

Evolving business of banking

266: Financial Markets and Institutions

Jon Faust

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► General perspective on all businesses

► All business

- Be good at your core business
- Be good at finance:
 - Manage leverage/capital buffer/solvency
Balance the higher ROE you get for higher leverage against the bankruptcy risk.
 - Manage liquidity
Balance the expense of minor and major liquidity crises against the cost of maintaining liquid balances which tend to have low yields.

► Bank business

- All that is the same for banks, but the core business is the finance part
- Thus, you are providing capital management and liquidity management services to the nonbank sector
- And you still have to manage your own finances.

► And banking is very different in 1 regard

- Banking is among the most heavily regulated industries in the economy (in every nation)
This is because of all those Shakespeare/social science problems
- This radically alters the capital/leverage management part of company finance.

► Capital management at banks

► Regulation and capital planning at banks

- At other firms, you try to choose the optimal level of leverage.
- In banking, most economist believe that due to externalities, the leverage that is optimal from the bank's perspective would be too high from a social perspective.

Same argument as optimal pollution from a power company perspective may be higher than optimal from a social perspective due to externalities.

► Externalities

- Deposit insurance is one source of incentive for excess leverage in banking
- The fact that healthy banks are crucial to the health of the economy.

In their capital decisions, banks would not weigh the cost that their own failure would impose on the economy as a whole

- TBTF (too big to fail) is a particular version of this.

A bank gets big and, thereby, essential to the economy. It ignores the social externality and behaves in a risky manner. If it fails, the government has little choice but to bail it out.

► The upshot

- The upshot is that governments heavily regulate bank leverage.
- Then from a bank management perspective, the incentive changes from
 - 'Balance higher ROE against risk of bankruptcy,' to
 - Minimize capital (maximize leverage) subject to complying with regulation.

► Capital planning/management

- Our simplest notion of equity capital is net worth ($E \equiv NW = A - L$)

We'll continue in this discussion to sidestep all the specifics about defining capital in practice.

- You have a desired level of leverage or capital
- Suppose you need to raise your level of capital, lower leverage
- You can either raise E (equity) relative to A (assets) and L (liabilities) or lower both A and L relative to E
- Text has a good discussion of this; I'll sketch the highlights

► Lower leverage by raising E relative to A&L

- Reduce dividends.

Instead of paying out dividends to shareholders you keep that money in order to raise net worth.
 (Every dollar you pay in dividends lowers net worth by one dollar).

- Sell new equity shares.

The money obtained raises net worth.

► **Lower leverage by reducing A& L relative to E**

- To lower A:
 Sell some securities; allow loans to run off (that is, don't replace the ones that get paid off); if possible, sell some loans
- To lower L:

Mainly, allow deposits to run off or 'purchase' fewer deposits in the form of large negotiable CDs

► **Obviously: do it the cheapest way**

- When you adjust your leverage you try to do it in the least costly way
- Selling new equity viewed as most costly
- Firm also reluctant in general to cut their regular dividend

This is often taken as a sign of firm weakness, so firms don't like doing it

► **Aside:: Shrinking/expanding the balance sheet**

- Holding capital fixed, when you expand or contracting A&L in parallel, this raises or lowers leverage.
- If you hold equity constant but increase both assets and liabilities, this is called 'expanding your balance sheet'

The alternative is shrinking your balance sheet.

► **Example**

		Our firm		
		Assets	Liabilities& Net Worth	
► Balance sheet	mortgages	570	deposits	525
	other	30		
			net worth	?
	total	600	total:	?

all values in millions of dollars

Our firm

Assets		Liabilities & Net Worth	
mortgages	570	deposits	525
other	30		
		net worth	75
total	600	total:	600

all values in millions of dollars

► **Expand the balance sheet**

- The bank wants higher leverage so it
 - Sells 200 in large negotiable CDs
 - Take the proceeds and, say, buys government securities
- This raise both A and L in parallel relative to NW, which is unchanged

Our firm

Assets		Liabilities & Net Worth	
mortgages	570	deposits	725
securities	200		
other	30		
		net worth	75
total	800	total:	800

all values in millions of dollars

- Now A/E is 10.66 instead of 8.

