Treating R&D as Investment

In the International Accounts

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International R&D: Conventional Style

Adhering to NIPA-BOP conventional practice:

- Export of R&D reduces domestic R&D capital despite non-rival quality
  - Is this right?
- Results do not resolve direct investment position/returns puzzle ("dark matter")
  - Net effects on flows and position both small
  - Net income flows increase—wrong direction
  - Net position decreases—wrong direction

Two Aspects of International Work

- Adjust domestic R&D capital stocks for exports and imports of R&D
- Explore treating MNC R&D spending as investment – discussed here
  - 80% of U.S. business R&D done by MNCs
  - First-time aggregate estimates provided
  - R&D capital ≈10% of total capital stock of affiliates

Impact on Flows

Item	%Δ, 2004
Current account, balance	**-0.2**
Int'l investment income, balance	**2.3**
Direct investment inc., balance	**0.9**
Outward	4.2
Inward	8.7

Impact on Stocks

Item	%Δ, 2004
Int'l investment position, net	**1.1**
Outward	1.4
Inward	1.3
Direct investment position, net	**-3.4**
Outward	5.1
Inward	8.6

BUREAU OF ECONOMIC ANALYSIS
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How is R&D Shared Across MNCs?

- Joint ownership: how to account for R&D shared between among parts of MNC
  - Non-rivalry in use
  - Alternative assignment schemes
    - Assign ownership to performer/earliest owner
    - Divide into “shares”
    - Expand stock when another entity gains access
  - Recommendations?

Joint Ownership: Option 1

Assign to performer/earliest owner (following standard conventions)

Pros

- Generally reflects rights to transfer ownership
- Simplifies treatment of issue
  - Little data burden
- Avoids subjectivity

Cons

- May not reflect economic reality
  - Ignores “sharees” access to knowledge
- Poorly suited to analyze sources of growth

Joint Ownership: Option 2

Divide into "shares" belonging to the various MNC entities

Pros

- Better suited to analyze sources of growth
- Reflects distribution of knowledge without changing total stock

Cons

- Lack of necessary data—must rely on assumptions
- May not reflect total value of R&D knowledge
- Implies that parent R&D stock falls with acquisition of affiliate

Joint Ownership: Option 3

Expand stock when another entity gains access

Pros

- Best reflects access to R&D knowledge
- Best suited to analyze sources of growth

Cons

- Lack of data
- Inconsistency when adding up over different domains
- May not reflect right to transfer ownership
- Not invariant to sequence of events
- Weakens link between investment and stocks

Limitations of Available Data

- Funding vs. performance data
  - Funding preferred, but data not collected annually
  - Funding is 90-95% of performance
- Lack of information on post-R&D knowledge sales

Depreciation and Price Adjustments

Capital stock estimates

- Depreciation
  - Assumed real rate of 15%
    - (Also tested range of other assumptions)
  - May vary with IPR regimes and other factors
- Price adjustments
  - No adjustment for relative price changes in round 1
  - Further work needed

Accounting for MNC Population Changes

- Newly created or acquired firms less exits
  - Ideally, requires information on R&D stocks of entering & exiting firms
  - Infer indirectly from physical capital stocks – assume entrance effect for R&D capital is proportional to entrance effect for tangible capital
    - Uses rough estimate of tangible capital entrance effect