

Money and the Measurement of Total Factor Productivity

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EMG Workshop

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Overview

- Examine the holding of cash balances by firms, representing underutilized resources
- Explore implications for the measurement of productivity.
- Application to the US and other countries

Why hold cash balances?

Motivations for holding such liquid assets, rather than e.g. investment assets, include:

- The need to cover immediate commitments (such as payments to suppliers, and the payment of dividends).
- Unexpected contingencies.
- Investment purchases

These assets represent underutilised resources. If a firm can effectively keep such low-yield balances to a minimum, it can invest in higher return assets, such as physical capital that can produce more output.

Cash balances well-known to industry as underutilised resources

They can be large, and they can vary:

- “The rise in profitability left a lot of cash lying around, and 69 per cent of companies lifted their interim dividends, while cash holdings also grew 6 per cent to \$111 billion.”

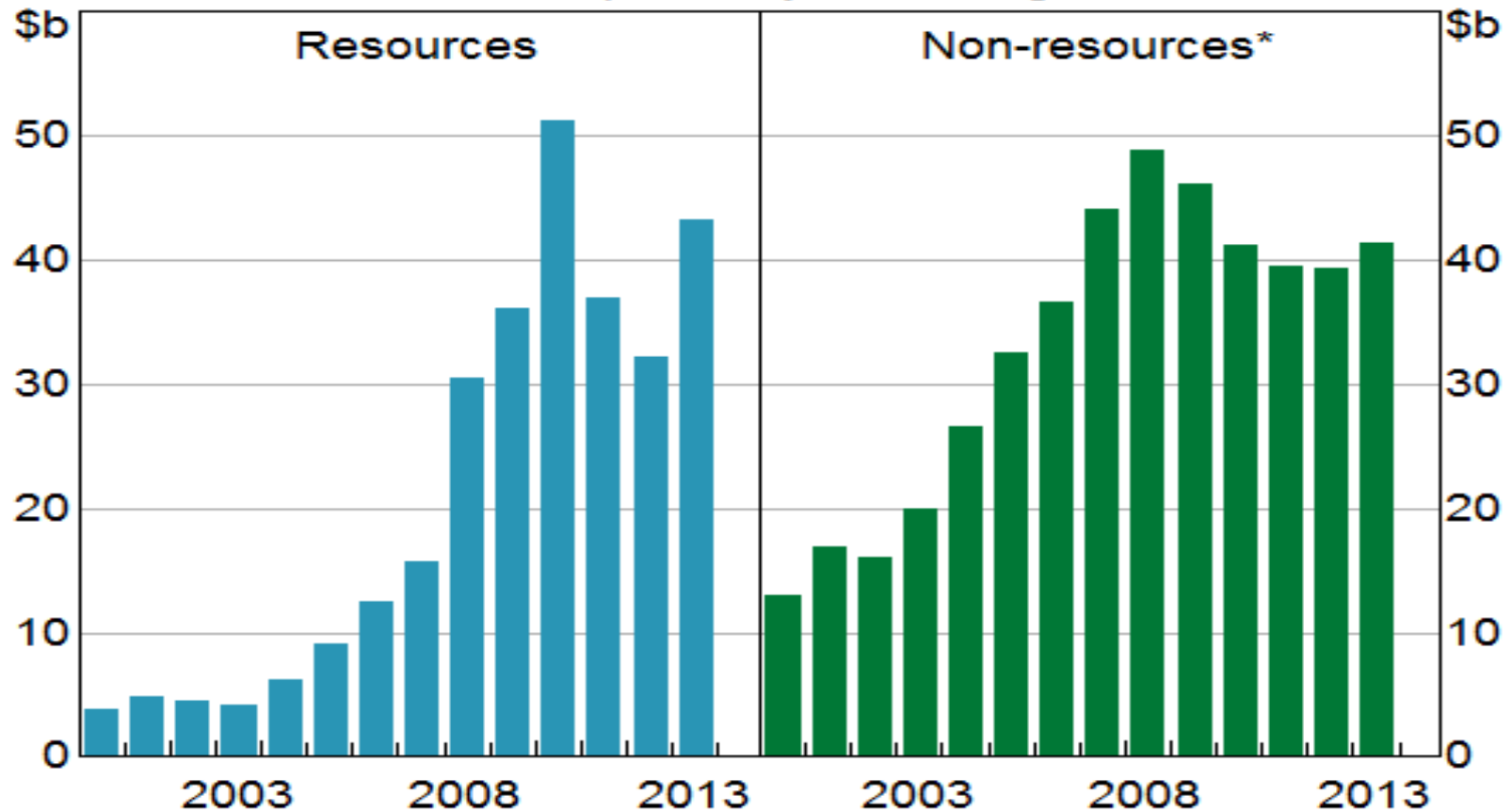
ABC News Online (3 March 2014)

- "Companies are sitting on significant cash reserves and are well placed to invest, employ and embrace future opportunities such as mergers and acquisitions. Indeed investors will want to know how Aussie companies plan to utilise cash reserves to lift future returns."

Craig James, Chief Economist CommSec, ABC News Online (3 March 2014).

Cash Holdings by Sector

Listed companies, year-end figures



* Infrastructure companies are double counted within the other cyclical and non-cyclical sectors

Sources: Bloomberg; Morningstar; RBA

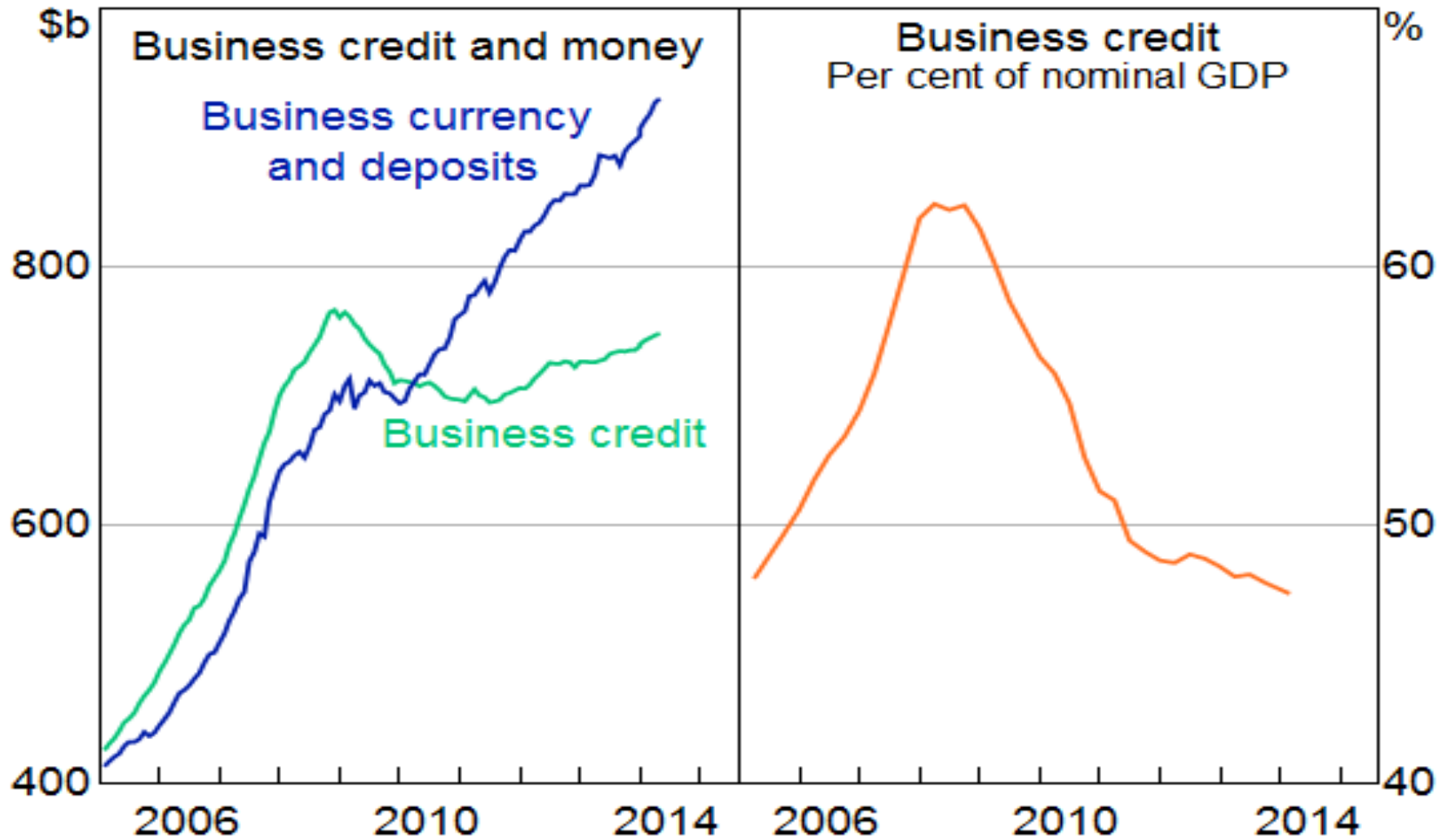
Glenn Stevens, RBA Governor, "The Economic Scene", address to CEDA Luncheon, Adelaide - 3 September 2014

<http://www.rba.gov.au/speeches/2014/sp-gov-030914.html>



UNSW
AUSTRALIA

Business Finances



Sources: ABS; APRA; RBA

Glenn Stevens, RBA Governor, "The Economic Scene", address to CEDA Luncheon, Adelaide - 3 September 2014

<http://www.rba.gov.au/speeches/2014/sp-gov-030914.html>: "This data includes fund managers' holdings of cash assets, which from other data appear to have risen by close to \$200 billion since 2006. But overall, this comparison suggests a very marked improvement in the liquidity of the business (and fund management) sectors' balance sheet over the past five years."

Cash Balances and Productivity

- In times of uncertainty, such as during a financial crisis or a change in government policies, firms may choose to hold more precautionary cash balances.
- An increase in unproductive cash holdings can then potentially lower investment, output and productivity.
- In assessing a firm's performance, ignoring cash holdings as an asset can then give a misrepresentation of its productivity performance.

