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**Seminar**  
**Creation, Recognition and Valuation**  
**of**  
**Intellectual Assets**

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**The BEA-NSF R&D Satellite Account:**

**Overview, Methods, and Issues**

**Presented by**

**Carol Robbins**

# The BEA-NSF R&D Satellite Account:

Overview, Methods, and Issues

Sumiye Okubo

UN Seminar on Creation, Recognition and  
Valuation of Intellectual Assets

July 13, 2006

Measuring the Nation's Economy



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## Introduction

- The knowledge economy and R&D
- Background and overview of R&D satellite account project at BEA
- Implications for BEA
- Estimating the R&D satellite account
- Future research issues



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## The Knowledge Economy and R&D

- Developing consensus on scope, concepts, and methods:
  - R&D
  - Human Capital
  - Firm-specific human capital
  - Brand equity
  - Organizational structure



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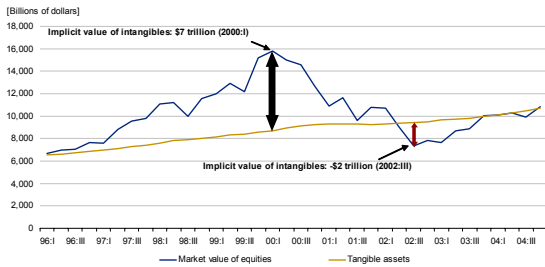
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## Measuring Intangibles: Problems in Using Imputations Rather Than Direct Measures



Source: FRB Flow of Funds (L.102 and B.102) release March 9, 2006. Data based on nonfarm nonfinancial corporate business.  
 Note: A number of analysts attributed the large difference between equity values and the replacement value of plant and equipment to intangibles during the market run-up in the late 1990s.

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## Background on R&D at BEA

- Carson, Moylan, and Grimm (1994) - Satellite Account for Research and Development using NSF expenditure data
- Fraumeni and Okubo (2002, 2005) - measured contribution of R&D using R&D data and a national accounts framework
- The National Science Foundation provided funds to produce an official satellite account (2004).

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## Table 1 – Changes to National Accounts

	Gross Domestic Product			Gross Domestic Income	
	Treatment in Current Measure of GDP	Adjusted GDP	Change in Current Measure of GDP	Adjusted GDI	Capitalizing R&D Change in Current Measure GDI
<b>R&amp;D Imputations, R&amp;D performed by:</b>					
Business	Intermediate input	Reallocate to investment	Increase	Increase in profits and depreciation	Increase
Nonprofit Institutions	Consumption (PCE)	1) Reallocate to investment 2) Increase consumption = Returns to R&D capital	No change Increase	Increase in returns to R&D capital	Increase
General Government	Government consumption	1) Reallocate to investment 2) Increase consumption = Returns to R&D capital	No change Increase	Increase in returns to R&D capital	Increase

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## Results of Fraumeni/Okubo Account: 1961-2002

- Capitalizing R&D
  - Increases current dollar GDP by 2 percent.
  - Increases the real GDP rate of growth by 0.1 percentage point.
- The estimated contribution of R&D investment to overall GDP growth is 4 percent.
- The adjusted national savings rate is 2 percentage points higher than the current measure (of 19 percent).

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## Recent International Efforts with R&D Satellite Accounts

- Impact on current value of GDP
  - Israel 2 percent
  - Canada 1.2 percent
  - Netherlands 1.1 - 1.2 percent
  - Australia 1.4 - 1.6 percent

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## Progress and Changes

- Produced Frascati Manual-SNA bridge
- Began research on methodologies including rates of return, depreciation rates & deflators
- Expanded and updated R&D satellite account estimates first produced by BEA in 1994
- Began research to develop an I-O based R&D satellite account
- Advisory Expert Group recommended that R&D output be treated as a fixed asset (July 2005) in the SNA

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## Treating R&D as a Fixed Asset

- The upcoming SNA revision is likely to adopt capitalizing R&D in the national accounts system because of work by BEA and others.
- The R&D satellite account would provide the basis for experimenting in capitalizing R&D in the NIPAs and the Industry Accounts.

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## Schedule for R&D Satellite Account

- Release of preliminary R&D Satellite Account, September 2006
- Technical conference on the R&D account, October/November 2006
- Feasibility study on producing an Industry R&D Satellite Account, Spring 2007
- Release of final R&D Satellite Account, September 2007
- User conference, November 2007

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## Inputs from Users

- Develop professional consensus on concepts and methods for capitalizing R&D in the national accounts.
- Obtain feedback on the approach used to estimate the preliminary R&D Satellite Account.
- Develop solutions to methodological and conceptual challenges for FY 2007.

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## Impact on BEA Accounts

- Treating R&D as an asset would have wide ranging effects on the national accounts:
  - Annual and quarterly data on R&D.
  - Detailed industry data on R&D investment.
  - Impact on Regional Accounts.
  - R&D assets and capital services in the international accounts.

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## Preliminary R&D Satellite Account: Base Case

- The R&D Satellite Accounts will be consistent with the NIPAs—base case
  - Valuation of own account output
  - Returns to government and non-profit capital : only CFC, no net return
  - Zero Lags between creation of R&D and its impact as investment
  - No Externalities (Spillovers)
- The funder of R&D is the best current proxy for ownership

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## Estimating the R&D Satellite Account

- Estimate the value of R&D output with input costs
  - R&D compensation
  - R&D supplies and materials
  - Consumption of fixed capital on the assets used to create R&D
- Apply input deflators
- Chain together the reals
- Create capital stock estimates

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## 2007 R&D Satellite Account: Improvements

- Improvements
  - 1) Improve the input deflators
  - 2) Improve estimates of consumption of fixed capital
  - 3) Improve assignment of ownership of R&D
- Framework for industry-based satellite account

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## Improve Identification of R&D Assets

- Improve Identification of Ownership of R&D Assets
  - Funder-performer transactions
  - Intellectual property rights
- The scope of capitalized R&D
  - Identify freely available R&D
  - Currently limited to science and technology

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## Longer Term Issues

- Measuring R&D output
- Identifying freely available R&D
- Depreciation of R&D and lag structure by industry
- Estimating private rates of return and spillovers from R&D
- Estimating rates of return for government and non-profit R&D
- Improving R&D source data for national accounting purposes

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