposit Funded Growth - Case Study

To align the profiles, two derivative transactions are required:

1. A five year pay interest rate swap; and
2. A three year receive fix interest rate swap.

Examining the derivatives already executed shows that the bank already has the necessary derivatives to transform the portfolio.



The derivatives in existence reduce the amount of 5 year re-pricing and increase the amount of 3 year re-pricing, aligning the asset profile with the target profile.

Updating the comparison will sometimes result in additional derivative action.

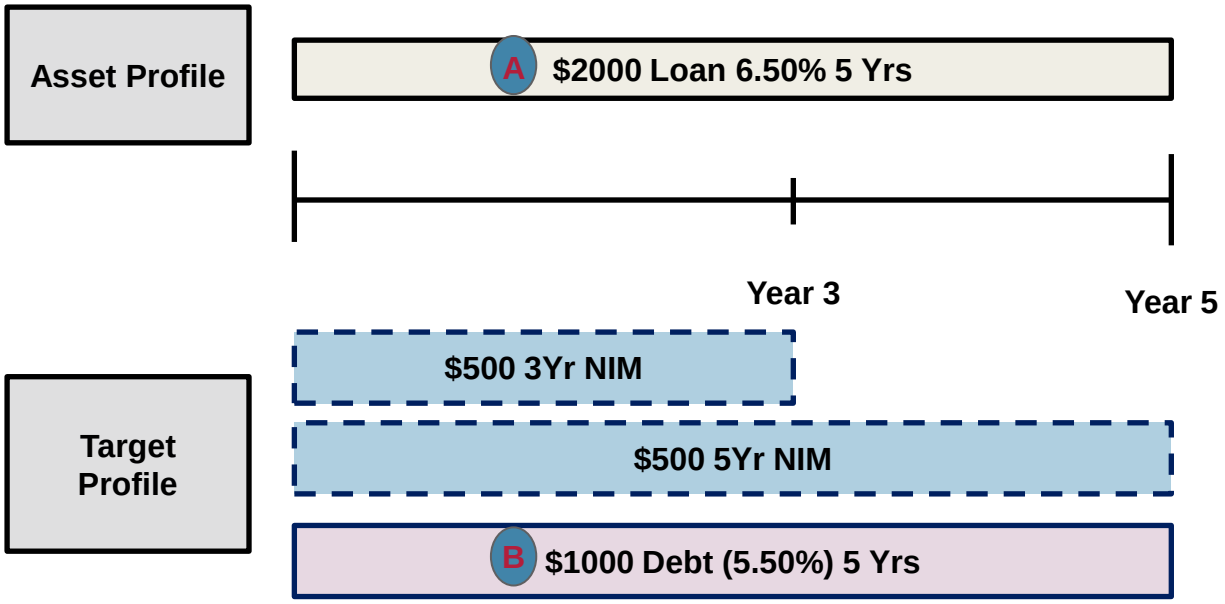
Debt Funded Growth – Case Study

Debt Funded Growth - Case Study

To demonstrate what would change if the growth was debt funded rather than deposit funded, the changes to the portfolio have been amended.

The bank issues 5 year fixed rate debt and uses the cash to fund another $1000 of 5 year fixed rate loans.

The risk profile is updated as per below:



A – The loan profile is updated as an additional $1000 of 5 year loans have been originated.

B – The target profile is updated to include the issued debt. This assumes management wishes to align the re-pricing of contractual assets and liabilities wherever possible, minimizing NIM fluctuations.

