

# A New-Schumpeterian perspective on innovation and economic growth

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*Some of the quotes are presented in a shortened way for an easier understanding*

# Outline

1. Europe caught in a „middle technology trap“
2. Traditional supply side policies: theory and implications
3. Elements of New-Schumpeterian growth theory
4. Some evidence that credit growth matters for economic growth
5. The relevance of a New-Schumpeterian growth theory
6. Annex: Quotes from Schumpeter's „Theory of Economic Development

1. Europe caught in a „middle technology trap“

# Europe is caught in a „middle technology trap“

Draghi Report:

“We are **severely lagging** behind in new technologies: only four of the world’s top 50 tech companies are European.”

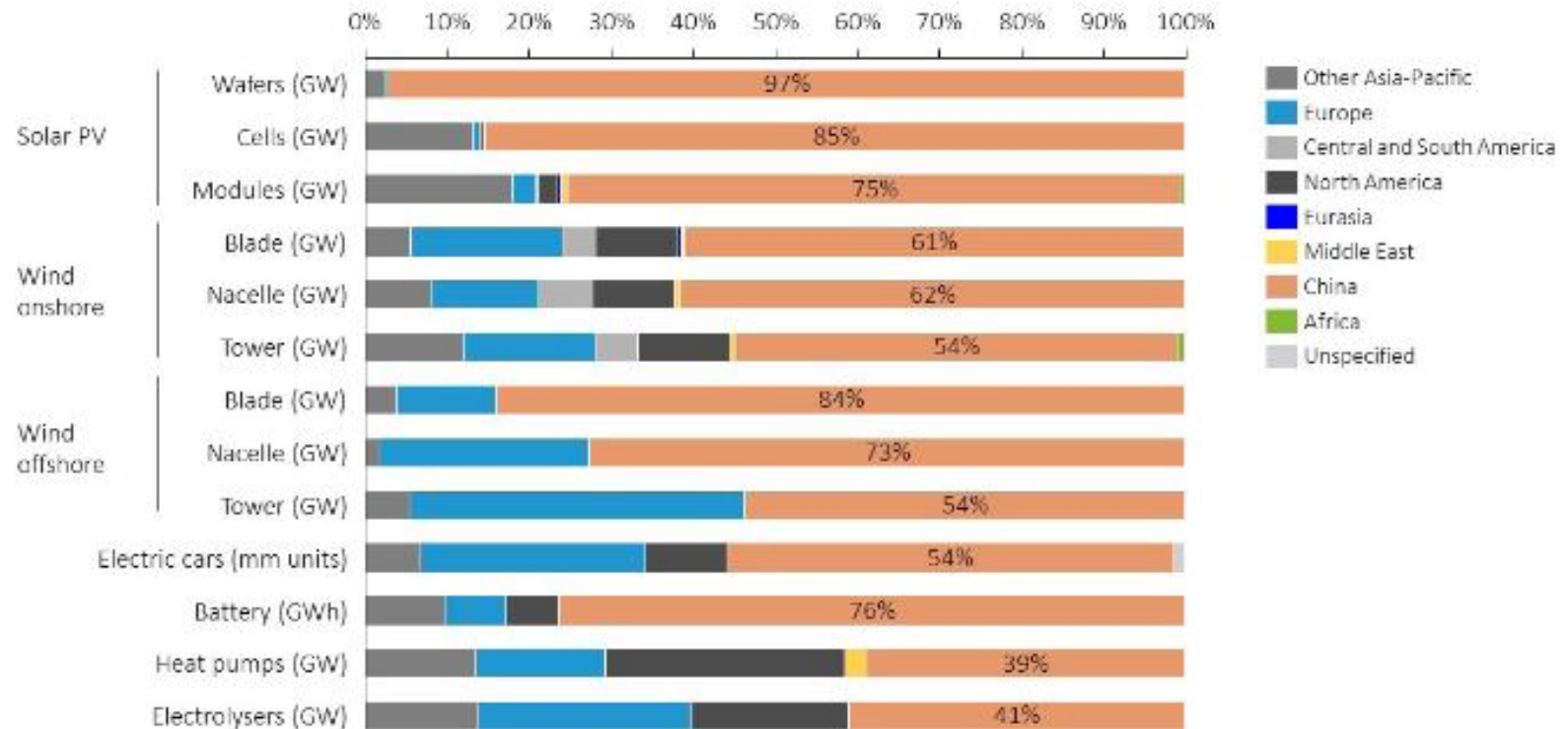


Top-3 R&D spenders and their industries compared over time

	2003	2012	2022
US	Ford (auto) Pfizer (pharma) GM (auto)	Microsoft (software) Intel (hardware) Merck (pharma)	Alphabet (software) Meta (software) Microsoft (software)
EU	Mercedes-Benz (auto) Siemens (electronics) VW (auto)	VW (auto) Mercedes-Benz (auto) Bosch (auto)	VW (auto) Mercedes-Benz (auto) Bosch (auto)
JPN	Toyota (auto) Panasonic (electronics) Sony (electronics)	Toyota (auto) Honda (auto) Panasonic (electronics)	Toyota (auto) Honda (auto) NTT (telecom)

# China's dominance in renewables

**FIGURE 7**  
**Clean technology manufacturing capacity by region**  
 %, 2021



Source: European Commission, 2024. Based on IEA, Bruegel.