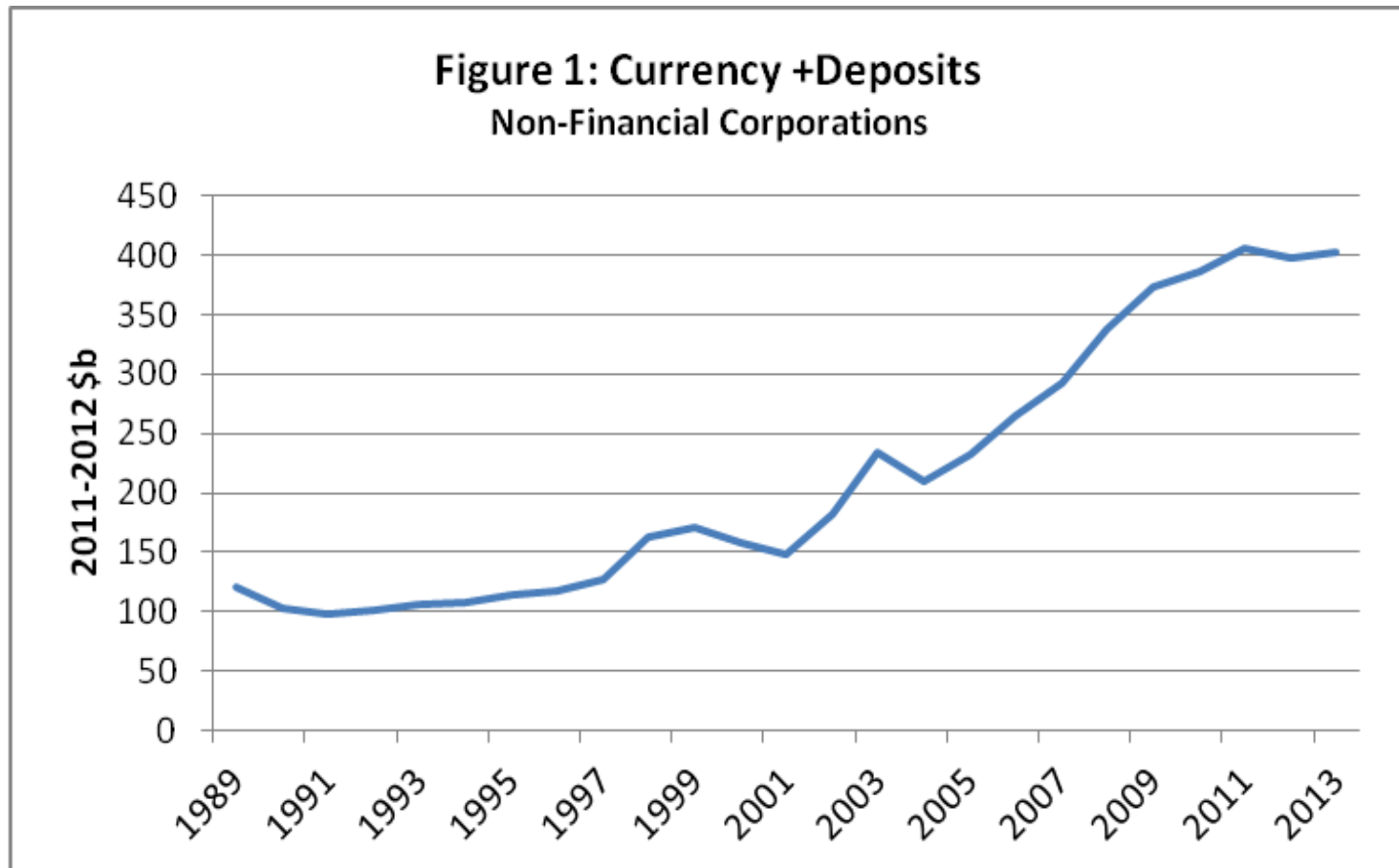


Literature

- Money in the production function?
 - Johnson (1969), Stein (1970), Friedman (1969), Bailey (1971)
 - “an economy without money would have to devote effort in order to devote effort in order to achieve the multitude of ‘double coincidences – of buyers who want exactly what the seller has to offer – on which successful barter is based” (Levhari and Patinkin, 1968, 737-738).
 - Moroney (1972): as an exchange innovation, money has broader implications than can be obtained from specifying money as an input.
 - Davidson (1979): “there is no elasticity of substitution between money and real capital or labor services along an isoquant” (p.281)
 - Fischer (1974): difficult to construct an index of money that measures the saving of resources from its use.
 - Empirical support for the inclusion of money in the aggregate production function: Sinai and Stokes (1972), Khan and Kouri (1975), Short (1979). At disaggregate level, Nadiri (1969), Dennis and Smith (1978)
 - Nguyen (1986): “money plays a role, not as an input, but as a factor whose growth rate contributes to productivity growth” (p. 150)

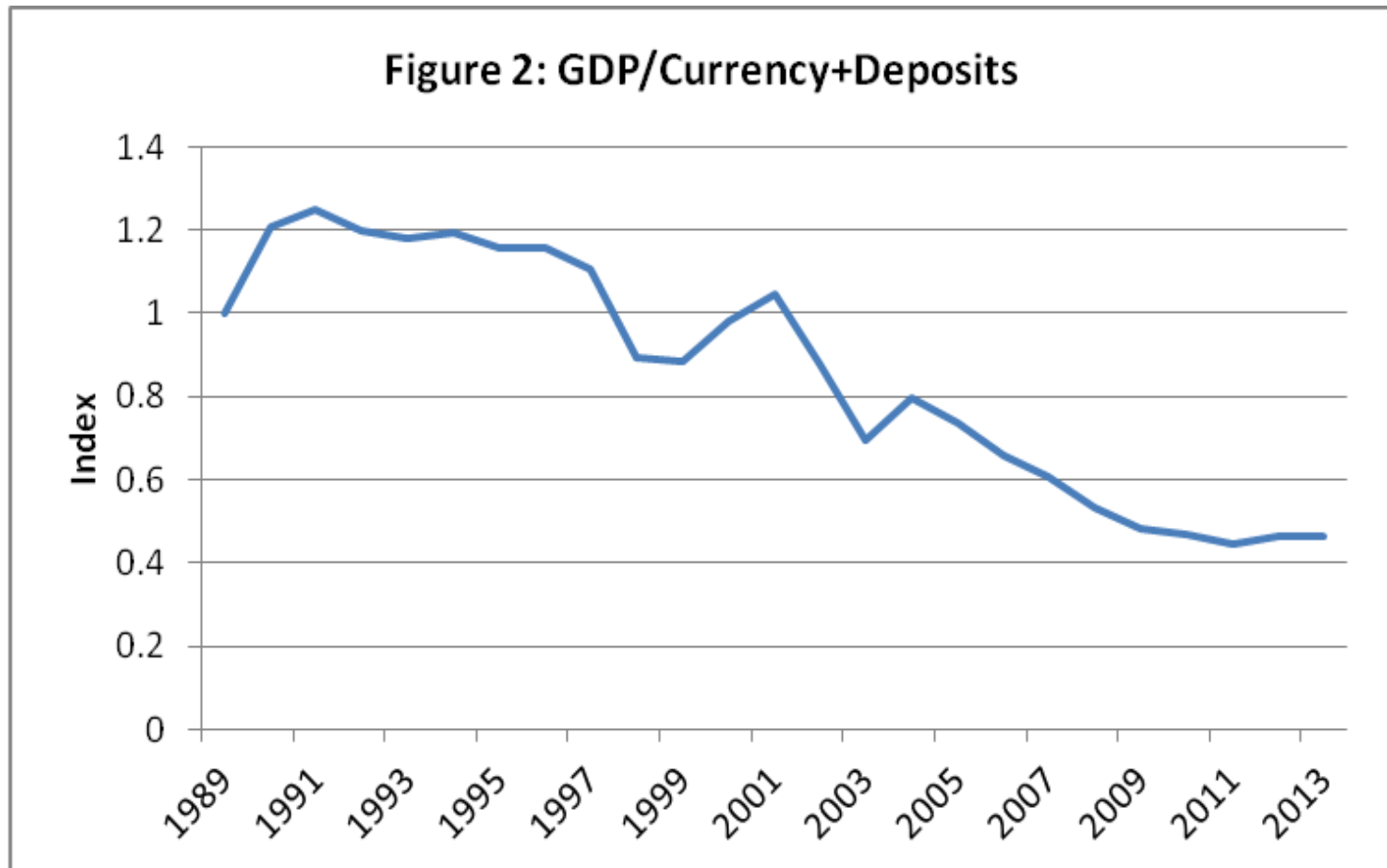


Example: Cash Balances and Productivity



Data sources: Australian System of National Accounts, 2012-13, Cat. No. 5204.0 Table 20 and Cat. No. 6401 - Consumer Price Index, All Groups CPI.

Example: Cash Balances and Productivity



Additional data source: Australian System of National Accounts, 2012-13, Cat. No. 5204.0 Table 1.

Ratio falls more than 50% between 1989-90 and 2012-13

Conceptual Issues and Data

A key issue is determining an appropriate deflator for cash balances. The above data used the Consumer Price Index (CPI), but this is only one possible choice.

Intermediate inputs price index: Firms hold cash balances to pay suppliers, so an intermediate inputs price index appears to be a reasonable choice.

Labour wages: Cash is held to cover wage commitments.

Capital price index: Cash is held in preparation for capital purchases.

Consumption price index (such as, but not necessarily, the Consumer Price Index): Firms may be holding funds in trust for shareholders as they want to pay a dividend.

Conceptual Issues and Data

Another issue to consider is the manner in which to aggregate over different classes of assets with varying degrees of liquidity.