► **That's the basics of capital management**

► **Now turn to liquidity management, sort of**

► **Liquidity management, old and new**

- Traditionally about this point, we would begin a discussion of bank reserves and money multipliers and related ideas
- And this gave us a simple and roughly accurate mechanical way of talking about the liquidity in the banking system
- Changes since the crisis mean these ideas are no longer operative.
- To fix ideas, we'll start with the old reality
- And then move to the current situation

a situation that is likely to prevail for several more years at least

► **Bank reserves**

- Bank reserves are a category of assets
- Bank reserves include the bank's deposits at the Fed and any vault cash the bank holds

► **Aside:: Terminology note: Reserves**

- There are many uses of the term reserves.
- We'll try to be clear, but out there in the real world you have to pay attention to what sense of reserves folks are talking about.

► **Bank reserves and reserve requirements**

- Banks hold some reserves to meet the Federal Reserve's mandated reserve requirements
- Traditionally banks had to hold reserves in proportion to deposits.
e.g., for every \$100 of checkable deposits, you had to hold \$3 in reserves (a 3% reserve requirement)
- Different deposit types had different requirements
- For our discussion, let's pretend there are only checkable deposits and they have a reserve requirement of 3%

► **Facts about required reserves**

- Required reserves ARE NOT funds available to satisfy the Bank's regular needs for liquidity
these have to be held
- Thus, only reserves above and beyond what is required provide a normal times liquidity buffer.
- These are called excess reserves

$$\text{total res.} = \text{required res.} + \text{excess res.}$$

► **Aside:: In extremis...**

- required reserves could be used to meet deposit outflowws, but that is in extremis—e.g., if the bank would go under otherwise.

Then they pay some penalty for violating the reserve requirement

► **Total reserves in the system**

- The Federal Reserve has essentially complete control over the quantity of total reserves in the system as a whole

- An individual bank can hold more or less total reserves, but if one bank holds one dollar less, some other bank ends up holding one dollar more.

► **Emphasize: the choices the banking system collectively make have** (essentially) no effect on the quantity of total reserves in the system

- The banking system collectively determines what share of reserves are required vs. excess
- Banks do this by choosing the level of deposits under the reserve requirement

In our discussion, the quantity of checkable deposits.

► **For example**

- Suppose that the reserve requirement is 3%
- Fed provides total reserves of \$100 billion
- Banks collectively choose to hold \$2.7 trillion in deposits
- Then required reserves are about \$81 billion; excess are \$19 billion.
- This is just two simple relations:

$$\begin{aligned} \text{required res.} &= 3\% \times \text{deposits} \\ \text{excess res.} &= \text{total res.} - \text{required} \end{aligned}$$

- Here is the recipe:
 - Fed. chooses total reserves
 - Banks collectively choose deposits, implying the level of required reserves
 - And excess reserves are what's left over.

► **Pre-crisis normal**

- Up until the crisis: the banking system chose to essentially hold no excess reserves.
- Whatever reserves the Fed provided, the banking system expanded deposits until the reserves were (essentially) all required.

► **For example,**

- For example, Fed provides \$100 billion in total reserves
- Banks will set deposits, D so that $D \times 0.03 = 100$.

That is, deposits are about \$3.33 trillion.

► **Seems simple and mechanical**

- This seems simple and mechanical, AND IT IS.
- And it was roughly an accurate account of how things worked pre-crisis
- The Fed never provided more total reserves than the banking system wanted to convert into required reserves.
- We say that the system always operated where reserves were scarce.
- If the Fed provided \$1 dollar, banks almost immediately increased deposits by \$33.33.

