

CENTRAL BANKS AND THE FINANCIAL SYSTEM

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INTRODUCTION

This paper deals with :

- Central Banks
- Crises
- Fragility of financial system
- Liquidity Transformation
- Monetary policy
- Taylor rule and interest rate

CENTRAL BANKS

GENERAL FUNCTIONS :

- Diffusion of legally sanctioned forms of central banks independence
- Spreading of inflation targeting as a guide to monetary policy
- Establishment of the European Central Bank managing a currency for a group of 17 countries
- Recently Central Banks has mostly focused on the following functions : management of inflationary expectations with the task of the price stability.

CENTRAL BANKS

- Being the guardian of financial stability, the Central Bank should pursue its macroeconomic mandate with all means at its own disposal, including interventions in the money markets; the concern for financial stability does not imply deviations of interest rates from the path dictated by the objectives of macroeconomic stability.
- Central Banks adjust monetary policy actively to offset inflationary or deflationary pressures
- According to Fed Chairman Bernanke Central Banks should not worry about the possible buildup of bubbles in financial markets but they should simply be aware of the effects of presumed bubbles or of other fluctuations in asset prices, and be prepared to respond to sudden changes in the price of financial assets.

EX ANTE/EX POST CRISE FUNCTIONS

■ Ex Post :

Abundant liquidity supply through interest rates and open market operations ; access to the discount window ; much enlarged universe of collateral instruments to obtain credit from the Central Bank , as well as access to Central Bank credit by a wider variety of financial intermediaries.

■ Ex Ante :

Central Banks should worry about the buildup of bubbles in financial assets prices, under the assumption that financial crises is the bursting of a financial bubble.

FRAGILITY OF FINANCIAL MARKETS

There are two main reasons for the fragility of Financial Markets:

- **Phenomenon of Bubbles:**

Sustained and sudden increases in the prices of certain financial assets that make them attractive to investors, whose investments further drive up prices, well beyond what is justified by the expected returns from those assets.

Bubbles "burst" when investors realize their enthusiasm is unjustified and they will always be present because information about the value of assets is always incomplete.

FRAGILITY OF FINANCIAL MARKETS

- **Liquidity Transformation :**

It is a central and ever present function of financial markets. The challenge for policymakers, including Central Banks, is how to minimize the occurrence of financial crises which arise from a breakdown of liquidity transformation, and how to design their policy taking into account the possibility that such crises might occur.

Through liquidity transformation different agents can be pooled together to provide long term funding for productive investments.

FRAGILITY OF FINANCIAL MARKETS

Liquidity transformation is produced by two intermediation technologies:

- Consider a **Bank** first : it issues short term debt in the form of short term deposits or checking accounts, and with them it finances long term loans. As long as the liquidity needs of depositors and checking account holders are diversified, the bank is profitable. However, when the bank is compelled to provide funds to a large fractions of depositors or account holders simultaneously, the value of its investments would fall.
- A **Securities Market** is very similar. Through it, an issuer can raise long term funding. Trading activity in the secondary market allows investors with diverse liquidity needs to enter and exit the market flexibly.

LIQUIDITY TRANSFORMATION AND FINANCIAL FRAGILITY

- ❖ The bank performs this basic function through the concession of credits, financing itself with the collection of deposits. Therefore the bank transforms cash equivalents or short term cash equivalents in assets whose disposal will occur in a longer time.
- ❖ We take the amount of liquidity transformation as given and discuss, through 2 examples, why it makes financial markets fragile.

LIQUIDITY TRANSFORMATION AND FINANCIAL FRAGILITY

❑ Dispatching inside liquidity :

- ❖ A well functioning financial market should be able to produce enough "inside liquidity" (created by financial intermediaries) to meet the liquidity shocks it needs to withstand. Then financial intermediaries re-dispatch it through a mechanism similar to drawing from credit lines.
- ❖ The most relevant cases in which this efficient distribution of inside liquidity can break down are macroeconomic shocks, where inside liquidity is insufficient because all intermediaries face the same need for liquidity and all at the same time.
- ❖ But the efficient distribution of inside liquidity can break down also in the absence of macro shocks : this can happen if financial intermediaries are unable or unwilling to redistribute efficiently a sufficient level of inside liquidity.

LIQUIDITY TRANSFORMATION AND FINANCIAL FRAGILITY

A) First Example by Tirole :

- Three periods
- In $t = 0$ an entrepreneur finances a project whose initial cost is I , borrowing B from investors and contributing E in equity, so $B + E = I$
- The project does not generate any revenue at $t = 1$
- With probability $\frac{1}{2}$ an overrun of L arises, that must be covered if the project is to go on and produce income at $t = 2$, otherwise the project is liquidated and yields no income
- With probability $\frac{1}{2}$ there is no overrun and therefore no extra expense at $t = 1$
- At $t = 2$ revenue accrues and total proceeds are shared between investors and the entrepreneur

The pledgeable income, that is the maximum amount that the entrepreneur can credibly promise to investors, at $t = 0$ is :

$$P = B + \frac{1}{2} L$$

LIQUIDITY TRANSFORMATION AND FINANCIAL FRAGILITY

- Assume an overrun occurs in $t = 1$
- The entrepreneur could look for new investors who are willing to re-finance his project. The reason is that all he can promise is P in $t = 2$ but to keep the project going he needs L . If $L > P$ he will find no investors and the project will be abandoned.