For the US, use the BEA Integrated Macroeconomic Accounts:

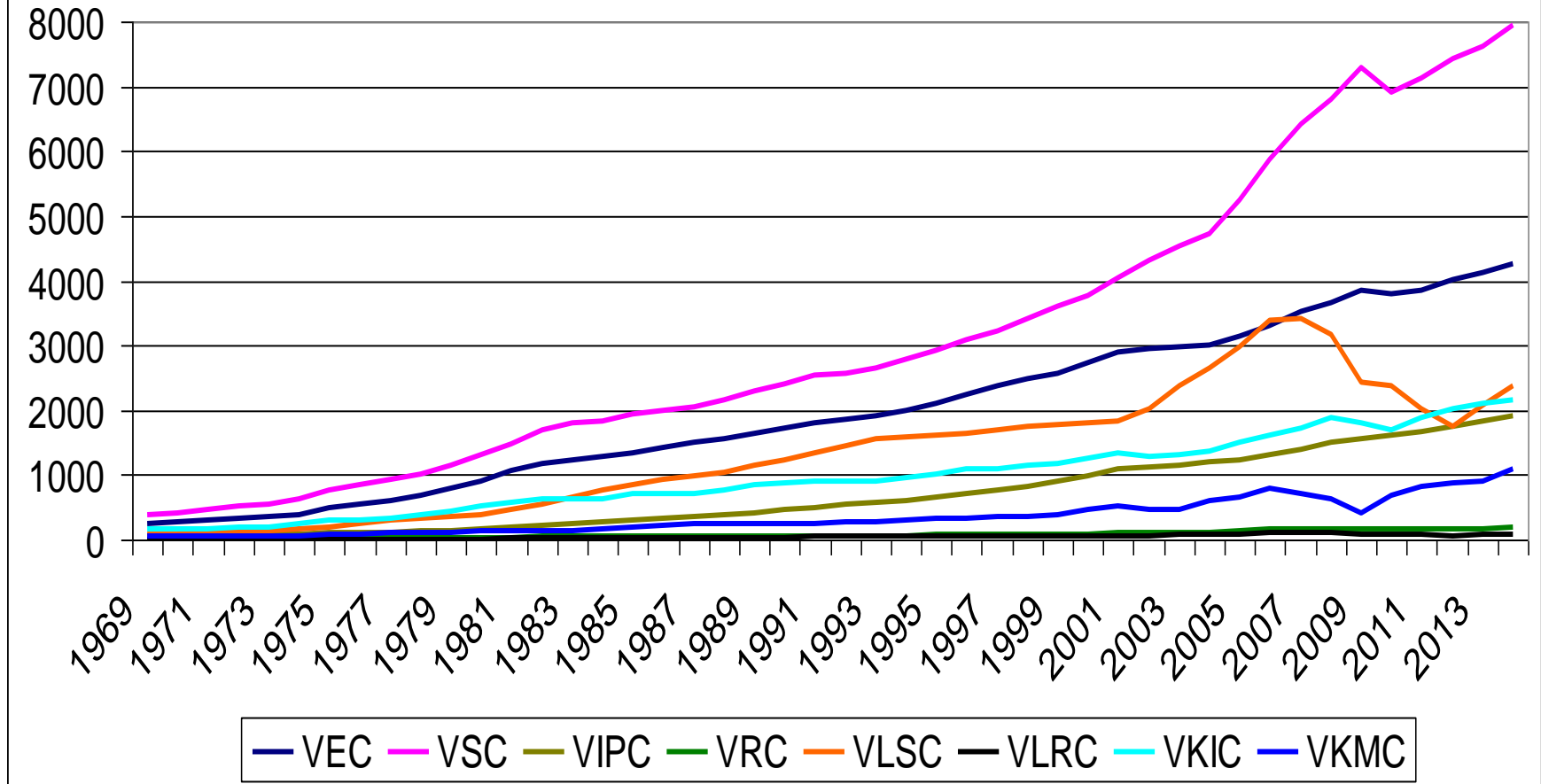
“They are part of an interagency effort to further harmonize the BEA National Income and Product Accounts (NIPAs) and the Federal Reserve Board Financial Accounts of the United States (FAUS).”

We focus on private business sector: (1) Nonfinancial corporate; (2) Noncorporate, nonfinancial



