Monetary Policy, Dynamic Efficiency, and Resource Security

CEP Conference
"Monetary Policy and Sustainability", Bellagio, 16-20 June 2014

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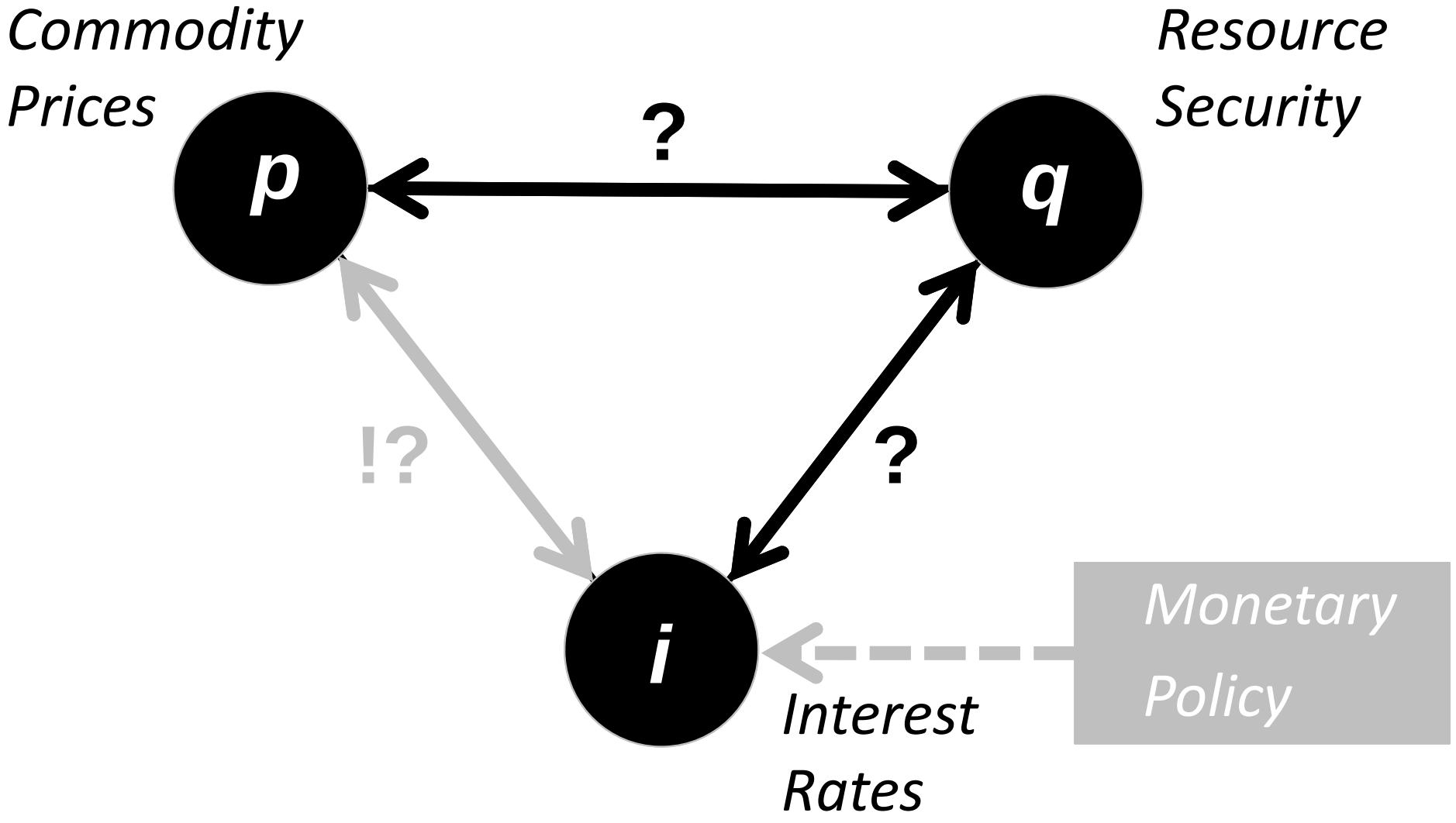
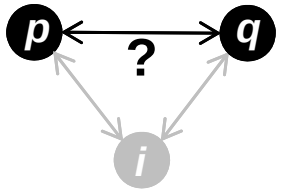
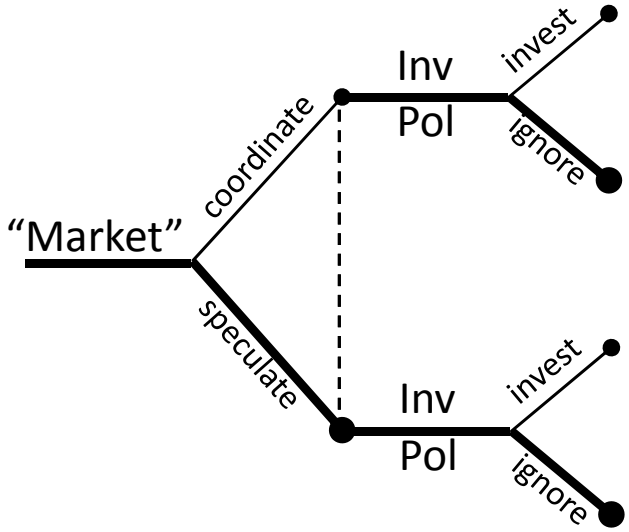
Outline