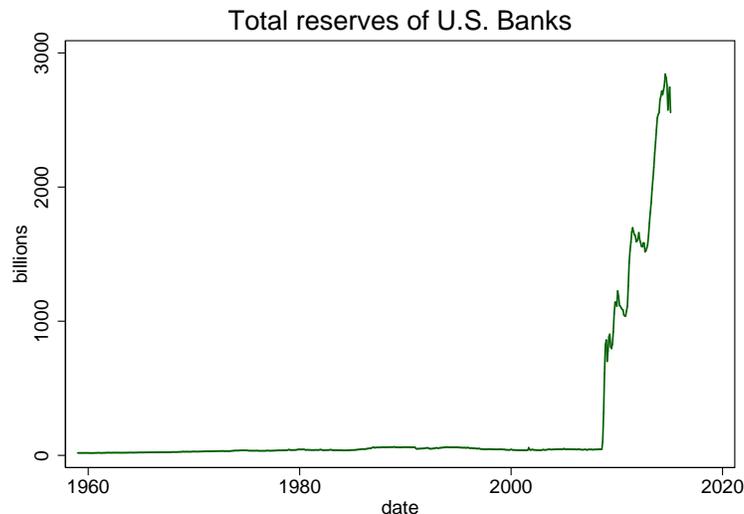
► **Thus,**

- In classes like this, we could basically teach that by setting total reserves, the Fed essentially set the level of (reservable) deposits
- It was never quite this simple for various reasons, but this was not a bad picture to have in mind when thinking about the system.

► **Since 2008**

- Since the crisis, the Fed (and all other major central banks) have taken actions that blew up total reserves far beyond what banks could profitably convert into required reserves.
- Excess reserves went from roughly zero to several \$trillion in the U.S.

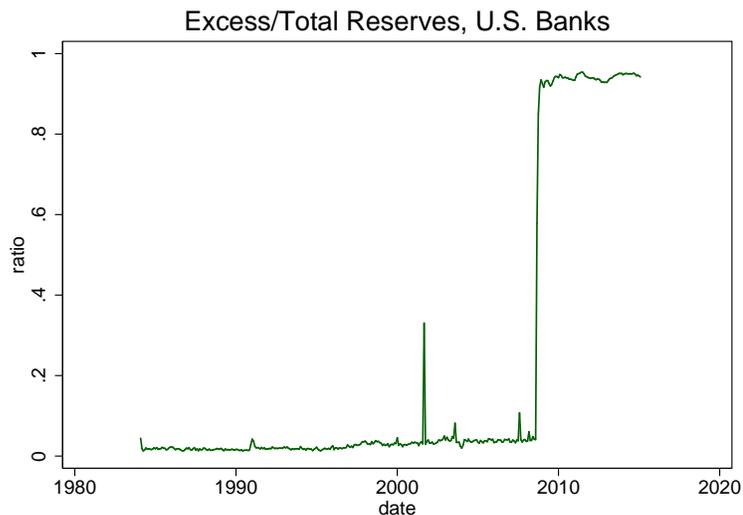
With similar actions in U.K., euro area, Japan



► **Reserves to GDP**

- Total reserves went from \$40 billion to nearly \$3 trillion
- From under 1% of GDP to over 10% of GDP

► **And most of these are excess**



► **As a rule of thumb**

- We went from very small amount of total reserves that were almost all required
(excess tiny relative to total)
- To a very large stock of total reserves, almost all excess
(required tiny relative to total)
- We'll get more into why reserves were expanded later in the course.
hint: it had nothing to do with 'flooding the system with liquidity.'
- The reserves are a byproduct of actions taken to stimulate the recovery.

► **For the foreseeable future...**

- We are likely to be in this situation of immense excess reserves for many years
That is, well into the start of your post-undergrad lives.
- But at some point, the Fed has indicated that it wants to return to a world in which reserves are relatively scarce

► **Real world**

- The Fed's current requirements (don't memorize these) are here:

go

<http://www.federalreserve.gov/monetarypolicy/reservereq.htm>

- Zero on everything but checkable. Zero on checkable below an exempt level.
- 3% for smallish values of checkable deposits and 10% for larger values of checkable deposits

► **Liquidity management**

- Typically liquidity management was first and foremost a matter of having the capacity to respond to unexpected deposit outflows.
- Now with trillions in excess reserves in the system, that is not such a big deal.
- But let's talk about how banks traditionally dealt with unexpected deposit outflows.

► **Managing deposit outflows**

- For specificity, we will talk about how a bank responds if it finds itself short on liquid funds.

Banks that have too many liquid funds do the opposite.

