



# Index of natural resources – a measurement proposal

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# Background

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- GG Indicators include indicators designed to **monitor the Natural Asset Base**
- Natural assets and their roles are country specific
- Either monitoring asset-by-asset or **composite index of evolution of natural assets**
- Reflection Group on headline indicators recommended the latter



# A Simple Principle (1)

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- Starting point: set of natural resources as defined in SEEA
  - Mineral and energy resources
  - Soil resources
  - Timber resources
  - Aquatic resources
  - Other natural biological resources
  - Water resources



## A Simple Principle (2)

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- Natural resource index = 
$$I^{t/t-1} = \sum w_i^t \frac{X_i^t}{X_i^{t-1}}$$
- Weighted average of net change in physical stocks ( $X_i^t$ )
- Weights = each asset's share in the total value of assets
- Then,  $I^{t/t-1} < (>) 1$  indicates a decline (increase) in the natural asset base
- Not an indicator of sustainability, but an indicator of unsustainability of use of natural assets if index is negative



# Valuation of natural resources (1)

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- Ideally, asset values are reflective of society's valuation, taking into account negative externalities => very difficult to measure, no agreed methodology
- Alternative: valuation from the perspective of the producer/owner :
  - Market prices => hardly any observations
  - Discounted flow of future incomes from exploitation of asset (resource rent)



## Valuation of natural resources (2)

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- Relevant valuation also useful to:
  - Reflect economic scarcity of assets
  - Provide a measure of the value and volume of depletion → depletion-adjusted national income
  - Complete national balance sheets
  - Provide a building block to more comprehensive measures of (non)sustainability



## However ...

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- Economic valuation may be partial, in the presence of subsidies and taxes
  - E.g., tax payer subsidises water distribution network
    - will increase producers' resource rent
    - will/may also reduce prices for consumers
- Valuation of aquatic stocks (eg fish stocks) in international waters
- Natural resource index is partial:
  - Services from ecosystems not considered
  - These would capture, for instance, negative externalities from resource exploitation
  - Research by World Bank



## Example: Australia

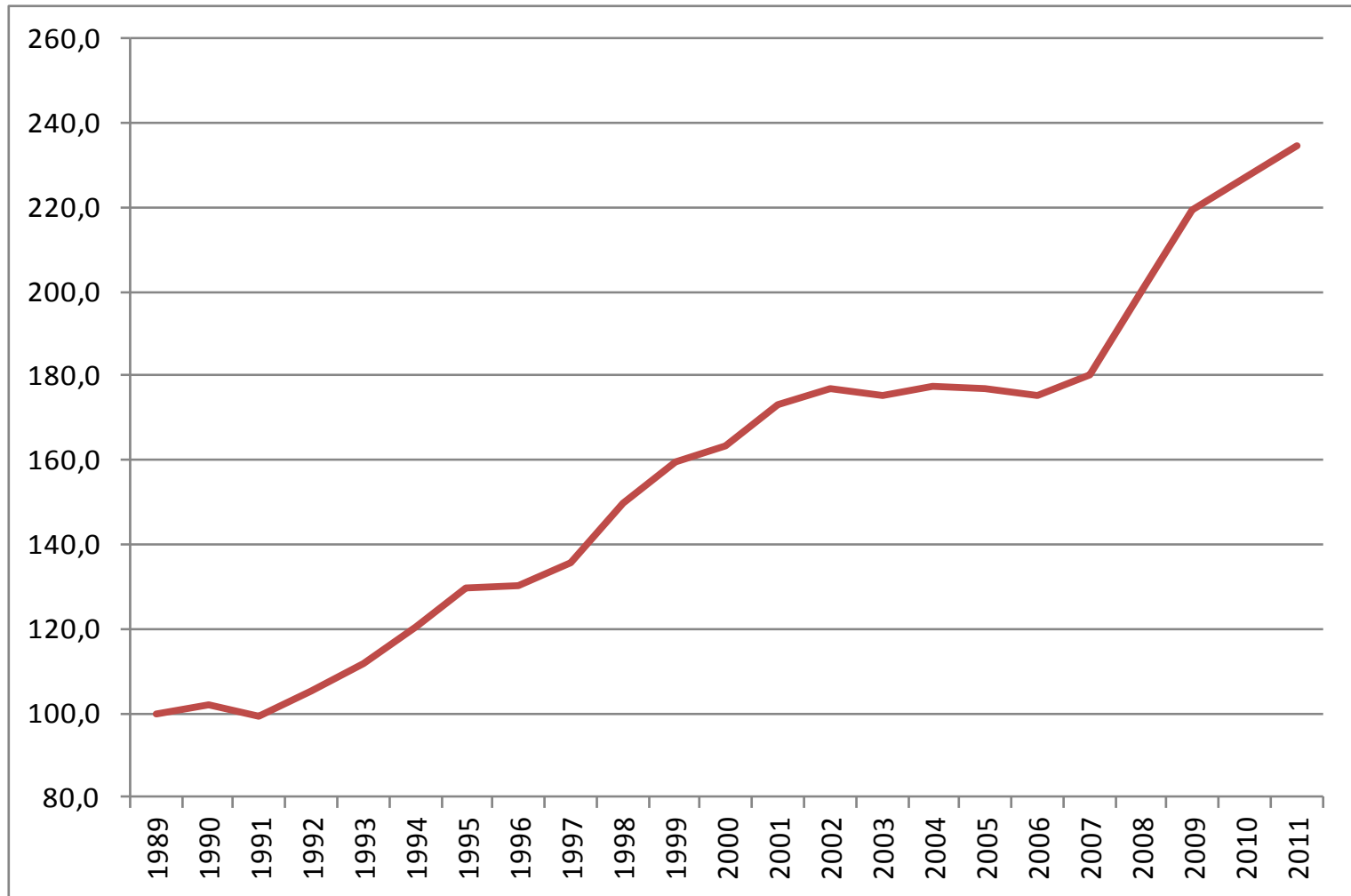
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- **Scope: sub-soil resources**
- **Excluded (lack of readily available data): timber, soil, aquatic resources, water**
- **Asset value = discounted flow of expected income to owners of asset (= resource rent)**





