Fire Sales & Liquidity: Shleifer & Vishny (2011)

Natural buyers, specialists, high-valuation bidders

Agents WTP relatively high price for an asset.

Fire sale

When you have to sell asset to <u>others</u>, hence must take a low price, e.g. because of a run.

Why don't natural buyers bid?

"they themselves are financially encumbered... suffer the same adverse industry-wide or market-wide shock... debt overhang problems afflicting many specialists simultaneously"

What's special about natural buyers?

In many models (e.g. Kiyotaki & Moore, 1997; Shleifer & Vishny 1992) asset is capital or land which have lower productivity when managed by non-specialists, or used outside the "industry" & an "outsider faces a bigger agency problem of hiring a manager to run these assets" (1992, p. 1348)

But what about financial assets?

Fire sales & Liquidity (cont.)

FI through collateralized borrowing

One form of FI: intermediator buys long term or illiquid assets (ie. bonds), uses them as collateral to borrow short-term (e.g. overnight) through loan-with-collateral or repo.

Lender won't lend FI 100% of current value of collateral, because price might fall or illiquid.

"Margin" or "haircut":

$$\text{Loan} = (1 - \text{haircut}) \otimes \text{current collateral price}$$

Haircut/margin must be covered by FI's capital.

$$\text{Assets} = \underbrace{(1-H)\cdot \text{Assets}}_{\text{Loans to FI}} + \text{Capital}$$

(H: % haircut)

$$\Rightarrow \text{Assets} = \frac{\text{Capital}}{H}$$

H depends on expected volatility (variance around $E[P]$), perceived potential illiquidity.

Fire sales (cont.)

"Runs" through haircuts

$$\text{Assets} = \frac{\text{Capital}}{H}$$

If $H \uparrow$, FI must raise capital or sell assets.

If sell assets, fire sale, become insolvent.

So if lender thinks <u>other</u> lenders will raise haircuts, lending to FI is riskier (bigger risk I must seize collateral & sell it), raise my own demanded H.

Margin calls

(current asset price)

$$\text{Loan to FI} = (1-H) \cdot P \cdot X \quad \text{(units of asset)}$$

If $P \downarrow$, FI must post more collateral (more X) or sell assets to pay back loan.

(fire sale! P Falls more!

Five sales & Liquidity (cont.)

p. 44 "During Five sales, many... banks are sidelined due to their inability to raise capital....
to increase bank lending & real investment...:
1) the government can lend to banks against risky collateral
2) ... purchase assets directly or provide subsidies targeted at purchasers of certain assets"

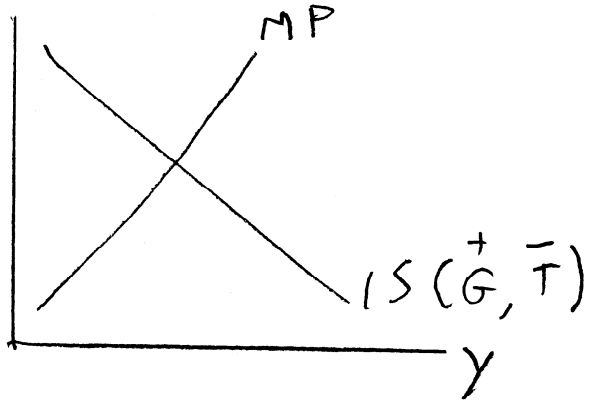
This is LOLR!

Financial Intermediation & IS/MP: Woodford (2010)

How can we incorporate FI's into IS/MP & think about events like 2008 crisis?

Recall IS/MP

Forget π^e, i is "interest rate"



IS comes from:

$Y = C + I + G$
$C(+Y, -i, -T)$
$I(-i, +Y)$

} defines $Y(-i, +G, -T)$ or $i(-T, +G, -T)$ ← equation of IS curve

Why "IS"?

Savings $S = Y - T = C$

$I = S - (G - T)$ ← deficit, govt. borrowing

also defines $Y(i)$

Note $S(+i, +Y, -T)$ because $C_i < 0$

Woodford (2010) cont.

