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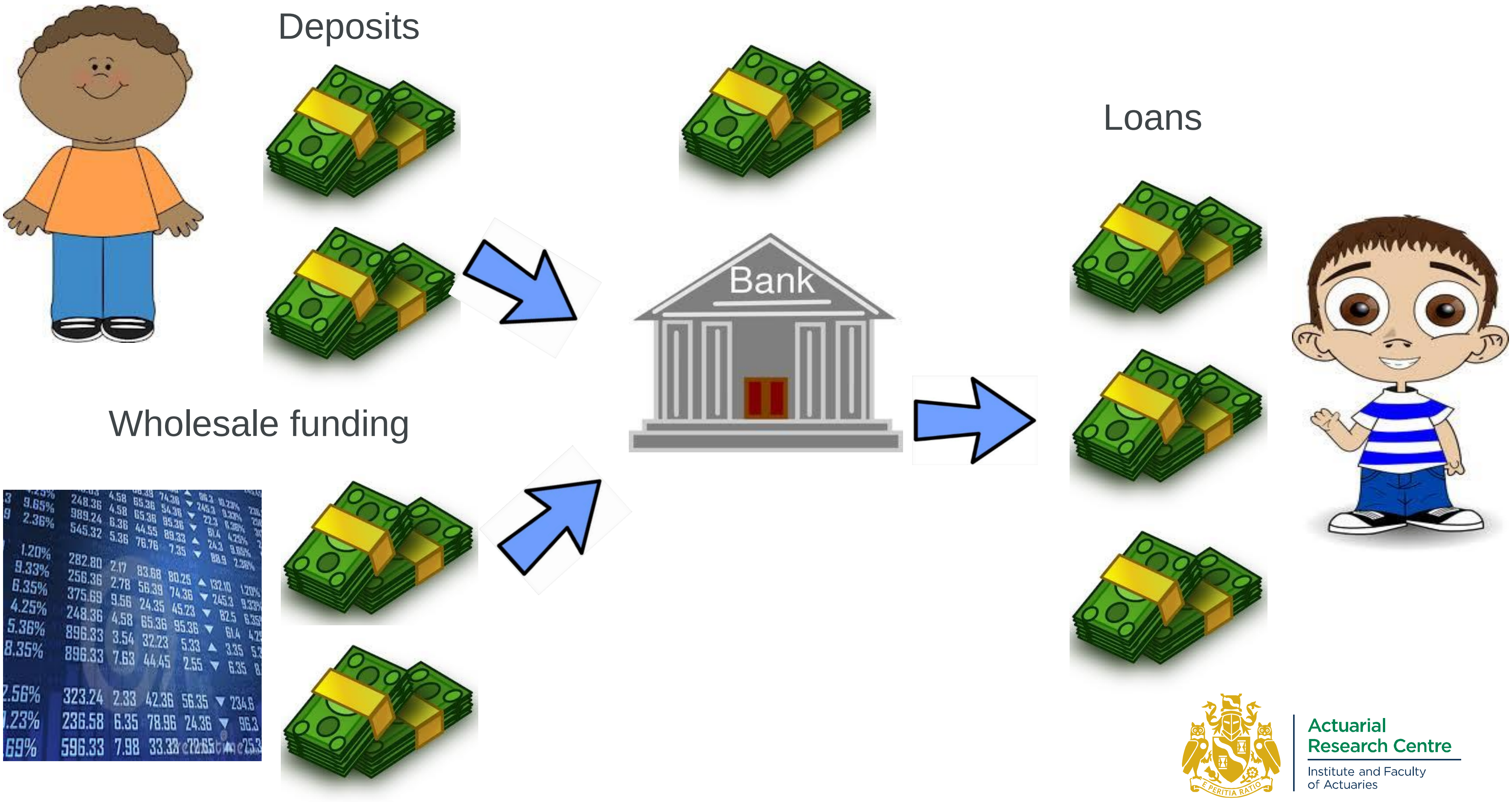
What is funding liquidity risk and how can a bank manage it?