► **Acquiring liquid funds**

- 1. Borrow funds from other banks
- Market for doing this is called the federal funds market
- Fed funds market is an interbank market where banks borrow reserves
- Most of these loans are 1-day (overnight) loans.
- In normal times, the interest rate on these overnight loans is viewed as the main indicator or control variable of monetary policy.
- Yesterday the Fed raised its target range for the Federal Funds rate by 25 basis points (one quarter of a percentage point)

► **Acquiring liquidity**

- 2. Borrow from the Fed.
- If the banking system as a whole were short on reserves, banks cannot all just borrow the needed funds from other banks
- They can borrow from the Fed, however.
- This borrowing from the Fed is called 'borrowing from the discount window'

And the interest rate is set by the Fed and called 'the discount rate'

► **Reminder: Backstop liquidity**

- Thus, banks provide backstop liquidity for the nonbank sector
- And banks provide backstop liquidity for each other

- But when the system as a whole is short on liquidity, the Fed provides backstop liquidity to the banks.

▶ **Acquiring liquidity**

- 3. ‘Buy’ some deposits

that is, generate deposit inflows by offering better interest rate than others

- Main source is here the market for large denomination negotiable certificates of deposit

▶ **Aside:: Large CDs**

- Large negotiable CDs are effectively short-term bonds issued by the bank
- But for legal purposes, they are considered to be deposits
- Selling a bunch of these CDs draws in funds

▶ **Acquiring liquidity: so far we have listed actions that originate on the liability side of the balance sheet (the bank borrows or raises deposits)**

▶ **Acquiring liquidity: Asset-side actions**

- 4. Bank could sell assets

For example, sell treasury securities for cash.

- 5. Over time can call loans in or not renew loans that are repaid

the proceeds are liquid assets and the bank could just keep them.

- Calling in loans or not renewing loan agreements may damage the customer relationship, however, so this is costly.

▶ **Do it the cheapest way possible**

- Banks obviously will try to meet deposit outflows the cheapest way possible.
- That usually means choosing options approximately in the order presented

Borrow fed funds, borrow from fed, sell CDs and/or liquid assets, etc.

▶ **That’s it for a sketch of liquidity management**

▶ **So, as promised, let’s return to regulation**

▶ **Capital and liquidity regulation**

- Regulation of bank capital leverage is still rapidly evolving in the wake of the crisis

- And governments have greatly stepped up the regulation of liquidity as well.

The crisis taught us (more accurately reminded many) that liquidity crises can spiral into solvency crises

► **Problem set**

- The problem set will explore some of the current liquidity and capital regulations by looking at the 10-k of JPMorgan Chase.
- This is intended to give you a sense of the complex, ill-defined, and changing nature of things in this area.
- And the current administration has promised the greatly change this once again.

► **Key driver: any regulation that binds, by definition makes some entity do something they don't want to do.**

► **The driver**

- Regulations that bind force an organization to do something it doesn't want to do.
- Government has a good reason to do this when the socially optimal behavior is not what the organization would choose.

e.g. due to moral hazard.

- Binding regulations inherently give the regulated entity an incentive to avoid the regulation by innovating or otherwise scheming.
- Note: there need not be anything nefarious here; it is the nature of things

Governments impose regulations, businesses attempt to minimize the cost of those regulations. . .

- Thus, banks want to take more risk than is socially optimal, so they tend to search for cracks in the system of regulations allowing them to be riskier.
- We'll get more into why reserves were expanded later in the course.

hint: it had nothing to do with 'flooding the system with liquidity.'

- The reserves are a byproduct of actions taken to stimulate the recovery.

► **For the foreseeable future. . .**

- We are likely to be in this situation of immense excess reserves for many years

That is, well into the start of your post-undergrad lives.

- But at some point, we will likely get back to something more like what used to be normal.

all regulation involves some dynamic like this.

- The financial system is especially dynamic and changes rapidly.

That's good!

- It is very hard for regulators to know which innovations are the good side of progress and which are mainly intended just to game the regulations.

many innovations have a bit of each.

▶ **Thus, the immense tension: How do you achieve the safety and soundness you desire while still allowing the system to be dynamic and innovative.**

▶ **A second tension: Banking is an international industry. How does a country regulate its banking system without giving an unfair disadvantage to its own banks on the world market.**

▶ **Nations struggled mightily with these tensions recently.**

▶ **Capital regulation: big picture**

- Because banking is an international business, much regulation is worked out at the international level
- By the 'Basel Committee'

A committee of the Bank for International Settlements (BIS) located in Basel, Switzerland

- BIS is not so much a 'bank' as it is a 'trade organization' for the world's central banks.

