Estimating Capital Services in the U.S.: An Empirical Assessment of Implementation Differences

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The framework

Theory of capital services

- Link between assets used in production and value added
- Focus on production and productivity

Guidelines

- OECD Manual: Measuring Capital, 2009
- System of National Accounts 2008, Chapter 20

Calculated by

- Some statistical offices
- In the context of research projects

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Aim of the study

Empirical comparison of different measures of capital services

- **BLS methodology (for integrated production accounts)**
- **Jorgenson, Ho, and Stiroh (2005), consistent with the BEA accounts**

Age-efficiency function as a major conceptual difference

Implementation issues

Structure of the paper

- General outline of method
- Explaining the compared methods
  - BLS Methodology
  - Approach of Jorgenson, Ho, and Stiroh (2005)
- Comparison
- Data and implementation issues
- Results

Measuring capital services

Calculation of productive capital stock

- using the PIM
- Age-efficiency function

Calculation of rental prices

- for each industry x asset cell
- representing the implicit rental cost of using the asset in production

Aggregation

Comparison

- **Methods**
- **Numerical modelling**
- **Empirical results**

Age-efficiency profile

BLS Methodology

Hyperbolic function

$$\lambda(\alpha, \Omega) \begin{cases} \frac{\Omega - \alpha}{\Omega - \beta\alpha} & \alpha < \Omega \\ 0 & otherwise \end{cases}$$

Very flexible form

Assumptions for β

Jorgenson/Ho/Stiroh (2005)