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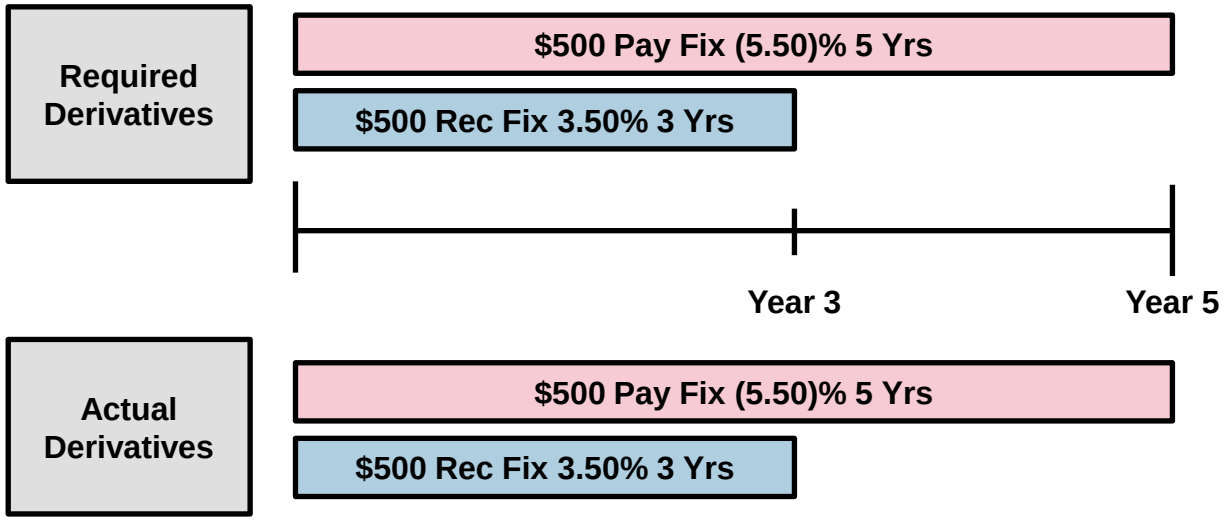
Debt Funded Growth - Case Study

Comparing the asset profile against the target, the bank has $2000 loans re-pricing in 5 years whereas the target is $500 of 3 year re-pricing and $1500 of 5 year re-pricing. As such, mitigating actions are required.

Examining the derivatives already executed shows that the bank already has the necessary derivatives to transform the portfolio.



The derivatives in existence reduce the amount of 5 year re-pricing and increase the amount of 3 year re-pricing, aligning the asset profile with the target profile.

Debt Funded Growth - Case Study

Examining NIM before and after growth will highlight a change between debt and deposit funded growth:

	Deposit Funded Growth	
A	Starting NIM	5.50%
B	Ending NIM	5.50%
C = A - B	**Change in NIM**	**0.00%**

	Debt Funded Growth	
D	Starting NIM	5.50%
E	Ending NIM	3.25%
F = D - E	**Change in NIM**	**2.25%**

In the example of Debt Funded Growth, NIM did not change because of mis-alignment between the asset and target profile coupled with a change in the interest rate environment. Nor was there a change in the target profile.

NIM changed because of growth. More specifically, the change occurred because the bank's funding mix changed from 100% core deposits to 50% core deposits.

NIM changed because the inputs to the target profile changed. Not because the profile itself changed.

Dynamic Risk Management

Overall, the dynamic aspect of risk management focuses on reacting to changes that have occurred in the portfolio and evaluating if additional mitigating actions are required.

It is a cycle whereby:

- The inputs composing the asset and target profile are updated;
- The asset profile is compared against the target profile;
- Mitigating actions are identified;
- If those derivatives are already in place – no further action required; or
- If those derivatives are not in place, then mitigating actions are taken.

These steps are taken to mitigate the impact interest rates can have on NIM re-pricing.

