CHARTA LEARNING · LESSON NOTES

The US Dollar Shortage

FRM Part II

1 A story: a bank that ran short of dollars

- Rhenwald Bank: euro-area home, big US dollar book
- US loans, structured credit, US securities
- Few dollar deposits: dollars borrowed short-term
- Autumn 2008: lenders stop rolling over
- Question: why did a big bank run short of dollars?

IN THE LESSON

- Meet Rhenwald Bank.
- It is a large bank whose home is in the euro area, so its own currency is the euro.
- Before the crisis it built a big book in U S dollars.
- It held American loans, structured credit, which means pooled and repackaged loans such as mortgage securities, and U S securities.
- Yet it had few dollar deposits from ordinary customers, so it borrowed most of its dollars for short periods.
- Then, in the autumn of two thousand and eight, its lenders stopped rolling over those loans.
- Our question for the whole lesson is simple.
- How can a large and solvent looking bank suddenly run short of dollars?

2 Where the dollar gap came from

- Non-US banks, especially European, built big dollar books
- Loans, structured credit, securities: US and foreign offices
- Few US dollar retail deposits
- A gap between dollar assets and stable dollar funding
- The gap was funded in wholesale markets

IN THE LESSON

- Rhenwald was not alone.
- Before two thousand and eight, large non U S banks, especially European ones, built big U S dollar balance sheets.
- They held loans, structured credit and securities, both in their offices in the United States and in their foreign offices, including head office.
- But they had few U S dollar retail deposits, which are the stable deposits of households and firms.
- That left a gap between their dollar assets and their stable dollar liabilities.
- A stable liability is one that is unlikely to run in a crisis.
- And that gap was funded in wholesale markets, which means borrowing from other financial institutions rather than from the public.

3 Example 1: Rhenwald's dollar funding gap

Rhenwald's dollar book before the crisis, in $bn

Dollar assets	loans, credit, securities	**$300bn**
Stable dollar liabilities	non-bank deposits	**$60bn**
Dollar funding gap	300 − 60	**$240bn**
Gap as a share of assets	240 ÷ 300	**80%**
Gap funded by	wholesale markets	**short-term**

IN THE LESSON

- Here is Rhenwald's dollar book before the crisis, in billions of dollars.
- Its dollar assets, the loans, structured credit and securities, total three hundred billion dollars.
- Its stable dollar liabilities are deposits from non banks, meaning households and companies, and they total sixty billion.
- The dollar funding gap is the dollar assets minus the stable dollar liabilities: three hundred minus sixty, which is two hundred and forty billion dollars.
- As a share of the dollar assets, that is two hundred and forty over three hundred, or eighty per cent.
- So four fifths of the dollar book is funded by wholesale markets, and that funding is short-term.
- Keep the two hundred and forty billion in mind.
- It runs through the whole lesson.

4 Three wholesale sources of dollars

Three wholesale sources filled Rhenwald's $240bn gap

Source	Who lent the dollars	Rhenwald
Interbank loans	Other banks, short-term	$70bn
CDs	US money market funds	$90bn
FX swaps	Euros swapped into dollars	$80bn
Total	The funding gap	$240bn

IN THE LESSON

- Three wholesale sources filled Rhenwald's two hundred and forty billion dollar gap.
- The table shows each source, who lent the dollars, and Rhenwald's amount.
- First, interbank loans, which are short-term loans from other banks.
- Rhenwald borrowed seventy billion dollars this way.
- Second, certificates of deposit, written C Ds.
- These are short-term deposits in the form of a tradable note, and Rhenwald sold them to U S money market funds, which are funds that invest in very short, very safe paper.
- That gave ninety billion.
- Third, foreign exchange swaps, or F X swaps, in which Rhenwald swapped euros into dollars, for weeks or months.
- That gave eighty billion.
- Seventy plus ninety plus eighty is two hundred and forty billion dollars, the whole funding gap.