There are two ways an entrepreneur can insure against such liquidity shocks :

- 1) The inefficient way is to hoard liquidity in case an overrun occurs. This is inefficient because capital would remain idle. Tirole suggests that the entrepreneur could negotiate a credit line with a bank. For a fee F paid in $t = 0$, the bank could commit to pay L in $t = 1$.

$$F = \left(\frac{1}{4}\right) L - \left(\frac{1}{2}\right) B$$

Outside investors will still finance the project in $t=0$.

They will also pay for the commitment fee : they pay $B + F = \frac{1}{2} B + \frac{1}{4} L$ in $t=0$ and their expected return is $\left(\frac{1}{2}\right) P = \frac{1}{2} B + \frac{1}{4} L$

LIQUIDITY TRANSFORMATION AND FINANCIAL FRAGILITY

- 2) In the previous example there is only one bank. But consider a situation where there is more than one bank and banks are not perfectly diversified.

Assume there are only two firms and two banks. Each bank extends a credit line to one firm only.

One firm faces an overrun and draws on its credit lines; the other pays the commitment fee but does not draw on its credit lines because it does not face an overrun.

In this case one bank makes a profit of F , the other a loss of F . The firm which faces an overrun can not rely on its bank to finance I and must fold up its project.

There is still enough liquidity but it is not dispatched to the firm that needs it because the bank which makes a profit has no incentive to give it up and transfer it to the other bank.

LIQUIDITY TRANSFORMATION AND FINANCIAL FRAGILITY

- ❖ The lesson from these two examples is that inside liquidity may be insufficient to prevent liquidation of productive projects. Financial fragility can result in productive capital being destroyed.
- ❖ The Central Bank has two ways to deal with this : it can use regulation to make sure that all banks are perfectly diversified so that none is exposed to shocks; if regulation fails to achieve perfect diversification it can step in to provide outside liquidity to those firms to which liquidity fails to be dispatched.

LIQUIDITY TRANSFORMATION AND FINANCIAL FRAGILITY

□ The fragility of securities' market

B) Second example by Tirole :

- Here the liquidity shocks might affect, rather than an entrepreneur, a portfolio manager
- Three periods
- At $t = 0$ the fund manager creates a fund purchasing securities
- Total outlays for the purchase is I , which fund manager finances borrowing B from investors and contributing E of his own, so $B + E = I$
- In $t = 2$ the portfolio yields the return greater than I
- In $t = 1$ the fund is subject to a liquidity shock: with probability $\frac{1}{2}$ investors withdraw B (Investors could discover that they are impatient and want to withdraw, maybe there is a shock to their preferences, maybe some macro news has scared them).

LIQUIDITY TRANSFORMATION AND FINANCIAL FRAGILITY

The pledgeable income at $t = 0$ is :

$$P = B + \frac{1}{2} B = 1,5 B$$

Investors contribute B in $t = 0$ and again B with probability $\frac{1}{2}$ in $t = 1$. Thus in $t = 0$ they must be promised at least $1,5 B$.

- ❖ If the fund manager needs to liquidate his investors in $t = 1$ he could either sell the portfolio or raise fresh fund from new investors. Because $P = 1,5 B > B$, he will always be able to survive the liquidity shock by attracting new investors: he needs to raise B and can promise $P > B$.
- ❖ Suppose the only way for the fund manager to survive the withdrawals is to sell the portfolio : let p be the price at which the portfolio can be sold in $t = 1$. Assume that $p < P$: in other words p is lower than the value of the portfolio in $t = 1$.
- ❖ The minimum price that allows the fund manager to survive is $p \geq B$. For $p < B$, anytime investors want to get out in $t = 1$, the intermediary is broke.
- ❖ Here again the Central Bank can address this fragility by stepping in to provide upside liquidity to the funds that experience sudden withdrawals.

