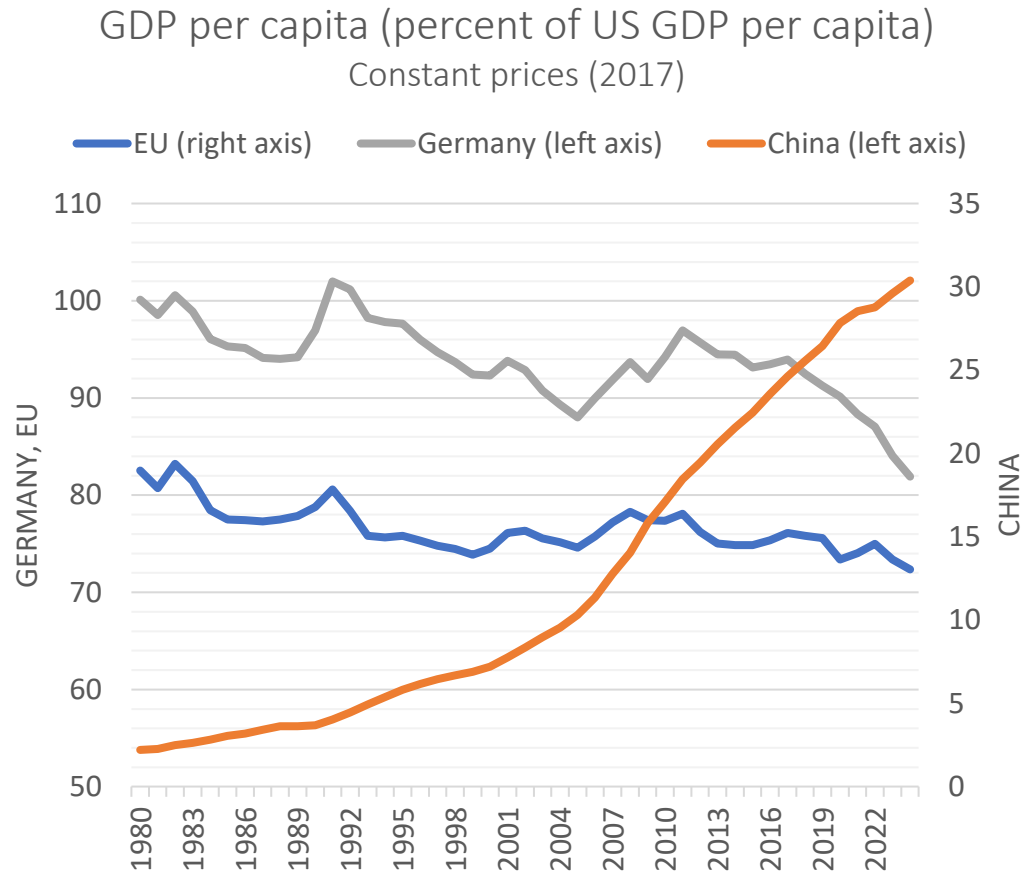# A Schumpeterian perspective on innovation, government debt and economic growth

Professor Dr. Peter Bofinger

Universität Würzburg

While China is catching up, Europe is lagging behind

GDP per capita (percent of US GDP per capita)
Constant prices (2017)

EU (right axis)   Germany (left axis)   China (left axis)

GERMANY, EU

110
100
90
80
70
60
50

CHINA

35
30
25
20
15
10
5
0

1980 1983 1986 1989 1992 1995 1998 2001 2004 2007 2010 2013 2016 2019 2022

Source: IMF, World Economic Outlook

Draghi Report:

- We are the **most open**: our trade-to-GDP ratio exceeds 50%, compared with 37% in China and 27% in the United States.

- We are the **most dependent**: we rely on a handful of suppliers for critical raw materials and import over 80% of our digital technology.

- We have the **highest energy prices**: EU companies face electricity prices thatare 2-3 times higher than those in the United States and in China.

- We are **severely lagging** behind in new technologies: only four of the world's top 50 tech companies are European