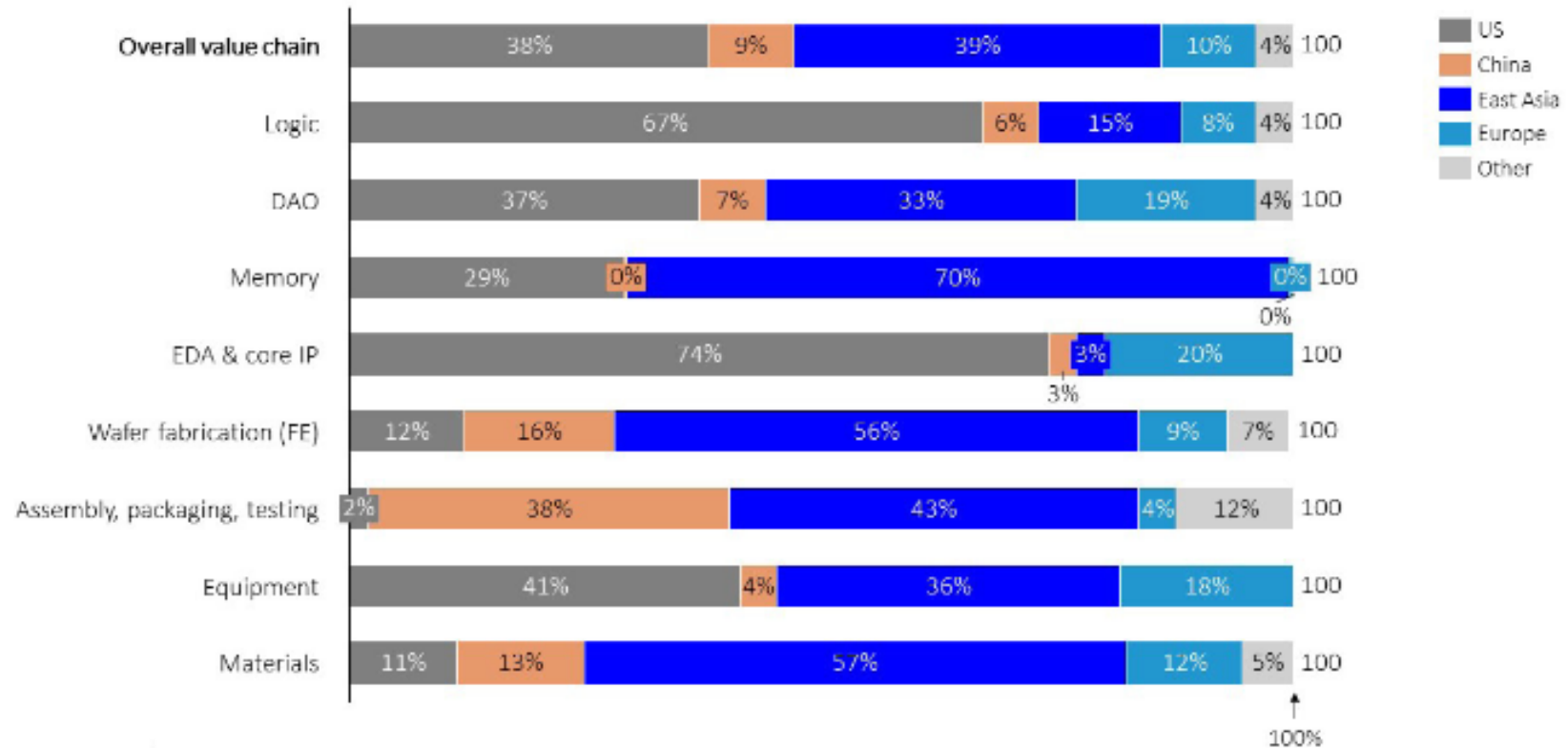
Source: Draghi Report

# US and East Asian dominance in semiconductors

FIGURE 3

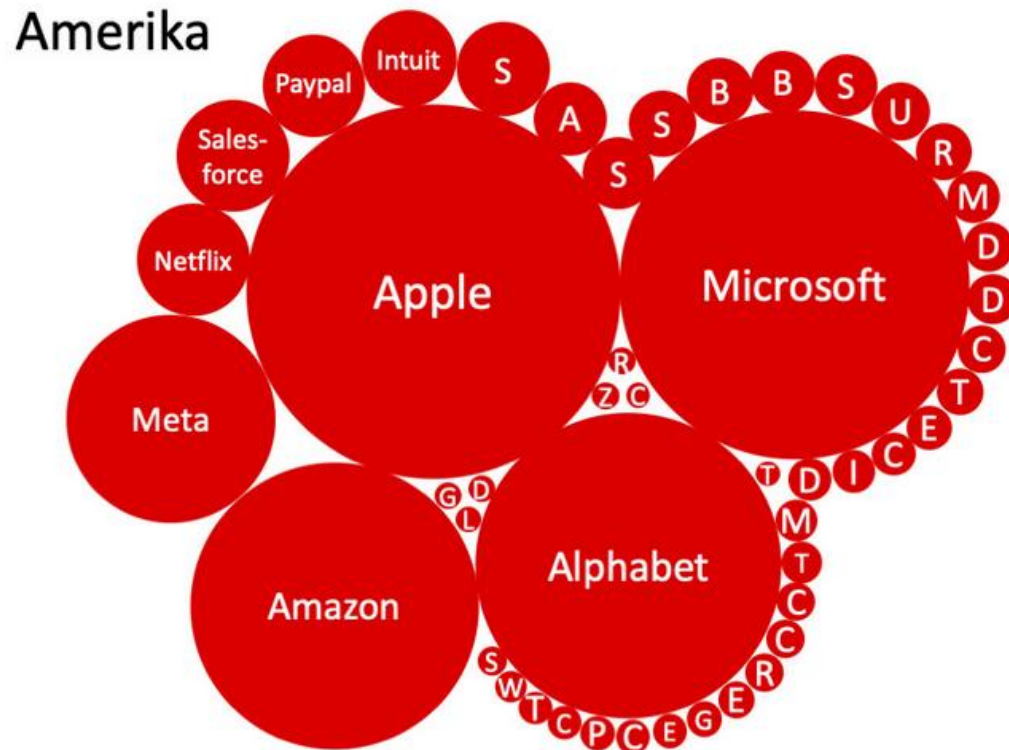
## Share in semiconductor value chain by country

