



NATIONAL RESEARCH
UNIVERSITY

XXI

APRIL
INTERNATIONAL
ACADEMIC CONFERENCE

Session A-52. Economics of Income and
Wealth

**THE CONTRIBUTION OF
INTANGIBLE ASSETS TO THE
GROWTH OF SECTORS OF THE
RUSSIAN ECONOMY
OR WHAT INNOVATIONS ARE ACTIVE?**

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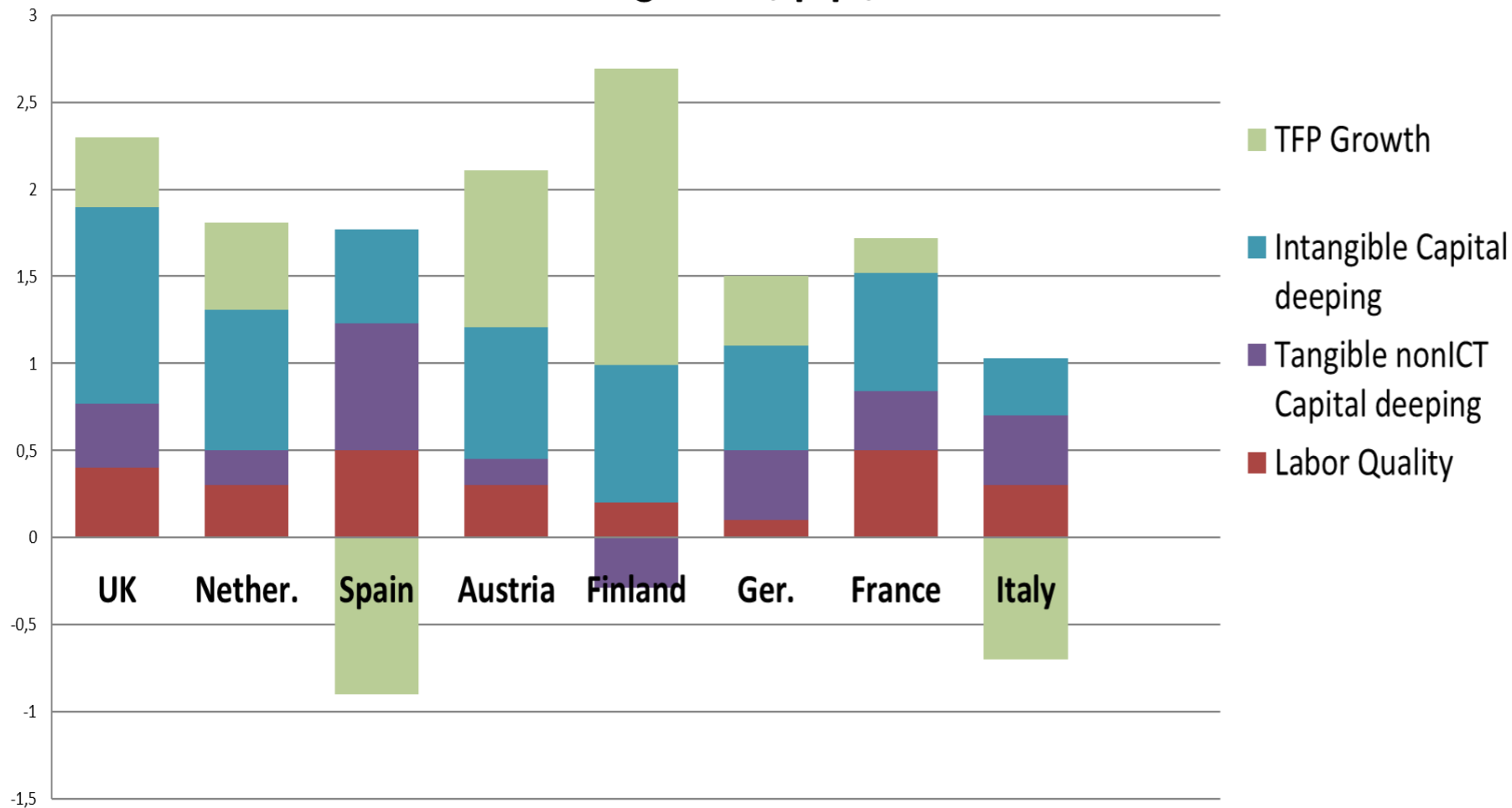
Moscow, 2020



WHAT IS THE ROLE OF INTANGIBLE ASSETS IN ECONOMIC GROWTH?