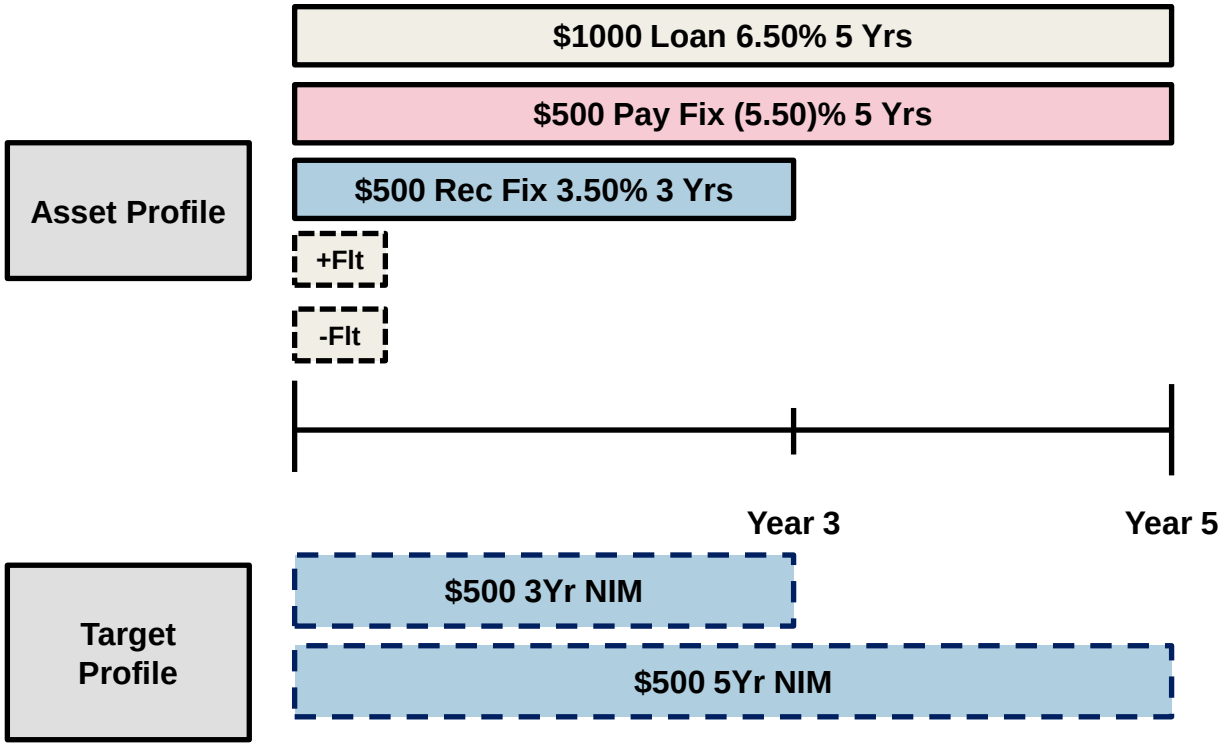
This does not mean DRM eliminates all factors that can impact NIM on a forward looking basis.

Time – Case Study

Time - Case Study

The following case will highlight the importance of considering the concept of time when defining the target profile.

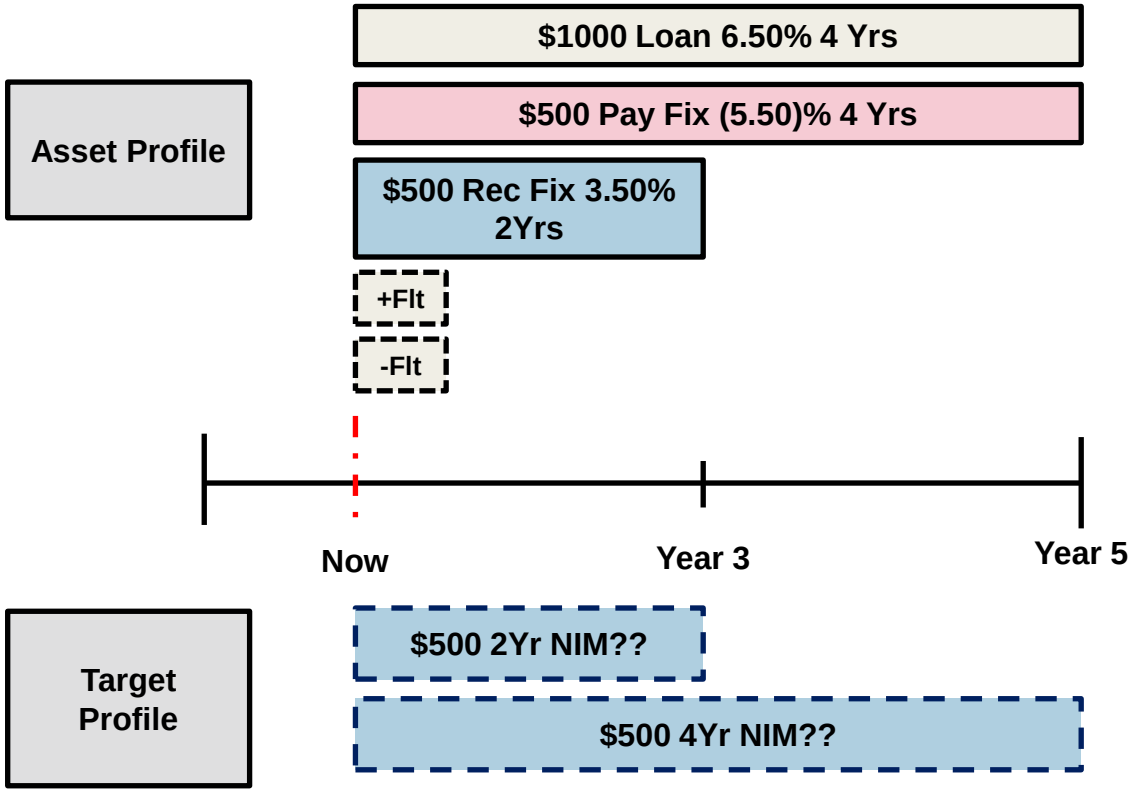
Re-using the ABC Bank example from page 13, the risk profile was as follows:



NIM is 5.50% after the profile has been transformed.

