The BEA Annual Capital Flow Table

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Why is Annual Capital Flow Important?

- BEA has traditionally produced benchmark I-O and capital flow tables (every 5 years). These tables rapidly become out of date.
- Recent importance of investment in the business cycle, and rapid technology change highlight the need for more frequent, timely information on investment.
- Researchers want more frequent timely data on capital flows to understand impacts of IT and other capital on productivity.

Sample from 1992 Capital Flow Table

Capital spending by selected industries and assets, 1992
(Values are shown as percent of total)

Capital equipment category	Oil and gas extraction	Communications services	Financial Services
Computers and peripheral equipment	0.6	5.3	15.3
Communication Equipment	0.1	55.5	4.5

The Need for Timeliness

- The preceding slide shows the purchases of computers and communication equipment for selected industries in 1992.
- Before the 1997 capital flow table was released in 2003, this distribution had changed greatly, but the latest available table was still for 1992, which by 2003 was 11 years old!

BEAs Strategy

- BEA has recently produced a series of annual I-O accounts from 1998 to 2002.
- These accounts provide the basis for creating annual capital flow tables, which should greatly enhance the usefulness of the accounts.
- This presentation:
  - Describes the concepts and methodology involved in building capital flow tables
  - Reviews data issues and challenges
  - Identifies research plans

What Is a Capital Flow Table?

- Shows the structure of flows of new capital goods and services to each industry. The rows are the capital goods and services, the columns are the using industries.
- Without the capital flow table, we know “what” is invested, but not “by whom”.
- Separate tables are developed for equipment and software, and for structures.
- The capital flow is consistent with the I-O tables and the national accounts (next slide).

Relationship Between the Input-Output Use Table and the Capital Flow Table

USE TABLE: COMMODITIES USED BY INDUSTRIES AND FINAL USES

		INDUSTRIES /1/							FINAL USE			
		Natural resources and mining	Construction	Manufacturing	Trade, transportation, and utilities	Information	Services	Total interme-diate use	Personal consump-tion expend-itures	Private fixed investment	Change in business inventories	Exports of goods and services
COMMODITIES /1/	Natural resources and mining											
	Construction											
	Manufactured products											
	Trade, transportation, and utilities											
	Information											
	Services											
	Noncomparable imports											
	Total intermediate inputs											
VALUE ADDED	Compensation of employees											
	Indirect business tax and nontax liability											
	Other value added /2/											
	Total											
TOTAL INDUSTRY OUTPUT												

CAPITAL FLOW TABLE: DISTRIBUTION OF NEW EQUIPMENT & STRUCTURES TO USING INDUSTRIES

		INDUSTRIES /1/						
		Natural resources and mining	Construction	Manufacturing	Trade, transportation, and utilities	Information	Services	Private fixed investment
COMMODITIES /1/	Natural resources and mining							
	Construction							
	Manufactured products							
	Trade, transportation, and utilities							
	Information							
	Services							
	Noncomparable imports							
	Total intermediate inputs							
TOTAL INDUSTRY USE OF NEW EQUIPMENT AND STRUCTURES								

NEW PRIVATE FIXED I

DISTRIBUTION ACROS

How Is It Used?

- To understand or forecast the market or sources of demand for a particular type of capital good.
- To determine impacts of changes in investment by industry on the demands for production from other industries (ripple effects).
- To analyze impacts of IT and non-IT investment on productivity.

How to Build a Capital Flow Table

- Develop row controls (investment purchases by commodity) from the I-O use table.
- Develop column controls (total equipment, software and structures use by industry).
- Allocate commodities to industries using information from the BLS Occupational Matrix, ACES, and StatCan.
- Compare column totals to column controls and make hand adjustments.
- Balance the matrix, and review the results.

Develop Row Controls

		INDUSTRIES /1/						
		Natural resources and mining	Construction	Manufacturing	Trade, transportation, and utilities	Information	Services	Private fixed investment
COMMODITIES /1/	Natural resources and mining							
	Construction							
	Manufactured products							
	Trade, transportation, and utilities							
	Information							
	Services							
	Total intermediate inputs							
TOTAL INDUSTRY USE OF NEW EQUIPMENT AND STRUCTURES								

Develop Column Controls

		INDUSTRIES /1/						
		Natural resources and mining	Construction	Manufacturing	Trade, transportation, and utilities	Information	Services	Private fixed investment
COMMODITIES /1/	Natural resources and mining							
	Construction							
	Manufactured products							
	Trade, transportation, and utilities							
	Information							
	Services							
	Total intermediate inputs							
TOTAL INDUSTRY USE OF NEW EQUIPMENT AND STRUCTURES								

Allocate Assets to Industry

		INDUSTRIES /1/						
		Natural resources and mining	Construction	Manufacturing	Trade, transportation, and utilities	Information	Services	Private fixed investment
COMMODITIES /1/	Natural resources and mining							
	Construction							
	Manufactured products							
	Trade, transportation, and utilities							
	Information							
	Services							
	Total intermediate inputs							
TOTAL INDUSTRY USE OF NEW EQUIPMENT AND STRUCTURES								

Goals for the Current Research

- Immediate goal is to develop a prototype table for 1998.
- Steps:
  - Identify alternative data sources for annual industry investment and asset distributions.
  - Decide on industry and commodity detail.
  - Develop techniques and propose a methodology for producing the time-series of tables.

Looking Ahead

- Long-term goal is to produce annual capital flow tables on a regular basis.
- *This is dependent on funding being approved and available.*

Data Issues

- Consistent classification of source data:
  - Enterprise (firm) versus establishment (plant level data).
  - Use versus ownership basis, and how to adjust for leased equipment and structures.
  - Expensed software and computers, which may not be measured as investment in the surveys.
- Data gaps in the annual data.

Industry Allocation: Strategies

- Occupational Employment Matrix
  - Shows types of workers employed in each industry.
  - Used for the benchmark capital flow tables to allocate investment.
- Annual Capital Expenditures Survey
  - Most comprehensive annual investment survey available for the United States.
  - Provides asset-by-industry data, with asset detail available every 5 years.
- Statistics Canada Investment Data
  - Provides detailed asset-by-industry data annually.

Industry Allocation: Challenges

- Occupational Employment Matrix
  - Unclear how well occupations correlate with asset types.
  - Classifications change with each matrix.
- Annual Capital Expenditures Survey
  - Enterprise based, not plant level data.
  - Detailed information available only every 5 years; asset types not very detailed.
- Statistics Canada Investment Data
  - Published data are quite aggregated. We need to work with StatCan to make use of the underlying detailed data.

Near-Term Research Plans

- Develop several versions of 1998 prototype table:
  - "Naïve" version, using simple row and column scaling of 1997 table to 1998 totals.
  - Version based on ACES data corrected for enterprise basis and industry truncation.
  - Version based on more detailed data from Statistics Canada; joint paper comparing U.S. and Canadian methodologies and data.
  - "Hybrid" version, using occupational distributions, ACES and StatCan.

Summary

- Annual Capital Flow tables should be a great boon to academic researchers and policy analysts.
- Combining data from many different sources is a challenge.
- The crux of our problem is to identify a reliable means of distributing assets to using industry on an annual basis.
- ACES data on enterprise basis is also a challenge. Obtaining access to microdata-based establishment data would help.

Questions, Comments and Discussion

- Are other countries producing capital flow tables? At what detail? What types of data are used?
- What experiences do others have converting company-level data to establishment (plant) data?
- What are the merits/problems in relying on data from a different country?
- Have any other statistical agencies followed the practice of borrowing coefficients or other information from another country?