# Balance-Sheet Channel in Great Depression

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The Great Depression of the US started with stock market crash of October 1929. This leads to a series of banking crisis, including Banking Holiday of March 1933. Between 1929 and 1933, 1/3 of the banks failed, money supply fell by 1/3, nominal GDP fell by 50%, real GDP fell by 1/3, and the unemployment rose to 25%. It took 10 years for real GDP to recover

Friedman and Schwartz (1967) argued that the Federal Reserve System was responsible for turning the financial turmoil into the Great Depression

Deposit-currency ratio fell from 11 in 1929 to 5 in 1933 as public lost the confidence on domestic banking system

In order to meet the withdrawal demand, banks reduced the deposit-reserve ratio from 13 in 1929 to 6 in 1933 by selling securities and calling back loans

The money multiplier:

$$\frac{M_2}{M_0} = \frac{Currency(C) + Deposits(D)}{Currency + \operatorname{Re} serve(R)} = \frac{\frac{C}{D} + 1}{\frac{C}{D} + \frac{R}{D}}$$

fell

$$\text{from} \quad \frac{\frac{1}{11} + 1}{\frac{1}{11} + \frac{1}{13}} = 6.5 \text{ in 1929,}$$

$$\text{to} \quad \frac{\frac{1}{5} + 1}{\frac{1}{5} + \frac{1}{6}} = 3.3 \text{ in 1933.}$$

Against this fall in the money multiplier, the Fed did not supply enough monetary base. The Fed tightened the collateral standard for borrowing by the private banks at the discount window, worrying the default of the borrowing banks.

Because of the Fed's inaction, many banks who initially faced liquidity shortage became insolvent (had negative bank capital)

$\longrightarrow$ Banks sold securities in order to meet the withdrawal demand

$\longrightarrow$ Security prices fell

$\longrightarrow$ Bank capital (net worth) fell (many became insolvent)

$\longrightarrow$ Banks had to call back loans

$\longrightarrow$ Further falls in security prices and loan values

| Bank B/S | |
|---|---|
| liquid assets (securities) $\downarrow$ | deposits $\downarrow$ |
| illiquid assets (loans) $\downarrow$ | bank capital $\downarrow\downarrow$ |

When the banks reduced loans,

→Credit constrained businesses decreased their investment on non-financial assets (working capital and fixed capital)

→The prices of non-financial assets and commodities fell

→ Assets values fell and the real value of the old debts rose (debt deflation)

→ Net worth of businesses fell (many became insolvent)

→ Further reduction of investment and falls of prices of assets and commodities

| B/S of nonfinancial businesses | |
|---|---|
| liquid assets (working capital) ↓ | real debt ↓↑ |
| illiquid assets (fixed capital) ↓ | net worth ↓↓ |

The Great Depression spread across the world through the international gold standard. Eichengreen (1992) argued the three factors contributed the world wide reduction of the liquidity:

$$\frac{world\ money\ supply\ (M_2)}{monetary\ gold\ (G)} = \underbrace{\frac{M_2}{monetary\ base\ (M_0)}}_{(1)}$$

$$\underbrace{\times \frac{M_0}{G + foreign\ reserve\ (FR)}}_{(2)} \times \underbrace{\frac{G + FR}{G}}_{(3)}$$

The first term $(1)$ is usual money multiplier $(M_2/M_0)$, which fell with the people's loss of confidence on the domestic banking system.

The second term $(2)$ is the ratio of monetary base (liability of the central bank) to the gold and foreign reserve of the central

banks. Under the gold standard, the countries who lost their reserve (such as Britain) had to reduce the monetary base in order to maintain the gold standard. But the countries who gained their reserve (such as US and France) did not have to expand the monetary base. This asymmetry reduced the monetary base-reserve ratio of the world in (2).

In the third term (3), as many countries lost the confidence of the gold standard of the central country (Britain), they (in particular France) started asking Britain to exchange British pound for the gold. This reduced the ratio of total reserve to monetary gold in (3). All these three terms fell, the world money multiplier - ratio of world money supply to monetary gold - fell dramatically, which transformed the Great Depression into the world wide phenomena.

Generally, the effect of the balance sheet channel depends upon whether the shock hit the agents with large leverage or agents without leverage. The leverage is usually defined as

$$leverage = \frac{total\ assets}{net\ worth} = \frac{total\ assets}{total\ assets - debt}$$

Thus the larger the ratio of debt to total assets, the larger is the leverage.

The technology stock crash in 2000-2001 was largely absorbed by pensions funds and households, who do not have much leverage. Thus the despite of the magnitude of the decrease in the asset value, it did not have large propagation though the balance-sheet channel.

In contrast, 1998 Russian crisis hit the hedge funds, investment banks and commercial banks, which have large leverage. Thus despite of the small loss compared with the technology stock crash, it had a large effects on liquidity and risk-premium in financial market through the balance sheet channel.

The present subprime crisis has huge propagation effects because the magnitude of the decrease in the asset value is at least as large as the technology stock crash of 2000-2001 and it decreases the net worth of highly-leveraged agents (investment and commercial banks and hedge funds) as in 1998 Russian crisis.