Iain Ritchie
Actuarial Research Centre

06 July 2016

How do banks work?



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Fund Transfer Pricing

Deposits

Treasury

Loans

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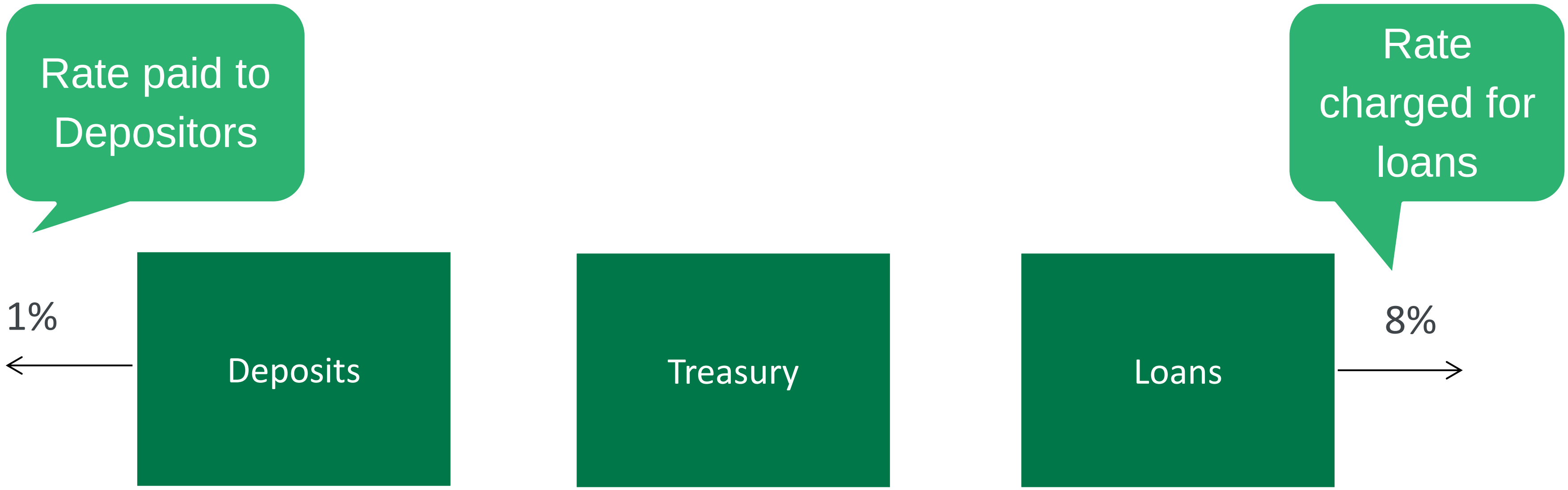
Fund Transfer Pricing