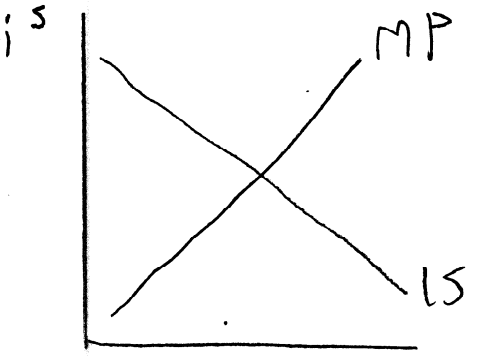
Depiction of FIs

FI's borrow funds from households, pay i^S
Lend funds on to borrowers L ("lending"
charging i^b

hence $S = L = I$ – any investment funded from earnings

$\omega = i^S - i^b$ what FI's earn for each $ borrowed/lent.

i^S is interest rate controlled by central bank, so



Result: "disturbances" to FI's e.g.
— drop in value of capital
— runs, including haircut runs
shift LS back/down.
Maybe so that you need $i^S < 0$ to keep $Y = \bar{Y}$
(Liquidity trap/zero bound

Woodford

Key assumption: "supply of intermediation"

$L_1(\overset{+}{c}, \overset{+}{W}, \ldots)$ W is FI's capital

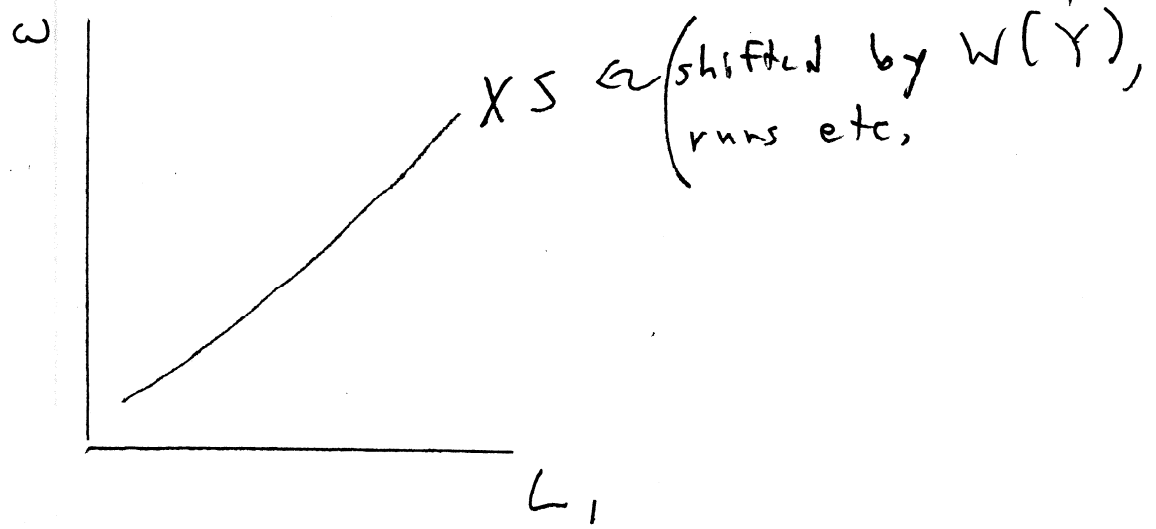
L − W is FI's borrowing

(L − W)/W "Leverage ratio."

Why? "the acceptable leverage ratio is higher when the spread between the expected return on ..assets... and the rate they must pay on their liabilities is greater."

Expected return must compensate for greater risk of insolvency when FI takes on more leverage.

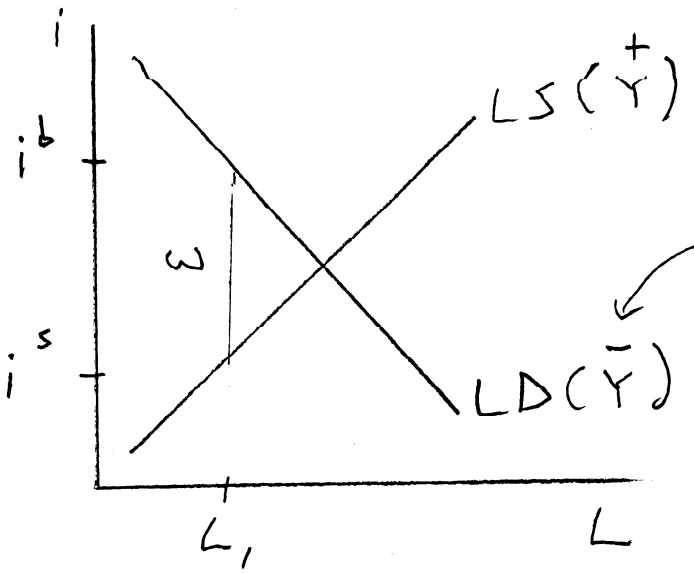
Also, $W(\overset{+}{Y})$: "an increase in aggregate economic activity will generally increase the value of intermediaries' assets."