Time - Case Study

The portfolio is unchanged until the end of year 1. The risk profile is re-measured and is shown below:



The loans and derivatives move one year closer to maturity.

However, how should the target profile react to the passage of time?

Should the profile age one year or did management wish a re-pricing profile always equal to 50% $T_{Now + 3}$?

Management should be specific when defining the profile, recognising how time will impact the distribution.

Target Profile Definition

Discussing the profile in the context of variables can help demonstrate the specificity required when defining the profile.

For example, if the profile was set as 50% 3 year and 50% 5 year, then that profile could be described in variables as follows:

T = Time Ntn = Notional % = Re-Pricing percentage

Today = T_0	T_0	T_1	T_2	T_3	T_4	T_5
Ntn = 1000	% = 0	% = 0	% = 0	% = 50	% = 0	% = 50

The above profile states as at today (T_0), 50% of the $1000 notional should re-price in T_3, and 50% of the notional should re-price in T_5.

Management cannot impact time. Time will move forward.

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Target Profile Definition

Moving forward one year, the profile could change as follows:

Today = T_0	T_0	T_1	T_2	T_3	T_4	T_5
Ntn = 1000	% = 0	% = 0	% = 0	% = 50%	% = 0	% = 50%

Today = T_1	T_1	T_2	T_3	T_4	T_5
Ntn = 1000	% = 0	% = 0	% = 50	% = 0	% = 50

Moving forward one period in time has resulted moving one year closer to re-pricing. As such, the first re-pricing will take place two years from now rather than three years from now.

Target Profile Definition

However, if T_3 were defined as $T_{Now + 3}$ the profile would change as follows:

Today = T_0	T_0	T_1	T_2	T_3	T_4	T_5
Ntn = 1000	% = 0	% = 0	% = 0	% = 50	% = 0	% = 50

Today = T_1	T_1	T_2	T_3	T_4	T_5	T_6
Ntn = 1000	% = 0	% = 0	% = 0	% = 50	% = 0	% = 50

Moving forward one period in time has not resulted in the bank being one year closer to the first re-pricing. The notional allocated to T_3 in the first definition is re-allocated to T_4 with the second definition.

As the mitigating actions required at T_1 differ depending upon the definition used, specificity in defining the profile is important.

Accounting Model Relevance

DRM activities are focused on aligning the asset profile against a target profile.

The specific target profile is informed by:

- The banks funding mix (term versus core deposit); and
- Management's decision regarding the NIM re-pricing profile.

Given growth, maturity, and time will impact the composition of the portfolio, DRM will take mitigating actions reacting to those changes in the portfolio. Those actions will maintain alignment between the asset profile and the target profile.

The more specificity with which the profile is defined, the easier it is to identify the rationale for mitigating actions taken and understand their impact on NIM.

Appendix – Case Study #1 May Board Session

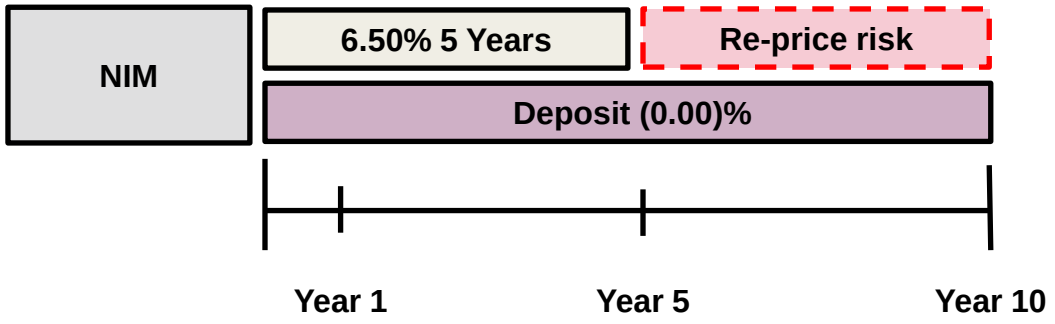
Appendix - Case Study # 1

AB Bank manages NIM. Their balance sheet is as follows.