China's dominance in renewables

FIGURE 7

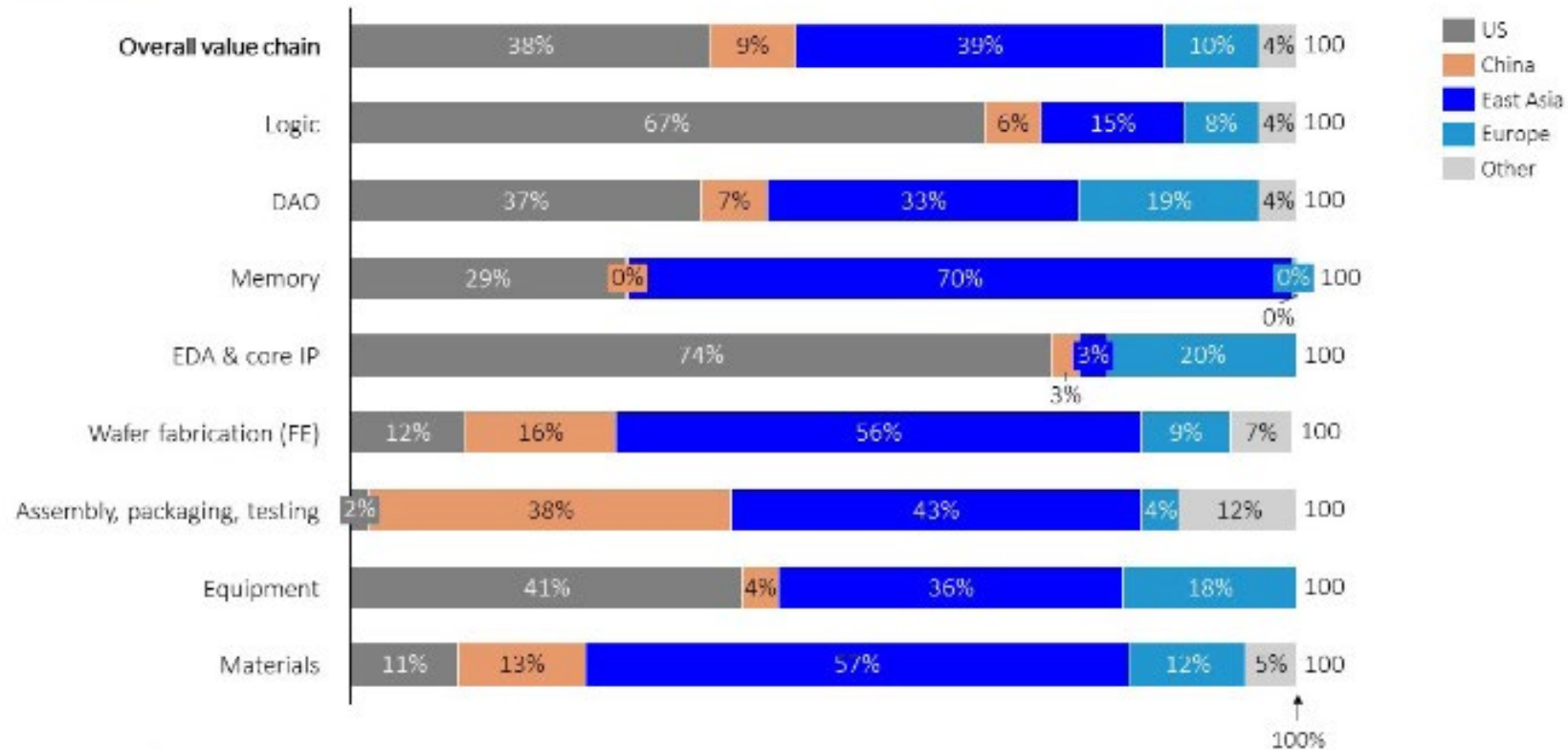**Clean technology manufacturing capacity by region**
%, 2021
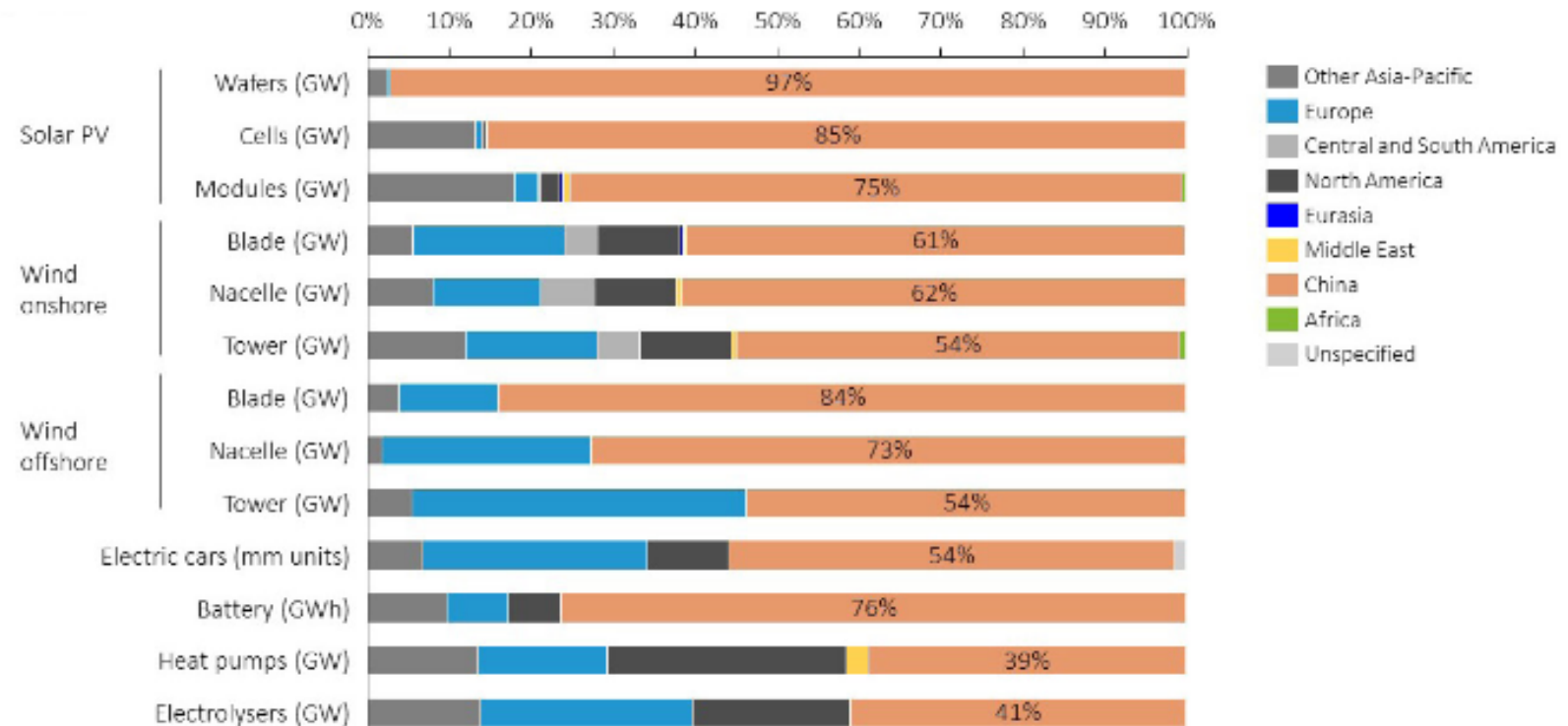
Source: European Commission, 2024. Based on IEA, Bruegel.