Geometric function

$$K_t = \sum_{\tau=0}^{\infty} (1-\delta)^{\tau} I_{t-1}$$

$$= K_{t-1} (1-\delta) + I_t$$

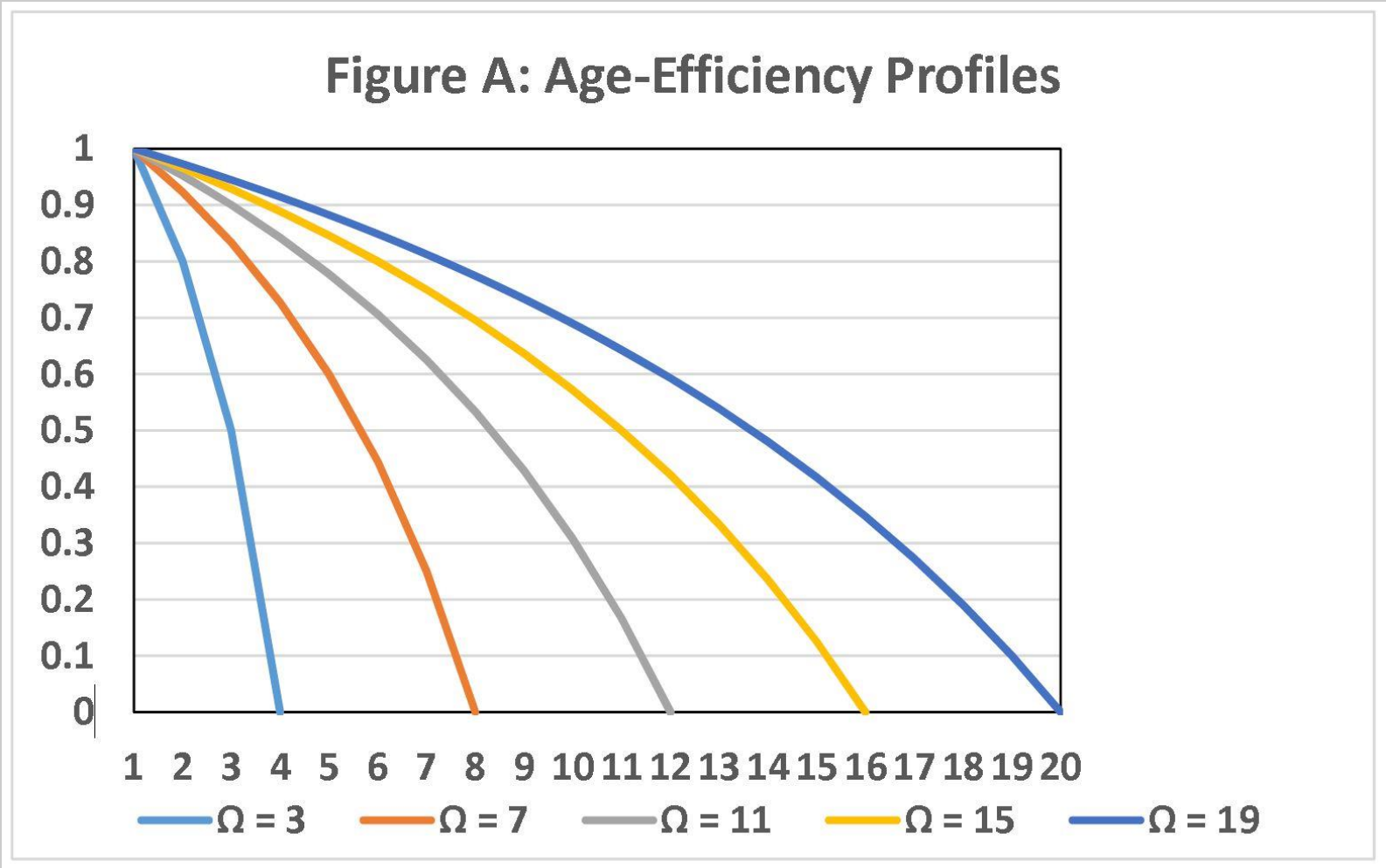

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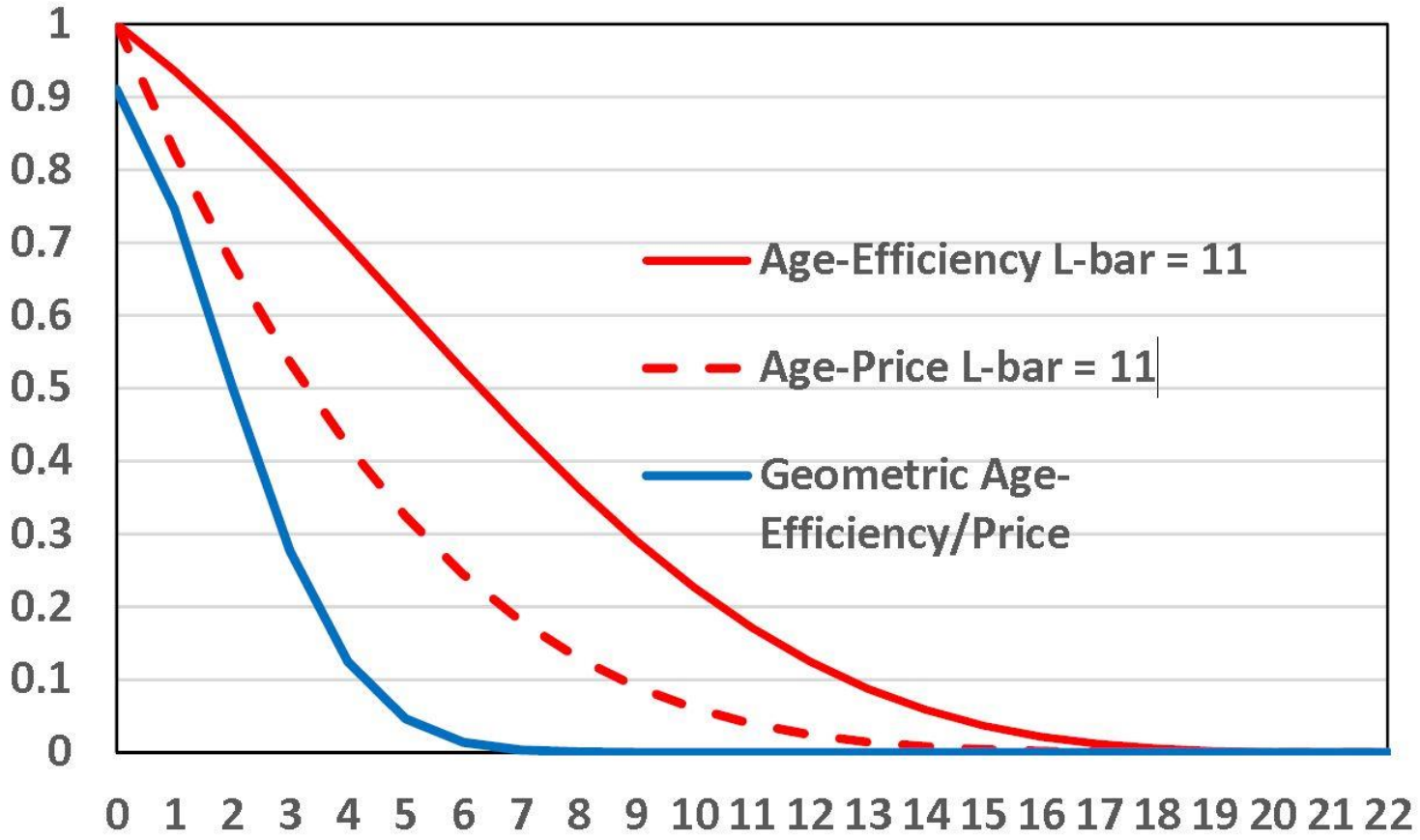
Figure B: Age-Efficiency/Price Functions



