Fact-Based Science and Innovation Policy or A Measure of Our Ignorance?

- Contribution of science and technology to economic growth oft-cited justification for government support.
  - Do advances in technology and knowledge account for over 50% of growth, (or 7%)?
- Solow's MFP residual and growth may reflect lots of things.
  - Despite years of work "reducing the residual," still 40%.
  - Residual may not reflect technology and advances in knowledge but a lot of other stuff including:
    - Increases in international trade, better economic policy, public infrastructure, economies of scale, better management, or even better weather (pre-dust bowl).
- Limited progress in directly measuring innovation

Decomposing the MFP Residual: Gaps in Our Knowledge

(billions of dollars, annual average)

Type	Total Spending	Comments on evidence as capital spending	Capital spending (included in NIPAs)
1. Computerized information	154	Firms capitalize only a fraction of purchased software in financial accounts. Relatively little is known about the service life of software assets.	154 (151)
2. Innovative property			
(a) Scientific R&D	201	Research suggests that scientific R&D yields relatively long-lasting returns and is capital spending.	201 (16)
(b) Nonscientific R&D	223	Little is known about nonscientific research R&D, but a portion of new product development expenditures in the entertainment industry apparently have relatively short-lived effects.	223 (40)
3. Economic Competencies			
(a) Brand equity	235	Research shows that the effects of some advertising dissipate within one year, but that more that half has effects that last more than one year.	140 (0)
(b) Firm-specific resources	407	Research suggests that firm-specific training is investment. Spending for organizational change is also likely has long-lived effects, but a portion of management fees probably is not capital spending.	365 (0)
Total	1220		1085 (205)
Percent of existing GDP			11.7
Ratio of Tangible Capital Spending			1.2

Source: Corrado, Carol, Charles Hulten and Daniel Sichel. "Intangible Capital and Economic Growth, " Working paper as part of the Finance and Economics Discussion Series, Divisions of Research and Statistics and Monetary Affairs, Federal Reserve Board, Washington, D.C. April 2006.

Getting it Right is Important: Especially in this Budgetary and Economic Environment !

- Both fiscal and monetary policy are targeted at long-term, sustainable growth rate.
  - If 40% of growth is unexplained and hard to estimate potential growth
  - If, for example, monetary target is too low, big consequences:
    - One half of 1% lower growth over the next ten years results in a cumulative reduction of $5.8 trillion in GDP, roughly the size of the hit on the value of household real estate assets during the housing crisis. [1]
    - Also, the projection of the Federal budget deficit over the same time period would be off by $1.6 trillion. [2]
  - What we know about 40% is limited:
    - From 1995-2007, BEA estimates that investments in R&D increased the growth rate of real GDP by .23 percentage point, and accounted for 7 percent share of growth. [3]
    - If you add spillovers, R&D might account for 14 percent; still a long way from 40%

Sources:
1. Based on OMB projections of GDP growth through 2022. 2. *FY2013 Analytical Perspectives*, OMB, pg. 58. 3. Results from 2010 Update to the R&D Satellite Account, BEA

Tax, Regulatory, and Trade Policies

- The R&E credit is the largest corporate tax credit and has a ten year budget planning price tag of $140 billion.[4]
- Investment tax credits and accelerated depreciation provisions are been targeted at equipment, which presumably embodies new technologies.
  - Accelerated depreciation has a ten year price tag of $287 billion. [4]
- Corporate tax rates, the treatment of transfers of intangible assets, and other tax laws have a large impact on the attribution and location of economic activity, especially for intellectual property.
  - Over the last 30 years, the share of U.S. multinationals foreign direct investment in tax havens has increased from 19 to 44 percent. [5]

Sources:
4. Estimates of Federal Tax Expenditures, Joint Committee on Taxation and OMB *5. The Impact of Globalization on National Accounts*, UNECE, Eurostat & OECD, pg. 15.

Regulatory & Trade Policies, & Direct Support for R&D

- Regulatory policies and trade policies – ranging from immigration visas (H-1B visas) and patents to customs and security – have a large role in encouraging or discouraging innovation.
- The federal government spends nearly 1% of GDP and over the ten year budget planning horizon $1.5 trillion in support of R&D. [5]
  - Based on BEA R&D estimates, increasing this share to 1 ½ percent would over the next ten years might, on net, raise GDP by $5.8 trillion, and lower the deficit by $1.6 trillion.
- In sum, improving the data on the returns to innovative activity could play a significant role in addressing the major fiscal and economic challenges we confront.

Sources:
6. BEA, OMB