"EXCESSIVE" LIQUIDITY TRANSFORMATION

- We now allow for monetary policy to determine the amount of liquidity transformation
- The Stein model considers a Bank which faces the following Investment: by investing I in $t = 0$, if a "good state" prevails total output at the time 2 is $f(I) > I$. If a "bad state" prevails total output in $t = 2$ is $\lambda I \leq I$.
- In $t = 1$ it is possible for the bank to sell its investment at a firesale price k
- The bank finances I borrowing from Investors.
- It can do so by issuing either short term or long term debt claims.
- Short term deposits pay a return R^M and are riskless.
- Because the interest rate on risky assets is above the interest rate on riskless assets, that bank has an incentive to finance as much as possible of its project with short term debt.
- Let m be the fraction of the project financed issuing short term deposit. In $t = 1$ the bank owes its short term creditors $mIR^M \equiv M$

"EXCESSIVE" LIQUIDITY TRANSFORMATION

- $m=m^{MAX}$ whenever the difference between the return on risky and riskless assets is sufficiently high.
- The only way the Bank can raise \mathbf{M} is to raise \mathbf{I} . When a Bank raises \mathbf{I} , and thus \mathbf{M} , it takes into account the fact that in the "bad state" this will force it to sell more assets at discount in order to payoff its own short term debt.
- By raising \mathbf{M} it reduces the value of k . The bottom line is that for a large enough spread between the return on risky and riskless assets the bank engages in inefficient liquidity transformation.
- In "bad state" if the bank needs to sell its project at a price k , in $t = 1$ there will be new investors in the economy.
- Let \mathbf{W} be the total resources of the new investors and $g(\mathbf{W})$ the output of the new projects they could finance.
- These investors could obtain a marginal return $g'(\mathbf{W})$. If instead they buy \mathbf{M} from the bank they will always invest $(\mathbf{W}-\mathbf{M})$ and their return will fall to $g'(\mathbf{W}-\mathbf{M}) < g'(\mathbf{W})$.
- To convince the new investors to buy \mathbf{M} , $g'(\mathbf{W}-\mathbf{M})$ must equal the marginal return from buying the old project from the bank.

FINANCIAL SYSTEM REFORMS AND MONETARY POLICY

- ❖ The basic ingredients of financial fragility are liquidity transformation as well as imperfect information which is a characteristic of any financial system, where the providers of funds are different from the users, and the problem is multiplied the greater is the distance between users and providers of funds.
- ❖ Another factor contributing to the spreading as well as liquidity crises is the process of risk management. Exposures to financial risks are hedged dynamically, giving rise to nonlinear reactions to price changing. These observations highlights that liquidity crises are as much outside the banking system as within the system itself.
- ❖ The final observation needed to describe the nature of financial crises in the contemporary financial system is that the number and frequency of transactions in securities has increased tremendously : with it, counterparty risk has multiplied. As a result, the potential of chains of failures has gone up.

FINANCIAL SYSTEM REFORMS AND MONETARY POLICY

FINANCIAL SYSTEM REFORMS :

Recognizing the increased fragility of financial system, many authors have suggested structural reforms to make the financial systems less prone to crises. These reforms include :

- A decrease of counterparties risk in the financial system as well as the adoption of orderly resolution rules for large balance sheets of financial intermediaries.
- A role for regulatory authorities to mitigate the information problem by accessing all data in the securities and derivatives market transactions and positions, by elaborating an aggregate picture of systemic risks, and by publishing their analysis and information for all market participants to see.
- The re-establishment of an appropriate correspondence between the regulatory framework that defines different financial organizations in the marketplace and the functions they effectively perform (to avoid the conflicts of interests, excessive risk taking, implicit puts to the government, etc.) .

INTEREST RATES AND TAYLOR RULE

- ❖ Structural reforms will definitely strengthen the financial system and decrease the risk of liquidity crises, but they will never eliminate it.
- ❖ The reason is that liquidity breakdowns can only be eliminated by eliminating liquidity transformation . In other words, all actors in the marketplace have to know that liquidity could be less than what they observe in "normal times", because there is always the possibility of breakdowns: interest rates have to properly reflect this.
- ❖ Discussions of monetary policies before the crises focus on the extent to which interest rate have been set according to the Taylor rule. They concentrate on the variables in the Taylor rule — the deviation of inflation expectations from the Central Bank target — but tend to overlook the other variable in the rule : the real rate of interest.
- ❖ Empirical applications of the Taylor rules tend to use, for the real rate, a long average of past real rates.

LOW INTEREST RATE TRAP

- ❖ If Central Banks set interest rates overlooking the risk of financial crises, rates in "normal times" will be too low and liquidity transformation will be subsidized.
- ❖ This could push the economy into a low interest trap. Low interest rates induce too much risk taking and increase the probability of crises. These crises, in turn, require low interest rates to maintain the financial system alive.
- ❖ Raising rates becomes extremely difficult in a severely weakened financial system, so monetary authorities remain stuck in a low interest rates equilibrium.

CONCLUSIONS

Two main messages came out from this paper :

- Financial Systems are fragile because of liquidity transformation
- Regulatory Reforms will strengthen the financial system and decreased the risk of liquidity crises.

This leaves monetary policy with a very important task : optimal monetary policy would consist of a modified Taylor Rule in which the real rate reflects the possibility of liquidity crises and recognizes that liquidity transformation gets subsidized. Failure to recognize this point risks leading the economy into a low interest rate trap.