% of worldwide total, 2019



Source: Draghi-Report

# US and Chinese dominance in digital platforms



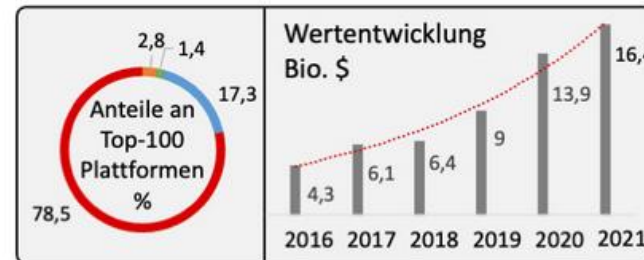
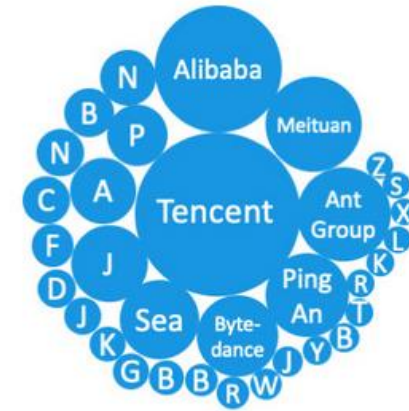
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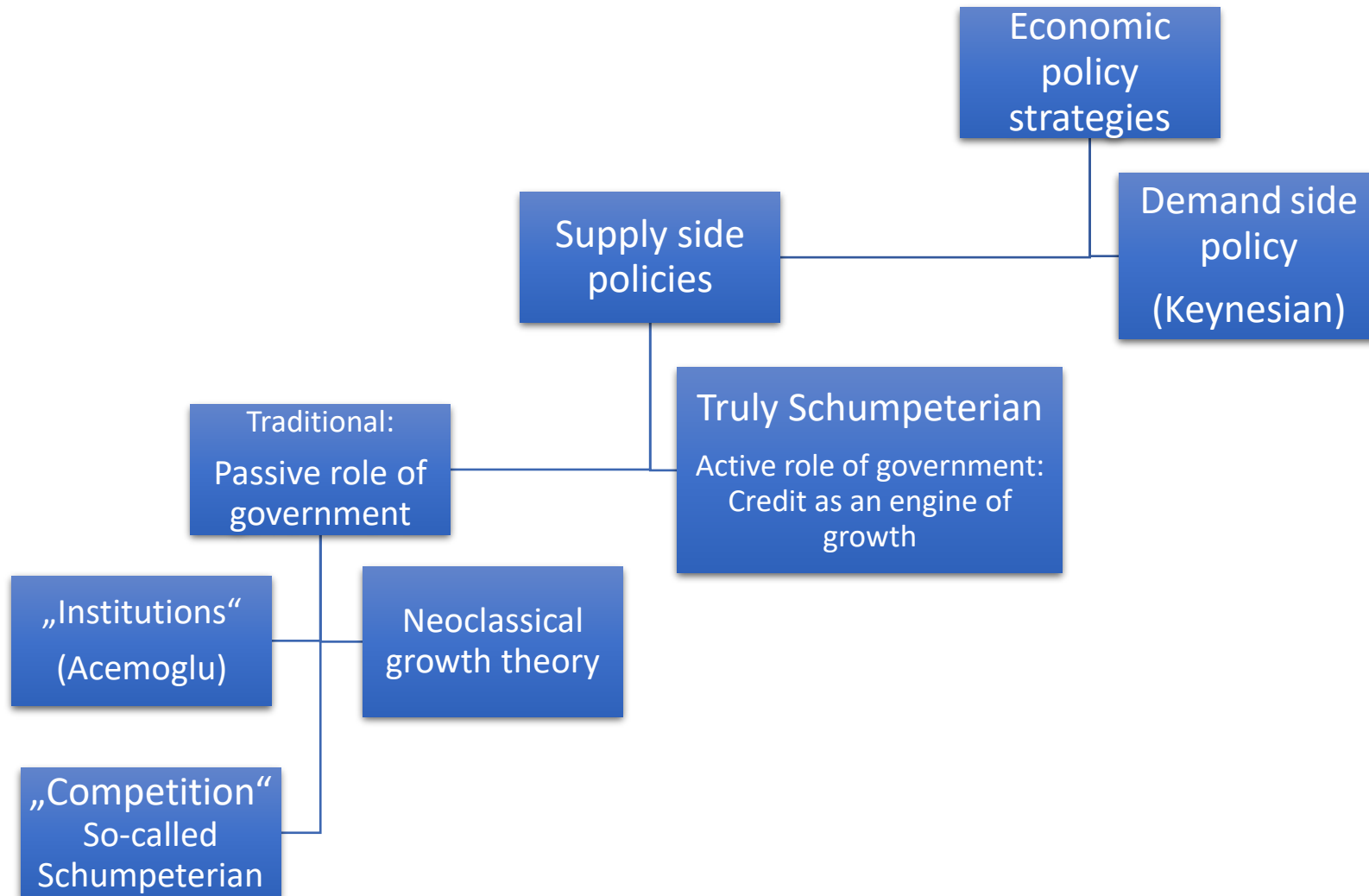
Afrika



Asien-Pazifik



# How to get out of the „middle technology trap“?





## 2. Traditional supply side policy: Theory and policy implications

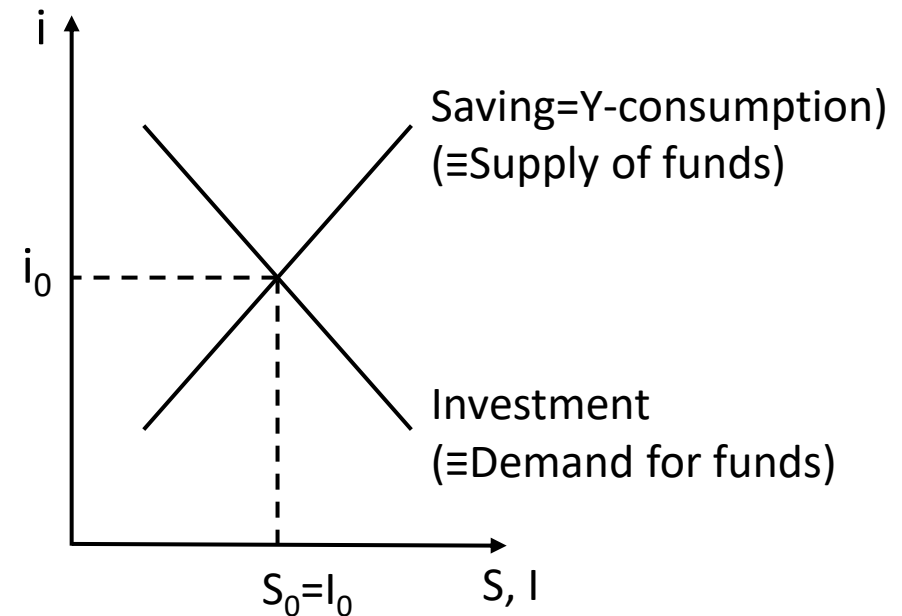
# The all-purpose asset of the neoclassical growth theory

**All-purpose asset (APA)** which is used interchangeably as

- **Output** of the production process ( $Y$ ).
- **Input** of the production process, i.e capital ( $K$ )
- **Consumption**: the output of the APA which is consumed ( $C$ )
- Financial Funds ("**Savings**"), the output of the APA which is not consumed ( $S$ )
- **Investment**: the output of the APA which is invested ( $I$ ).