5 Example 2: how an FX swap raises dollars

Rhenwald swaps euros into dollars for three months

Spot rate	dollars per euro	**1.25**
Euros handed over now	raised in euro markets	**€64bn**
Dollars received now	64 × 1.25	**$80bn**
In three months	hand back dollars, get euros	**repay $80bn+**
Then	roll the swap, or find dollars	**rollover**

IN THE LESSON

- Rhenwald swaps euros into dollars for three months.
- Let us see how such an F X swap works.
- A foreign exchange swap is two trades agreed together: an exchange of currencies now at the spot rate, and the reverse exchange on a set later date.
- The spot rate in our example is one point two five dollars per euro.
- Rhenwald hands over sixty four billion euros, raised in euro markets.
- It receives sixty four times one point two five, which is eighty billion dollars, now.
- In three months the swap ends.
- Rhenwald must hand back the eighty billion dollars, plus an agreed amount that reflects interest, and it gets its euros back.
- Then it must either roll the swap into a new one, or find the dollars elsewhere.
- That is why the swap is a short-term dollar debt.

6 Maturity transformation in a foreign currency

- Maturity transformation: lend long, borrow short
- Here done in a foreign currency: the dollar
- Assets last years; funding lasts weeks or months
- Works only with continual rollover
- Rollover risk: lenders may simply say no

IN THE LESSON

- Now put the pieces together.
- Maturity transformation means lending long and borrowing short, which is what banks always do.
- Here it is done in a foreign currency, the dollar, which Rhenwald cannot raise from its own home customers.
- Its dollar assets last for years, while its dollar funding lasts weeks or months.
- So the business works only with continual rollover, meaning that as each loan, certificate or swap matures, it is replaced by a new one.
- That creates rollover risk: the risk that, on the day the funding matures, lenders simply say no.
- In normal times that risk looks tiny, because rollover always happens.
- In a panic, it is the whole story.

7 Example 3: how much must be rolled over?

Of the $240bn gap, how much matures within three months?

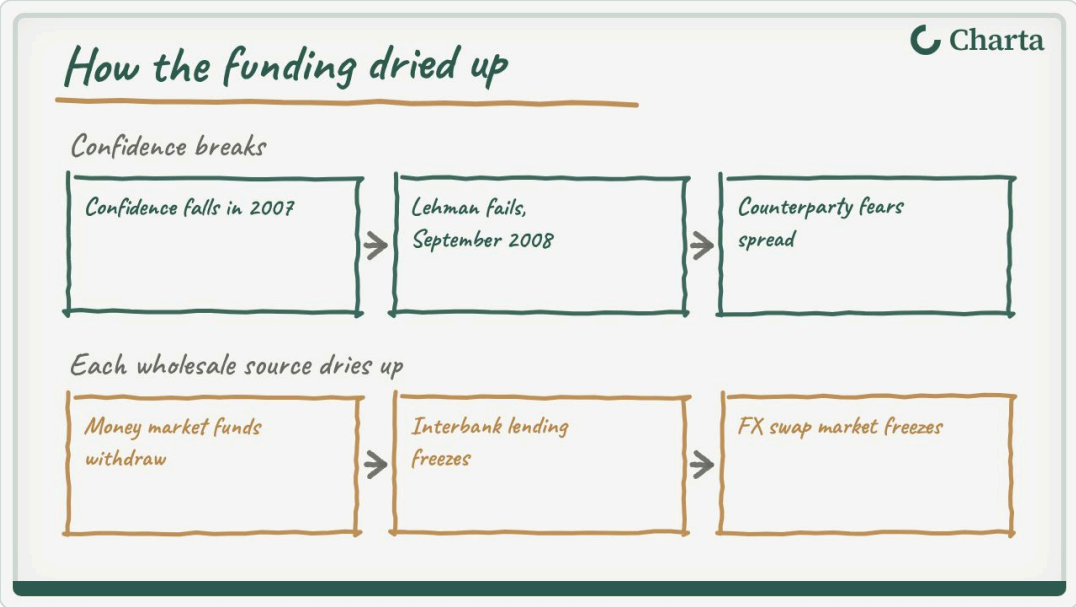
CDs to money funds	all of 90	**$90bn**
Interbank loans	60 of 70	**$60bn**
FX swaps	30 of 80	**$30bn**
Due within three months	90 + 60 + 30	**$180bn**
Due each month, on average	180 ÷ 3	**$60bn**

Each month: CDs 90 ÷ 3 = 30, interbank 60 ÷ 3 = 20, swaps 30 ÷ 3 = 10

IN THE LESSON

- How much of Rhenwald's funding comes due soon?
- Take the funding that matures within three months.
- All ninety billion of the certificates sold to money market funds mature within three months.
- Of the seventy billion of interbank loans, sixty billion do.
- Of the eighty billion of F X swaps, thirty billion do.
- So ninety plus sixty plus thirty, which is one hundred and eighty billion dollars, is due within three months.
- Spread evenly, that is one hundred and eighty divided by three, or sixty billion dollars every month.
- Within that sixty, thirty is certificates, twenty is interbank and ten is swaps, which is each source's three month total divided by three.
- Every month, Rhenwald must persuade lenders to give it sixty billion dollars again.