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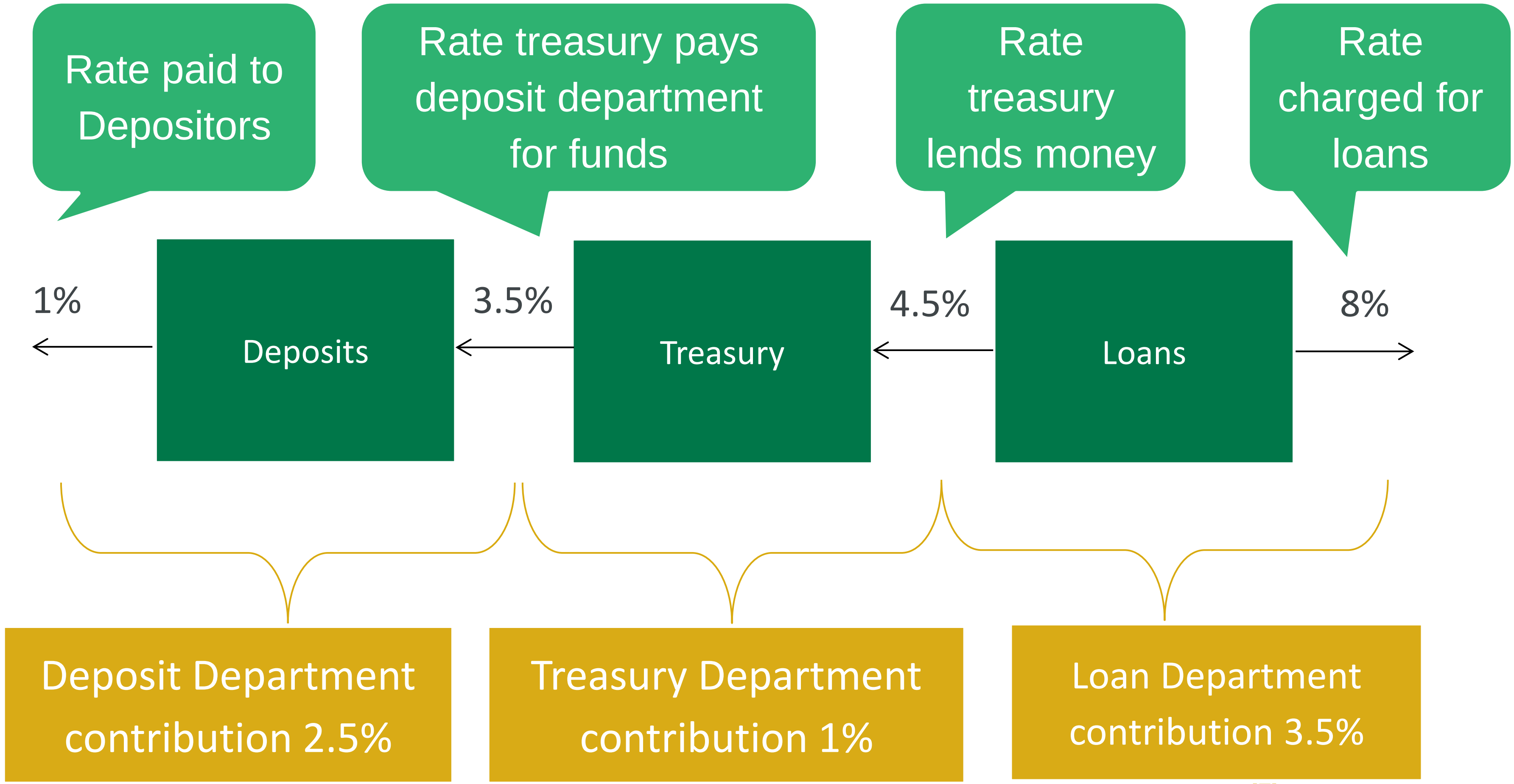