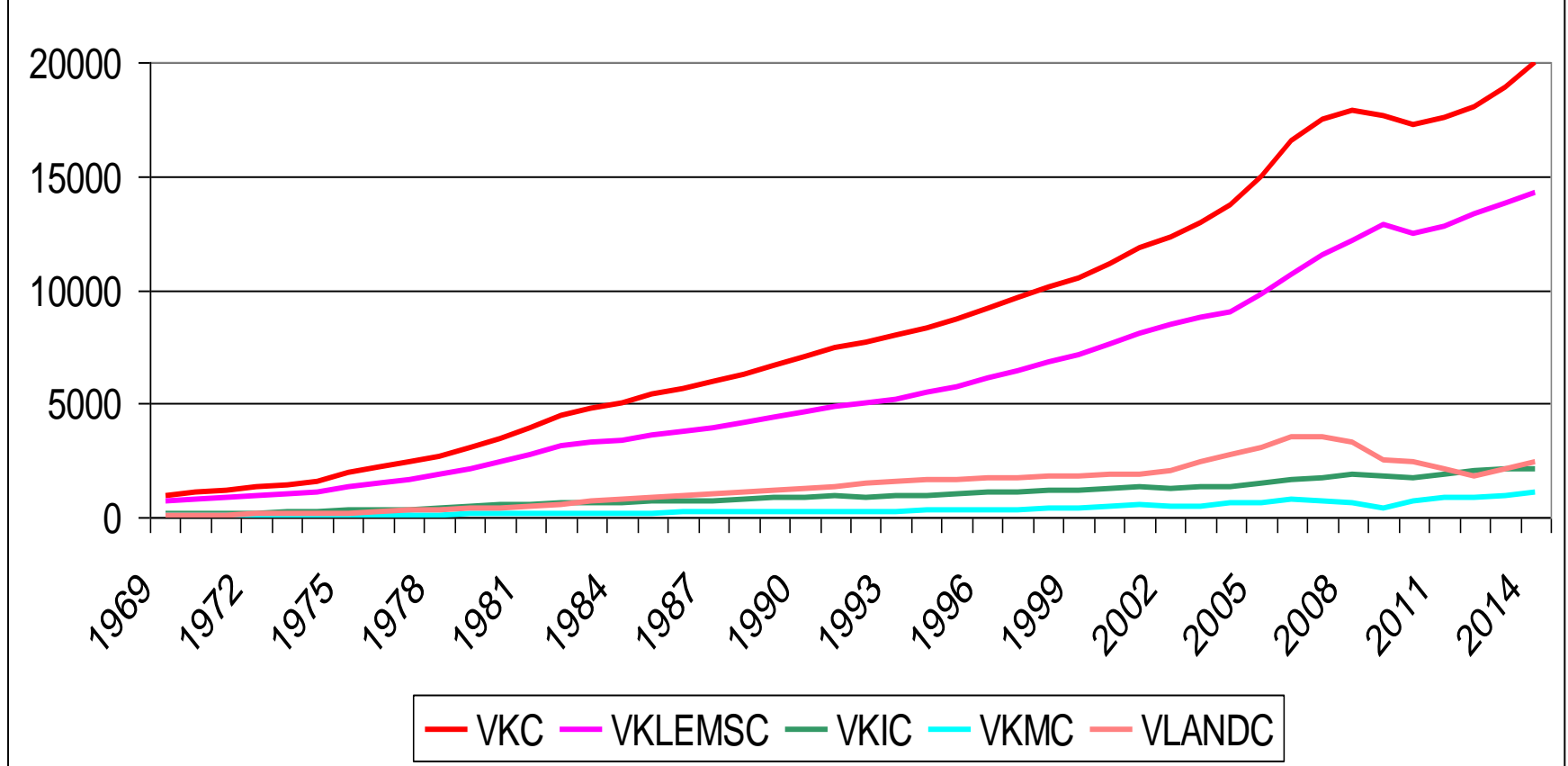
Asset Values

Corporate Asset Values for Eight Asset Classes: 1969-2014



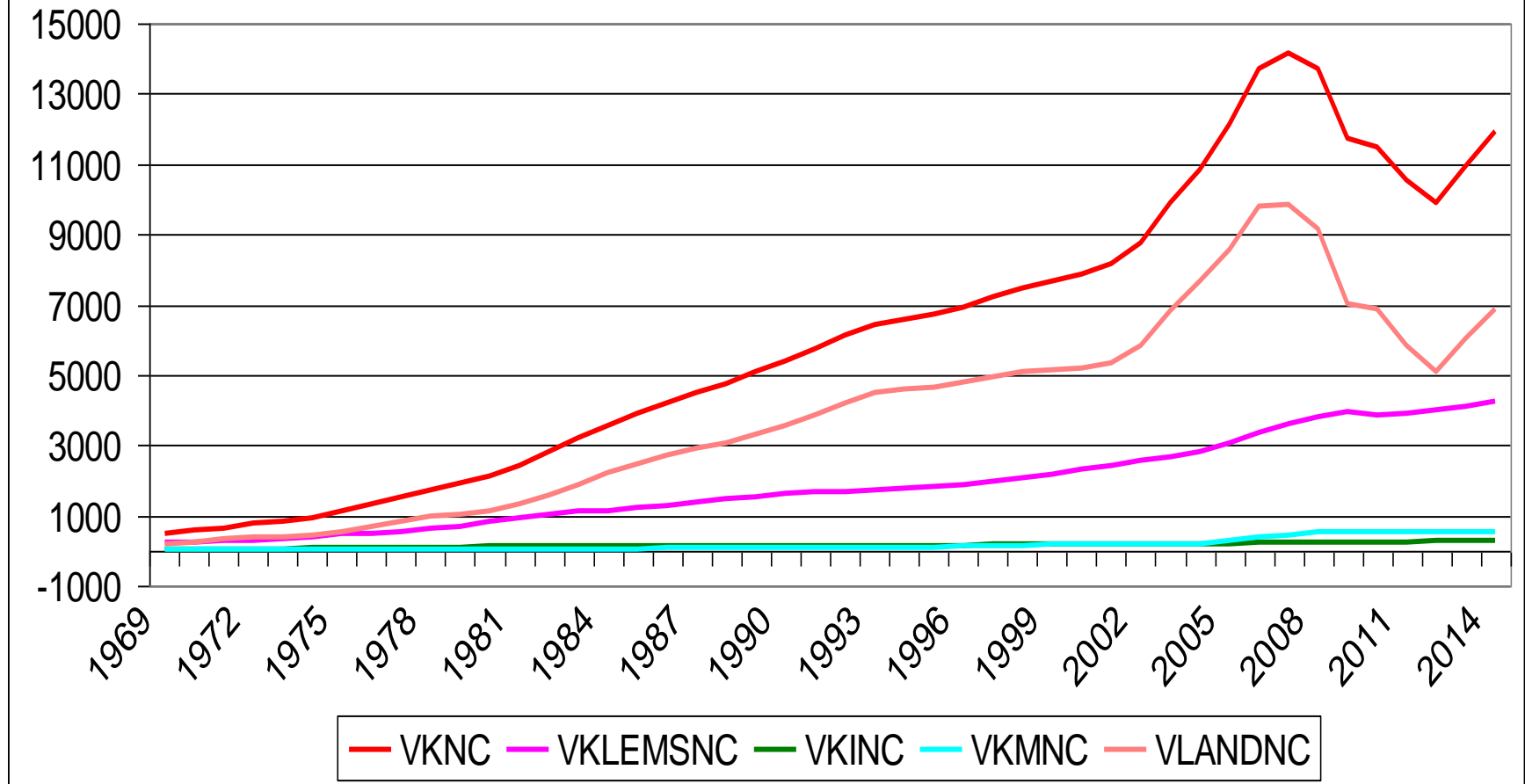
Asset Values

Corporate Sector Asset Values KLEMS Values versus True Values



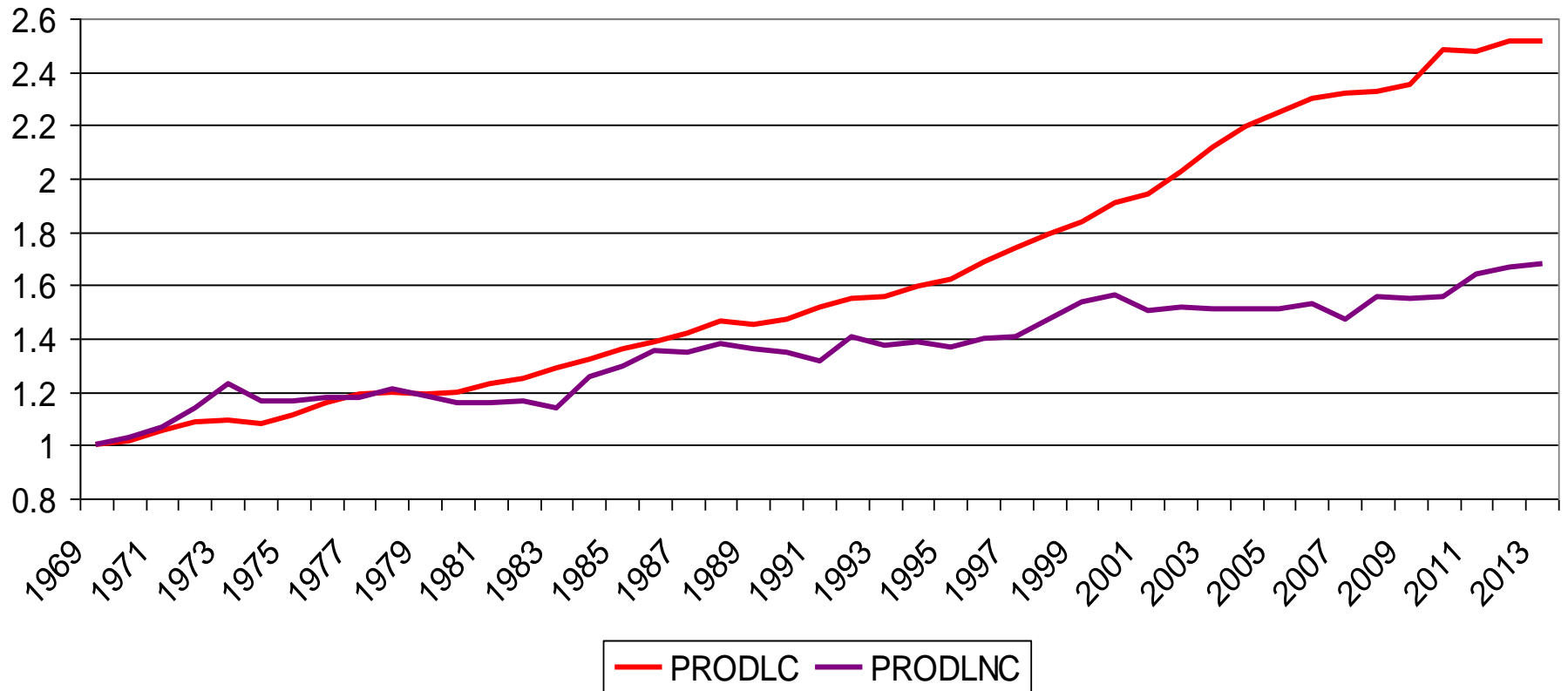
Asset Values

Noncorporate Asset Values: KLEMS versus True Values

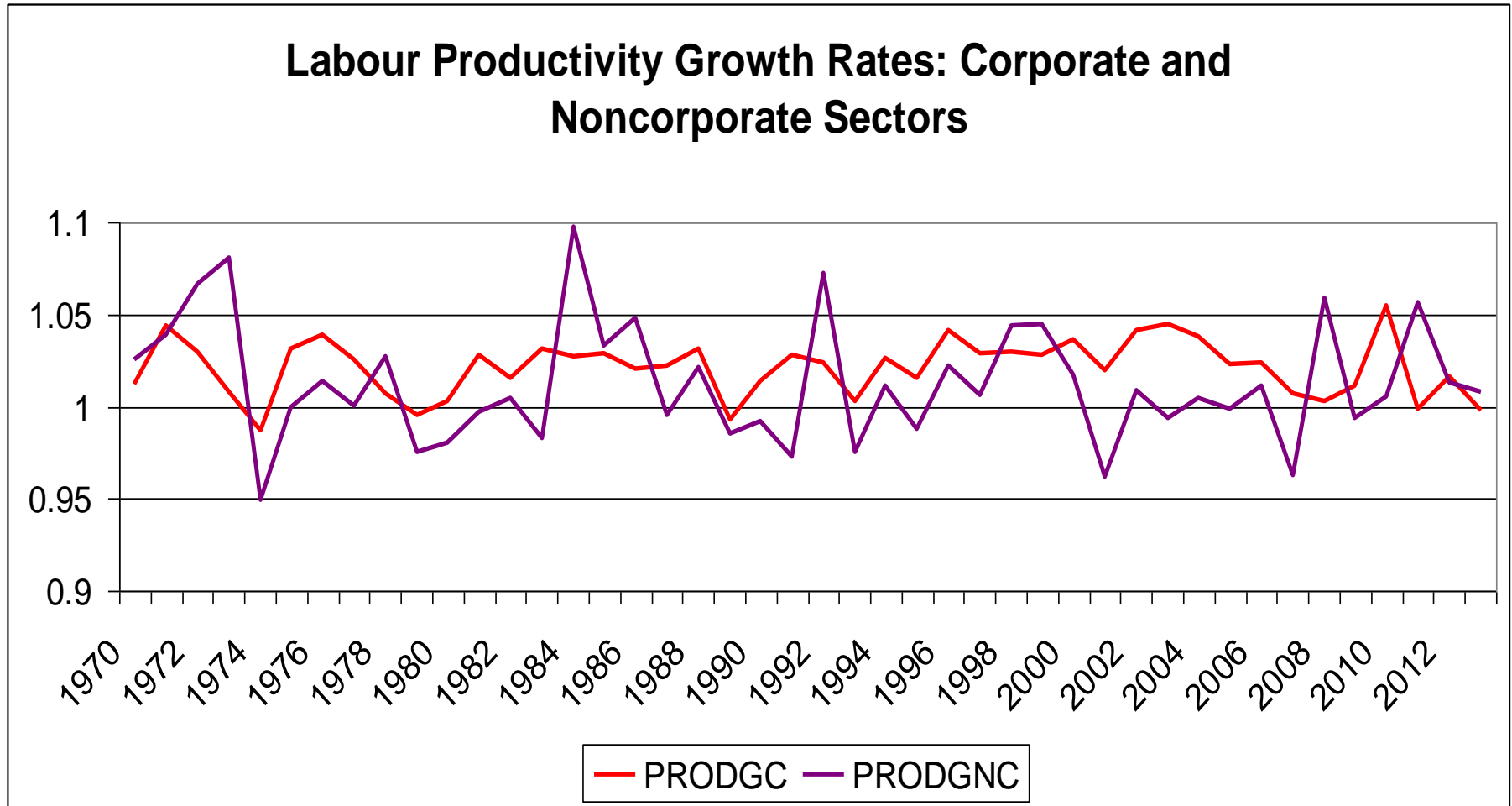


Productivity