All products are non-amortising. Management has assessed their deposit base and is comfortable it is effectively zero rate perpetual funding.

Product	Balance	Yield
Assets		
5YR Fixed Loans	1,000.0	6.50%
Liabilities		
Core Deposits	1,000.0	0.00%

Over a ten year horizon, the NIM profile is as follows. 100% of NIM is subject to re-pricing at the end of T^5.

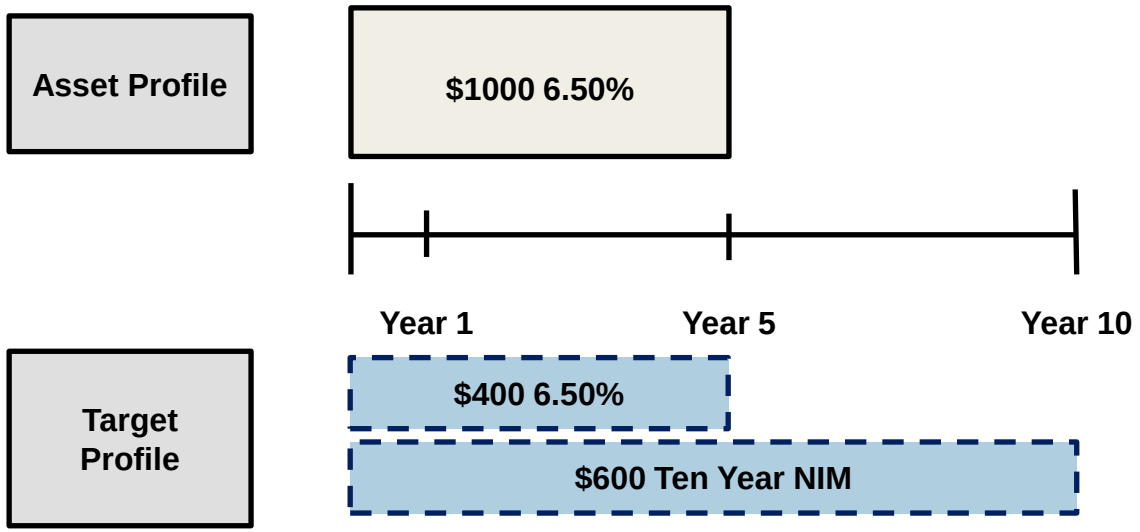


Management is uncomfortable with 100% NIM re-pricing at end T^5.

Appendix - Case Study # 1

Management decides to fix re-pricing such that $400 re-prices after 5 years and the remaining $600 of the portfolio re-prices after 10 years.

Management compares the target profile with the actual profile below, highlighting the necessary transactions to transform the portfolio.



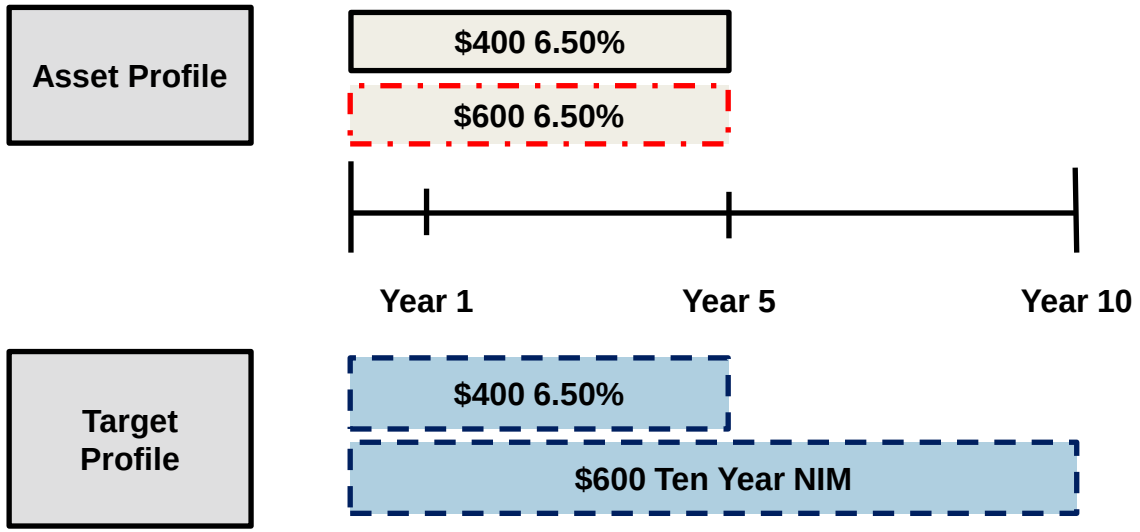
In order to transform the portfolio to the target, certain actions must be taken at T^0 and certain actions are required at T^5.