▶ **Basel Accords**

- Basel committee has reached a sequence of agreements on regulation: 'the Basel Accords'

Basel I, Basel II, Basel III

- Often abandoned or revised before they are even fully implemented.

for example, U.S. was far from done with Basel II when the crisis hit and showed it to be quite flawed.

- One key to Basel is a tier 1 capital ratio

ratio of tier 1 capital to risk weighted assets.

▶ **Tier 1 capital**

- There are a bunch accounting issues that make Tier 1 capital not the simple notion of net worth we've been discussing.

- e.g., some liabilities are like capital and are included.
- Just think of this as ‘high quality capital’

► **Risk weighted assets**

- It is not just the size of total assets that matters for the risk of going bankrupt
- The riskiness matters as well.
- Thus, we apply a weight to each asset reflecting its risk
- Treasury bills have a risk weight of zero, reflecting the idea that these are safe and that banks don’t need to hold a capital buffer against these.

► **But...**

- Folks were worried that banks would game this system by designing assets that had low risk weights but in fact were risky.
- So the Fed also makes banks meet what is called a leverage ratio of tier 1 capital to total assets.

Calling this a leverage ratio is a bit confusing because all of these regulations affect leverage.

► **Extreme example**

- Extreme example: Bank holds a bunch of risky assets that happen to have zero risk weights
- This bank would not need any capital against these under the standard ratio, but would have to hold capital against them under the leverage ratio.

► **A better idea: stress testing?**

► **Recently stress tests have become the centerpiece of capital regulation in the U.S.**

► **Idea: Instead of attempting to write down in advance what banks can and cannot do you attempt to directly measure whether the bank has an adequate capital buffer to protect itself from bankruptcy.**

► **Keys: 1. Models of the bank**

- Both the government and the bank separately build a model of the evolution of all the bank’s assets and liabilities.
- The bank has a better understanding of its business, but has an incentive to underplay risk
- The Fed has no incentive to underplay risk, but can’t fully understand the business

► **So you look at results from each model. Hope that two imperfect models can jointly be used to get a reasonable answer**

► **Keys: 2. Scenarios**

- The Fed comes up with some nasty economic scenarios
‘adverse’, ‘severely adverse’
- Both sides simulate the models and see whether the bank remains well-capitalized under its stated capital plans
- If not, the Fed rejects the capital plans and tells the bank to come up with new plans.
e.g., can force the bank to cut its dividends, cancel share buy backs, etc.

► **The good:**

- It tailors capital to whatever the bank is actually doing and the costly scenarios where the externalities from banking are likely to emerge.
- Hard to game because the Fed creates clever new scenarios every year
- Both bank and Fed models allow a back and forth where the two can argue over differences.

► **The bad:**

- Really complicated
- Banks view it as a unfair moving, and unclear, target
- It is a moving target and is unclear.
- Whether it’s unfair or not is subject to debate.

The financial crisis and bailouts were not fair either, the question is how to balance the unfairness.

► **Liquidity coverage ratio**

- Banks are also required to hold a certain amount of ‘high quality liquid assets’ (HQLA)
- In particular, when fully implemented banks will have to hold HQLA equal to 100% of expected net flows over a 30-day period under a stress scenario.

a bit like the stress testing above

- Very hard to define, but the idea should be clear.
- The liquidity coverage ratio is just coming into full effect.
- Some argue that it is counterproductive: limiting the true liquidity of financial markets.

► **Lessons:**

- Regulation is hard.

- And even well-designed regulations ALWAYS have some negative side-effects
Sometimes these are known ahead of time, but judged to be worth it; other times these are unintended.

▶ **It would be foolish to even try regulation were it not for the fact that the alternative is collapse back to regular financial crises and/or the ‘neither a borrower nor a lender be’ world.**

▶ **Aside:: A last note**

- I have mainly been describing regulation of big banks
- Small banks are much simpler and regulation is substantially different
- Many folks agree with the Trump administration that our regulation of small banks is too heavy-handed and complicated.