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Data and implementation

BEA‘s fixed investment statistics in both approaches

Differences for

- **Equipment**
- **Structures**
- **Intellectual property products**

Others

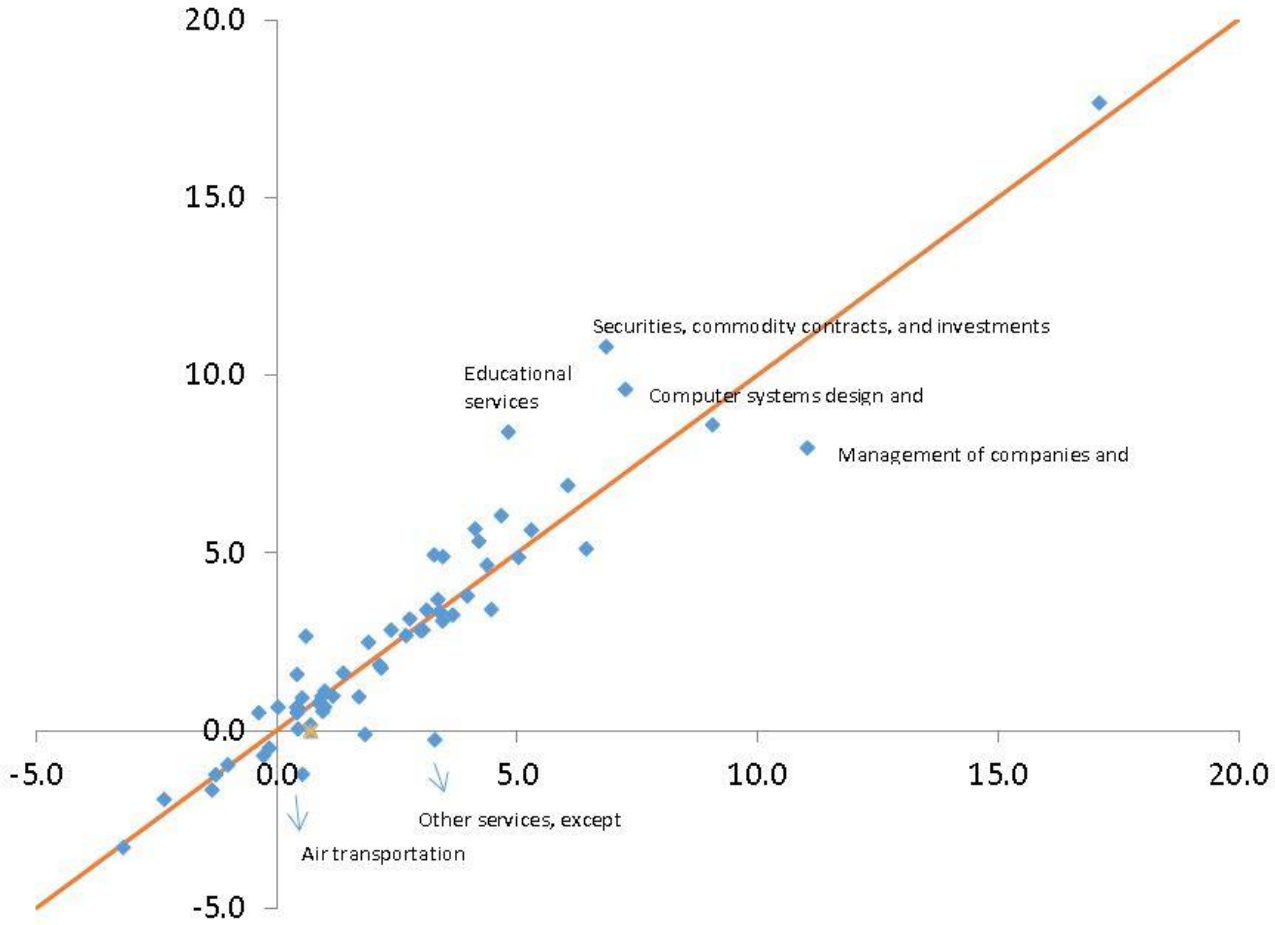
- **Wealth stock**
- **Capital Income**
- **Rates of return**
- **Capital Service Prices**