8 How the funding dried up



IN THE LESSON

- Now the shock.
- Look at the top row: confidence breaks.
- Confidence in banks began to fall in two thousand and seven.
- It collapsed after the failure of Lehman Brothers, a large U S investment bank, in September two thousand and eight.
- After that, counterparty fears spread: every lender worried that the bank it lent to might be the next to fail.
- Now the bottom row: each wholesale source dries up.
- Money market funds withdrew, refusing to buy new certificates.
- Interbank lending froze, as banks hoarded their own dollars.
- And the F X swap market froze too, so euros could no longer be swapped into dollars in the amounts needed.
- Each freeze fed the next, and all three sources failed within weeks, because they shared one fear.

9 Example 4: a month of stress

A stressed month: $60bn matures. Rollover: CDs 40%, interbank 25%, swaps 50%

Money funds: not rolled	60% of 30	**$18bn**
Interbank: not rolled	75% of 20	**$15bn**
FX swaps: not rolled	50% of 10	**$5bn**
Shortfall in the month	18 + 15 + 5	**$38bn**
Share of maturing funding	38 ÷ 60	**63.3%**

IN THE LESSON

- Let us put numbers on a stressed month, with assumed rollover rates.
- Sixty billion dollars of Rhenwald's funding matures.
- Money market funds roll over only forty per cent, so sixty per cent of the thirty billion, eighteen billion, is not rolled.
- Interbank lenders roll over only twenty five per cent, so seventy five per cent of twenty, fifteen billion, is lost.
- Swap partners roll over half, so half of ten, five billion, is lost.
- The shortfall in the month is eighteen plus fifteen plus five, which is thirty eight billion dollars.
- That is thirty eight over sixty, or sixty three point three per cent, of the funding that matured.
- Rhenwald must find thirty eight billion dollars within a month, or default on its dollar debts.

10 Why the home central bank could not fix it

- Home central bank creates euros, not dollars
- Euro loans need converting: the swap market is frozen
- Selling dollar assets in a panic: fire-sale losses
- No dollar lender of last resort for banks abroad

IN THE LESSON

- Normally a bank short of cash turns to its central bank, the lender of last resort.
- But here is the catch.
- Rhenwald's home central bank creates euros, not dollars.
- It could lend Rhenwald euros, but those euros would then have to be converted into dollars, and the swap market that does the converting was frozen.
- Rhenwald could try to sell dollar assets, but selling in a panic means fire sale prices and heavy losses.
- So there was a gap in the system.
- No home central bank could create dollars, and no one stood ready as a lender of last resort in dollars to banks outside the United States.

11 The factors behind the dollar shortage

Exam point: the funding structure, not a lack of dollars in the world

Factor	What it did
Big dollar books at non-US banks	A large need for dollars
Few retail dollar deposits	Left a gap to fund
Short-term wholesale and FX swaps	Needed continual rollover
Confidence collapse after Lehman	Funds withdrew; markets froze
No home central bank makes dollars	No dollar lender of last resort abroad

IN THE LESSON

- Exam point: the funding structure, not a lack of dollars in the world.
- Keep that in mind as we read the factors in one table, the list the exam asks you to name.
- First, non U S banks held big dollar books, which created a large need for dollars.
- Second, they had few retail dollar deposits, which left a gap to fund.
- Third, that gap was funded with short-term wholesale borrowing and F X swaps, which needed continual rollover.
- Fourth, confidence collapsed after Lehman, so funds withdrew and markets froze.
- Fifth, no home central bank could create dollars, so there was no lender of last resort in dollars for banks abroad.
- Put together, the shortage came from how the dollars were funded and the risk of rolling them over, which is why the next step is to measure that funding properly.