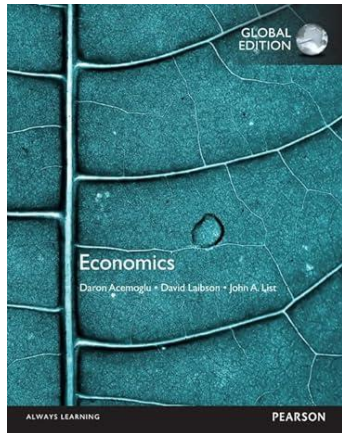
*Solow (2000): "Probably the best method of exposition is to think of the neoclassical growth model as being a story about an imaginary economy that has only one produced good that can be consumed directly or stockpiled for use as a capital good."*

## Loanable Funds Modell



# 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 APA



## 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.

# The limitations of the Solow model

- Adding-up more and more of the APA leads to **diminishing returns** of scale and to economic stagnation
- Growth is explained **exogeneously**
- Solow (1988):
  - Gross output per hour of work in the U.S. economy doubled between 1909 and 1949.
  - *Some seven-eighths of that increase could be attributed to ‘technical change in the broadest sense’.*
  - *Only the remaining eighth could be attributed to conventional increase in capital intensity.”*

# The Romer (1990) model of endogenous growth: Refining the APA with „designs“ or „ideas“



# Innovation in the Romer model

- **Vague concept** of „ideas“/“designs“
- „Innovation“ takes place in a „**black box**“:
  - Romer (1990) describes „the sector that produces capital goods ‘a black box’ that takes final output in on one side and gives capital goods out of the other side.”
- **No true innovation**: The all-purpose asset remains input (Capital) and output of the production process
- “Capital goods” are perfect substitutes as inputs of the APA
- Innovation as an **incremental process**
- Innovators are **atomistic agents**

# So-called Schumpeterian growth theory

- “Schumpeterian growth theory has helped **bridge the gap between micro and macroeconomics.**” (Aghion et al 2015)
- The net rents from innovation (...) depend upon **property right protection, competition and openness, education, democracy** (Aghion/Howitt 2013)
- Both, empirical studies and casual evidence point to a **positive correlation between growth and product market competition.**” (Aghion et al. 2015)

*Aghion et al (2015)*

*A final output is produced at any time using an intermediate input, according to:*

$$Y = A y^\alpha,$$

*where  $A$  denotes the current quality of the input, which is multiplied by a factor  $\gamma > 1$  each time a new innovation occurs.*

***Innovations arrive at Poisson rate  $\lambda z$** , where  $z$  is the amount of labor devoted to R&D.*

*The **intermediate is itself using labor “one for one,”** thus  $y$  also denotes the amount of labor working in manufacturing the intermediate input.*

# Short-comings of the neoclassical models

- Neglect of the **financial sphere**
- Neglect of the **demand side**
  - Solow (1988, p. 309): “I think I paid too little attention to the problems of effective demand. To put it differently; a theory of equilibrium growth badly needed – and still needs – **a theory of deviations from the equilibrium growth path.**”
- **Innovation either exogenous or black box:** incremental processes by atomistic actors. Entrepreneur “simply does not exist” Schumpeter (1934)
- Lack of **empirical evidence**
  - Inability to explain **differences in growth rates**
  - The „anomaly“ of the **Asian growth miracles**
    - Romer (2016): “China’s growth reflects is rapid embrace of these two big meta-ideas, the **market and the city.**”
    - Acemoglu and Robinson (2012): “Our theory also suggests that growth under extractive political conditions, as in China , **will not bring sustained growth and is likely run out of steam**”



# Traditional supply-side policy based on the neoclassical approach propagated by German economists

Lars P. Feld, Clemens Fuest, Justus Haucap, Volker Wieland und Berthold Wigger (2024):

## How to overcome economic stagnation in Germany

- “State intervention is part of the problem, not the solution.”
- **Interventionist subsidy programmes should not be used.**
- Instead: **deregulation, bureaucracy reduction, broad improvement in the tax and regulatory framework for investment**, improvement in the energy supply and an energy market design that brings market signals to bear

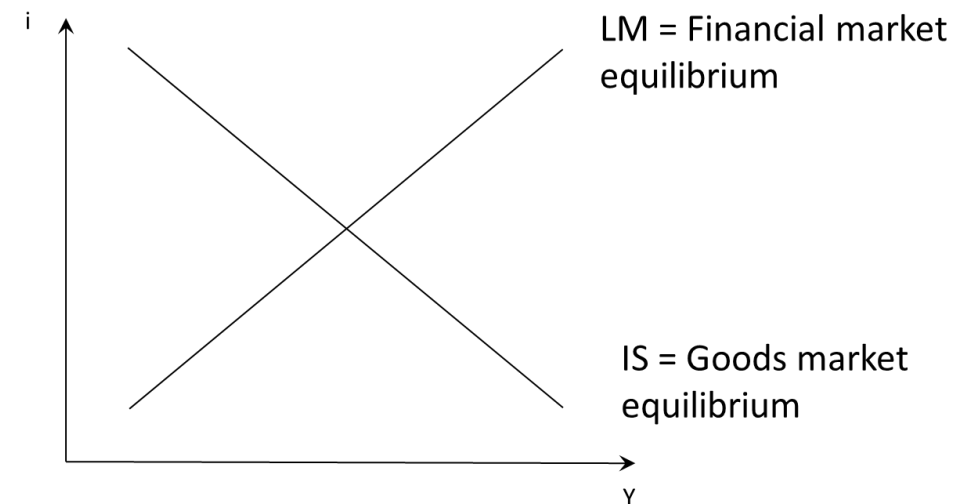


### 3. Elements of a New-Schumpeterian growth Theory

# „Monetary analysis“ instead of „real analysis“ „Creating purchasing power out of nothing“

- **Monetary analysis:** Real assets (consumption and investment goods) *and* financial assets (bank deposits, bonds, reserves)
  - Real sphere separate (IS) from financial sphere (LM)
  - Saving no limitation for financing
  - Banks create credit/money autonomously
- Schumpeter (1911): It is always a question, not of transforming purchasing power which already exists in someone's possession, but of the **creation of new purchasing power out of nothing** (...) which is added to the existing circulation."