Appendix - Case Study # 1

The following actions will transform the portfolio.

Step 1 – Split the actual portfolio

As management wishes $400 to re-price at T^5, and $400 will naturally re-price at that time, no action is required. Management will focus on the $600 which they do not want to re-price at T^5.

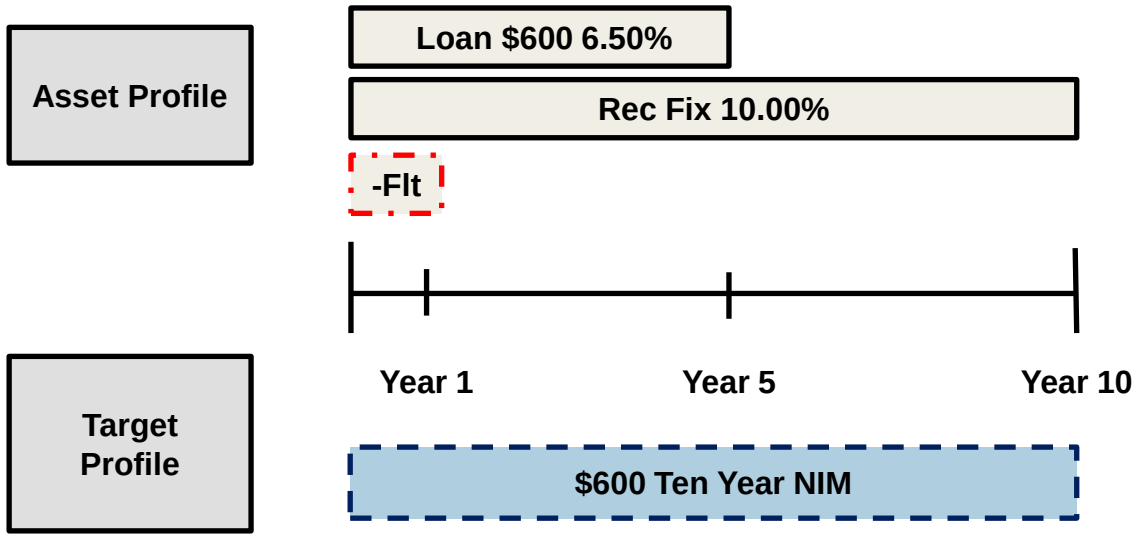


The above demonstrates that the target profile has been obtained for $400 out of the $1000.

Appendix - Case Study # 1

Step 2 – Secure 10 year yield

Focusing on the $600 where management wishes re-pricing to take place at T^{10}. A 10 year receive fix, pay float swap will provide a fixed rate asset (i.e., the receive leg) for 10 years.