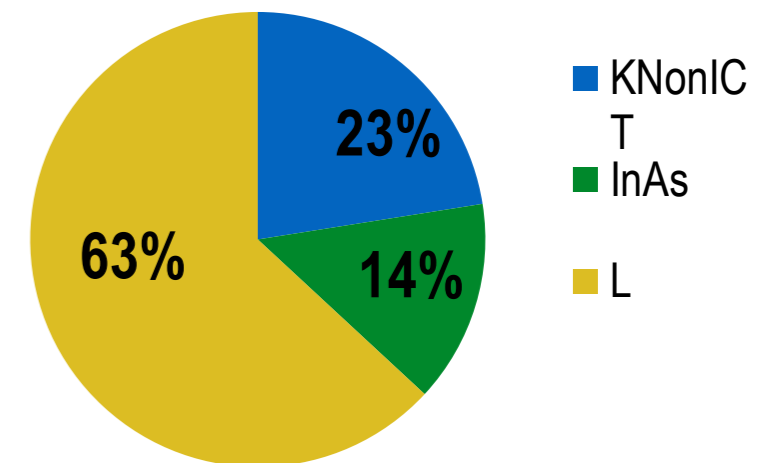
THE ROLE OF INTANGIBLE ASSETS IN THE WORLD

Labor productivity decomposition for business sector EU countries growth, p.p., 1995-2009