Table 1: Growth in Aggregate Value-Added and the Sources of Growth
Direct Aggregation across Industries

	1998-2012	1998-2007	2007-2012	2007-2009	2009-2012
Contributions BLS					
Value-Added	1.94	2.71	0.56	-1.69	2.06
Capital Input	1.13	1.51	0.44	0.60	0.34
Labor Input	0.38	0.63	-0.09	-1.38	0.77
College Labor	0.55	0.66	0.35	-0.11	0.66
Non-college Labor	-0.17	-0.02	-0.44	-1.27	0.11
MFP	0.44	0.56	0.21	-0.91	0.96
Contributions JHS					
Value-Added	1.94	2.71	0.56	-1.69	2.06
Capital Input	1.11	1.48	0.45	0.70	0.29
Labor Input	0.38	0.63	-0.09	-1.38	0.77
College Labor	0.55	0.66	0.35	-0.11	0.66
Non-college Labor	-0.17	-0.02	-0.44	-1.27	0.11
MFP	0.45	0.59	0.20	-1.01	1.01

Notes: Average annual percentages. Aggregate value added growth is the aggregate of share weighed industry value added growth. The contribution is the domar-weighted industry contributions.

Figure 1: Capital Input Growth Rates 1998-2012: JHS versus BLS



Results

Generated growth rates are very similar

Differences in some industries

- **Due to differences in the estimates of capital composition**
- **And due to implementation choices)**

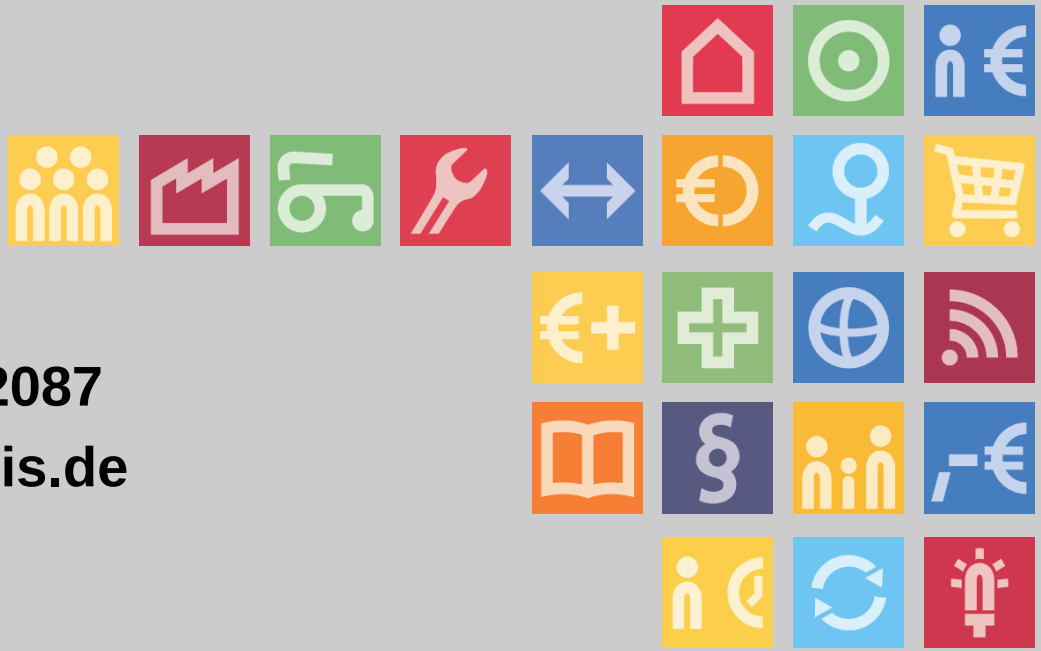
Comments/question to the authors

Structure of the paper ok

Explanation for similar growth rates?

BEA DJA BLS JHS?

Thanks for your attention!



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