Monetary Policy, Dynamic Efficiency, and Resource Security

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Outline

Commodity Prices

Resource Security

Monetary Policy

Interest Rates
Investors / Policy Makers

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<th>Invest</th>
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<td>high price = “bubble”</td>
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<td>high price = fundamental</td>
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- Investments = Real investments
- “Markets” = Commodity markets
Investment decisions under market price uncertainty:

$H_0$: “The price is a bubble”

- If $H_0$ is falsely rejected (type I error): “The price was really a bubble, but we thought it was fundamental” = false negative

- If $H_0$ is falsely not rejected (type II error): “The price was fundamental, but we thought it was a bubble” = false positive
Price → Resource Security (III)

Investment decisions under price uncertainty:

- **type II error**: If we do not invest and the high price was representing fundamentals, we get price shocks and reduced resource security.
  - type II kills “animal spirits”

- **type I error**: If we invest and the high price was a bubble, we get capital misallocation & insolvencies, but *potentially* fixed capital investments into more secure and *dynamically efficient* resource provision:
  - e.g. fossils replaced by renewables because of oil prices
Secure resource provision..
= an output level appropriate to societies’ needs, and
= an output potential appropriate to absorb shocks, and
= a capital structure with low variable cost risks
..requires sufficient fixed capital.

(limitations: necessary conditions - but not sufficient,
linear assumption, no efficiency, no redundancy, no
technology switches/differentiation)
i-Rate → Resource Security

\( i \rightarrow \text{capital costs} \rightarrow \text{capital intensity} \rightarrow \text{investments} : \)

The more capital intensive a production system/value chain/sector, the more crucial the interest rate (expectations) to profitability and investment decisions.

- How capital intensive is energy provision? Is sustainable energy provision more capital intensive?
- How capital intensive is food provision? Is sustainable food provision more capital intensive?
Cumulative global investment cost estimates by IEA until 2035..

..New Policies Scenario: $48 trillion

..450 Scenario: $53 trillion

“The power sector requires additional investment, as low-carbon technologies tend to be more capital intensive than conventional technologies”, IEA 2014: p42

Source: IEA 2014
Interest rate sensitivity:
Assuming constant annual investments and a 10y (!) payback period, the 450 Scenario investment Capital Costs $i=1\% = $3$ trillion or Capital Costs $i=3\% = $9.1$ trillion, i.e. 6% / 17% more!
Food-secure agriculture is capital intensive:

- **mechanization**, e.g. to reduce energy-intensive inputs (e.g. soil fertility investments, drip irrigation, precision farming)
- **automatization**, because specialized mechanization is more labor intensive
- **human capital** investments, because mechanization and automatization require knowledge & skills

*Source: FAO 2012*
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According to FAO (e.g. Schmidhuber et al. 2009), cumulative developing countries investments until 2035 is approx. $4.2 trillion.

*Source: FAO 2012*
Monetary Policy → Res. Security

Assuming conventional discount policy & inflation targeting (New Macroeconomic Consensus):

- Targeting the lowest possible discount rate to stabilize core inflation

Resource Security → Monetary Policy:

- resource scarcity → prices → may increase headline inflation (in oil & food) and decrease core inflation

Regulation:

“One unintended consequence of Basel III’s focus on short-term liquidity and solvency is likely to be an increase in the cost of long-term energy financing”, IEA 2014: p39
Conclusions

(H1) Interest rates: Low interest rates increase resource security.

(H2a) Prices: Type II errors move us away from resource security.

(H2b) Prices: Type I errors create malinvestments but can still be dynamically efficient and contribute to resource security.

(Q3) Price Stability: Links between price stabilities and resource security?