Labour Productivity, Corporate and Noncorporate Sectors: Levels



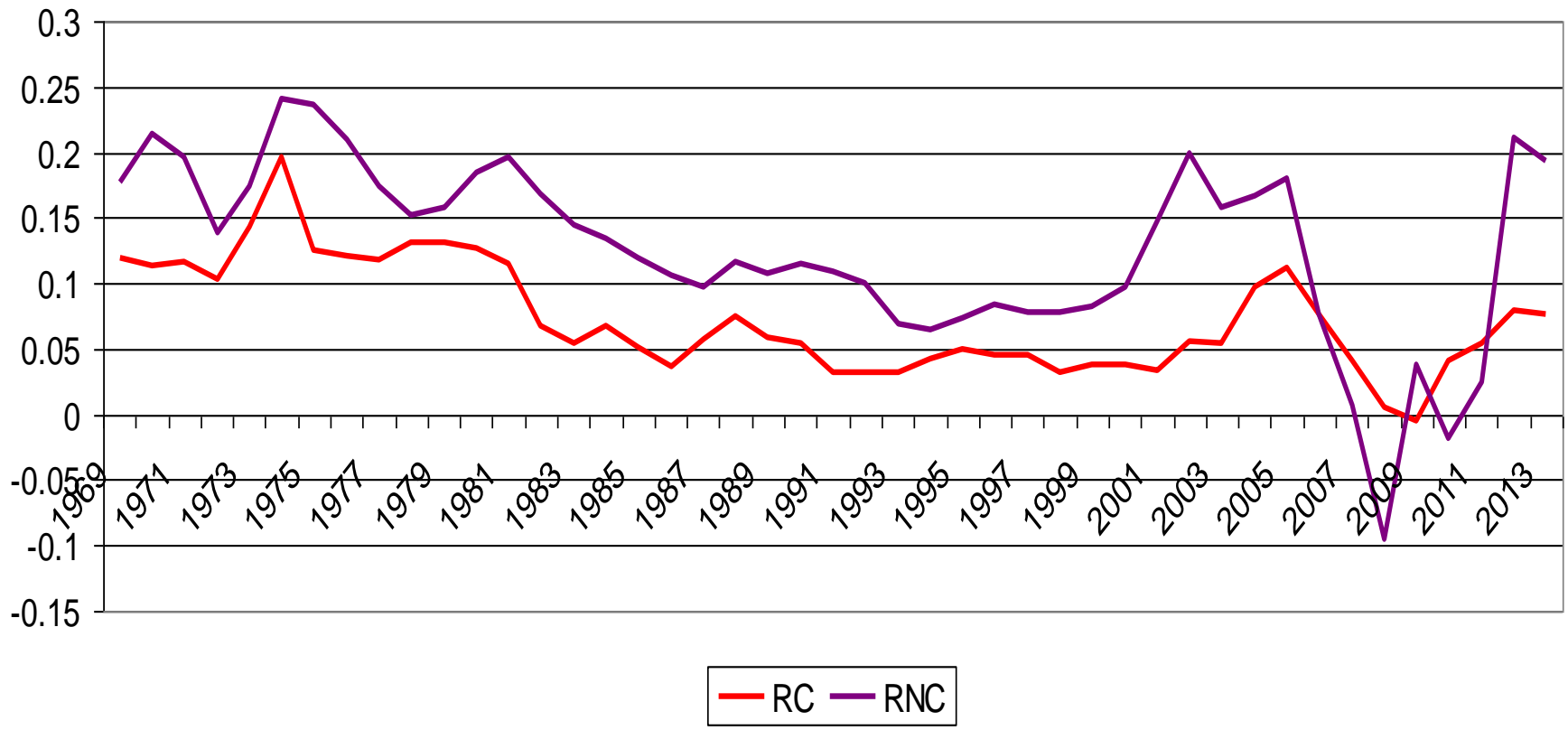
Productivity



Note the tremendous volatility of the noncorporate productivity growth rates. This is almost certainly due to the inclusion of the farm sector.

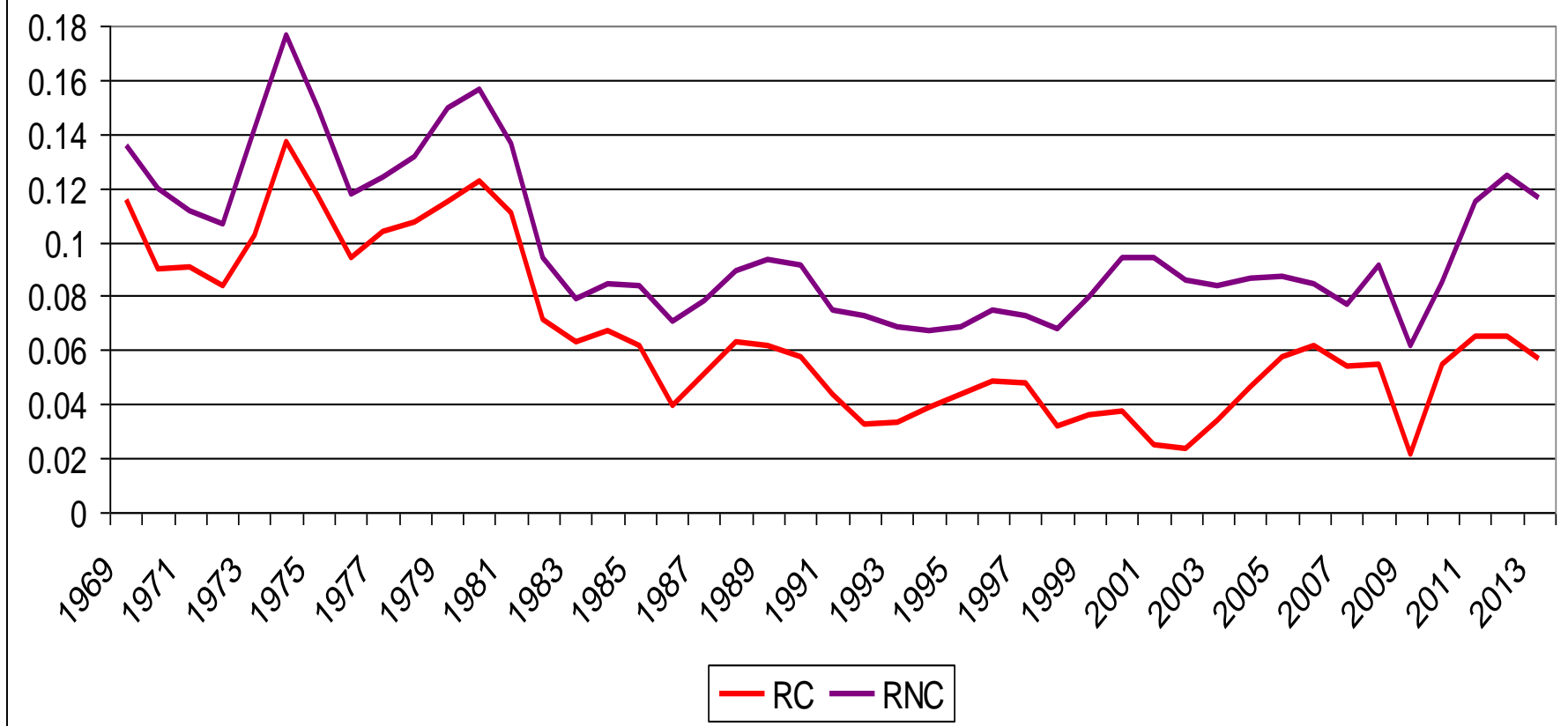
Rates of Return

Before Tax Balancing Rates of Return in the Corporate and Noncorporate Sectors; Ex Post Capital Gains Included



