

Macroeconomics

Based on the textbook by KARLIN and SOSKICE:
Macroeconomics: Institutions, Instability, and the Financial System

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Business cycles and financial cycles

Business cycles are fluctuations in all main real economic aggregates, such as output, consumption, investment, employment, that may be caused by supply or by demand shocks and that last for around 3–6 years.

Some institutions (e.g., NBER) attach to these cycles a chronology of episodes of recession and expansion, with ouvertures and transitions. Business cycles, however, do not appear to follow any strict patterns and periodicities.

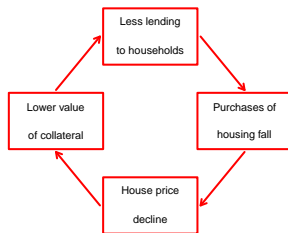
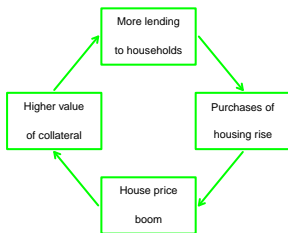
Financial cycles have appeared more recently in the economic literature. They tend to be longer than business cycles (8–18 years). Financial and business cycles may interact, and financial crises may entail real recessions.

The idea of financial cycles

In a mortgage-based economy—lending by households is connected to mortgages and real estate collateral—a cycle can start with the introduction of a new financial instrument, for example, that facilitates household borrowing. House prices will rise, and the increased collateral benefits further expansion. This describes a *house-price cycle*. [In countries, where mortgages play a lesser role, such cycles are much weaker.]

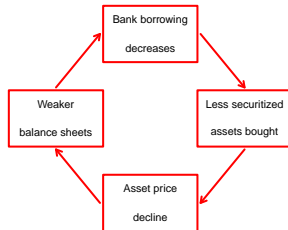
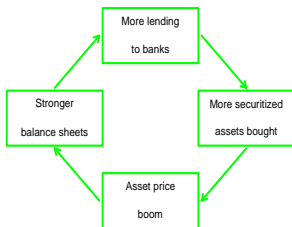
Similarly, new financial instruments may facilitate lending of banks to other banks. Banks will purchase more financial assets, and the rising asset prices increase the value of the collateral for further expansion. This describes a *bank-based financial cycle*.

The house-price cycle



Upswing and downswing of the house-price cycle in a mortgage economy.

The bank-based financial cycle



Upswing and downswing of the bank-based financial cycle.

Different types of banks

- ▶ *Retail banks* serve customers such as households and SMEs, take deposits and give loans;
- ▶ *Investment banks* trade in various financial products including securities, derivatives, and commodities. Their typical customers are governments and corporations;
- ▶ *Universal banks* combine the activities of retail and investment banks;
- ▶ *Shadow banks* focus on activities such as credit intermediation, without being banks. They may not be subject to banking regulations.

Four types of crises

REINHART AND ROGOFF (2009) distinguish four types of major economic crises:

1. Inflation crises;
2. Currency crises;
3. Sovereign debt crises;
4. Banking crises.

Here, the focus is on *systemic banking crises*. Such crises are characterized by (a) deep and prolonged asset price collapses, (b) large and lasting adverse impacts on output and employment, and (c) explosive increases of government debt.

Financial cycle: upswing and downswing

A sequence of episodes:

1. In the upswing, house prices increase, banks extend more credit. Debt increases for households and for banks;
2. The bubble bursts. A collapse in housing prices and/or a banking crisis follow;
3. In the downswing, households and banks tend to reduce their stock of debt (*deleveraging*). Banks increase the interest rate spread (markup);
4. A deep recession is aggravated by the increasing public sector debt (they may also need to bail out banks).

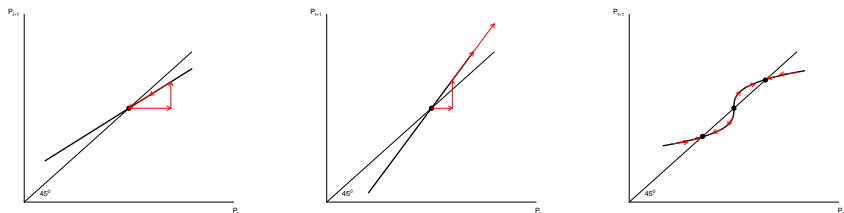
The financial cycle is much longer than the business cycle, thus an upswing can also persist during a business cycle recession.

Bubbles and financial accelerator

In order to analyze financial crises, two concepts are introduced:

1. An *asset price bubble* relies on price dynamics in a market. Participants are bidding up the price, as they expect the price to rise even more strongly in the future. Their behavior can be rationalized, but the assessment of intrinsically cheap goods (tulip bulbs, for example) can appear preposterous. Sooner or later, bubbles burst;
2. The *financial accelerator* describes a feedback cycle in financial markets. An increased value of a collateral can induce accumulating the collateral and thus having access to more loans.

Price dynamics



Processes of price dynamics for one stable equilibrium, one unstable equilibrium (bubble), and multiple equilibria (two stable, one unstable).

Dynamics with stable and unstable equilibria

With a stable equilibrium, price shocks can cause $P_{t+1} > P_t$, but, as everyone expects P to drop to equilibrium P^* in the future, the shock is absorbed, and soon $P_{t+1} = P_t = P^*$ will hold again.