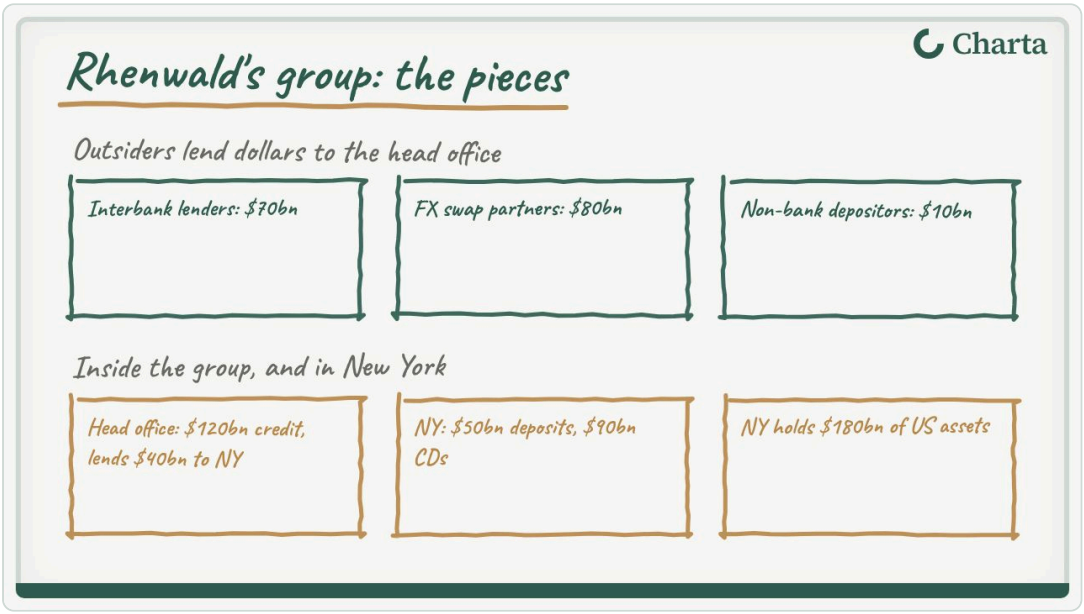
12 One entity at a time can mislead

- Look at one office, and the mismatch can vanish
- Head office lends dollars to its foreign branch
- The branch looks funded
- But head office raises those dollars short-term or by swaps
- So consolidate the group first

IN THE LESSON

- Now the second outcome: how to measure a bank group's mismatch.
- A currency mismatch means assets and liabilities in a currency do not match in amount.
- A maturity mismatch means they do not match in term.
- Both are easy to miss if you look at one office, or one legal entity, at a time.
- Here is how.
- Inside a group, the head office may lend dollars to its foreign branch.
- The branch then looks funded, because its dollar assets are covered by dollar liabilities.
- Yet the head office raises those dollars from outside, through short-term borrowing or F X swaps.
- The risk has not gone away.
- It has moved to another office.
- So the correct first step is to consolidate the group.

13 Rhenwald's group: the pieces



IN THE LESSON

- Here is Rhenwald's group in two rows, all in dollars.
- The top row shows outsiders lending dollars to the head office.
- Interbank lenders give it seventy billion.
- F X swap partners give it eighty billion.
- Non bank depositors give it ten billion.
- The bottom row follows the money inside the group, and in New York.
- The head office holds one hundred and twenty billion of structured credit, and it lends forty billion to its New York branch.
- The New York branch also takes fifty billion of deposits and sells ninety billion of certificates to money market funds.
- With all that, New York holds one hundred and eighty billion of U S loans and securities.
- The forty billion loan is the link that hides the risk.

14 Example 5: the New York branch alone

New York branch alone, dollars in $bn

US loans and securities	assets	**$180bn**
Non-bank deposits	stable, from outsiders	**$50bn**
CDs to money funds	short-term	**$90bn**
Due to head office	intragroup	**$40bn**
Funded?	50 + 90 + 40 = 180	**looks funded**

Call head-office money stable: only the $90bn CDs look risky

IN THE LESSON

- First, look at the New York branch alone, in billions of dollars.
- It holds one hundred and eighty billion of U S loans and securities.
- It has fifty billion of non bank deposits, which are stable and come from outsiders.
- It has ninety billion of certificates sold to money market funds, which are short-term.
- And it owes forty billion to its head office, which is intragroup funding, meaning money owed inside the same group.
- Fifty plus ninety plus forty is one hundred and eighty.
- So the branch looks fully funded.
- A branch manager might even call the head office money stable, because a parent will not run on its own branch.
- On that view, only the ninety billion of certificates looks risky.