## IS/LM model



# Key messages from Schumpeter's „Theory of economic development“

- **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
- **Credit** as an engine for growth: The key role of the **banker**
- Economic development driven by the **entrepreneur** not by atomistic agents
  - **Innovations** matter, not inventions (“ideas”)
  - **New goods** are not created by consumer wants but by entrepreneurial action. Entrepreneurs create markets.
- Competition is detrimental for growth. “Economic analysis offers no material in support of indiscriminate ‘trust busting’.”
- **Disturbance of equilibrium** forever alters and displaces the equilibrium state previously existing.

# The macroeconomic dimension of growth

- „**Credit inflation**“:
  - The provision of additional purchasing power 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, the entrepreneur 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:

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

- Identity:  $Money = Credit$
- „Schumpeterian Version“: Credit growth increases real GDP without permanently increasing the price level

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

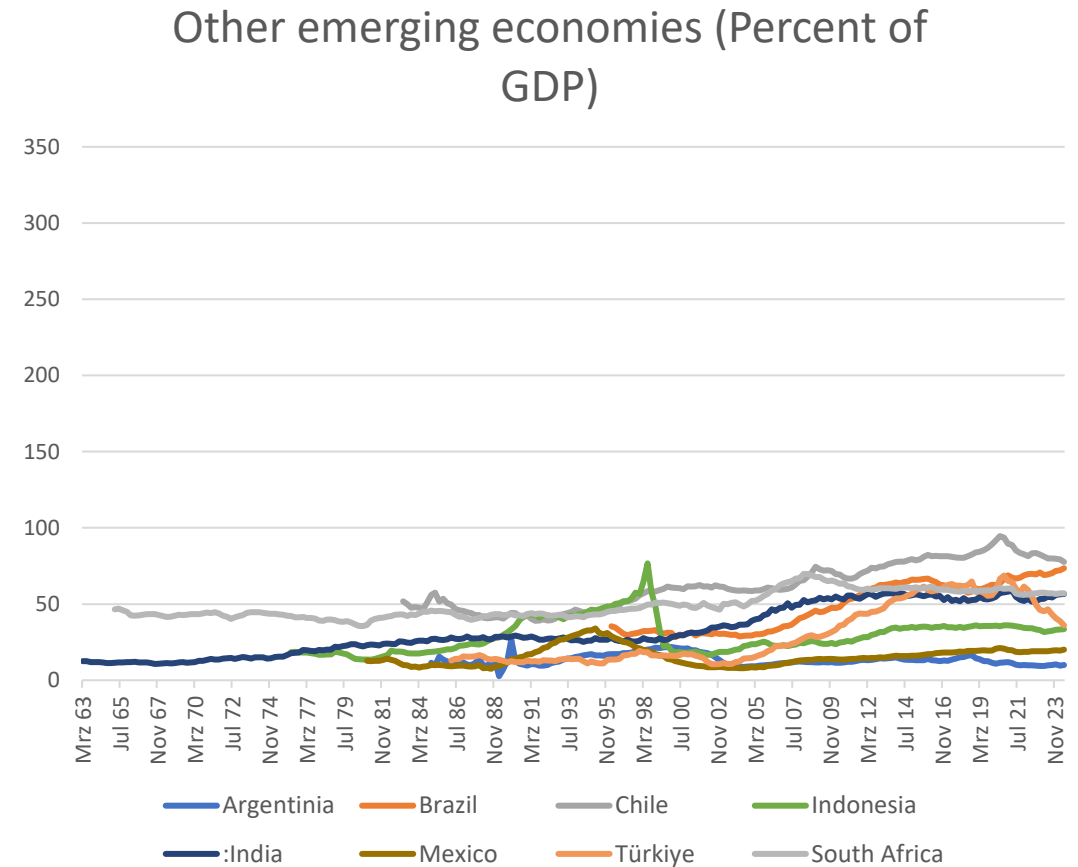
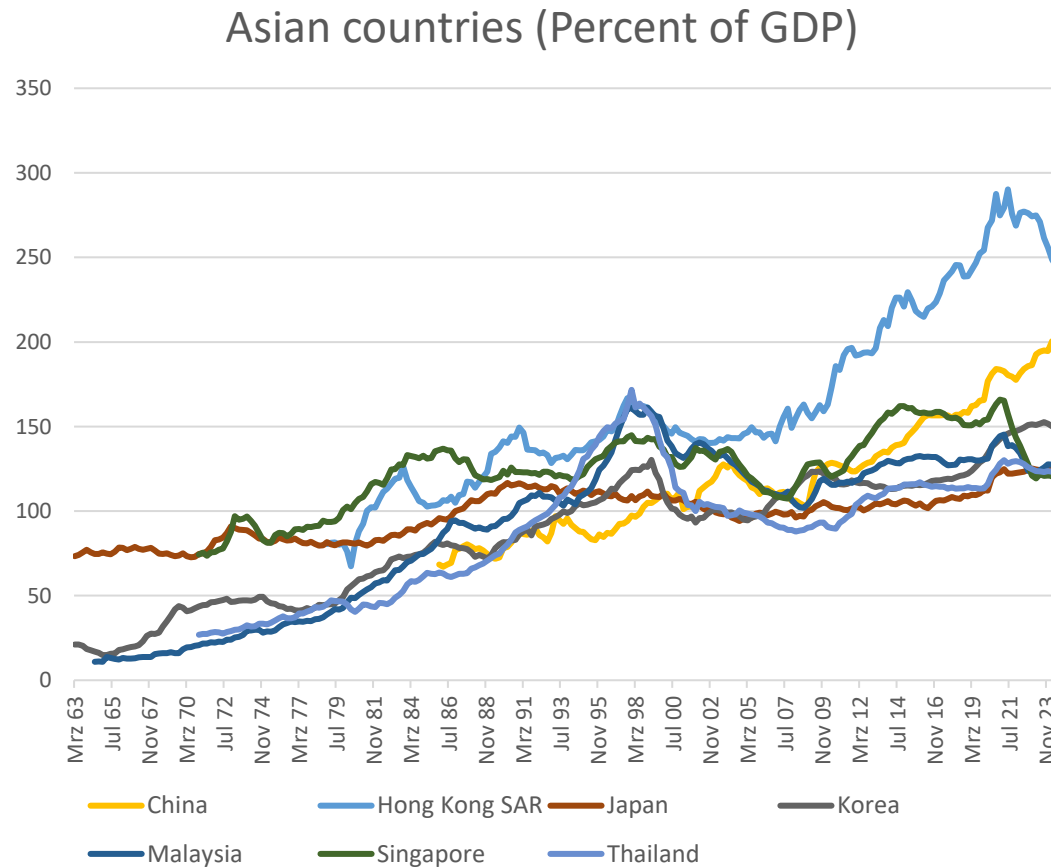
4. Some evidence that credit growth matters for economic growth