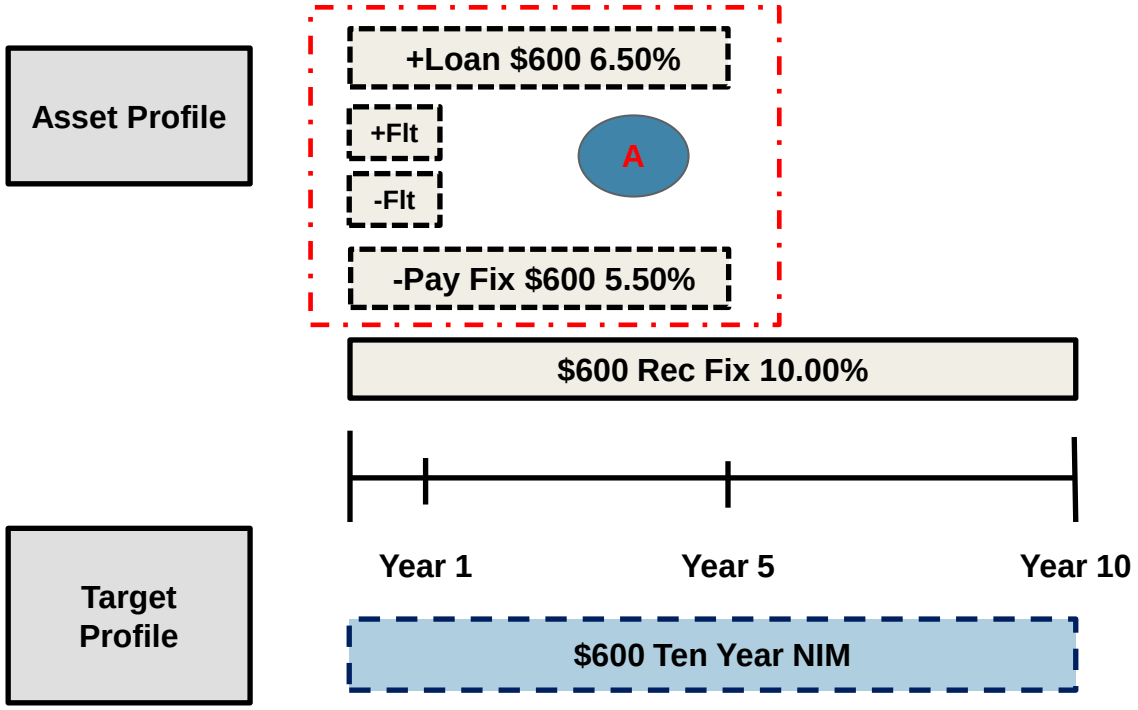


While the 10 year asset has been obtained, management is now funding a 5 year asset with floating rate debt (i.e., the swap pay leg).

Appendix - Case Study # 1

Step 3 – Close out position

The final action taken at T^0 is to eliminate the residual re-pricing risk by executing a 5 year pay fix, receive float interest rate swap.



A – The four instruments in the red box net to a notional of $0 but earn 1.00% of $600 each period.

NIM has changed from 6.50% to 11.00% after aligning the asset and the target profile.

No more actions are required until T^5.

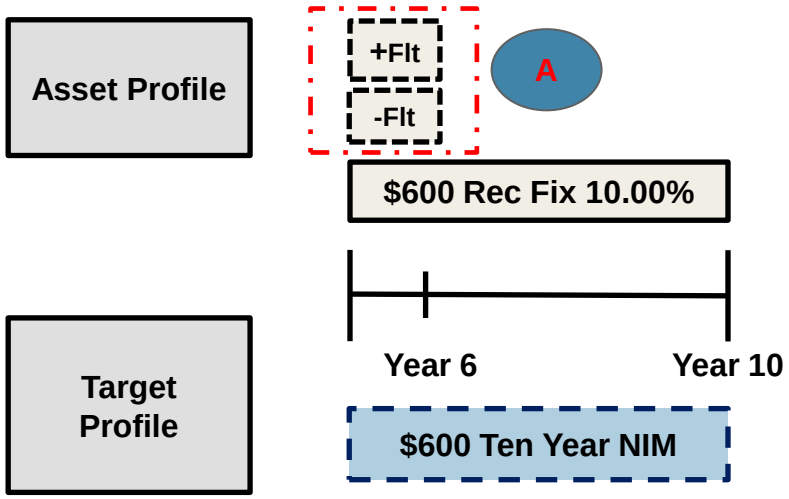
Appendix - Case Study # 1

Step 4 – T^5

At the end of year 5, three events will occur which the risk position must consider:

- $600 of cash will be received as the loan matures;
- The 5 year pay fix, receive float interest rate swap will mature; and
- The $600 of cash will be used to originate another loan.

After these events, the risk position will be as follows assuming the bank funds a year 5 floating rate loan earning float + 1%.