15 Example 6: the head office alone

Head office dollar book, in $bn; it reports in euros

Structured credit	dollar assets	**$120bn**
Loan to New York branch	intragroup	**$40bn**
Dollar liabilities	deposits 10 + interbank 70	**$80bn**
Euros swapped into dollars	off balance sheet: €64bn	**$80bn**
Dollar position	160 − 80 − 80	**0: hedged**

IN THE LESSON

- Now the head office, which reports in euros.
- Its dollar assets are one hundred and twenty billion of structured credit, plus the forty billion loan to New York.
- That is one hundred and sixty billion.
- Its dollar liabilities on the balance sheet are ten billion of deposits plus seventy billion of interbank loans, which is eighty billion.
- The other eighty billion is funded in euros, sixty four billion euros, swapped into dollars.
- The swap sits off the balance sheet, meaning it is a contract that does not appear among the head office's assets and liabilities.
- Its dollar position is one hundred and sixty minus eighty minus eighty, which is zero.
- So the head office looks hedged against the exchange rate.

16 How to consolidate

- 1. Add up the group's entities
- 2. Eliminate intragroup claims and liabilities
- 3. Restate currency by currency
- 4. Then sort by maturity bucket
- 5. Include off-balance-sheet FX swaps

IN THE LESSON

- So the branch looks funded and the head office looks hedged, and neither view shows the whole dollar gap.
- Here is the method that reveals the truth, in five steps.
- Step one, add up the group's entities, the head office and every branch and subsidiary.
- Step two, eliminate intragroup claims and liabilities.
- A loan from head office to a branch is an asset of one and a liability of the other, so inside the group it cancels.
- Step three, restate the assets and liabilities currency by currency, rather than in one reporting currency.
- Step four, within each currency, sort them by maturity bucket, such as within one month, or within three months.
- Step five, include the off balance sheet F X swaps, because their dollar legs are real dollar debts.

17 The consolidated dollar funding gap

Dollar gap = dollar assets − stable dollar liabilities
Rollover need = short-term part of the gap

Dollar assets	Consolidated: outsiders only
Stable liabilities	Non-bank deposits from outsiders
Dollar funding gap	Funded short-term or by FX swaps
Rollover need	Must be rolled over soon

IN THE LESSON

- Now the measure itself.
- The consolidated dollar funding gap equals dollar assets minus stable dollar liabilities.
- The dollar assets are the consolidated ones, so they count only claims on outsiders.
- The stable dollar liabilities are those owed to outsiders that are unlikely to run, such as deposits from non banks.
- The gap is what must be funded by short-term wholesale borrowing or F X swaps.
- The second line gives the rollover need, which is the short-term part of the gap.
- It is the funding that must be rolled over soon, and it measures how exposed the group is if lenders stop rolling.

18 Example 7: Rhenwald's consolidated gap

Combine New York and head office; remove the $40bn intragroup loan

Gross dollar assets	180 + 120 + 40	**$340bn**
Less intragroup loan	340 − 40	**$300bn**
Stable dollars from outsiders	deposits 50 + 10	**$60bn**
Consolidated dollar gap	300 − 60	**$240bn**
Funded by	CDs 90, interbank 70, swaps 80	**$240bn**

IN THE LESSON

- Let us consolidate Rhenwald.
- Combine New York and head office.
- Gross dollar assets are one hundred and eighty, plus one hundred and twenty, plus the forty billion intragroup loan, which is three hundred and forty billion.
- Now remove the forty billion intragroup loan, leaving three hundred billion of claims on outsiders.
- Stable dollars from outsiders are the non bank deposits: fifty in New York plus ten at head office, which is sixty billion.
- The consolidated dollar gap is three hundred minus sixty, which is two hundred and forty billion dollars.
- It is funded by ninety of certificates, seventy of interbank loans and eighty of swaps, which again totals two hundred and forty.
- Neither office alone showed it, yet the group has a two hundred and forty billion dollar gap.

19 Example 8: rollover need, view by view

Dollar funding due within three months, by view, in $bn

New York branch alone	CDs	**$90bn**
Head office, balance sheet	interbank due	**$60bn**
Group, balance sheet only	90 + 60	**$150bn**
Group, with FX swaps	150 + 30	**$180bn**
Share of the gap	180 ÷ 240	**75%**

IN THE LESSON

- Here is the dollar funding due within three months, view by view, which is the short-term part of the gap.
- Each row is a different way of looking.
- The New York branch alone sees only its certificates, ninety billion due within three months.
- The head office balance sheet alone shows sixty billion of interbank loans due.
- The group, using the balance sheet only, sees ninety plus sixty, one hundred and fifty billion.
- The group with the F X swaps included adds the thirty billion of swaps due, so one hundred and fifty plus thirty gives one hundred and eighty billion.
- That is the true rollover need.
- As a share of the gap, it is one hundred and eighty over two hundred and forty, or seventy five per cent.
- Each partial view understates the risk.