# The Asian growth stories: High average GDP growth rates since the 1960

	60s	70s	80s	90s	00s	10s	2020- 1960
Argentina	3,9	2,7	-0,8	4,1	3,4	-0,7	2,1
Brazil	6,2	8,6	1,6	2,6	3,7	0,3	3,8
Chile	4,2	2,9	2,9	6,2	4,3	2,1	3,8
China	3,9	6,2	<b>9,3</b>	<b>10,4</b>	<b>10,6</b>	<b>6,8</b>	<b>7,8</b>
Hong Kong	8,8	<b>9,0</b>	6,7	4,0	4,1	1,5	5,6
Indonesia	3,9	7,4	5,5	3,9	5,2	4,6	5,1
India	4,0	3,0	5,6	5,6	<b>6,7</b>	<b>5,1</b>	5,0
Japan	<b>9,4</b>	4,5	4,5	1,3	0,6	0,4	3,4
Korea, Rep.	<b>9,5</b>	<b>9,3</b>	<b>10,0</b>	<b>7,1</b>	4,7	2,6	<b>7,2</b>
Mexico	6,8	6,6	1,8	3,6	1,2	0,9	3,5
Malaysia	6,5	8,3	6,0	<b>7,1</b>	4,6	4,0	6,1
Singapore	<b>9,3</b>	<b>8,8</b>	7,7	<b>7,1</b>	<b>5,8</b>	3,1	<b>7,0</b>
Thailand	8,2	6,9	<b>7,8</b>	4,4	4,6	2,2	5,7
United States	4,2	3,2	3,3	3,4	1,8	1,9	3,0
South Africa	5,7	3,4	1,5	1,8	3,5	0,8	2,8
Turkey	5,4	5,8	6,0	5,4	5,4	<b>5,9</b>	5,8

The three countries with the highest growth rates are marked in red

# Credit to the private non-financial sector as a driving force for growth in Asian countries



Source: BIS Credit Data Base



# A comprehensive analysis for 43 countries from the BIS credit data base (1940-2019)

**Table 1.** Growth effects of credit growth, household saving growth and household saving rate growth, estimated with FE and RE.

Dependent: GROWTH	FE					
	(1)	(2)	(3)	(4)	(5)	(6)
log(INITIAL GDP)	-1.531** (0.630)	-1.860*** (0.514)	-3.084** (1.294)	-2.354*** (0.565)	-3.332** (1.244)	-2.108*** (0.583)
SCHOOL	0.013 (0.010)	0.019** (0.008)	0.015* (0.009)	0.019** (0.007)	0.017* (0.009)	0.020** (0.007)
GOV	-0.311*** (0.090)	-0.422*** (0.063)	-0.596*** (0.140)	-0.645*** (0.106)	-0.548*** (0.145)	-0.593*** (0.109)
log(OPENNESS)	2.404** (0.927)	2.287** (0.846)	2.118** (0.787)	1.660** (0.706)	2.601*** (0.749)	2.067*** (0.702)
INFL	-0.018*** (0.003)	-0.102*** (0.016)	-0.099*** (0.032)	-0.118*** (0.042)	-0.137*** (0.035)	-0.161*** (0.049)
$\Delta$ CREDIT <sub>Bank</sub>		0.098*** (0.016)			0.075*** (0.023)	0.067*** (0.021)
$\Delta$ NHS			0.000** (0.000)		0.000*** (0.000)	
$\Delta$ NHSR				0.000 (0.000)		0.000 (0.000)
Constant	13.579** (6.578)	17.022*** (5.777)	34.522** (12.592)	30.285*** (6.061)	33.021** (11.952)	24.657*** (5.887)
Observations	1,509	1,399	842	936	834	928
Countries	41	41	31	34	31	34
Adj. R <sup>2</sup>	0.3172	0.4183	0.4504	0.4481	0.4863	0.4764

GROWTH, growth of GDP per capita in %. log(INITIAL GDP), logarithm of current expenditure side GDP from previous period at current purchasing power parities (PPPs); SCHOOL, secondary school enrollment rate (% of population in secondary school age); GOV, general government final consumption expenditure (% of GDP); log(OPENNESS), logarithm of trade as sum of exports and imports of goods and services (% of GDP); INFL, inflation in consumer prices (% change);  $\Delta$ CREDIT<sub>Bank</sub>, annual growth rate of domestic bank credit to non-financial private sector (%);  $\Delta$ NHS, annual growth in household sector net saving (%);  $\Delta$ NHSR, annual growth in share of net saving to net disposable income (household sector, %).