Woodford (2010)

Demand for intermediation

Comes from another graph:



not necessary, but Woodford says it

LS Supply of funds to FI's, from household savings minus deficit

$$LS = S(i^{+s}, Y^{+}, \bar{T}^{-}) - (G - T)$$

so $LS(i^{+s}, Y^{+}, T^{\pm}, G^{-})$

LD Demand for funds for investment, but investors can also fund I from current income, so

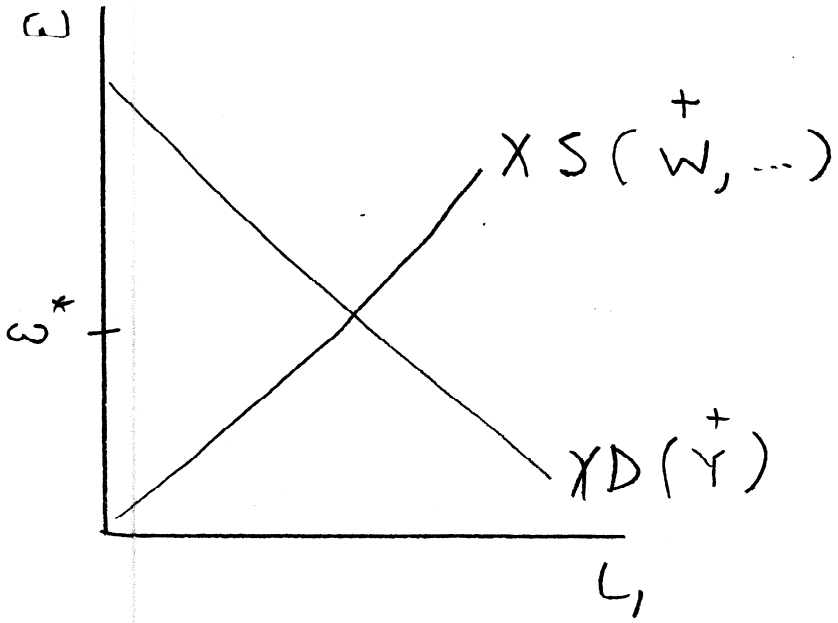
so $LD(i^{-b}, \bar{Y}^{-})$ ← but this effect is relatively small

Determines L_1 as function of ω, Y, call it

$XD(\omega^{-}, Y^{+})$ ← because effect on LS is stronger

Woodford (2010)

S&D for intermediation



Given Y, we have ω^*

Given Y and i^s, we have $i^b = i^s - \omega^*$

so we have

$$i^b = i^s - \omega^*(\overset{+}{Y}, \overset{-}{w}, \ldots)$$

IS curve

We need $Y(i^s, \ldots)$ or $i^s(Y, \ldots)$

Investment I depends on i^b and Y ....

Woodford (2010)

IS curve (cont.)

$I(\bar{i}^{b}, \overset{+}{Y})$ ← $(i^b = i^s - \omega^*(\overset{+}{Y}, \bar{W}, \ldots))$ ← other FI stuff

and $Y = C(\overset{+}{Y}, \bar{i}^{s}, \bar{T}) + I + G$

so given i^s you can solve out for Y

$Y(\bar{i}^{s}, \overset{+}{G}, \overset{+}{T}, \overset{+}{W}, \ldots)$

Review: why does $W\downarrow \rightarrow Y\downarrow$ given i^s?

$W\downarrow \rightarrow$ shifts XS back, so $\omega^*\uparrow$, so $i^b\uparrow$,

so $I\downarrow \rightarrow Y\downarrow$

IF $W(\overset{+}{Y})$, a "financial accelerator":

anything that reduces Y (like $G\downarrow$) has <u>extra</u> effect on Y through ω^*.

Anything else that hurts FI's also shifts IS back.