Commodity Prices
Resource Security
p
?
q
!?
?
i
Interest Rates
Monetary Policy

Price → Resource Security (I)



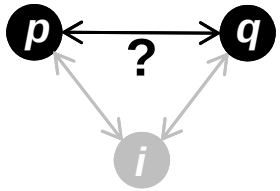


- Investments = Real investments
- "Markets" = Commodity markets

Investors / Policy Makers

"Market"	*Invest*	*ignore*
high price = "bubble"	?	
high price = fundamental		

Price → Resource Security (II)



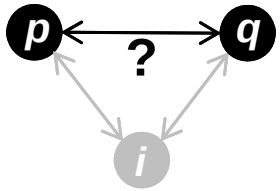
Investment decisions under market price uncertainty:

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

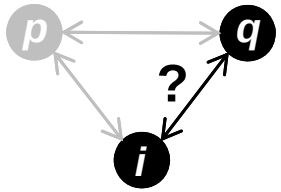
Resource Security

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

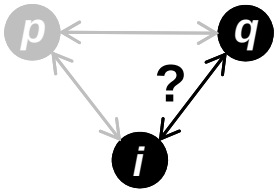


i → capital costs → capital intensity → investments:

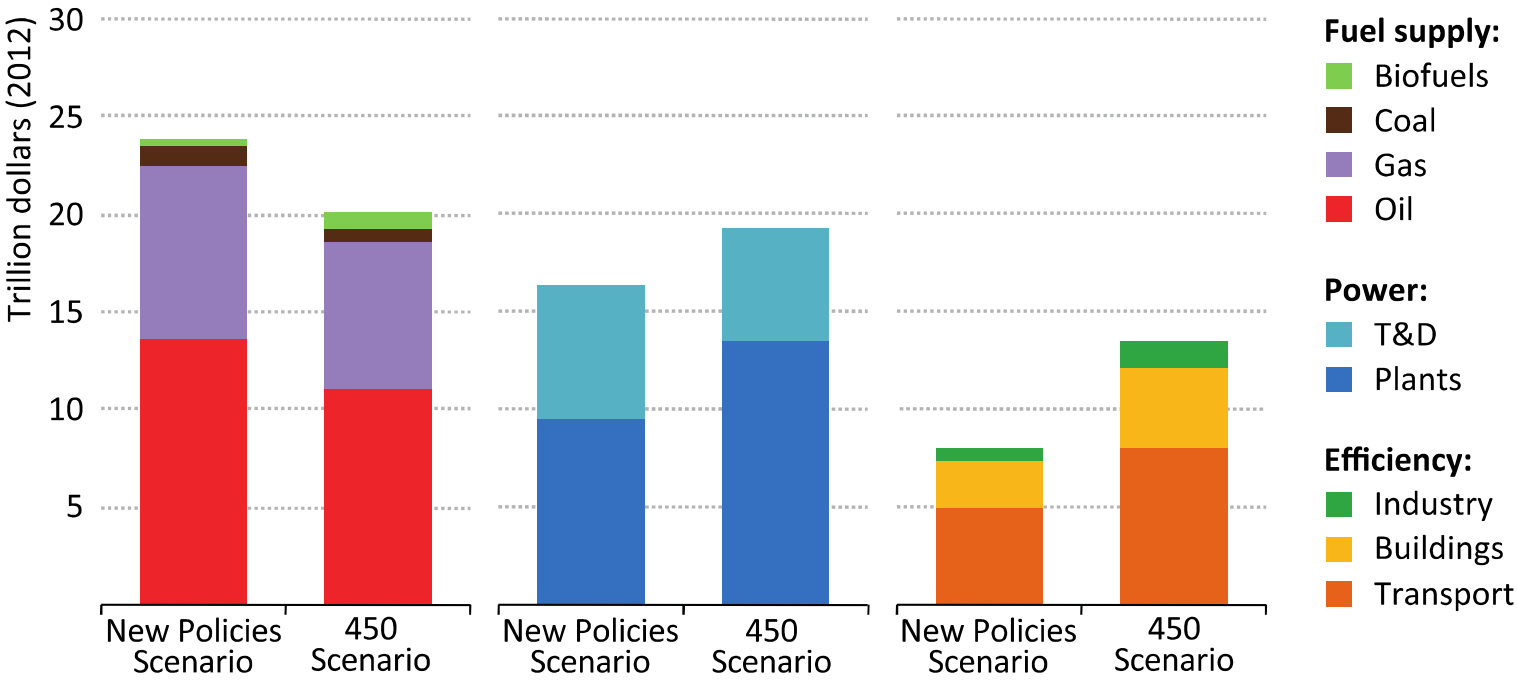
The more capital intensive a production system/value chain/sector, the more crucial the interest rate (expectations) to profitability and investment decisions.

- 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?

i-Rate → Energy Security (I)



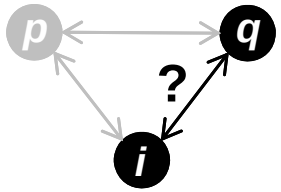
- Cumulative global investment cost estimates by IEA until 2035 ..
  ..New Policies Scenario: $48 trillion
  ..450 Scenario: $53 trillion



Source: IEA 2014

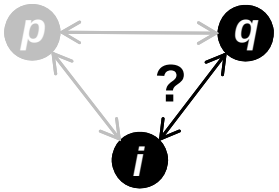
"*The power sector requires additional investment, as low-carbon technologies tend to be more capital intensive than conventional technologies*", IEA 2014: p42

i-Rate → Energy Security (II)