20 Example 9: a hedged position can hide a gap

Group dollar position including the swaps, in $bn

Dollar assets	consolidated	**$300bn**
Dollar debts on balance sheet	60 + 90 + 70	**$220bn**
Dollars owed on FX swaps	off balance sheet	**$80bn**
Net open dollar position	300 − 220 − 80	**$0**
Dollar funding gap	still to roll over	**$240bn**

Totals in euros balance; the FX risk is hedged; the gap remains

IN THE LESSON

- Here is the group's dollar position, including the swaps, and the subtlest trap of all.
- Take the consolidated dollar assets, three hundred billion.
- Take the dollar debts on the balance sheet: sixty of deposits, ninety of certificates and seventy of interbank loans, which is two hundred and twenty.
- Add the dollars owed on the F X swaps, eighty, which sit off the balance sheet.
- The net open dollar position is three hundred minus two hundred and twenty minus eighty, which is zero.
- So the exchange rate risk is hedged.
- But the dollar funding gap is still two hundred and forty billion, and it must still be rolled.
- And the group's totals, reported in euros, balance, as every balance sheet does.
- Balanced and hedged is not the same as funded.

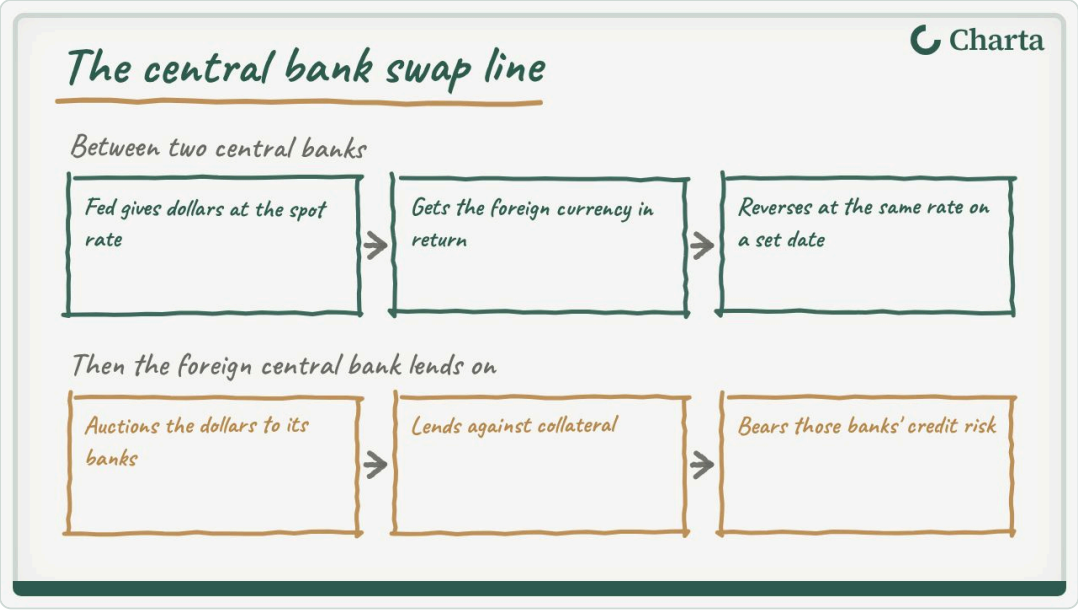
21 Traps when measuring a group's mismatch

- Trap: judging one legal entity or office
- Trap: counting intragroup funding as stable
- Trap: trusting a balanced total in one currency
- Trap: leaving out off-balance-sheet swaps
- Rule: consolidate; each currency by maturity, swaps in

IN THE LESSON

- So, what traps does the exam set?
- The first trap is judging one legal entity or one office, where the mismatch can disappear.
- The second is counting intragroup funding as stable, when the parent must itself borrow those dollars from outsiders.
- The third is trusting a balanced total balance sheet in one reporting currency, which can hide a large gap in dollars.
- The fourth is leaving out off balance sheet swaps, whose dollar legs must be repaid and rolled.
- The rule to remember is to consolidate first, eliminating intragroup positions, and then look at each currency separately, by maturity bucket, swaps included.
- That is the measure supervisors and risk managers need before a crisis, not after it.