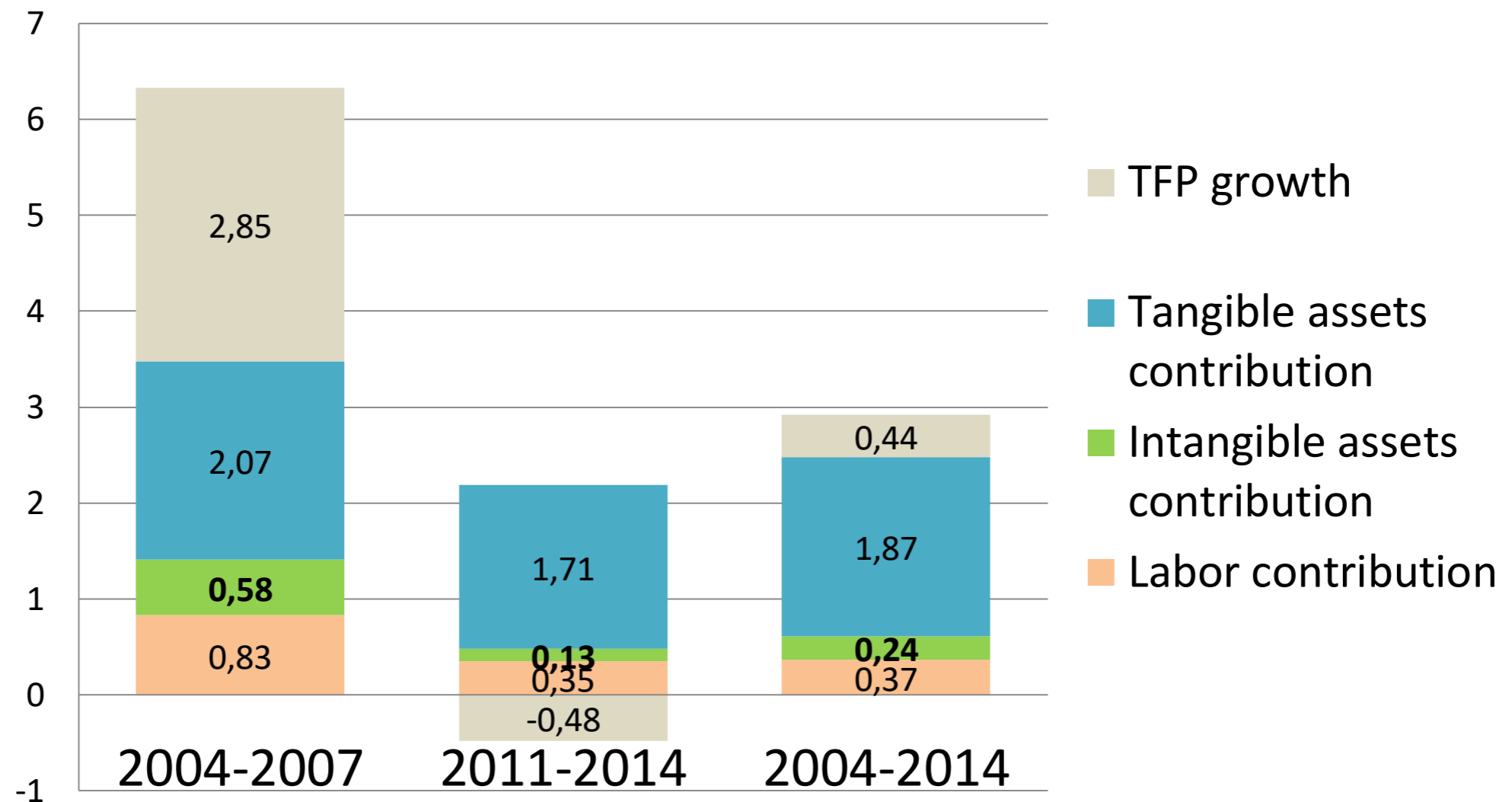
Source: Corrado et al, 2014

Factor shares in Value Added for the Market Sector of 10 EU countries, 1998-2007, %



Source: Corrado et al, 2017

THE ROLE OF INTANGIBLE ASSETS IN RUSSIA



Source: author's calculation based on Russia KLEMS



KEY POINTS

- **Industry structure of capital services contribution related to intangible assets to growth of Russia economy.**
- **Comparison the industry structure of growth contribution of capital services related to intangible assets in Russia and the OECD countries.**
- **What kind of intangibles drive each economic sector?**



KEY RESULTS

- **The contribution of intangibles to average value added growth to be higher in market services than in manufacturing in Russia.**
- **In OECD countries intangible assets participate more evenly in services and manufacturing.**
- **The common between Russia and the OECD is that research and development are important in manufacturing, and intangible assets not related to R&D are more important in the service sector.**
- **The role of research and development in Russia is much lower than in OECD economies.**



WHAT INTANGIBLES WE OBSERVED

Asset type	Included in System of National Account
1. Basic intangible assets (Investments in computerized information, including software and computerized databases; Mineral Resource Exploration and Assessment Results; Entertainment and artistic originals)	Yes
2. Research and Development	Since 2008, missing from published data
3. New product development	No
4. New architectural and engineering designs, advertising, marketing research and purchased organizational capital	No