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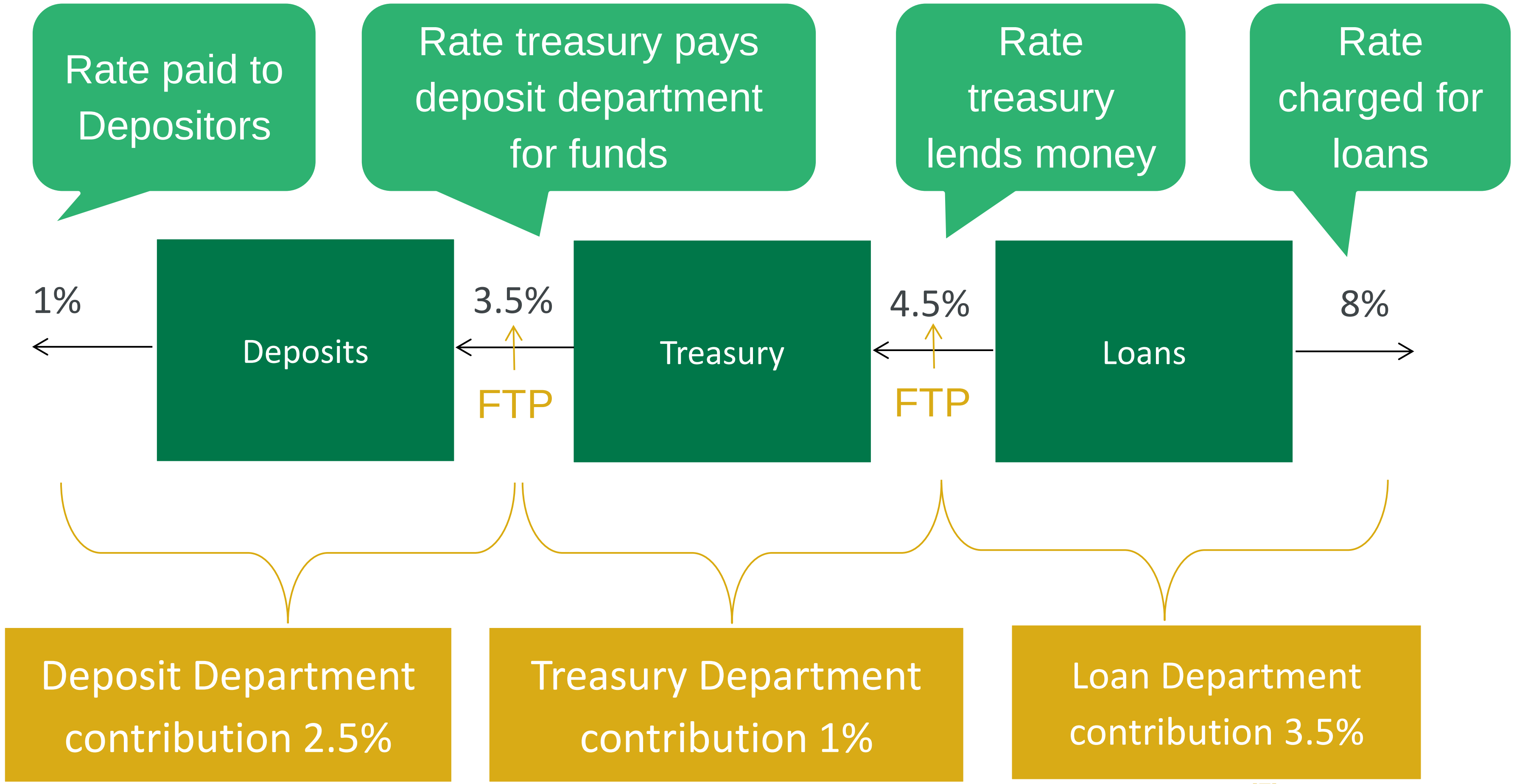