Source: Draghi Report
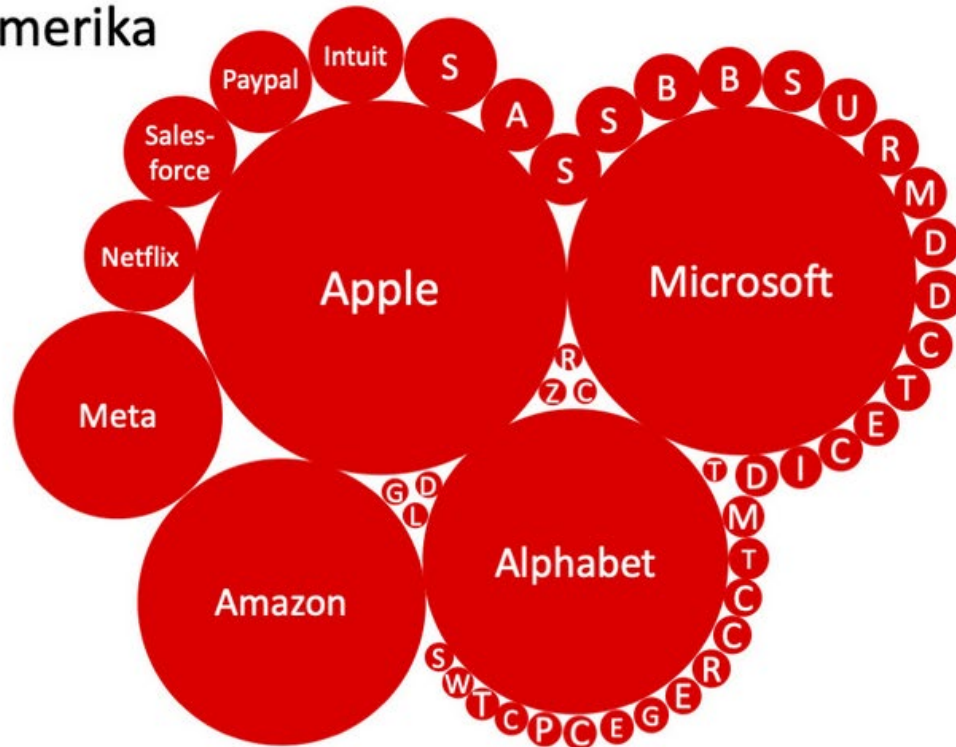
US and East Asian dominance in semiconductors

FIGURE 3

Share in semiconductor value chain by country
% of worldwide total, 2019

	US	China	East Asia	Europe	Other
Overall value chain	38%	9%	39%	10%	4%	100
Logic	67%	6%	15%	8%	4%	100
DAO	37%	7%	33%	19%	4%	100
Memory	29%	0%	70%	0%	0%	100
EDA & core IP	74%	3%	3%	20%		100
Wafer fabrication (FF)	12%	16%	56%	9%	7%	100
Assembly, packaging, testing	2%	38%	43%	4%	12%	100
Equipment	41%	4%	36%	18%		100
Materials	11%	13%	57%	12%	5%	100

100%

Source: Draghi-Report

US and Chinese dominance in digital platforms

Amerika · Europa · Asien-Pazifik · Afrika

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DEIX — Digital Economy Investments

THE ORIGINAL PLATFORM FUND
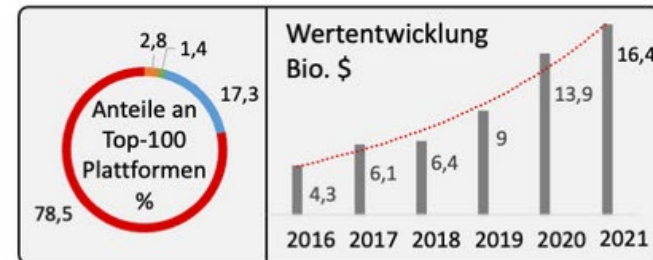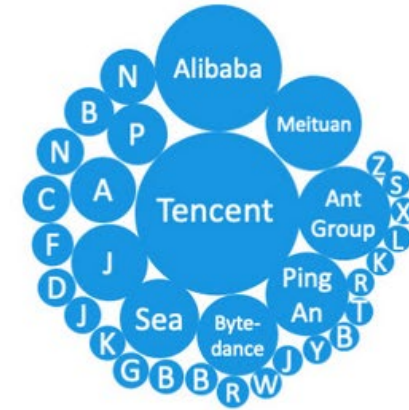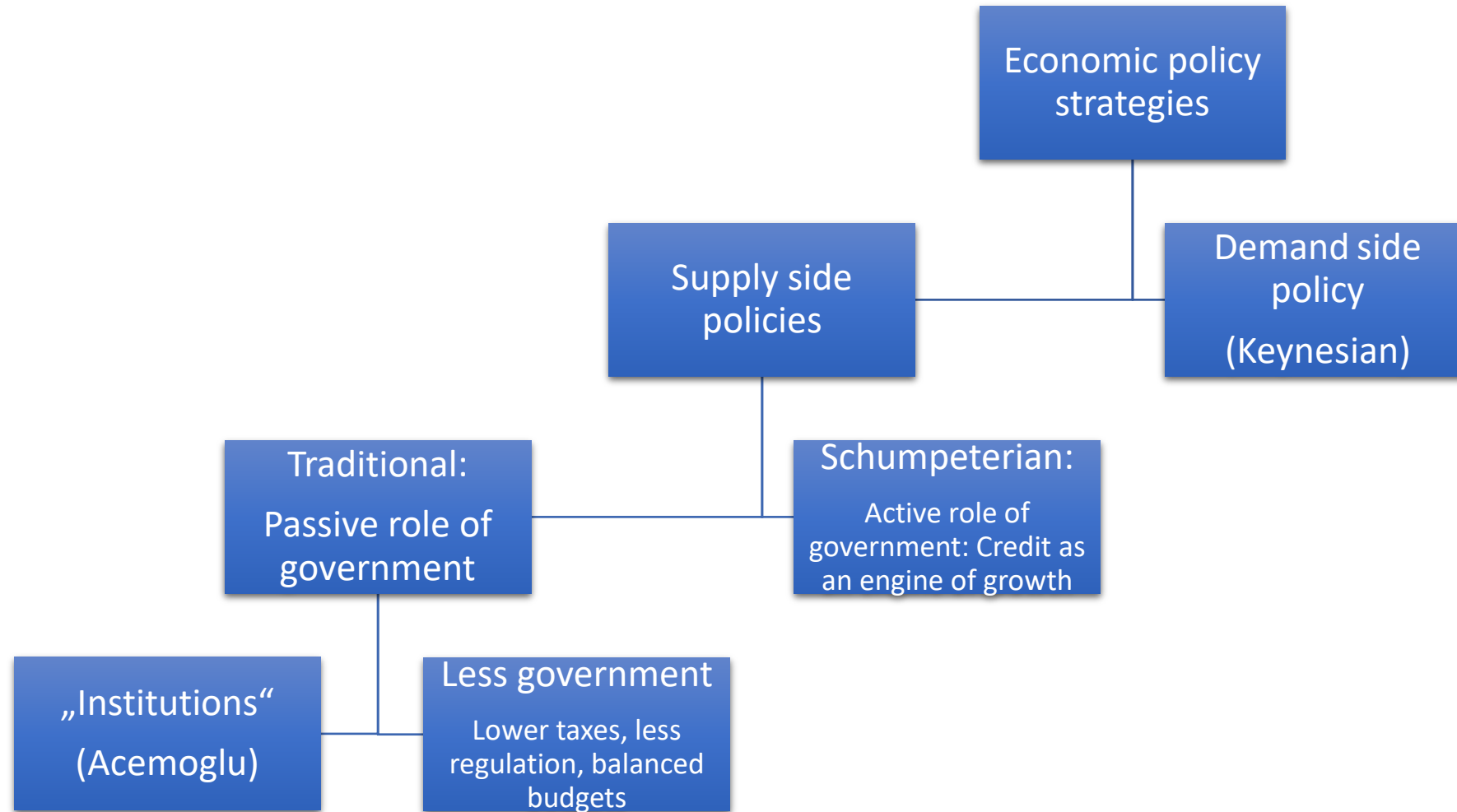
How to get out of the „middle technology trap"?