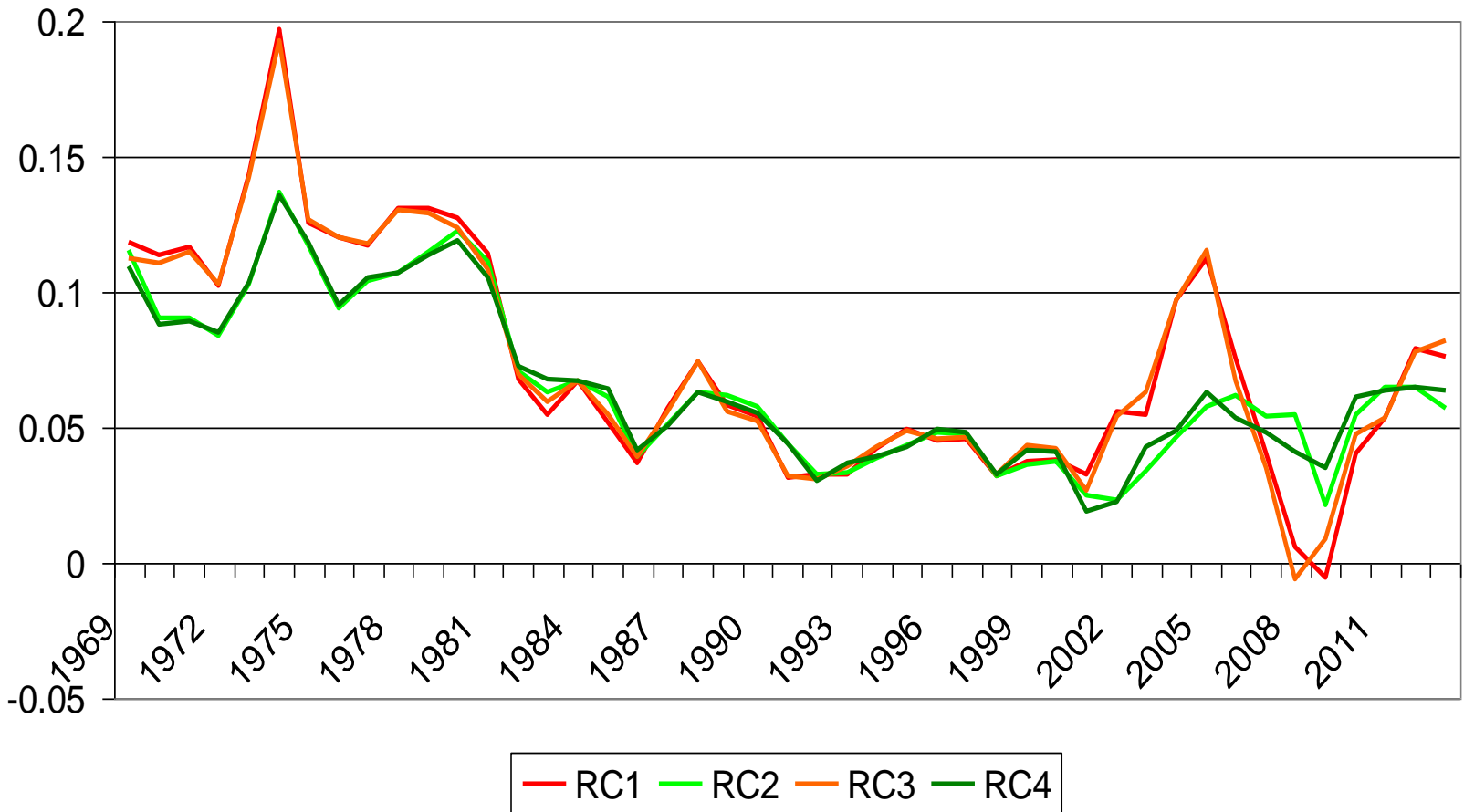
Rates of Return

**Before Tax Balancing Rates of Return for Sectors C and NC:
CPI Inflation Rates Used**

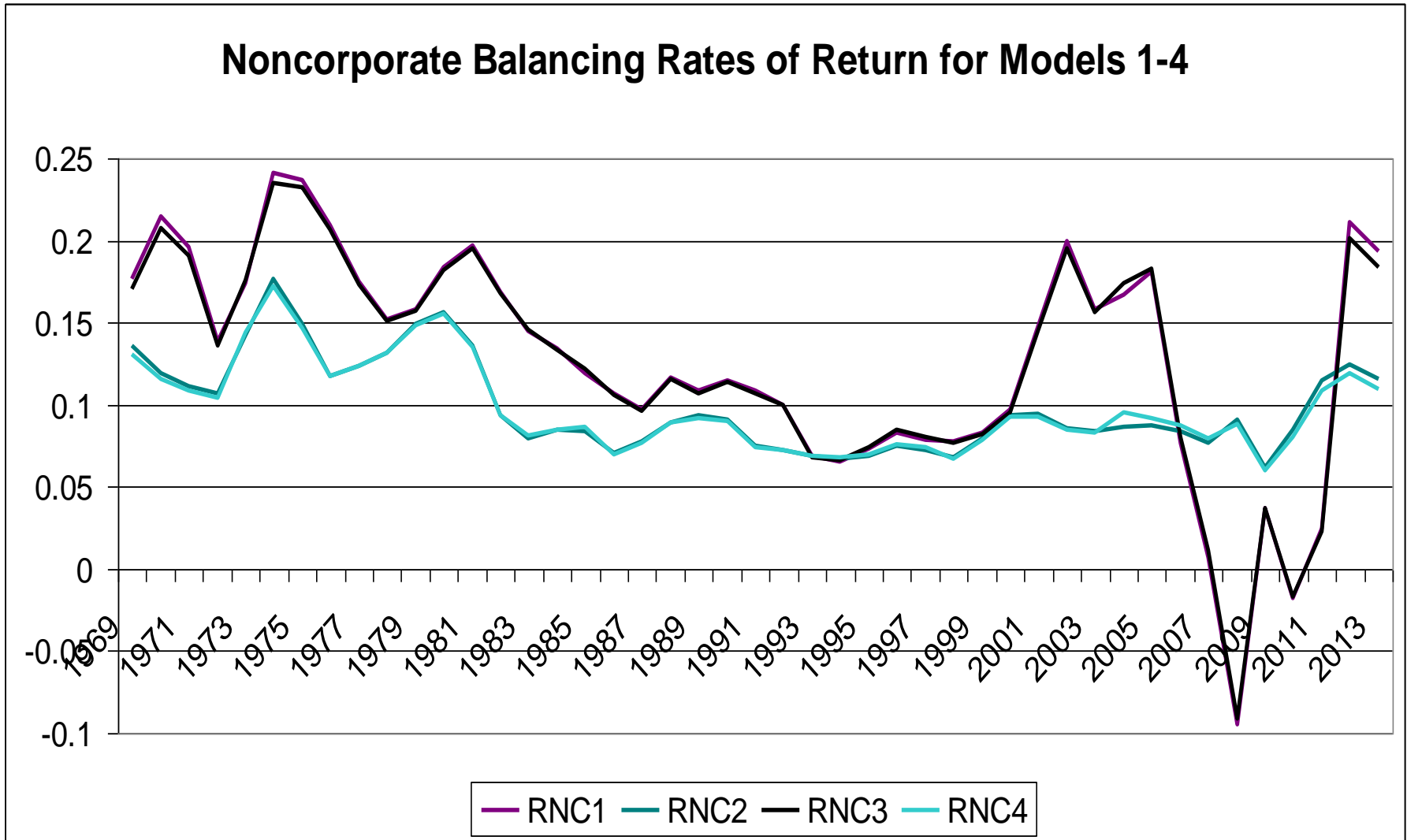


Rates of Return

Corporate Sector Balancing Rates of Return: Models 1-4

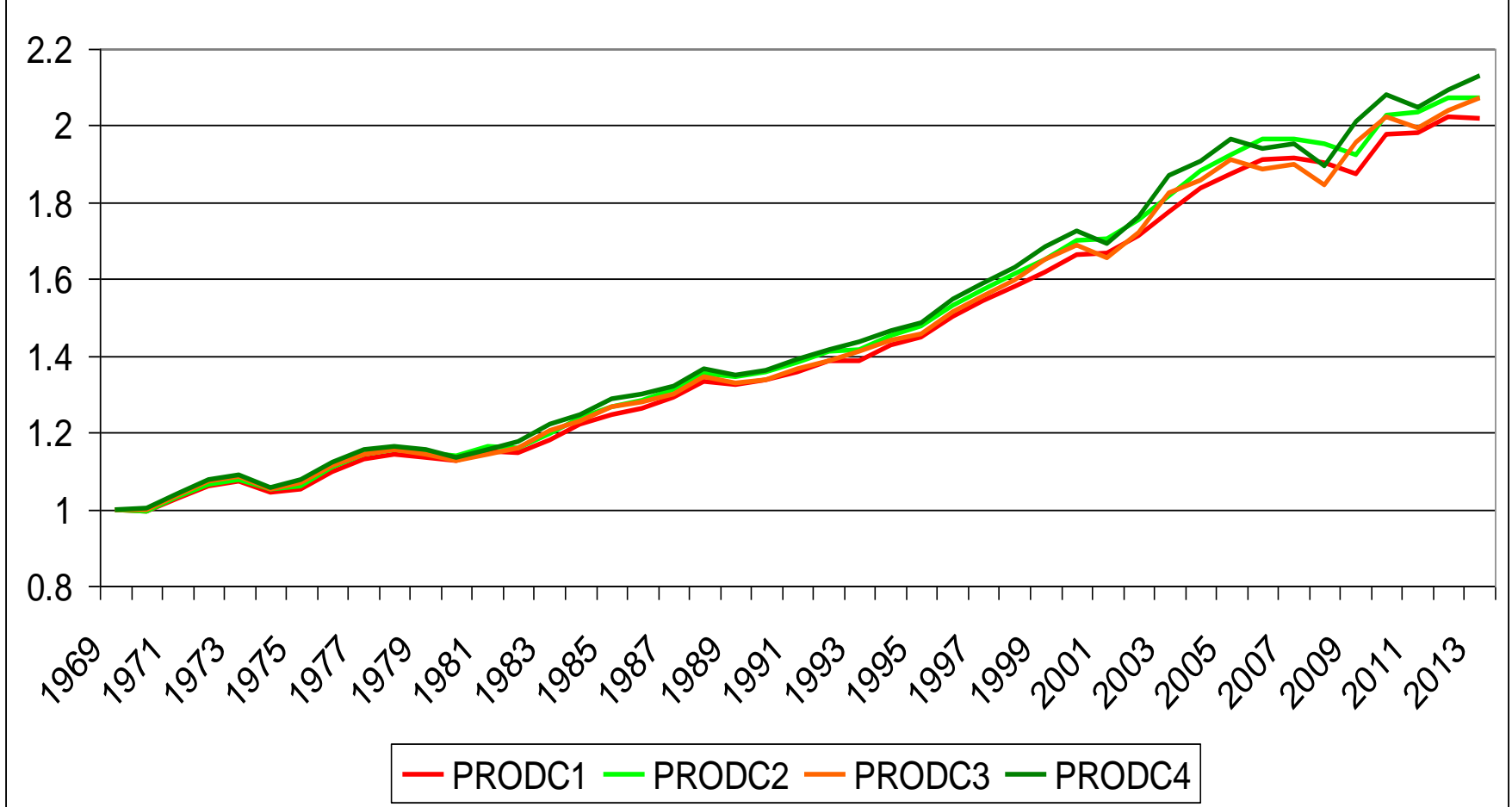


Rates of Return



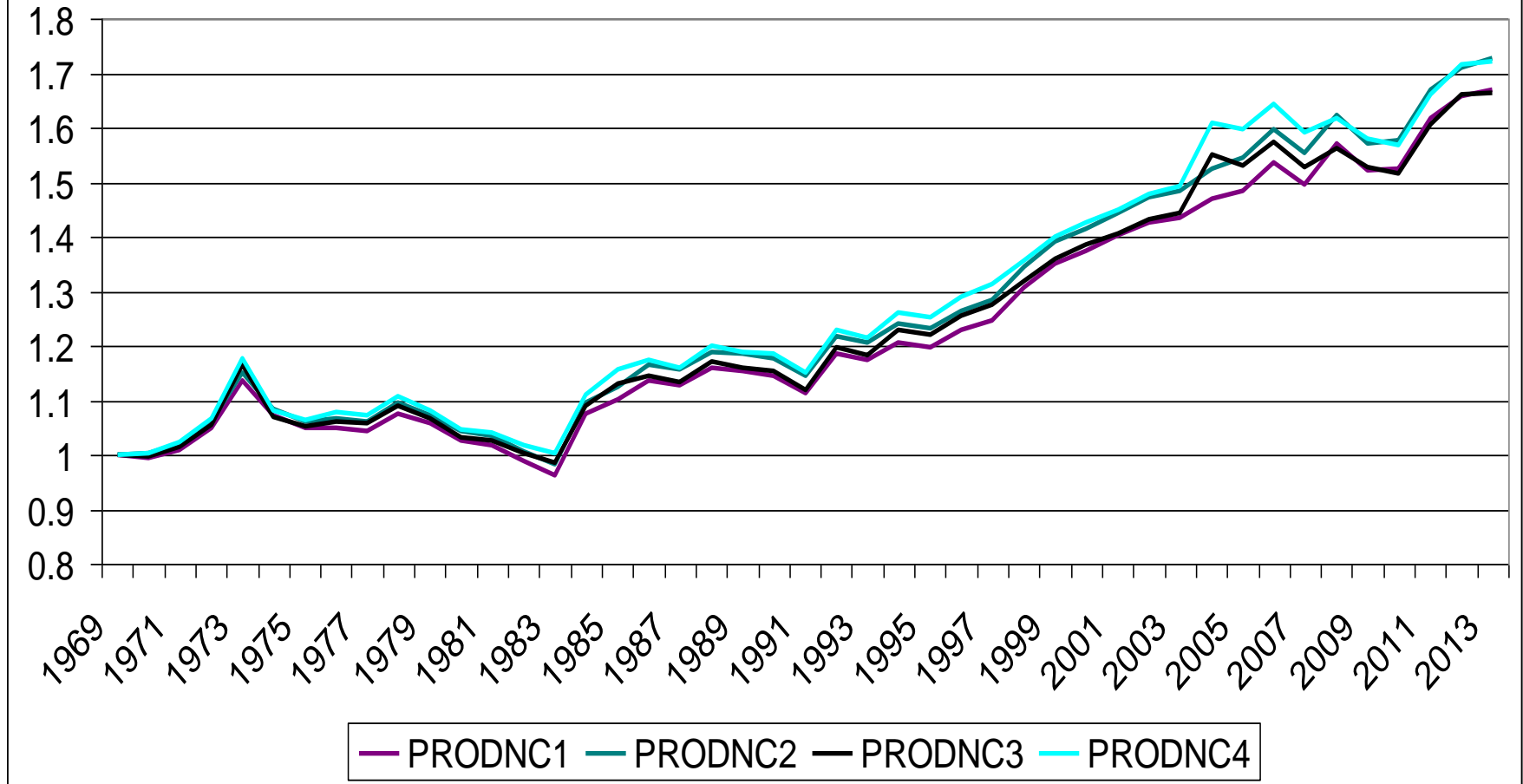
TFP

Corporate Sector Productivity Levels; Models 1-4



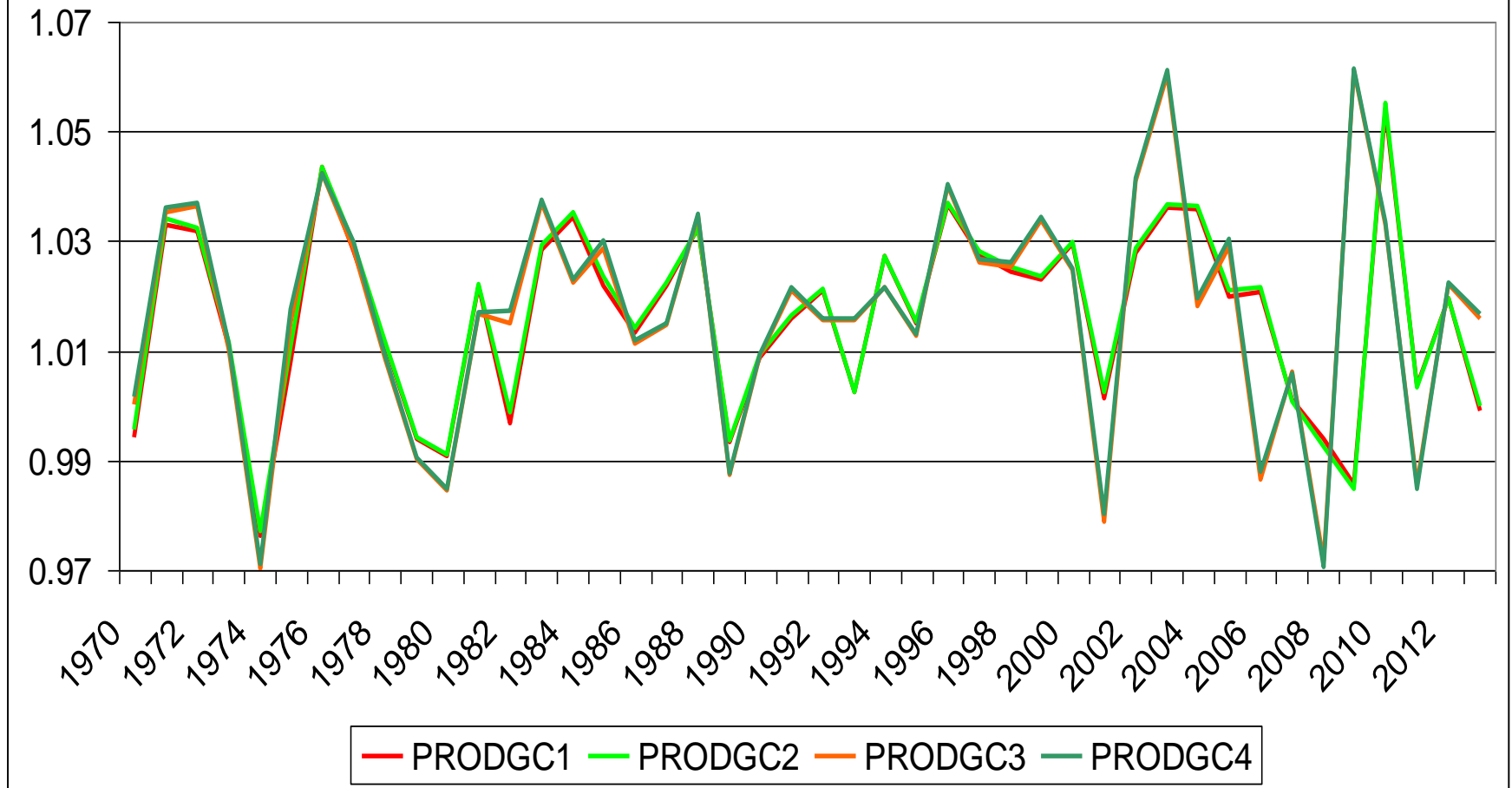
TFP

Noncorporate TFP Levels: Models 1-4



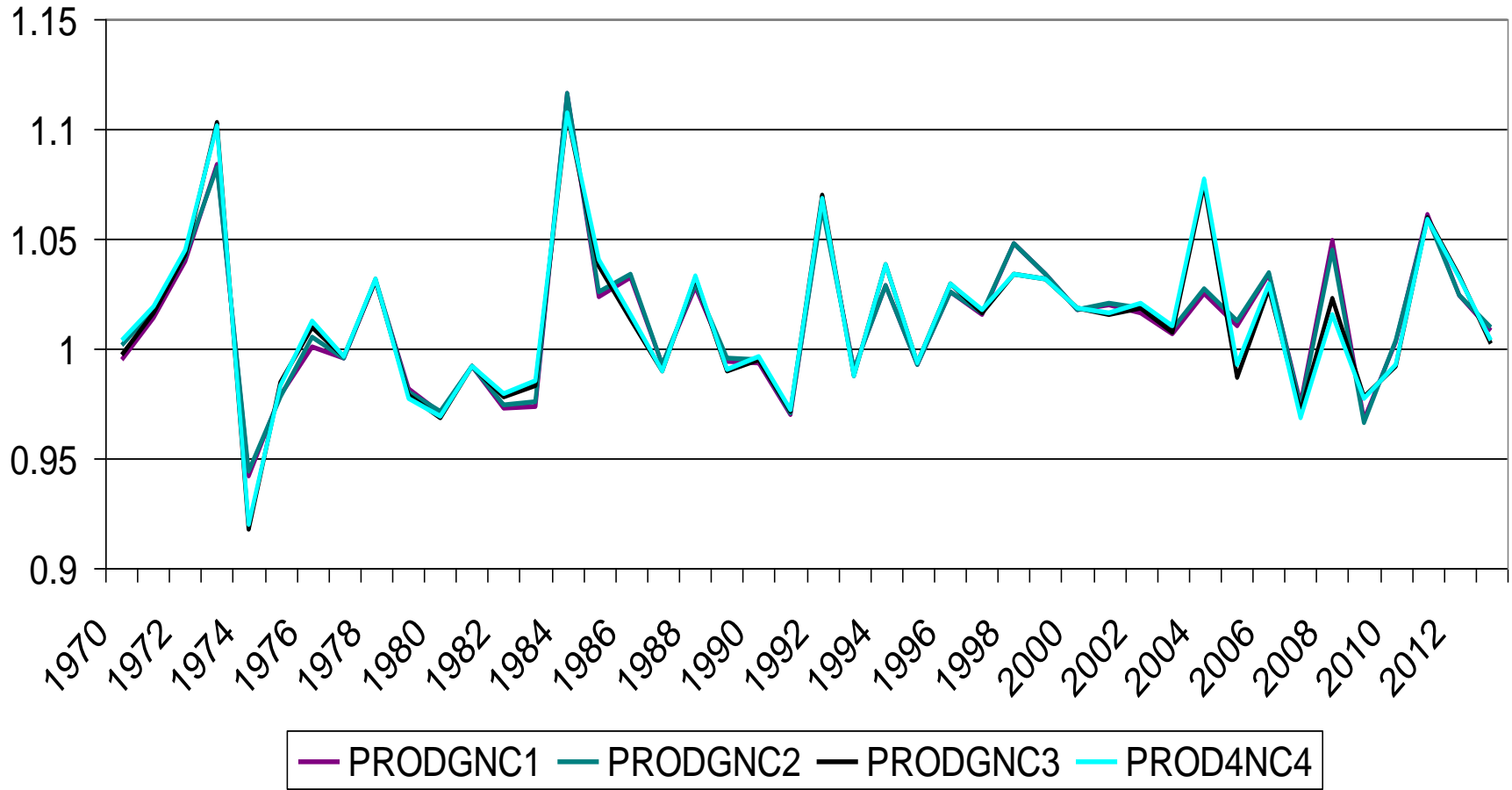
TFP

Corporate TFP Growth Rates: Models 1-4

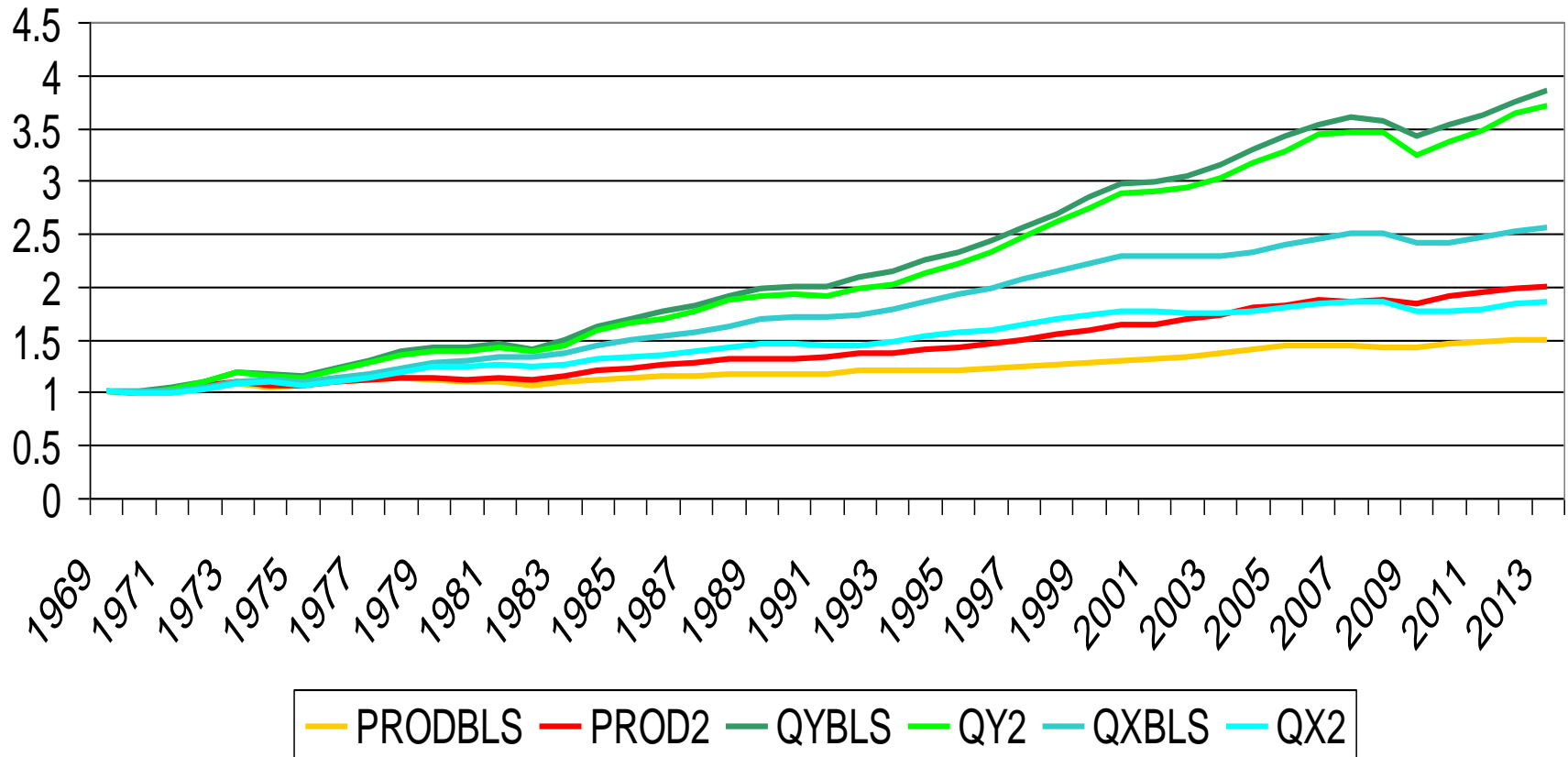