# Volume index of sub-soil assets, Australia, 1989=100





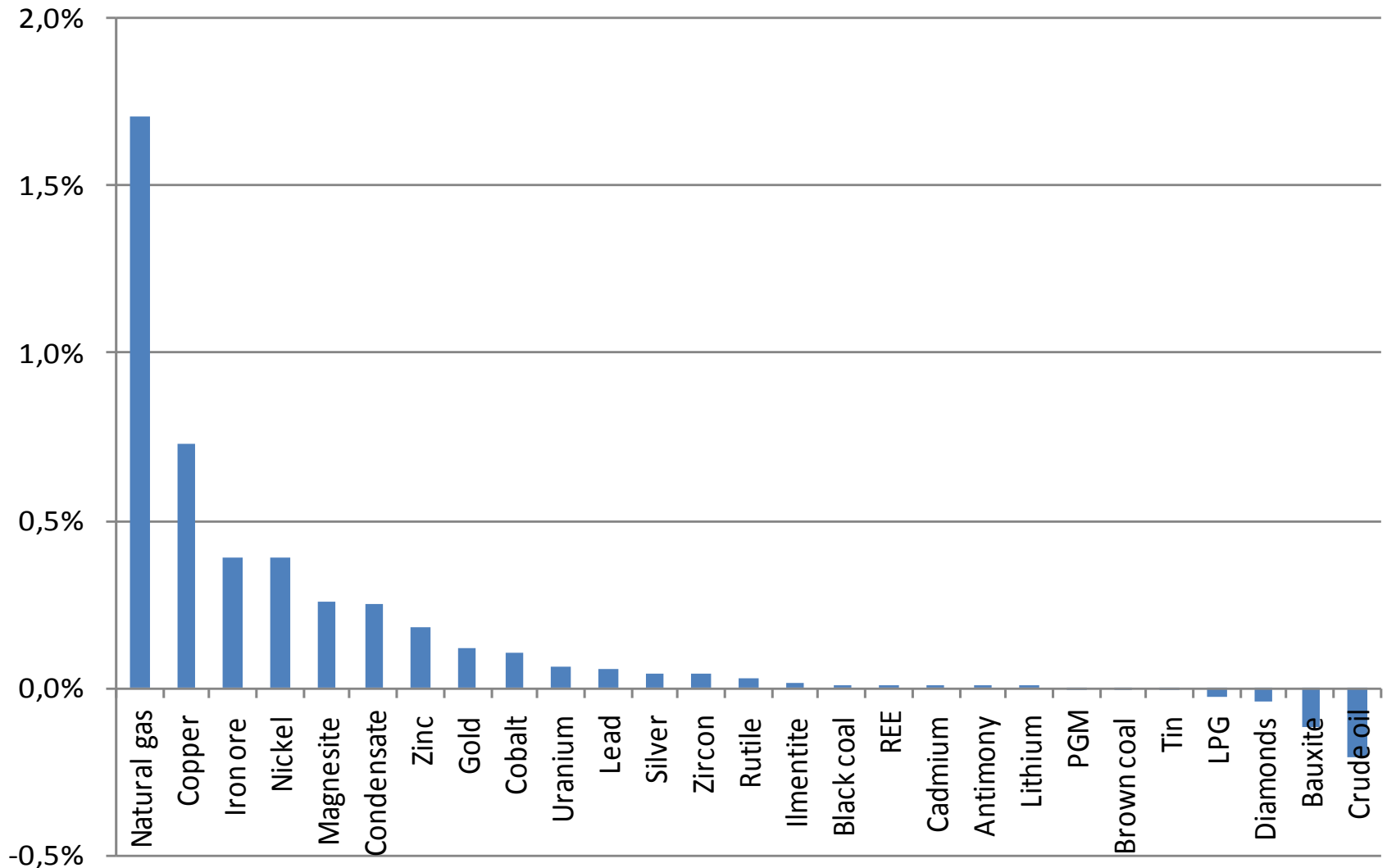
## Example: Australia (2)