Joseph A. Schumpeter (1954)
„real analysis" versus „monetary analysis"

- **Real Analysis: Identity of the real and the monetary sphere**

    "Real proceeds from the principle that all the essential phenomena of economic life are capable of being described in terms of goods and services, of decisions about them, and of relations between them."

- **Monetary Analysis: Real and monetary sphere are separate. Monetary sphere has a "life of its own"**

    "Monetary analysis introduces the element of money on the very ground floor of our analytic structure and abandons the idea that all essential features of economic life can be represented by a barter-economy model."

Key features of a „real analysis": Neoclassical model

**General purpose good** (GPG) that can be used interchangeably as

- **consumption good**,
- **financial asset ("savings"),** if GPG is saved and becomes available as a supply of funds,
- **investment good ("capital")**, if GPG is used by an investor for the production process
- **output of the investment process** for consumption in the future.

Loanable Funds Modell

i

Saving=Y-consumption)
($\equiv$Supply of funds)

i_0

Investment
($\equiv$Demand for funds)

$S_0=I_0$ S, I
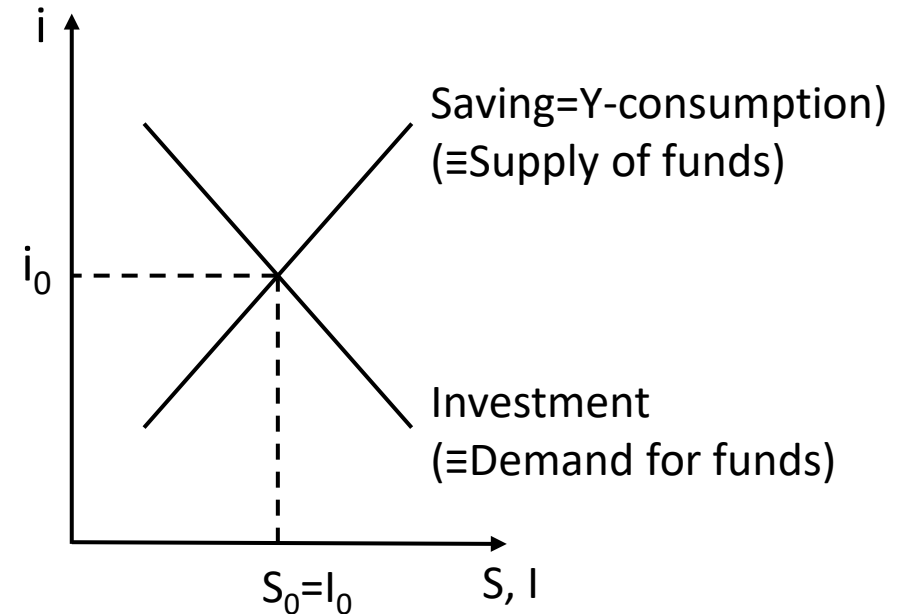
Implications

- Real sphere is identical with financial sphere:
  - Consumption/saving decision is identical with supply of funds
  - Investment decision is identical with demand for funds
- Saving is the source for investment funds
- Banks and financial markets are intermediaries for the GPG
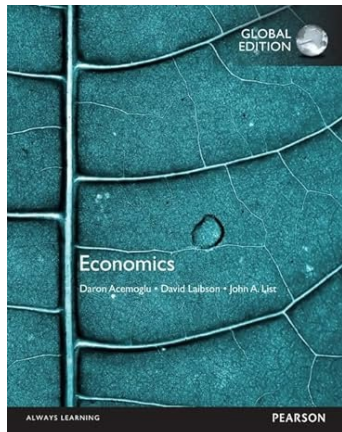
Banks Are Only One of Many Types of Financial Intermediaries

Many different types of financial institutions act as financial intermediaries, channeling funds from suppliers of financial capital—in other words, savers—to users of financial capital. In addition to banks, financial intermediaries include, but are not limited to, asset management companies, hedge funds, private equity funds, venture capital funds, bank-like businesses that comprise the "shadow banking system," and even pawnshops and shops that give payday loans.