22 The central bank swap line



IN THE LESSON

- Now the third outcome: the policy response.
- The core of it was the central bank liquidity swap line.
- Look at the top row, which happens between two central banks.
- The Federal Reserve, the U S central bank, gives dollars to a foreign central bank at the current spot rate.
- It gets the foreign central bank's own currency in return.
- And both commit to reverse the trade at the same rate on a set date.
- Now the bottom row.
- The foreign central bank lends the dollars on to its own banks, usually in auctions.
- It lends against collateral, meaning assets pledged to secure the loan.
- And it bears those banks' credit risk.
- The Fed deals only with the central bank.

23 Example 10: the Fed's side of the swap

Fed swaps $50bn with a central bank at 1.25 $ per €, for three months

Fed gives now	dollars	**$50bn**
Fed receives now	50 ÷ 1.25	**€40bn**
Euro later falls to 1.10	40 × 1.10	**worth $44bn**
Reversal at the fixed rate	€40bn back for $50bn	**$50bn**
Fed exchange-rate loss	rate fixed in advance	**$0**

IN THE LESSON

- The Fed swaps fifty billion dollars with Rhenwald's home central bank, at the spot rate of one point two five dollars per euro, for three months.
- These are made up numbers.
- The Fed gives fifty billion dollars now.
- It receives fifty divided by one point two five, which is forty billion euros.
- Now suppose that, during the three months, the euro falls to one point one zero dollars.
- The forty billion euros the Fed holds are then worth forty times one point one, only forty four billion dollars.
- Does the Fed lose six billion?
- No.
- At the end, the trade is reversed at the fixed rate: the Fed returns forty billion euros and gets its fifty billion dollars back.
- Its exchange rate loss is zero.

24 Example 11: Rhenwald borrows at the auction

Rhenwald's shortfall is $38bn. It wins $30bn at the dollar auction

Dollars borrowed at auction	three months	**$30bn**
Value needed in euros	30 ÷ 1.25	**€24bn**
Collateral, 20% haircut	24 ÷ 0.8	**€30bn**
Still short	38 − 30	**$8bn**
Covered by	selling liquid US securities	**$8bn**

IN THE LESSON

- Recall Rhenwald's shortfall of thirty eight billion dollars in the stressed month.
- Its home central bank auctions dollars from the swap line, and Rhenwald wins thirty billion dollars for three months.
- To secure them it must pledge collateral.
- At one point two five dollars per euro, thirty billion dollars is twenty four billion euros.
- The central bank applies a haircut, a cut in the value it gives the collateral, of twenty per cent.
- So Rhenwald must pledge twenty four divided by point eight, which is thirty billion euros of collateral.
- It is still short thirty eight minus thirty, eight billion dollars, which it covers by selling eight billion of its most liquid U S securities.

25 Who bears which risk

Each party in the chain carries a different risk

Party	Risk it carries
Federal Reserve	Claim on a central bank; no FX risk
Foreign central bank	Credit risk of its banks, vs collateral
Commercial bank	Must still repay dollars; mismatch remains

IN THE LESSON

- Each party in the chain carries a different risk, and the table reads row by row.
- The Federal Reserve has a claim on the foreign central bank, not on any commercial bank, and it bears no exchange rate risk, because the reversal rate was fixed at the start.
- The foreign central bank carries the credit risk of its banks.
- If Rhenwald failed, its home central bank, not the Fed, would take the loss, after selling the collateral.
- And the commercial bank, Rhenwald, must still repay its dollars when its auction loan matures.
- Its mismatch remains.
- The swap line bought it time.
- It did not shrink its two hundred and forty billion dollar gap.

26 How the swap lines spread

The swap lines began in 2007 and spread after Lehman

When	What happened
December 2007	First lines: ECB and Swiss National Bank
After Lehman, Sept 2008	Lines spread to many central banks
October 2008	Unlimited: ECB, BoE, BoJ, SNB

IN THE LESSON

- The swap lines began in two thousand and seven and spread after Lehman.
- Here is the history, in three rows.
- In December two thousand and seven, the first lines began, with the European Central Bank and the Swiss National Bank.
- After Lehman failed, in September two thousand and eight, the lines spread to many central banks around the world.
- In October two thousand and eight, the lines became unlimited for four central banks: the European Central Bank, the Bank of England, the Bank of Japan and the Swiss National Bank.
- Unlimited means there was no cap on how many dollars they could draw.
- That told markets that the dollars would be there, however large the need.