## The finance and growth nexus revisited: a truly Schumpeterian perspective

Peter Bofinger ✉, Lisa Geißendörfer, Thomas Haas, Fabian Mayer

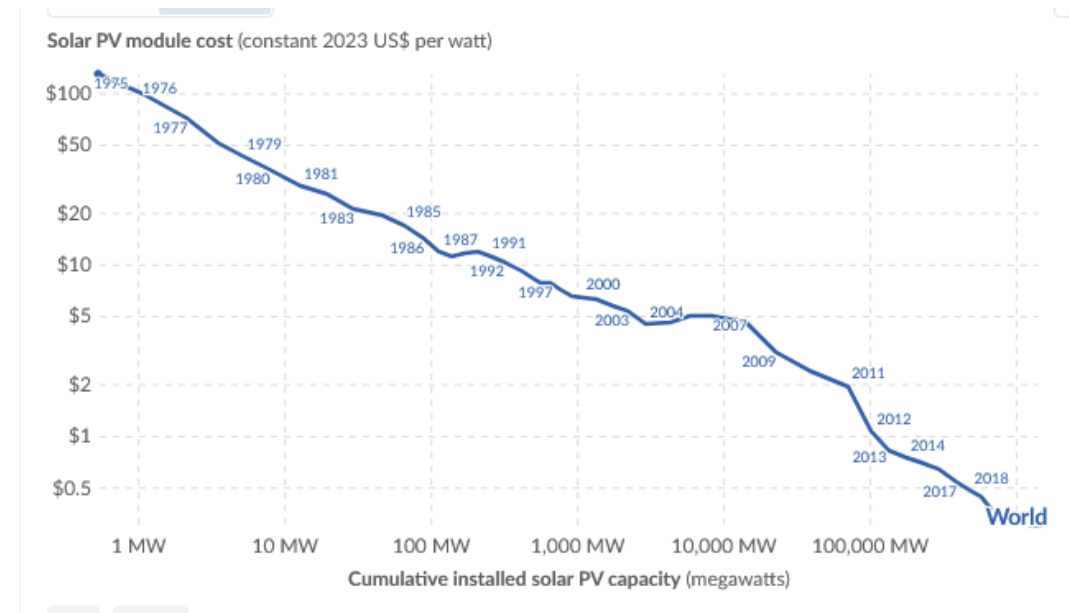
Cambridge Journal of Economics, Volume 48, Issue 4, July 2024, Pages 617–659, <https://doi.org/10.1093/cje/beae014>

Published: 26 April 2024 Article history ▼

## 5. The relevance of a New-Schumpeterian growth theory

# Main implications for innovation and growth policies

- Inventions („Ideas“) are not enough. What matters is „economic leadership“ carrying them into practice to realize economies of scale.
- Innovators and growth require “purchasing power” financed by bank credit.
- There are no financing constraints (i.e. by a given amount of saving) for productive innovations.
- Innovation is the result of entrepreneurial decisions to introduce a new good — that is one with which consumers are not yet familiar.
- For new goods a market must be created. They must be “forced on consumers, perhaps even given away gratis.” Schumpeter 1934, p. 120)



Source: Our world in data

# Who is the „banker“ (ephor of the exchange economy) today?

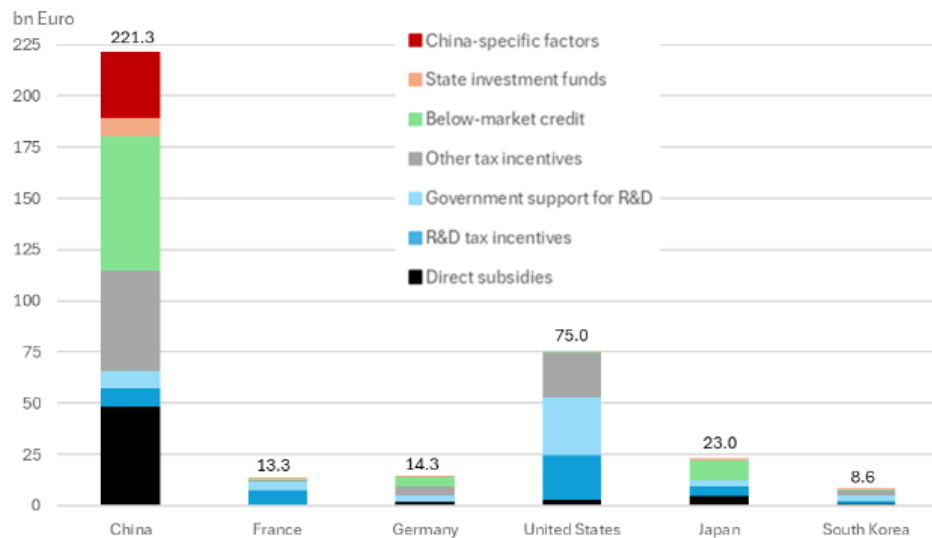
- Schumpeter: “The banker is essentially a phenomenon of development, **though only when no central authority directs the social process.**”
- Mazzucato (2013): Concept of the “entrepreneurial state”

## Biggest subsidies for Tesla

	Location	Year	Amount
<a href="#">Tesla Motors</a>	Nevada	2014	\$1,287,000,000
<a href="#">SolarCity Corp.</a>	New York	2014	\$750,000,000
<a href="#">Tesla Motors</a>	Nevada	2015	\$725,800,000
<a href="#">Tesla Motors</a>	Nevada	2023	\$330,250,366
<a href="#">Tesla Motors</a>	Nevada	2015	\$245,856,460
<a href="#">Tesla Motors</a>	Nevada	2015	\$103,137,512

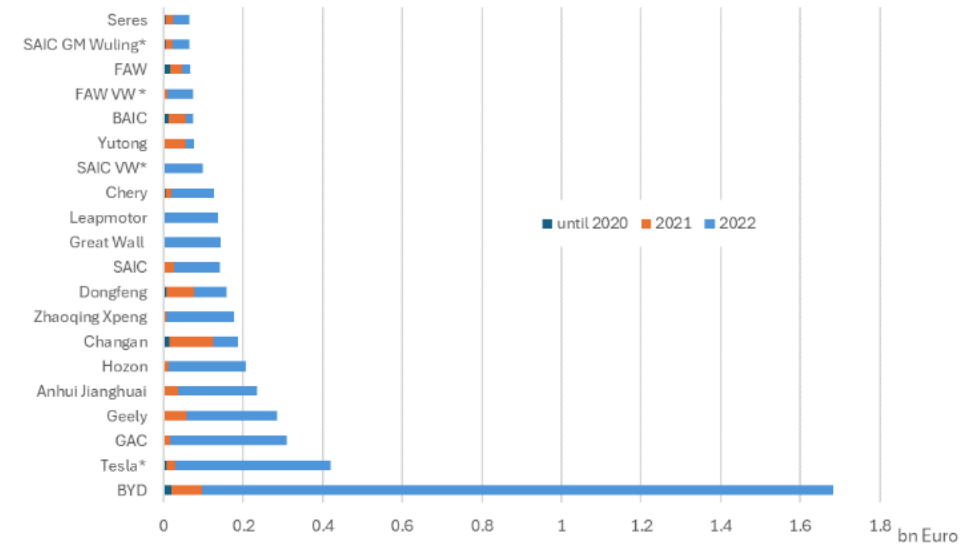
# China: the entrepreneurial state in action