Key features of a monetary analysis

- Financial assets (bank deposits, bonds, reserves) and real assets (consumption and investment goods)
- Implications:
  - Real sphere separate (IS) from financial sphere (LM)
  - Banks create money autonomously
  - Saving no limitation for financing

IS/LM model

i

LM = Financial market equilibrium

IS = Goods market equilibrium

Y
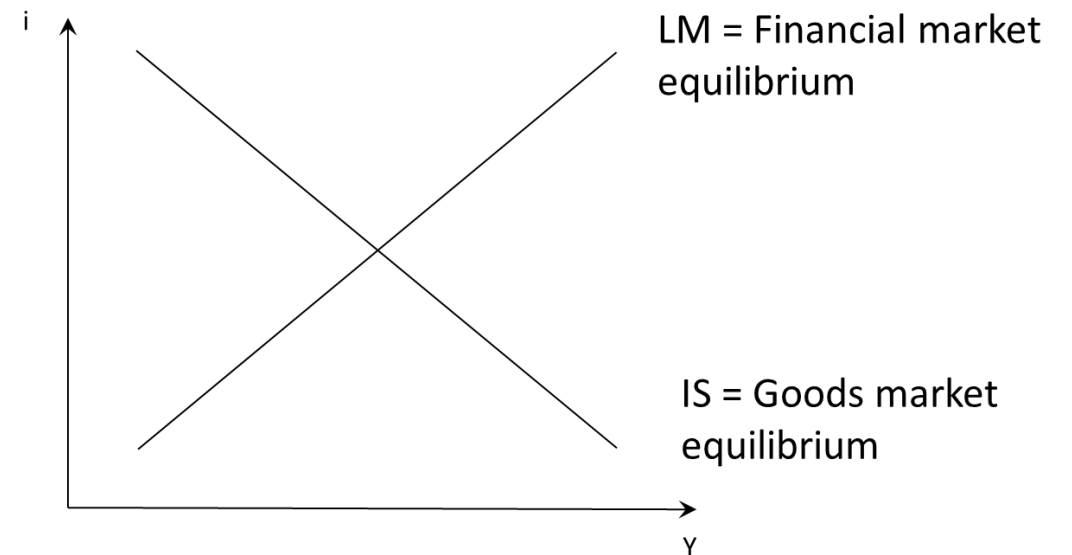
Schumpeterian growth theory

- No continuous accumulation of the GPG

„*Different methods of employment, and not saving and increases in the available quantity of labor, have changed the face of the economic world in the last fifty years*" (p. 57)

- No limitation by saving

"*The banker, therefore, is not so much primarily a middleman in the commodity "purchasing power" as a producer of this commodity.*

- The innovator is the key actor

"*By credit entrepreneurs are given access to the social stream of goods before they have acquired the normal claim to it. (…) It is only thus that the economic development could arise from the mere circular flow in equilibrium*". (p. 94)
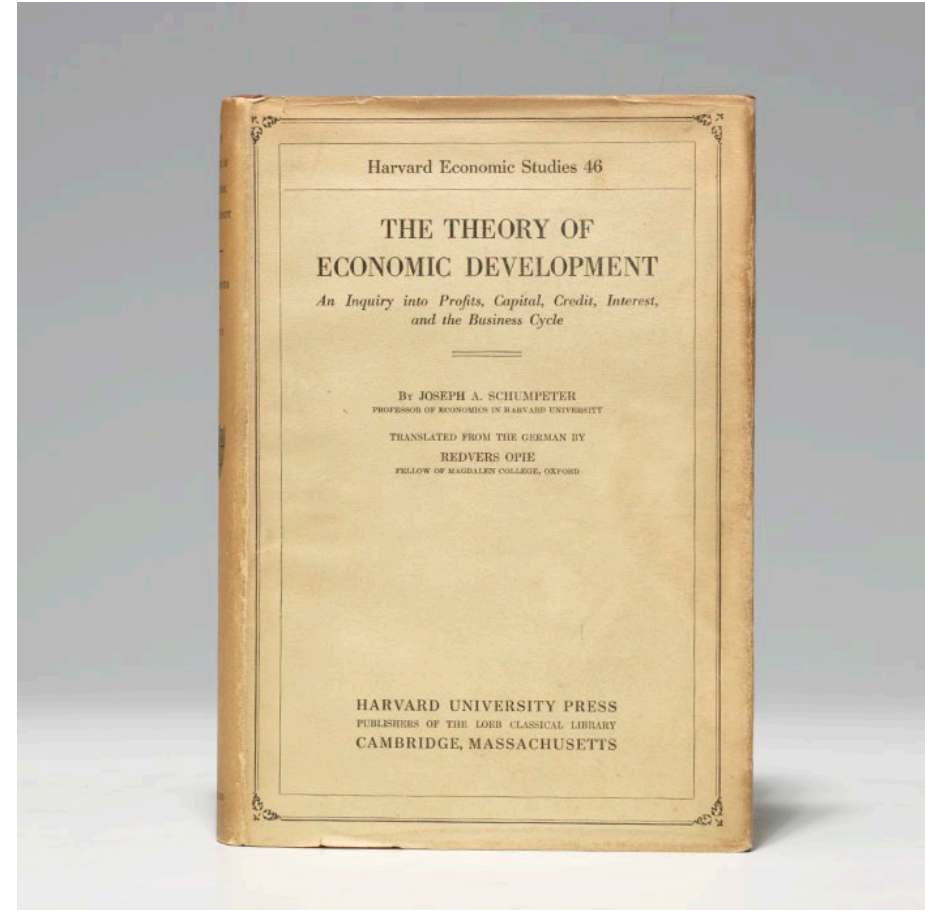
Development as a "revolutionary" change