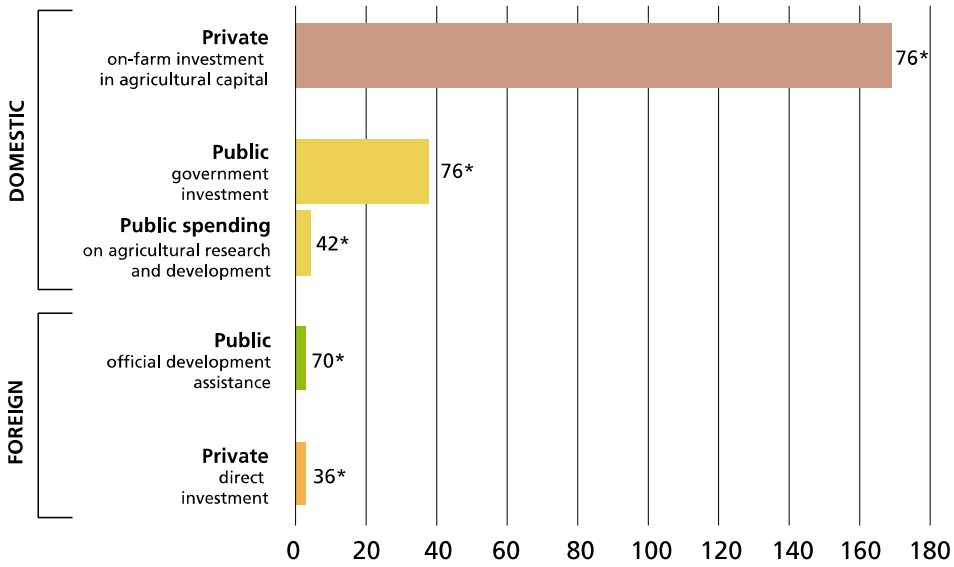
- Interest rate sensitivity:
  Assuming constant annual investments and a 10y (!) payback period, the 450 Scenario investment
  Capital Costs$_{i=1\%}$= \$3 trillion or
  Capital Costs$_{i=3\%}$= \$9.1 trillion, i.e. 6% / 17% more!

i-Rate → Food Security



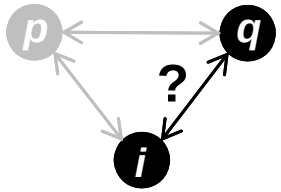
Food-secure agriculture is capital intensive:

- **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

i-Rate → Food Security



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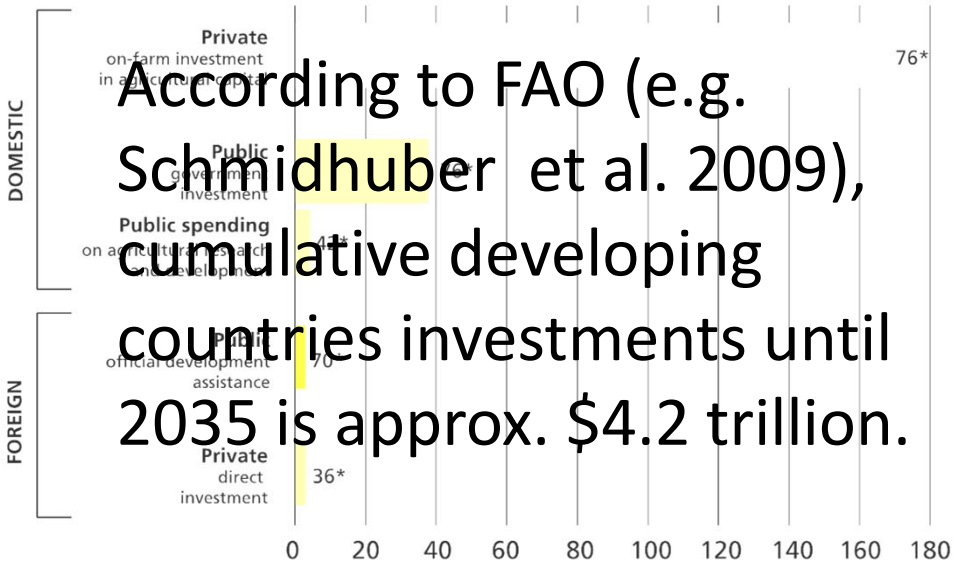

According to FAO (e.g. Schmidhuber et al. 2009), cumulative developing countries investments until 2035 is approx. $4.2 trillion.

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

(H_1) **Interest rates**: Low interest rates increase resource security.

(H_{2a}) **Prices**: Type II errors move us away from resource security.

(H_{2b}) **Prices**: Type I errors create malinvestments but can still be dynamically efficient and contribute to resource security.

(Q_3) **Price Stability**: Links between price stabilities and resource security?