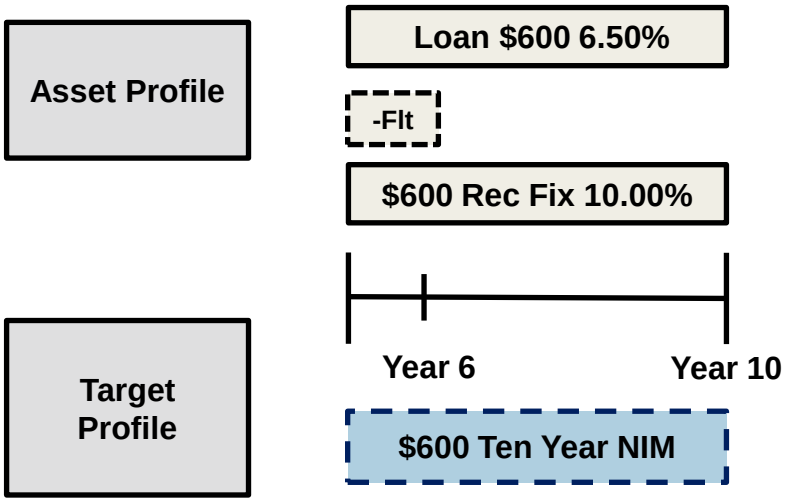
A – The new loan earns the float rate, which is offset by the pay float leg on the 10 year swap executed at T^0.

The actual profile matches the target, no action is required. NIM is maintained at 11% until the end of T^{10}.

Appendix 1 - Case Study # 1 – What if

Step 4 – T^5

The case assumed a floating rate loan would be originated at the end of T^5. Given management cannot control what type of loans are originated, what would occur if a fixed rate loan had been originated?

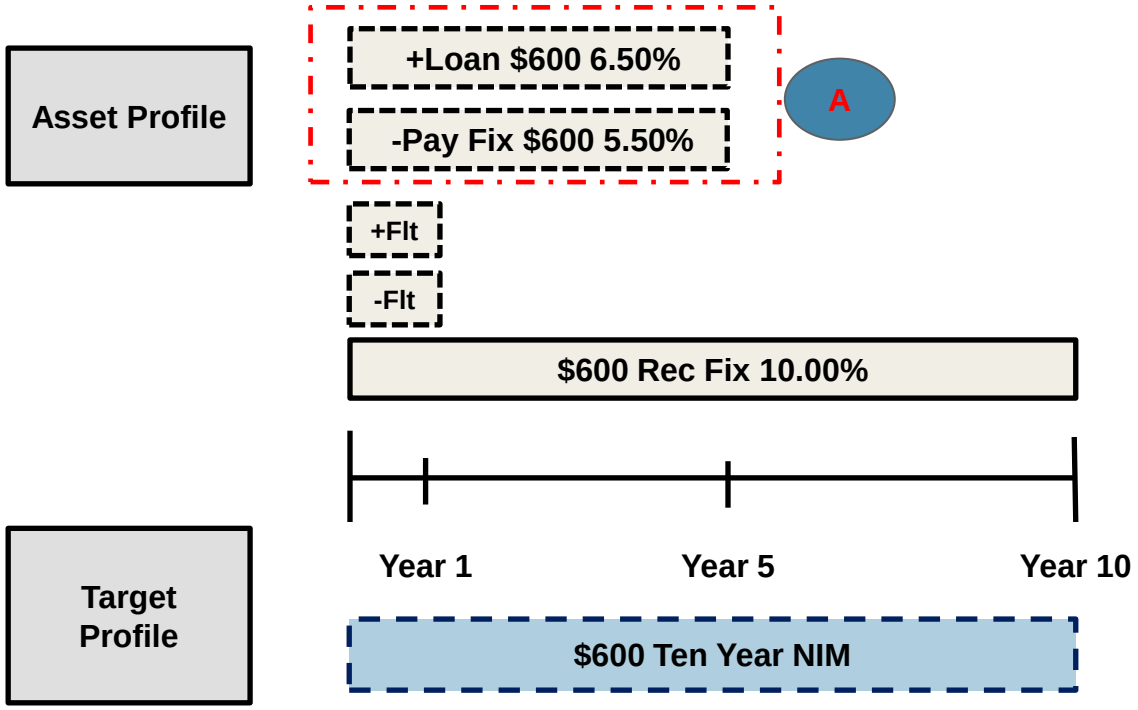


The profile above is very similar to that on page 16 where the fixed rate loan is funded by the float leg of the swap creating re-pricing risk.

Appendix 1 - Case Study # 1 – What if

Step 5 – Close out the T^5 position

The final action taken at T^5 is to eliminate the residual re-pricing risk by executing another 5 year pay fix, receive float interest rate swap.



A – As the loan and the swap will be priced at the same time, there is limited risk that these two instruments will impact NIM going forward.

NIM is maintained at 11% until the end of T^{10}.

Management is indifferent to which type of loan is funded at the end of T^5. Management has the flexibility to react to customer actions.

Thank you