„It is spontaneous and discontinuous change in the channels of the flow, disturbance of equilibrium, which forever alters and displaces the equilibrium state previously existing". (Schumpeter 1934, p. 54)
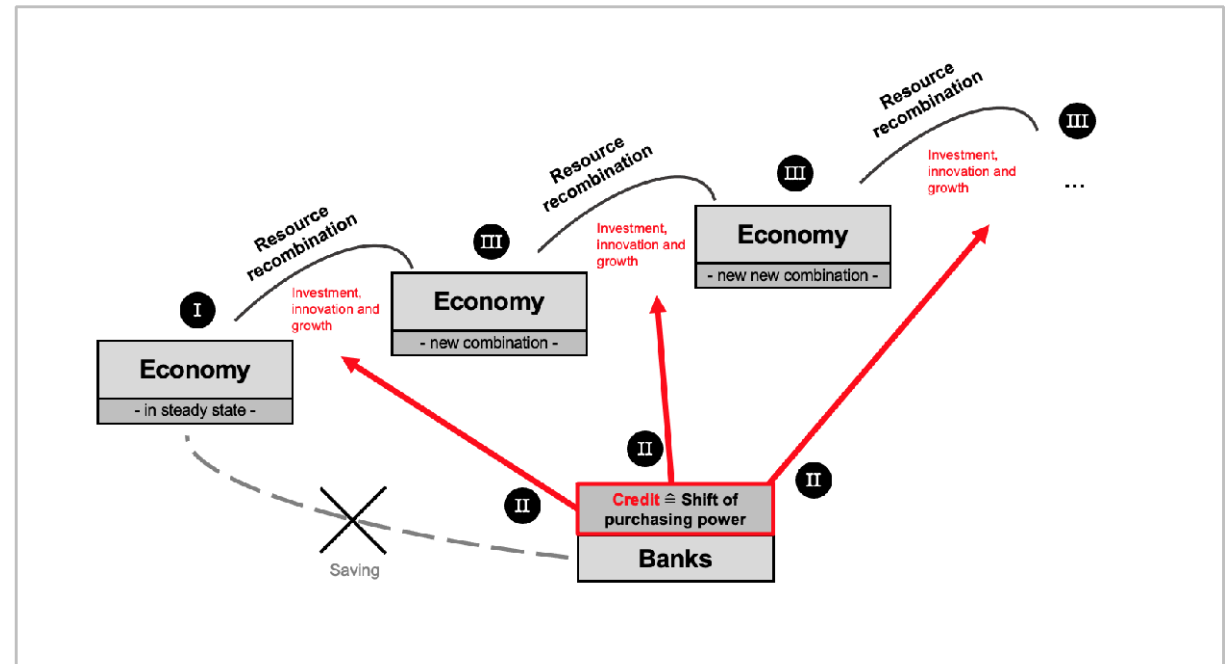
Innovation financed by credit

- **Centrally planned system:** Central authority "issue(s) orders to those in charge of the productive functions to withdraw part of them from the employments in which they are engaged, and to apply the quantities so withdrawn to the new purposes envisaged." (Schumpeter, 1939, p. 110)

- **Capitalist system:** "If innovation were financed by savings, the capitalist method would be analogous, (…) a shifting of factors through a shifting of means of payment may, indeed, be likened to the canceling of an old and the issuing of a new 'order' to the owners of factors." (Schumpeter, 1939, p. 110)

- **Credit financed innovation:** "(…) the shifting of the factors is effected (…) by the reduction of the purchasing power of existing funds which are left with the old firms while newly created funds are put at the disposal of entrepreneurs: the new 'order to the factors' comes, as it were, on top of the old one, which is not thereby canceled." (Schumpeter, 1939, p. 110f.)

The problem of credit inflation

- „**Credit inflation**": „If now credit means of payment, (…) are created and placed at the entreprener's disposal, then he takes his place beside the previous producers and his purchasing power its place beside the total previously existing. Obviously, this does not increase the quantity of productive services existing in the economic system. (…) It causes a rise in the prices of productive services." (Schumpeter 1934, p. 95)

- **"Social stream" enriched**: "After completing his business (…) — he has (…) enriched the social stream with goods whose total price is greater than the credit received and than the total price of the goods directly and indirectly used up by him. Hence the equivalence between the money and commodity streams is more than restored, the credit inflation more than eliminated (…)" (Schumpeter 1943, p. 96)

- Quantity theory: Money growth causes inflation with constant velocity and constant GDP:

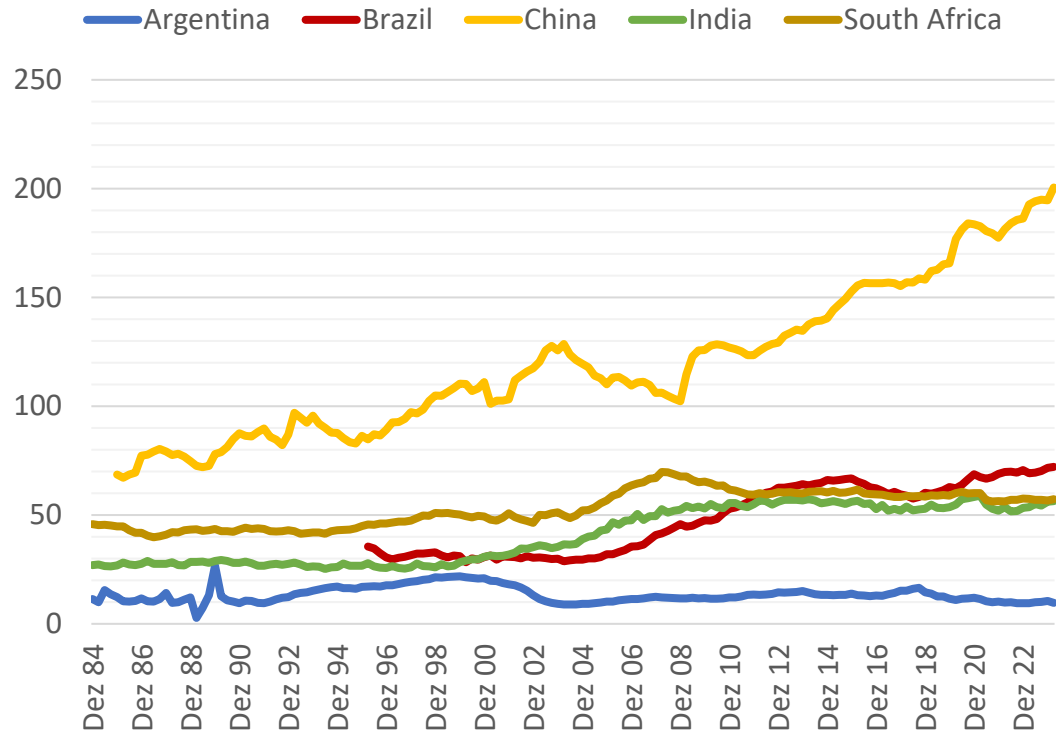$$Money \; x \; \overline{Velocity} = \overline{real \; GDP} \; x \; Price \; Level$$