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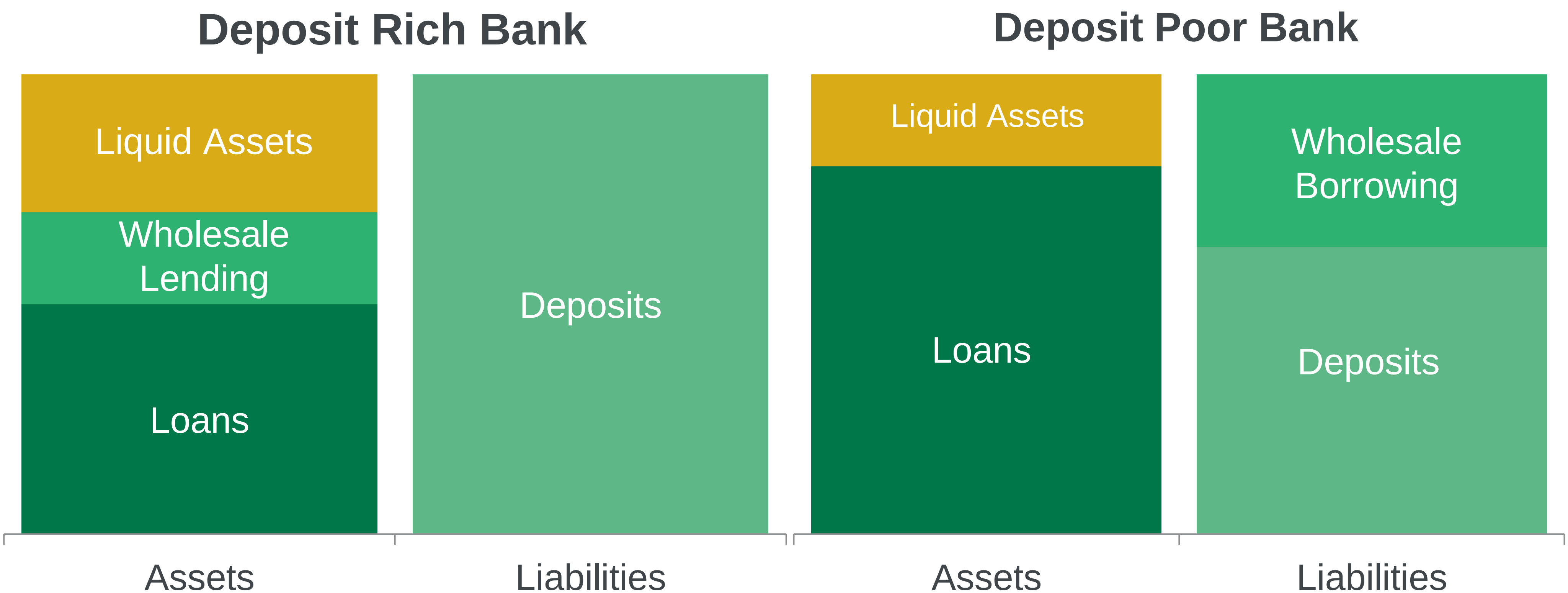
Bank’s Balance Sheet

- Either be deposit rich or poor as shown in the graphs.



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Profit Maximisation

Want to Maximise Profit from the following equation:

$$P = Li_L + M_L W_O + Bi_B - Di_D - M_B W_B$$

Assets multiplied by asset return

Liabilities multiplied by rate of return

Regulatory Requirements for Liquid Assets:

$$B = \alpha D + \beta M_B$$

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Comments

Comments on Profit Maximisation Formula

Bank sets i_L, i_D:

$$L \equiv L(i_L)$$
$$D \equiv D(i_D)$$

Wholesale market: Borrowing or Lending

Normally $M_B > 0,\ M_L = 0$

or $M_B = 0,\ M_L > 0$

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FTP Results

Deposit Rich (M_B=0):

$$P = L(i_L)(i_L - W_O) + D(i_D)\big((1-\alpha)W_O + \alpha i_B - i_D\big)$$

FTP Rate when bank is Deposit Rich:

For Loan Unit, FTP Rate is W_O

For Deposit Unit, FTP Rate is $(1-\alpha)W_O + \alpha i_B$

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FTP Results

Similarly:

FTP Rate when bank is Deposit Poor (M_L=0):

For Loan Unit, FTP Rate is $\frac{W_B}{1-\beta} + \frac{\beta i_B}{1-\beta}$

For Deposit Unit, FTP Rate is $(1-\alpha)\left(\frac{W_B}{1-\beta} + \frac{\beta i_B}{1-\beta}\right) + \alpha i_B$