With an unstable equilibrium, a positive price shock again induces $P_{t+1} > P_t$. As everyone expects P to rise further, demand will increase again, P expands without bounds. A bubble is forming.

In a bubble, the market price can exceed the intrinsic value of a good enormously (Dutch tulips, house prices of the early 2000s).

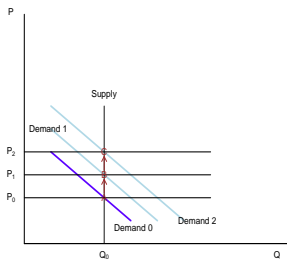
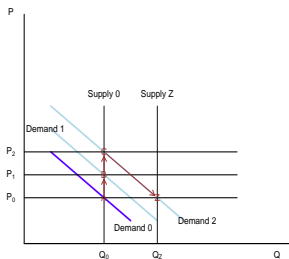
Financial accelerator

The financial accelerator is a positive feedback process, such as:

- ▶ House prices increase because of a shock;
- ▶ The value of collateral increases. Households face less credit constraints;
- ▶ Households borrow more. A part of the loans is spent on consumer goods, another part on housing;
- ▶ House prices increase again.

The financial accelerator can amplify the business cycle. The effect shifts the IS curve right. It need not lead to a bubble, as it is not driven by expectations but by agents observing the market.

Housing in Kazan and in Monaco



If the city has space for expansion, increasing demand is satisfied eventually and prices return to the old level P_0 . A construction boom lets the bubble burst. If the city does not have sufficient space, there is no brake for the price rise.

Plain vanilla

Consider the following crisis scenario:

1. A real-estate bubble bursts, house prices fall, some households fail to serve mortgages;
2. Foreclosure, houses are repossessed by banks and sold cheaply;
3. Banks suffer losses and may become insolvent.

Such banking crises are called *plain vanilla*, the standard flavor of ice-cream: The crisis is not complicated by innovations in securities etc.

Housing price cycles in the 3–equation model

The housing-price cycle can be represented in the 3–equation model as follows:

1. Higher aggregate demand shifts the IS curve right: output increases;
2. The Phillips curve shifts up: inflation and its expectations rise;
3. The central bank steps on the brake and increases the interest rate (MR curve).

The financial cycle is mirrored in the business cycle.

A feedback process centered on leverage

Not all financial cycles are 'plain vanilla'. Consider an investment bank that mainly keeps asset-backed risky securities. Assume these securities (financial assets F) have an expected return rate r and a maximum loss of ζ . The assets have a price P . Then, the investment bank can spend $P \cdot F$ on these assets:

$$PF = (1 + r - \zeta)F + e,$$

where e denotes the bank's equity.

Demand for the risky asset and leverage

The formula for PF yields immediately

$$F = \frac{e}{\zeta - (1 + r - P)},$$

such that less risk ζ and more equity imply a higher demand for the risky asset. Similarly, leverage (assets by equity) becomes

$$\lambda = \frac{F}{e} = \frac{1}{\zeta - (1 + r - P)}.$$

A numerical example

CARLIN & SOSKICE present a numerical example for a financial cycle ending in a crisis (crash):

	Period 0	Period 1	Period 2	Period 3
policy rate r^P	0	0	0	0
asset return r	0.07	0.07	0.07	0.07
equity e	10	10	20	wiped out
risk level ζ	0.12	0.04	0.04	0.12
asset price P	1	1.05	1.05	1

In period 0, the bank has $e = 10$ and accordingly purchases 200 financial assets. Its leverage is $\lambda = 200/10 = 20$.

Boom and bust

1. In period 1 (*upswing*), the market assigns a lower risk to the asset. The asset price increases to 1.05. The bank buys 500 financial assets, and its leverage rises to 50;
2. In period 2, the value of the previously purchased 200 assets has increased by $200 * 0.05 = 10$ due to capital gains reflecting the higher price. Equity doubles, and the bank can buy more assets, $F = 1000$ and $\lambda = 50$;
3. In period 3 (*crash*), the market assigns a higher risk to the asset. This higher risk comes with a lower price, and the capital loss of $0.05 \cdot 1000$ exceeds the bank's equity. The bank becomes bankrupt.

The lower perceived risk in the upswing and the increased leverage are the main problems in this scenario.

The leverage cycle in the 3–equation model

The crash in the leverage cycle can be represented in the 3–equation model as follows:

1. Consumption and investment contract, aggregate demand falls, the IS curve shifts left, output falls;
2. The Phillips curve shifts down, inflation and its expectation fall;
3. The central bank reduces r (MR curve) and thus runs a monetary expansion that should take output back to normal.

The paradox of credibility

The real culprit for the crash of the investment bank in the example was the lower perceived risk in period 1. If the market believes that risk is low, participants will make the system riskier.

Lower perceived risk can be due to:

- ▶ Successful macroeconomic stabilization policy;
- ▶ Rising housing prices reduce credit risk by increasing the value of the collateral;
- ▶ Financial innovations, such as *tranching*, i.e. blending of assets with higher and lower risk, such that the new asset has an inconspicuous risk.