INDUSTRY GROUPS

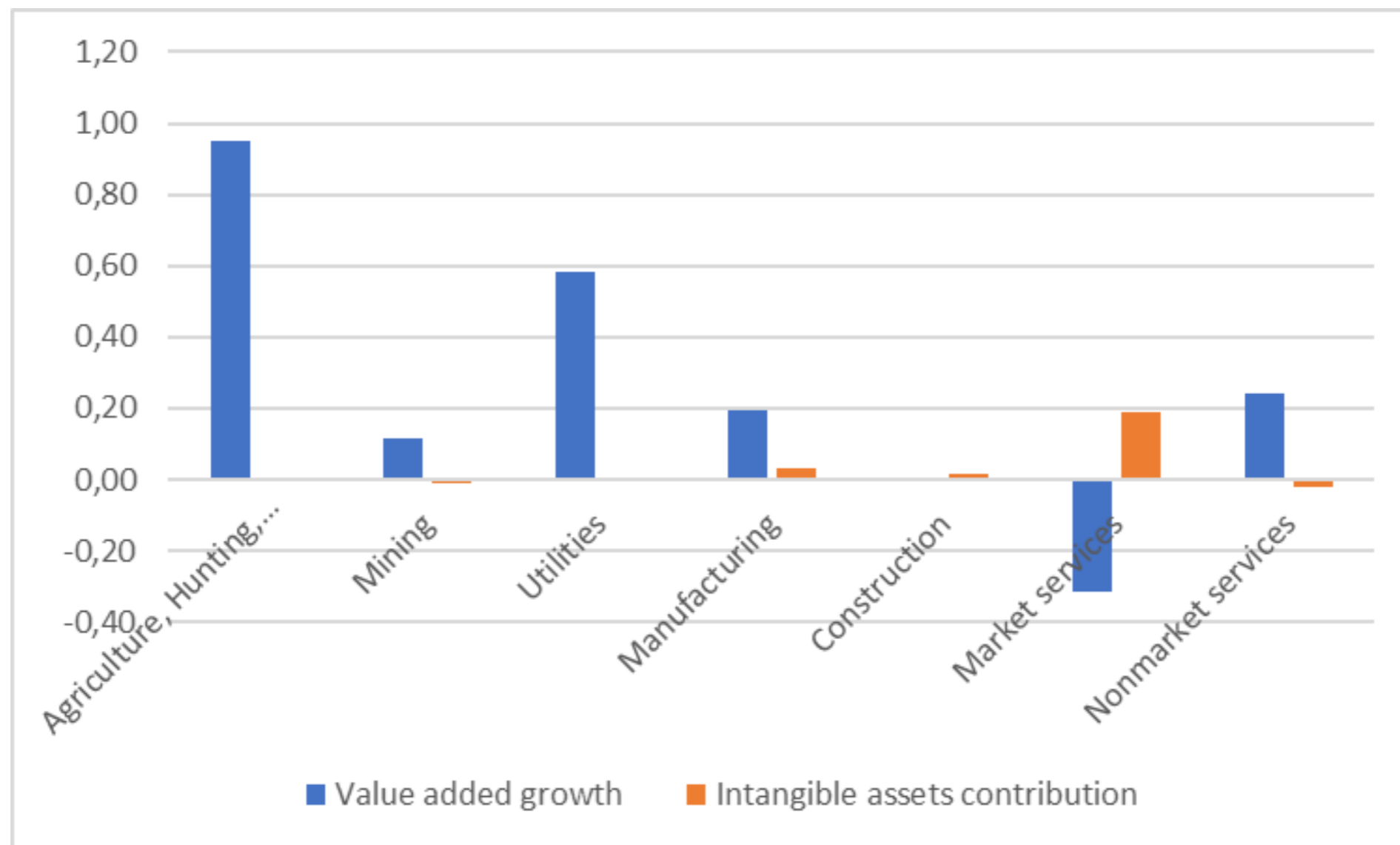
N.	Using in work	OKVED code OK 029-2007 (NACE Rev. 1.1)
1.	Agriculture, Hunting, forestry and Fishing	A B
2.	Mining	C
3.	Utilities	E
4.	Manufacturing	D
5.	Construction	F
6.	Market services	G H I J
7.	Nonmarket services	L M N O

INTANGIBLE INVESTMENT AND VALUE ADDED SHARES BY INDUSTRIES OF RUSSIA IN 2010-2016, %

	Intangible Investment by industry (average %)	Intangible Investment by industry (GDP average %)	Value added share (average %)
Agriculture, Hunting, Forestry and Fishing	0,6	0,03	3,4
Mining	4,3	0,21	7,8
Utilities	2,2	0,11	2,8
Manufacturing	17,1	0,82	12,0
Construction	3,0	0,14	5,7
Market services	63,4	3,04	47,3
Nonmarket services	9,5	0,45	20,9

Source: author`s calculations

VALUE ADDED GROWTH AND INTANGIBLE ASSETS CONTRIBUTION BY INDUSTRIES OF RUSSIA IN 2010-2016, P.P.