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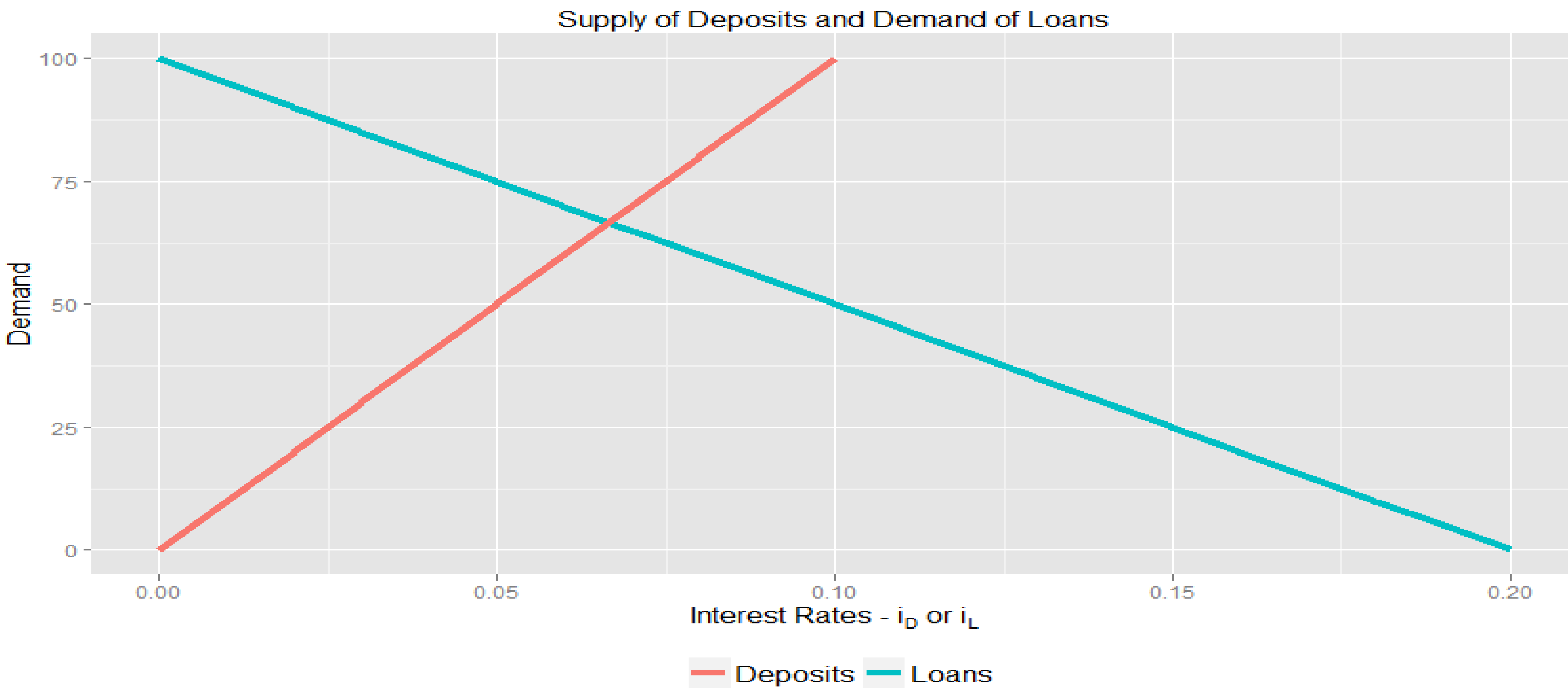
$$P = L(i_L)i_L + M_L W_O + B i_B - D(i_D)i_D - M_B W_B$$



