Discussion of Diewert-Fox: Money and the Measurement of Total Factor Productivity

Carol Corrado
The Conference Board and Georgetown University
Center for Business and Public Policy

IARIW Workshop
16-17 April 2015, Paris

Purpose and Motivation

- Consider liquid assets from the perspective of productivity analysis
- High cash balances were noted as a policy concern during the financial crisis, i.e., that firms were holding cash rather than undertaking new investment
- Authors suggest high cash holdings means . . . "the economy is not using its full capacity" and that TFP may not be measured correctly

Approach

- Review conceptual issues that arise when adopting the view that real money balances should be added to the production function
- Conduct empirical exercise where real money balances are added to other inputs and analyze results (impact on measured TFP)

Conceptual Issues

- Authors discuss role of **money in production function**, noting in particular the empirical literature that began in the late 1960s/early 1970s and centered on testing where real money balances enhanced the technical efficiency of the economy
- Authors don't take a stand on this literature, except to say that regardless of purpose, **cash and liquid assets have an opportunity cost** in terms of investment, productivity and economic growth
- Additional clarity on dimension of this proposition would be nice—does it refer to firms, sectors, or to the functioning of the economy as a whole?

Data and Facts

Authors use data for the U.S. **nonfinancial** corporate and noncorporate business sectors from the BEA/FRB Integrated Macroeconomic Accounts (IMAs)

Some facts about the assets of the U.S. noncorporate business sector:

- About 75 percent of total assets are nonfinancial assets, 90 percent of which are real estate holdings
- About 25 percent of the sector's financial assets are currency and deposits, short-term bank loans exceed that amount by about 50 percent
- Inventory holdings are very small, whereas trade receivables (and trade payables) are much larger
- The leverage ratio of this sector was elevated during the financial crisis
- Net investment (nominal) contracted for three years and the residential component is still below its pre-crisis peak

Facts, continued

Corporate sector:

- About 50 percent of this sector's total assets are nonfinancial assets, about 1/2 of which percent of which are real estate/structures
- Nearly 1/3 of total financial holdings consists of U.S. DIA and probably another 10 percent are intangible assets recorded after M&A
- At year-end 2013, inventories were 12 percent of total nonfinancial assets, and trade receivables and payables still larger
- Currency and deposits about 7 percent of total financial assets
- Leverage is low for the sector as a whole
- Domestic net investment contracted for one year during the Great Recession; (net) dividends were cut back for two years but expanded thereafter
- U.S. DIA was generally maintained during the Great Recession

Diewert-Fox Implementation

Some choices and considerations:

- Money balances (currency and deposits, taken together) are used
- To deflate money balances, alternative deflators depending on the predominant reason for holding cash balances are considered:
  - a consumption price if funds are for paying dividends
  - a wage rate if funds are for covering wage commitments
  - an intermediate inputs price index if funds are for paying suppliers
- To calculate user costs, ex post and smoothed inflation rates are considered

Results

- The asset share for money balances is very small
- As a result, **adding real money balances to inputs makes very little difference to measured TFP** growth (virtually no difference for the corporate sector)
- Is this because the authors have asked an uninteresting question or is something astray in their approach or implementation?

What's the Underlying Question?

The role of **finance** in economic growth or the impact of **corporate finance** on productivity?

- In the usual view, a country's financial institutions influence its economic efficiency, an influence naturally associated with TFP
  - Money and finance are seen as "lubricating the wheels of commerce"
  - e.g., consider the "dependence on external finance" that Rajan and Zingales (1998) link (positively) to cross-country differences in productivity growth
- Cash management is an aspect of corporate finance, the prudent practice of which is arguably important for productivity

TFP and Efficiency of Institutions

A topic in the development literature, e.g., David Weil discusses this in his AEA lectures on economic growth. Write

$Y = \boldsymbol{A}F(K, L)$ where $\boldsymbol{A} = \textit{Technology} * \textit{Efficiency}$

The idea is that, while the application of technology may indeed differ across countries, it hard to fathom that technology explains the very large differences we see in $\boldsymbol{A}$. According to The Conference Board's *Total Economy Database*, $\boldsymbol{A}$ for the Euro Area is 25 percent less than $\boldsymbol{A}$ for the United States. That is not technology (innovation or diffusion).

Cash Management and Corporate Finance

- Corporate finance examines **working capital**, the difference between current (i.e., short-term) assets and current liabilities
  - Current assets include **inventories**, cash and liquid assets, and trade receivables
  - Current liabilities include trade and current debt payables (bank loans, lines of credit, commercial paper, and other short-term debt instruments).
- Consider the proposition that financial working capital is a productive asset to be included in growth accounting

Financial Working Capital as a Factor of Production

- As a starting point, consider modeling nonfinancial business.
  - Let working capital, not inventories alone, enter the production function where working capital is inventories plus financial working capital
  - For well-managed firms, the values for current assets and current liabilities will roughly cancel out (or inventories and financial working capital will roughly cancel out)
  - Financial capital is then an unlikely source of long-term economic growth
  - But swings in inventories and financial working capital will, in all likelihood, surface in cyclical episodes and in financial and liquidity crises

Financial Working Capital, continued

- Consider now the modeling of **aggregate** activity with financial working capital as an asset
  - Assume that domestic financial business is the source of working funds for nonfinancial business
  - . . . and that financial business assets and liabilities are on a consolidated basis
- Current financial assets and liabilities "cancel out" in aggregation
- As a result, financial working capital does not affect the productive capacity of the economy
- .... although it might change picture of industries and reveal transmission mechanism of financial shocks

Implications for the SNA

Assume that in the SNA
(a) capital income has *ex post* price and quantity elements and (b) that industry capital income includes all forms of remuneration to capital (i.e., production subsidies are included). Then

- Services from financial working capital are a rightful component of capital services for industries and sub-sectors of the economy
  - ... so too are **net** positions in long-term financial assets (e.g., DIA and FDI)
- When considering aggregate impacts, financial assets and liabilities must be consolidated (just as we net out intermediate goods) and thus the aggregate implications are nil
- In implementing the notion of money in a production function, Diewert-Fox consider only money balances, rather than using all current financial assets and liabilities

Thank you