- Identity: $Money = Credit$

- „Schumpeterian Version": Credit growth increases real GDP without permanently increasing inflation

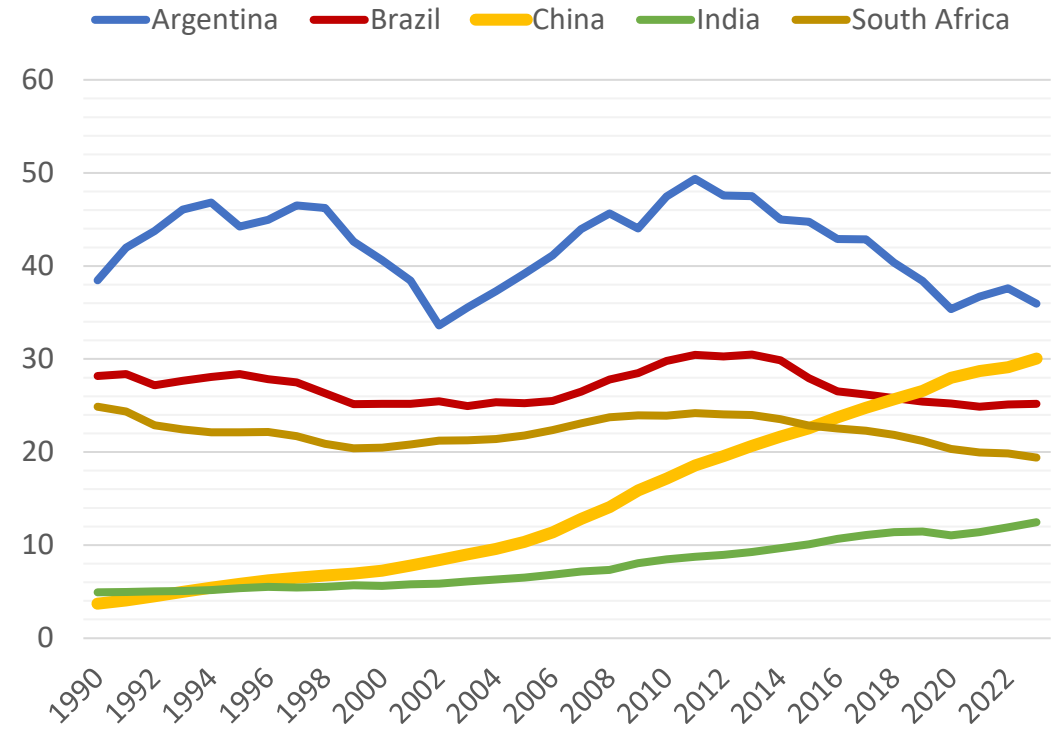$$Credit \; x \; \overline{Velocity} = real \; GDP \; x \; \overline{Price \; Level}$$

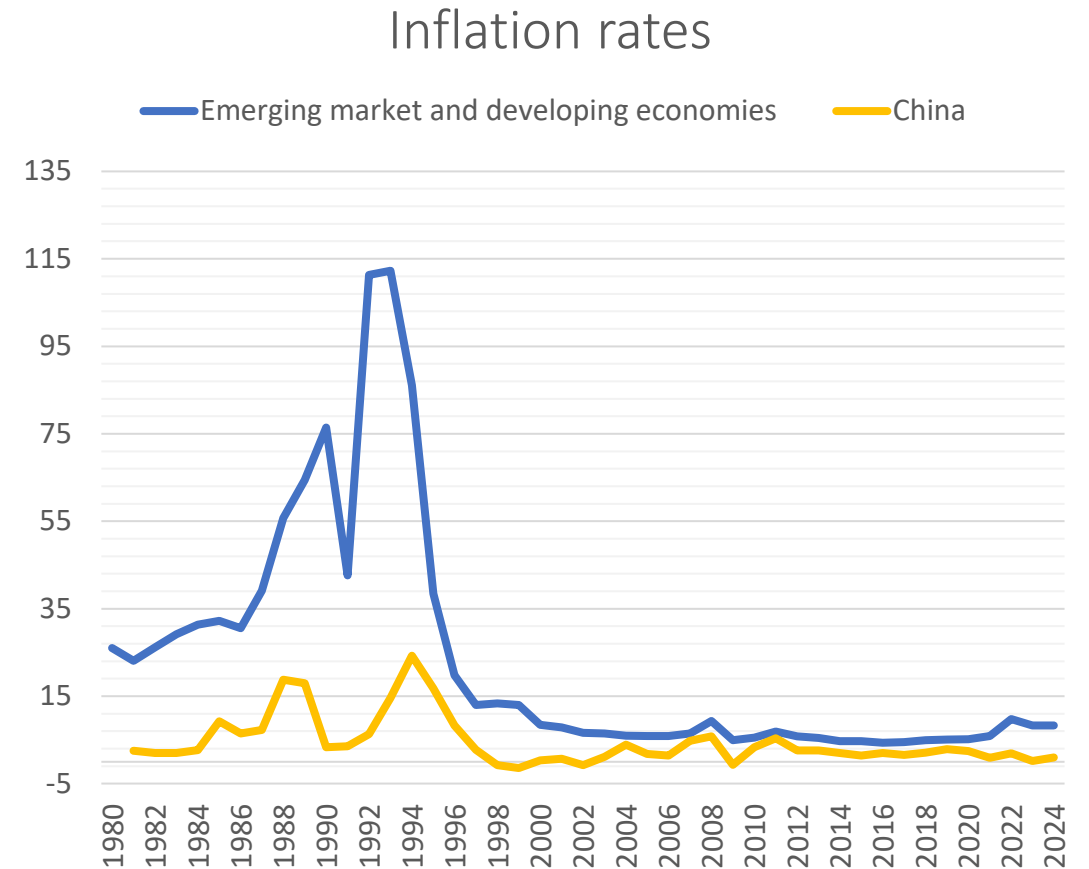# Does it work?