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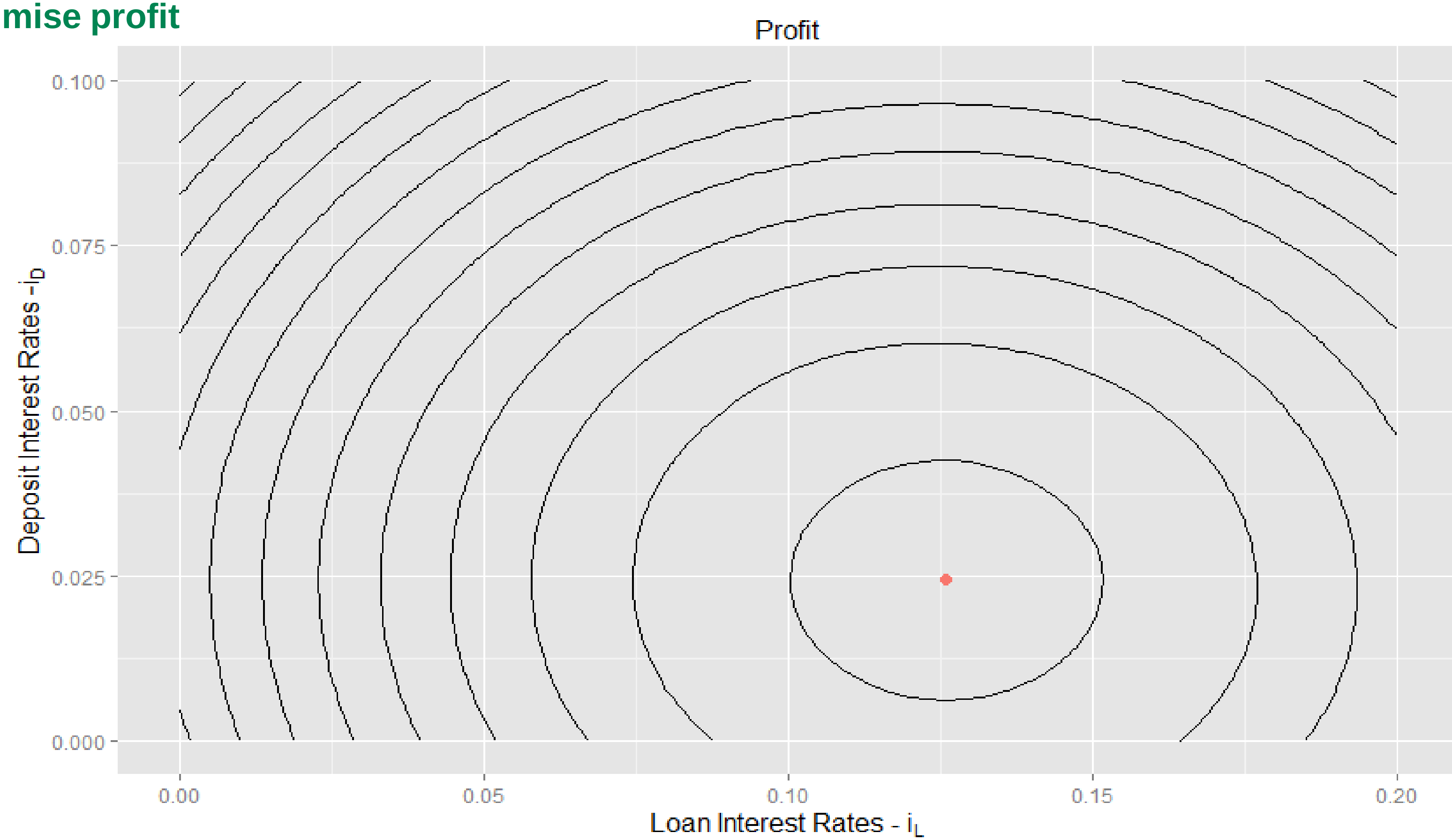
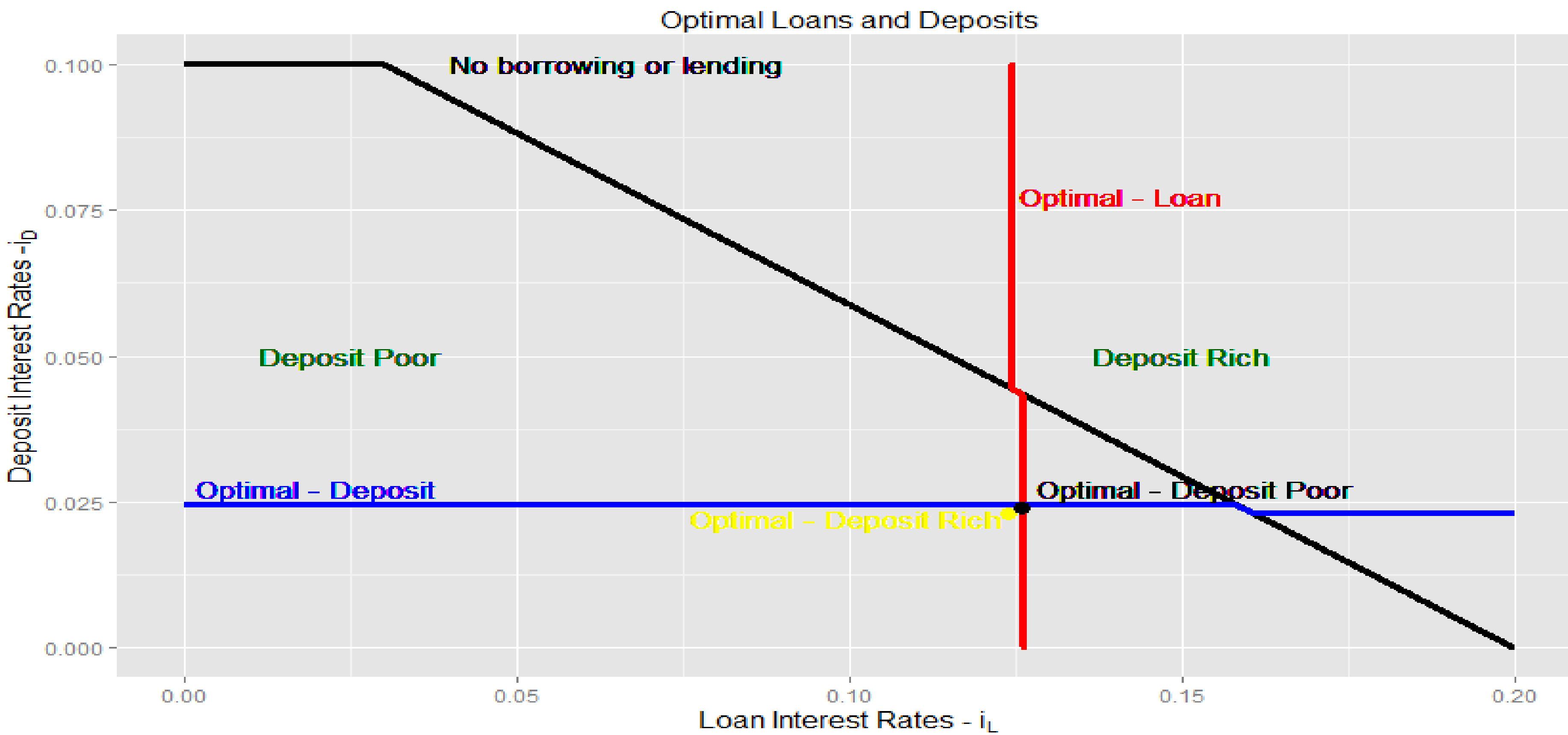
Profits

Maximise profit



Maximum Profit is £3.33m when $i_L = 12.61\%$ and $i_D = 2.44\%$

Deposit Poor



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Multi-Period Model

- So far we have only looked at one time period
- Loans and deposits are often granted for multiple time periods
- There is uncertainty on when loans may be repaid due to the option of prepayment
- Customers have the right to withdraw their money anytime
- These options have a cost for the business and need to be reflected in the FTP

Conclusion

- FTP can be separated independently between business units
- FTP rates are independent of demand and supply functions
- FTP can be used to maximise overall profits of the bank
- Liquidity constraints can be incorporated within the FTP system
- More work needs to be done to estimate the appropriate α and β in the FTP system

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Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.

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