Natural Resources Extraction and Long Term Sustainability

Ariaster B. Chimeli
Ohio University
Department of Economics
Natural Resources Extraction
Boom and Bust

Figure 1. The Real Price of Coal, 1946–1993, and Mining Employment as a Percent of Total Employment, 1969–1993
Natural Resources Extraction

Boom and Bust


Real Price of Coal

Earnings from Coal

Year


131.919

54.4304

2.88084

.884409
Natural Resources Extraction and Long Term Sustainability

- Weak sustainability: keep *value* of total capital (physical + human + natural) constant – possible depletion.
- Strong sustainability: keep *value* of natural capital constant.
- Environmental sustainability: keep *physical* flow of natural services constant.
Natural Resources Extraction and Long Term Sustainability - Theory

• Hartwick Rule: invest 100 % of natural resource rents.
  – Keep consumption constant across generations.
  – Substitute capital for natural resource in the production of goods and services.
  – Depletion of natural resource determined by degree of substitutability between capital and natural resources.
Natural Resources Extraction and Long Term Sustainability - Practice

• Sovereign wealth funds
  – Norway’s “Government Pension Fund – Global”: Invest government oil revenues (taxes, royalties, licenses); up to 4%/year added to government budget.
  – Kuwait Investment Authority SWF (1953).
  – Kiribati (1956, phosphate), Saudi Arabia (oil), etc.
  – Typical provisions on maximum spending, type of expenditures, exceptions (capital investment, referendum).
Natural Resources Extraction and Long Term Sustainability - Practice

• US experiences
  – Alaska Permanent Fund (25% all mineral revenues received by state – spend only on income-generating investments, or referendum for current expenses).
  – Texas Permanent School Fund, Permanent University Fund (revenues from public lands)
  – Alabama (oil and gas), North Dakota (oil and gas), Wyoming (minerals), New Mexico.
Natural Resources Extraction and Long Term Sustainability - Practice

**Figure 1 - Effective Natural Gas Tax Burden**

Source: Innovation Ohio, using state tax data provided by the Society of Petroleum Evaluation Engineers.
Natural Resources Extraction and Long Term Sustainability - Practice

Figure 4 - Projected Natural Gas Severance Tax Revenue for Ohio Adjusted to Match Other States' Nominal Tax Rate from 2011-2020

Source: Innovation Ohio, gas projections from Ohio Oil and Gas Energy Education Program Report.
Coal Boom and Bust and Investment in Human Capital (OH, WV, KY and PA)

• Better job prospects for unskilled labor increases incentives for high-school drop out.

• Findings (Black et al., 2005, 2003):
  – 10% increase in earnings of low-skilled workers reduces high school enrollments by 5% to 7%. (KY, PA)
  – 10% ↓ earnings → 7%; 8% ↑ AFDC (coal; steel)
  – Bust: ↑ 1-parent families, ↑ divorce rates, ↓ marriage rates

• Implications:
  – Short run gains and long run losses (worse job prospects after the bust, lower supply of human capital)?
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Natural Resources and Economic Development – Malaysia

• Malaysia (minerals, timber) (Vincent, EDE, 1997):
  – Growth and development in Peninsular Malaysia (evidence of investment of rents in physical and human capital).
  – Stagnation in Sabah and Sarawak states (more remote – consumption in these states and investments in Peninsular Malaysia where returns to capital are higher – outmigration).
Concluding Remarks

• Need for mechanisms to guarantee transformation of natural resource rents into capital investment (long term returns). (Not necessarily direct public investment).

• Attention to regional imbalances.

• The notion of “capital” is broad including:
  – Physical capital
  – Infrastructure
  – Human capital (education, knowledge, health)
  – Natural environment
References

• Innovation Ohio, “Fracking fairness and the future: Making sure Ohio taxpayers and workers share in the benefits”.