27 How well did the response work?

- Funding pressure eased once lines were in place
- Filled the lender-of-last-resort gap in dollars
- Fed protected: fixed rate, central bank counterparty
- Limit: countries without lines used own reserves
- Limit: the underlying mismatch was not fixed

IN THE LESSON

- So how well did it work?
- First, funding pressure eased once the lines were in place.
- Second, the lines filled the gap we found earlier: they gave the world a lender of last resort in dollars, working through the central banks that know their own banks.
- Third, the Fed was protected, by the fixed reversal rate and by having a central bank, rather than a commercial bank, as its counterparty.
- But there were limits.
- Countries without lines had to rely on their own dollar reserves.
- And the lines did not fix the underlying mismatch: banks still held dollar assets funded short-term.
- They treated the symptom, the run, not the cause, the funding structure.

28 Example 12: a country without a swap line

Valoria has no swap line. Reserves $25bn; banks need $15bn a month

Month 1: lend from reserves	25 − 15	**$10bn left**
Month 2: need 15, have 10	15 − 10	**short $5bn**
Months the reserves cover	25 ÷ 15	**1.7 months**

IN THE LESSON

- Here is why a missing line matters, with a made up country, Valoria, whose central bank has no swap line with the Fed.
- It holds twenty five billion dollars of reserves, and its banks must roll fifteen billion dollars a month that markets will no longer provide.
- In month one the central bank lends fifteen billion from its reserves, leaving twenty five minus fifteen, ten billion.
- In month two the need is fifteen again, but only ten billion is left, so it is short by five billion.
- The reserves cover twenty five over fifteen, about one point seven months of need.
- A central bank with an unlimited swap line faces no such limit.
- That is the difference a line makes.

29 Mistakes to avoid

- Not too few dollars in the world: the funding structure
- Never judge a group one entity at a time
- Hedged for currency is not the same as funded
- Swap line: Fed bears no FX or bank credit risk
- Swap lines fixed the symptom, not the mismatch

IN THE LESSON

- Before the quiz, here are the mistakes to avoid across the whole lesson.
- First, the shortage was not too few dollars in the world.
- It was the funding structure.
- Second, never judge a group one entity at a time.
- Consolidate first.
- Third, hedged for currency is not the same as funded.
- Swaps must still be rolled over.
- Fourth, in a swap line the Fed bears neither exchange rate risk nor the credit risk of commercial banks.
- The foreign central bank carries that credit risk.
- Fifth, the swap lines fixed the symptom, the dollar run, and not the mismatch that caused it.
- That mismatch is what risk managers should be measuring, every day.

30 Try three quick questions

1. $50bn of dollar funding matures; lenders roll over 30%. Shortfall?
   Answer: 70% not rolled: 70% × 50 = $35bn.
2. Branch $90bn assets: $20bn deposits, $70bn from parent. Parent holds $60bn of other dollar assets, funded wholesale. Group gap?
   Answer: Drop the $70bn. Assets 90 + 60 = 150; 150 − 20 = $130bn.
3. Fed swaps $30bn at 1.5 $ per unit; the currency falls to 1.2. Fed gets back?
   Answer: $30bn: the reversal rate was fixed.

IN THE LESSON

- Try three quick questions.
- Pause the video, think, then listen to the answers.
- Question one.
- Fifty billion dollars of a bank's wholesale dollar funding matures this month, and lenders roll over only thirty per cent.
- What is the shortfall?
- Seventy per cent is not rolled, so the shortfall is thirty five billion dollars.
- Question two.
- A branch holds ninety billion dollars of assets, funded by twenty billion of non bank deposits and seventy billion from its parent.
- The parent holds sixty billion of other dollar assets, funded wholesale.
- What is the group's dollar funding gap?
- Drop the seventy billion intragroup loan.
- Assets are ninety plus sixty, one hundred and fifty.
- Stable funding is twenty, so the gap is one hundred and fifty minus twenty, or one hundred and thirty billion dollars.
- Question three.
- The Fed swaps thirty billion dollars at one point five dollars per unit of foreign currency, and the currency then falls to one point two.
- What does the Fed get back?
- Thirty billion dollars, because the trade reverses at the fixed rate.