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- Upward trend in asset volume: more additions than removals for the aggregate
- Some reserves become economically profitable and increase stock
- Contributions very different across sub-soil assets



# Drivers of growth in index of sub-soil assets, Australia, 1989-2011





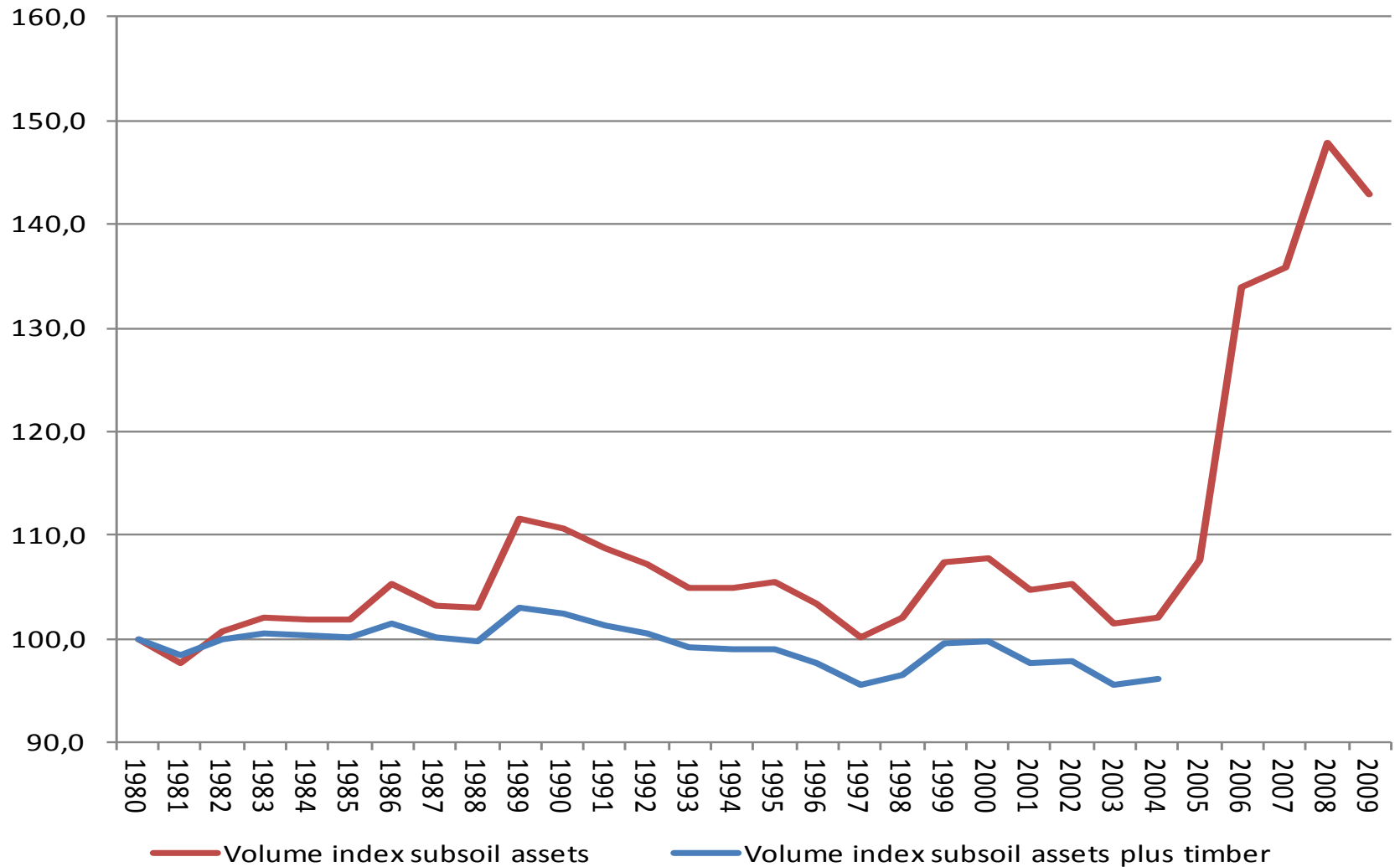
## Example: Canada

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- **Scope: sub-soil resources plus timber**
- **Excluded (lack of readily available data): soil, aquatic resources, water**
- **Asset value = discounted flow of expected income to owners of asset, similar approach to ABS**