Source: author`s calculations

CONTRIBUTION OF INTANGIBLE ASSETS BY TYPE

Market Services	Share	Growth rate
R&D	0,04	-6,82
DesighnAdvMarRes	0,16	8,47
New FinProduct	0,08	7,02
Basic intangibles	0,01	12,15
Manufacturing		
R&D	0,01	18,76
DesighnAdvMarRes	0,11	1,80
New FinProduct	0,01	3,63
Basic intangibles	0,00	5,25

Source: author`s calculations

LITERATURE: ROLE OF INTANGIBLES

Early approach - evaluation of information and communication capital and the omission of other intangibles (due to lack of data about them)

- Brynjolfsson, E. et al (2000, 2002 etc)
- Basu, S. et al (2004 etc)
- Further, R & D was used as a proxy variable for all intangible assets (Acharya, R., 2016)

Corrado, C., C. Hulten and D. Sichel approach:

developed a simple three-sector model that identifies production functions for consumer goods, common investment goods and intangible assets

- measured an expanded list of intangible assets at the aggregate level in the US economy
- identified three integrated categories of intangible assets (computerized information, innovative property, including R & D, economic competence) and proposed methods for their accounting

THE EMPIRICAL BASIS (FIRST APPROACH)

Russia KLEMS (www.worldklems.net)

- VA-based
- 34 species of NACE activities
- 1995-2014

The system of indicators of growth rates of gross output / value added

- Decomposition of gross output using the "Cost-Release" tables
- Simplified decomposition using value added

It is possible to present the rates of GDP growth in the form of the amount of sectoral contributions

- factors of production
- effect of reducing real costs per unit of output - multifactor productivity (MFP)

Includes data on capital services

- ICT-capital (Computing equipment, Communication equipment, Software)

THEORETICAL FRAMEWORK

- Growth accounting methodology (Jorgenson, Ho and Stiroh 2005)

$$Y_j = f_j (X_j, K_j, L_j, T)$$

$$\Delta \ln A_j^Y \equiv \Delta \ln Y_j - \bar{v}_{X,j}^Y \Delta \ln X_j - \bar{v}_{K,j}^Y \Delta \ln K_j - \bar{v}_{L,j}^Y \Delta \ln L_j$$

$$\Delta \ln K_j = \sum_k \bar{v}_{k,j}^K \Delta \ln K_{k,j}$$

$$v_{k,j}^K = \frac{p_{k,j}^K K_{k,j}}{p_j^K K_j}$$

$$v_{X,j}^Y = \frac{p_j^X X_j}{p_j^Y Y_j}$$

$$v_{L,j}^Y = \frac{p_j^L L_j}{p_j^Y Y_j}$$

$$v_{K,j}^Y = \frac{p_j^K K_j}{p_j^Y Y_j}$$

THEORETICAL FRAMEWORK

- Measurement of capital input based on the perpetual inventory method (PIM) with geometric depreciation profiles for each individual asset

$$S_{k,T} = \sum_{t=0}^{\infty} \delta_{k,t} I_{k,T-t}$$

$$S_{k,T} = \sum_{t=0}^{\infty} (1 - \delta_k)^{t-1} I_{k,T-t} = S_{k,T-1}(1 - \delta_k) + I_{k,T}$$

$$p_{k,t}^K = p_{k,t-1}^I i_t + \delta_k p_{k,t}^I - (p_{k,t}^I - p_{k,t-1}^I)$$

$$i_{j,t} = \frac{p_{j,t}^K K_{j,t} + \sum_k (p_{k,j,t}^I - p_{k,j,t-1}^I) S_{k,j,t} - \sum_k p_{k,j,t}^I \delta_{k,j} S_{k,j,t}}{\sum_k p_{k,j,t-1}^I S_{k,j,t}}$$



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THANK YOU FOR ATTENTION

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