**Figure 1b:**  
Industrial support spending in China and key OECD countries, 2019 (bn Euro)



Source: DiPippo et al. (2022) and Deutsche Bundesbank (2024); own calculation in Euro and own illustration.

**Figure 4:**  
Approved NEV Purchase Subsidies in China: Top-20 NEV Purchase Subsidy Recipients\*



\* \* indicating sino-foreign joint ventures or foreign-owned firms.

Source: Ministry of Industry and Information Technology of China (2023; 2024) and Deutsche Bundesbank (2024); own calculations and own illustration.

# Insights from the Draghi report

- “We have many talented researchers and entrepreneurs filing patents. But innovation is blocked at the next stage: we are **failing to translate innovation into commercialization** (...).”
- To meet the objectives laid out in this report, a minimum **annual** additional investment of EUR 750 to 800 billion is needed, based on the latest Commission estimates (4.4-4.7% of EU GDP in 2023).
- The **issuance of common safe assets** to fund joint investment projects could follow existing templates (...)
- Since supply adjusts more gradually than demand – as the build-up of additional capital takes time – the transition phase implies **some inflationary pressures**, but these pressures dissipate over time.

# A truly Schumpeterian growth theory

- Employing existing resources in a different way instead of the accumulation of an all-purpose asset of the neoclassical theory
- Financing of innovations is key for realization of growth
- Innovation requires strong agents: banker and entrepreneur and is open for the „entrepreneurial state“
- Addresses the need to create new markets
- Includes the macroeconomic effects of innovation
- Is open for temporary monopoly positions

	<b>Neoclassical Growth Theory</b>	<b>New-Schumpeterian</b>
<b>Macroeconomic theory</b>	Real analysis: All-purpose asset	Monetary analysis: Financial assets and real assets
<b>Financing of innovation</b>	Saver  Limited role of banks as Intermediaries for saving(s)	Banks as “producers of purchasing power”
<b>Driver of innovation</b>	Anonymous, atomic actors, market (Hayek)	Banker and entrepreneur
<b>Dynamics of innovation</b>	Incremental	“Revolutionary”: Creating disequilibria
<b>Role of inventions/“ideas” for innovation</b>	High (Romer)	Low
<b>Role of the government</b>	Institutions, Property Rights, Democracy (Acemoglou)	Unclear
<b>Competition</b>	Perfect competition (Aghion)	Oligopoly/Monopoly
<b>Demand side (“markets”)</b>	Neglected	Created by entrepreneur
<b>Macroeconomic effects of innovation</b>	More saving: Negative effect on demand	More purchasing power to investors: Positive (inflationary) effect on demand



Annex:

Quotes from Schumpeter's Theory of Economic Development

# Credit as an engine for growth: The key role of the banker (Schumpeter 1934, p. 59)

- “(...) in carrying out new combinations, ‘**financing**’ as a special act is **fundamentally necessary**, in practice as in theory.”
- The banker, therefore, is not so much primarily a middleman in the commodity “purchasing power” as **a producer of this commodity**. He stands between those who wish to form new combinations and the possessors of productive means.
- He is essentially **a phenomenon of development**, *though only when no central authority directs the social process*. He makes possible the carrying out of new combinations, authorises people, in the name of society as it were, to form them. He is the ephor of the exchange economy.

# Economic development driven by the entrepreneur not by atomistic agents

- The carrying out of new combinations we call “enterprise”; the individuals whose function it is to carry them out we call “**entrepreneurs**”. (p. 62)
- His characteristic task consists precisely in breaking up old, and creating new, tradition.
  - the dream and the will to found a private kingdom (p. 74)
  - the will to conquer (p. 74)
  - the joy of creating, of getting things done, or simply of exercising one’s energy and ingenuity (p. 75)
- The only man he has to convince or to impress is the banker who is to finance him (p. 72)

# Innovations matter, not inventions (“ideas”)

- **Economic leadership (“innovations”)** in particular must hence be distinguished from **“invention.”** As long as they are not carried into practice, inventions are economically irrelevant. (p. 72)
- And to carry any improvement into effect is a task entirely different from the inventing of it. (p. 72)
- It is, therefore, not advisable, and it may be downright **misleading, to stress the element of invention** as much as many writers do. 72

# New goods are not created by consumer wants but by entrepreneurial action

- Innovations in the economic system do not take place in such a way that **first new wants** arise spontaneously in consumers and then the productive apparatus swings round through their pressure.
- The **producer initiates economic change, and consumers are** taught to want new things.
- *Hayek (2002): “Rather, the knowledge of which I am speaking consists to a great extent of **the ability to detect certain conditions**—an ability that individuals can use effectively only when the market tells them what kinds of goods and services are demanded, and how urgently.”*

# Schumpeter: „No support for indiscriminate ‘trust busting’“

- “The mere facts of size, single-sellership, discrimination, and cooperative price setting are in themselves **inadequate for asserting that the resulting performance is inferior to** the one which could be expected in **conditions attainable under pure competition.**”
- “Economic analysis offers no material in support of indiscriminate ‘trust busting’.”

The American Economic Review  
VOLUME XXXIX      MARCH, 1949      NUMBER TWO

SCIENCE AND IDEOLOGY\*

*By* JOSEPH A. SCHUMPETER

# 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)

“Neoclassical competition is a little like watching the ocean when it is calm, while Schumpeterian competition is like watching a raging storm or perhaps even a tidal wave.”

(Hovenkamp 2008)