China's catching-up process

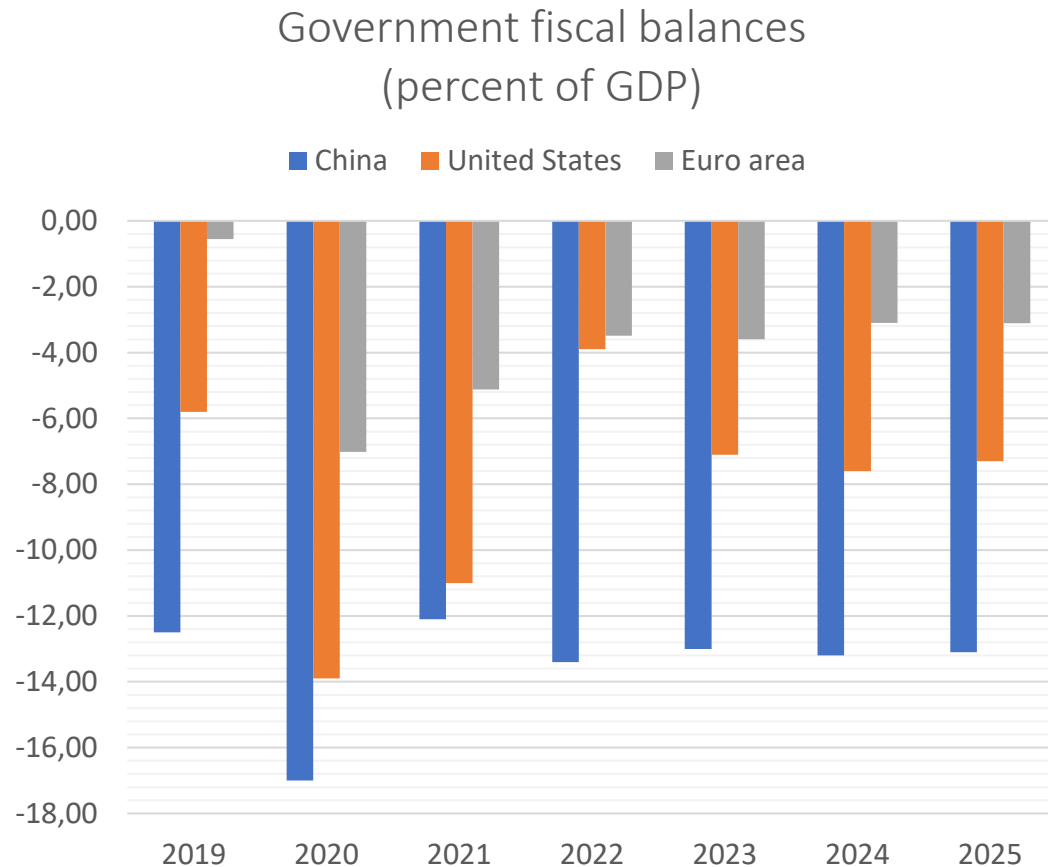Bank credit to private non-financial sector
(Percent of GDP)

GDP per Capita
(in % of United States GDP per Capita)

China was able to cope with the challenge of the „Growth Strategy Dilemma" (Agarwal 2023)

Promoting national champions
The Growth Strategy Trilemma has three competing objectives: fiscal/financial stability; economic growth; and the promotion of national champions.

ESTABLISH NATIONAL CHAMPIONS
(THROUGH INDUSTRIAL POLICY)

Strategy A: Support Safe Champions

Strategy B: Support Bold Champions

THE GROWTH STRATEGY TRILEMMA

FINANCIAL AND FISCAL STABILITY

Strategy C: Fair-Market Capitalism

ECONOMIC GROWTH

Source: Author.

Inflation rates

Emerging market and developing economies — China

Implications for Europe: The way-out of the „middle technology trap" requires public debt

Government fiscal balances
(percent of GDP)

- Draghi Report:

- To meet the objectives laid out in this report, a minimum annual additional investment of EUR 750 to 800 billion is needed (4.4-4.7% of EU GDP in 2023).

- The transition phase implies some inflationary pressures, but these pressures dissipate over time

- The EU should continue – building on the model of NGEU – to issue common debt instruments, which would be used to finance joint investment projects that will increase the EU's competitiveness and security.

Insights from a Schumpeterian theory of public finance

- There is a role for debt financed government investments even in a situation with full employment.
- Growth requires a different usage of existing resources by innovators.
- Temporary inflationary tensions are unavoidable. But they vanish if the productivity effects of innovate investments materialize.
- Innovators need „purchasing power" which can be provided by banks or the government („entrepreneurial state").

	Real analysis	Monetary analysis
Unemployment	NA	**Keynesian:** Government debt reduces unemployment
Full employment	Neoclassical: Government debt transforms excess saving into consumption	**Schumpeterian**: Government debt finances innovation by a reallocation of existing ressources