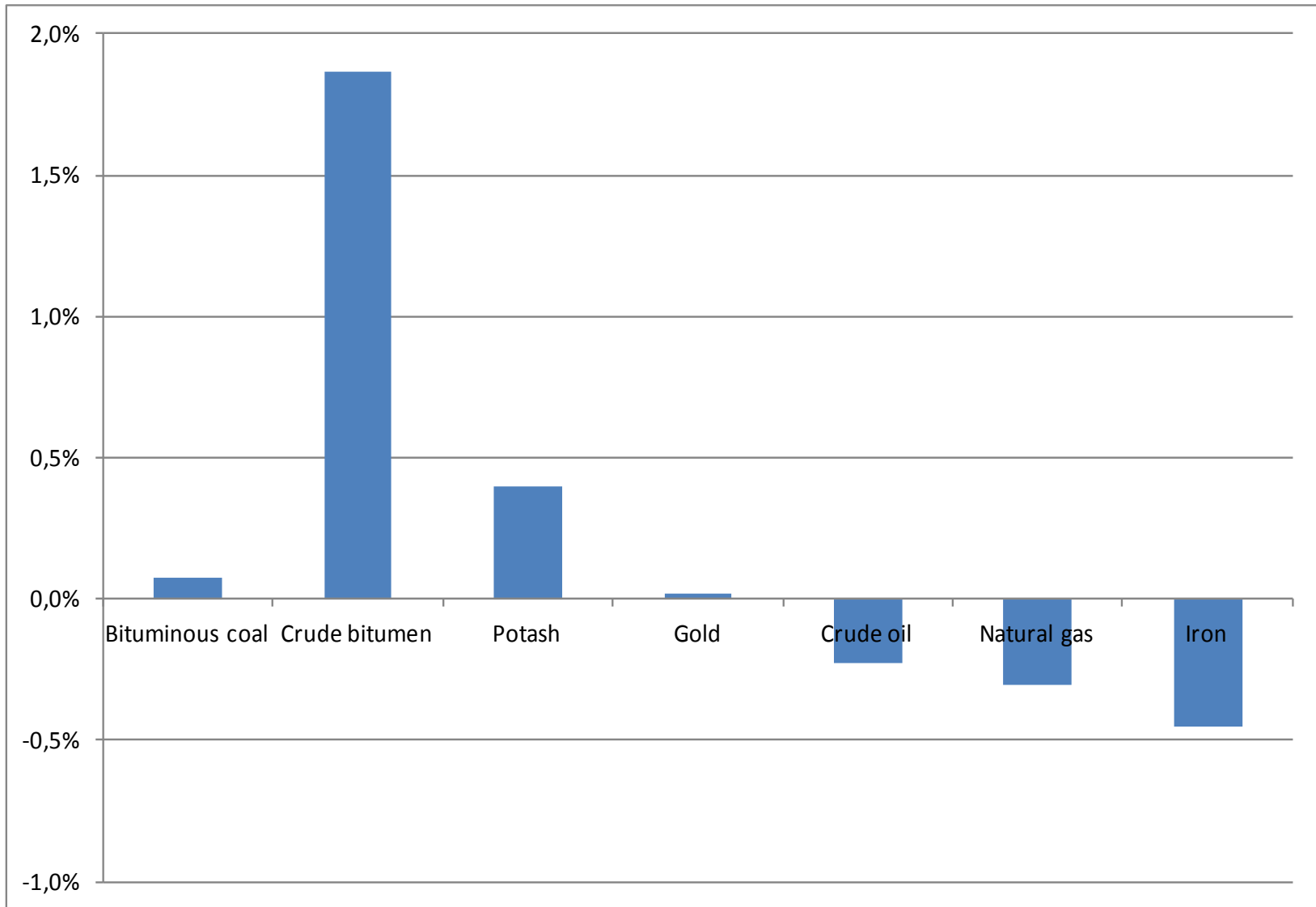


# Volume index of sub-soil assets and timber, Canada, 1980=100





# Drivers of growth in index of sub-soil assets, Canada, 1980-2009





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Thank you!