TFP

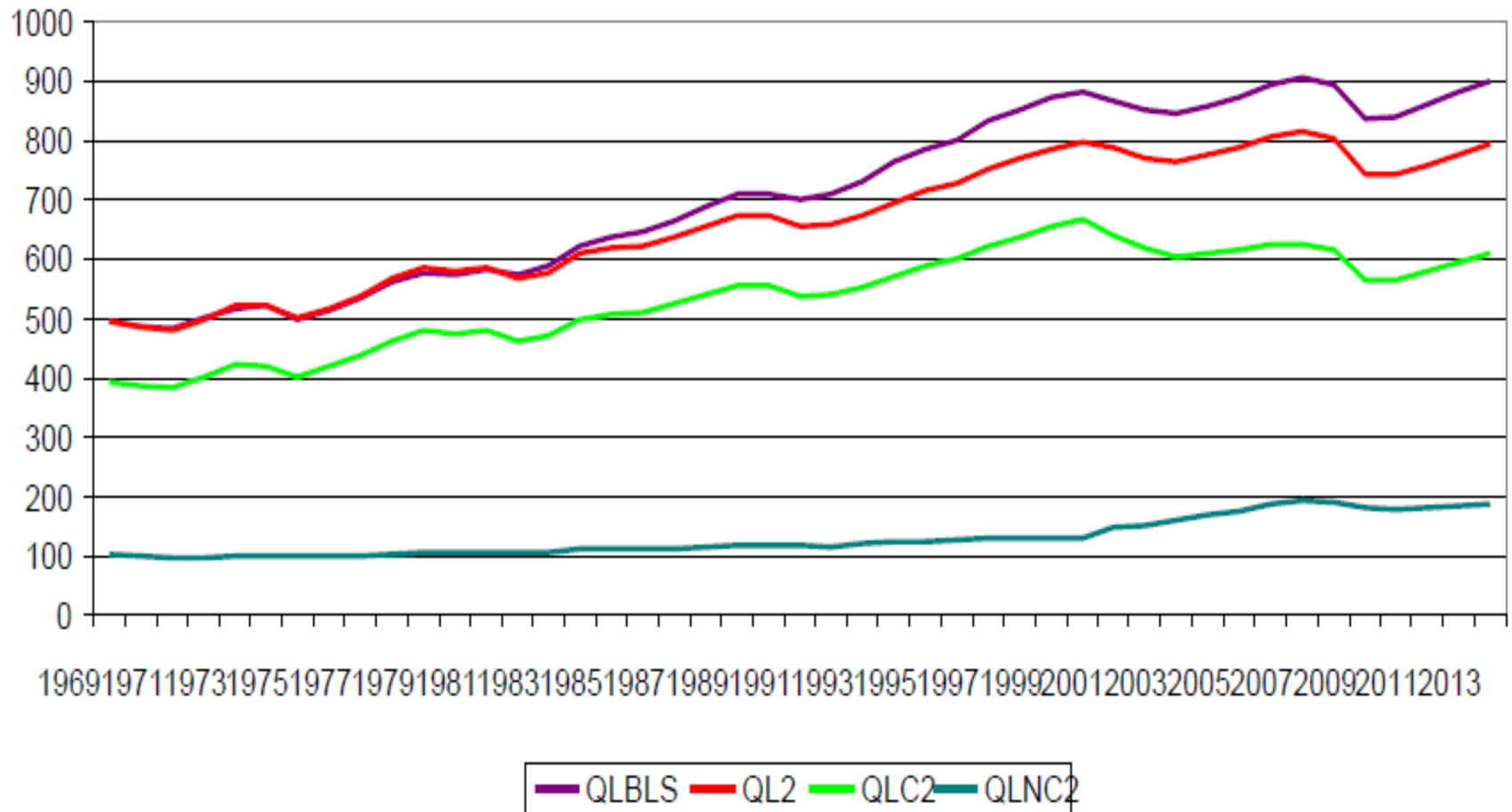
Noncorporate TFP Growth Rates: Models 1-4



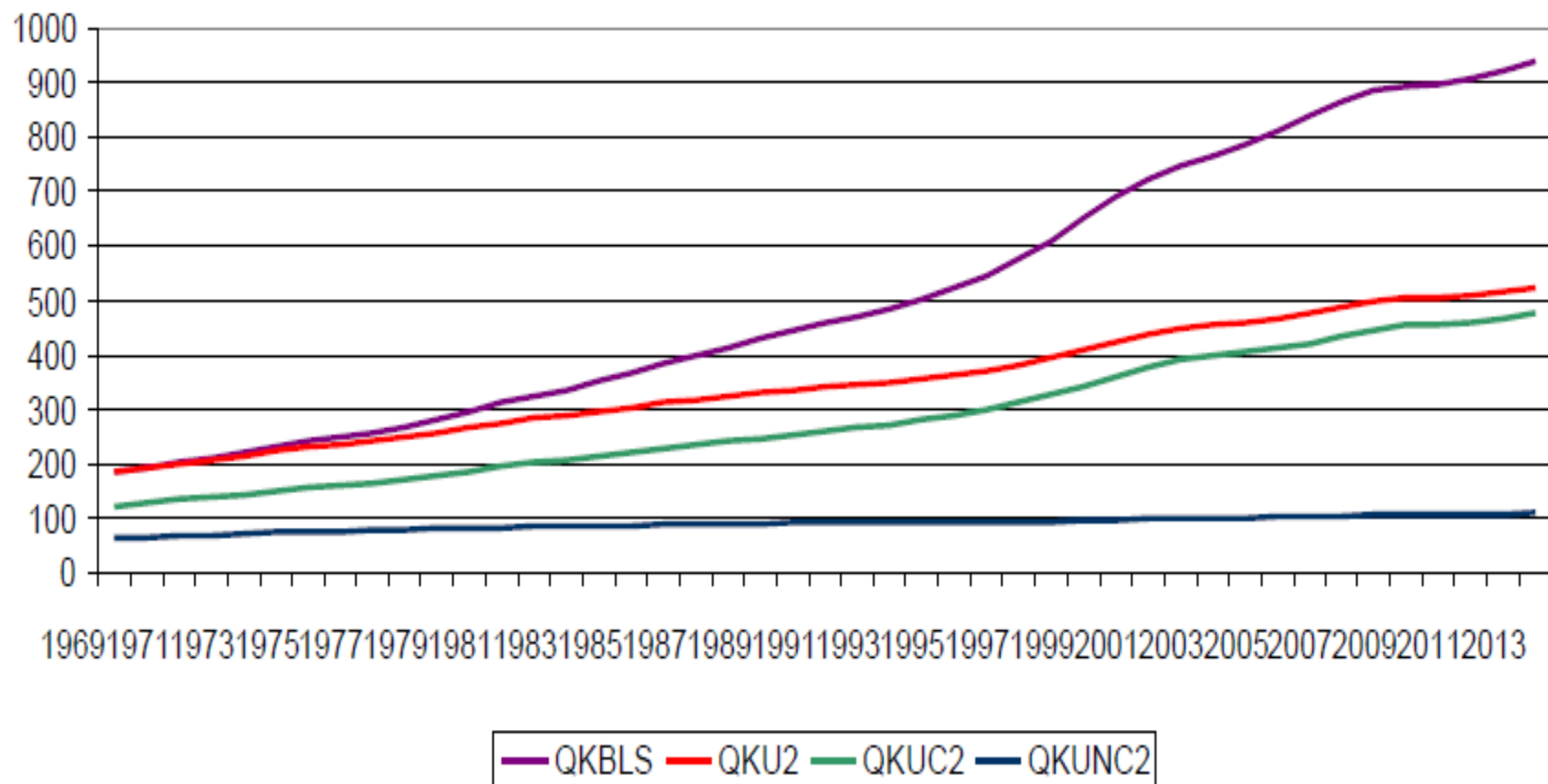
Comparison of BLS Private Sector Productivity, Output and Input for the Private Sector with Model 2 Counterparts



BLS Aggregate Labour Input Compared to our Estimates



BLS Aggregate Capital Services Input Compared to Our Estimates



Conclusion

- Adding monetary balances to the list of assets (and treating these holdings as inventory items) does not change the productivity picture to any great extent.
- However, the missing asset problem with KLEMS is huge: inventories, money holdings and land are all missing from the KLEMS data.
- Omitting these assets greatly changes rates of return and rates of TFP growth.
- The BLS and BEA estimates for the value of land are way too low. This leads to rates of TFP growth that are much lower than the “truth”.
- Putting in ex post rates of asset appreciation will lead to significant changes in capital services growth (not to mention the problem of negative user costs).
- However, it is appropriate to put ex post user costs into the user cost formula if the goal is to obtain ex post rates of return on assets.
- BEA and BLS data are far from being consistent!