RUSSIA KLEMS

НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ

SNA 2025 and new opportunities for cross-country productivity comparisons using Russia KLEMS data

Voskoboynikov Ilya B.,
Center for Productivity Studies,
Expert Institute of the National Research University Higher School of Economics

Prospects for the development of statistics: the role of international projects, “Development of CIS statistics”,
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Outline

1. **Productivity in the SNA context**
2. **SNA 2025 and capital services (Chapter 17)**
3. **World KLEMS Initiative in Russia**
4. **Experience in constructing a capital services indicator within the Russia KLEMS framework**
5. **The slowdown in Russian economic growth in the 2010s as a result of productivity stagnation in the capital-intensive expanded oil and gas complex**
6. **Conclusion: CIS KLEMS?**

1. Productivity in the context of SNA indicators

Output measure	Factors of production			
	Labor (L)	Capital (K)	Labor and capital (KL)	Capital, labor and intermediate inputs (KLEMS)
Gross output	**Labor productivity based on gross output (GOLP)**	Capital productivity based on gross output (GOKP)	Capital-labor multifactor productivity based on gross output (GOKLP)	**Total factor productivity based on gross output (GOMFP)**
Value added	**Labor productivity based on value added (VALP)**	Capital productivity based on value added (VAKP)	Capital-labor multifactor productivity based on value added (VAKLP)	**Total factor productivity based on value added (VAMFP)**
	Single factor (individual) productivity measures		Multifactor (aggregate) productivity measures	

Source: Paul Schreyer, 2001, *OECD Productivity Manual: A Guide to the Measurement of Industry-Level and Aggregate Productivity Growth*

KLEMS and SNA 2025

- Capital expenditures. The indicator is based on the concept of capital services (Chapter 17 of the 2025 SNA; Chapter 20 of the 2008 SNA)
- (Jorgenson, Schreyer 2013) – on the integration of capital services into the 2008 SNA system of accounts
- The concept of capital services
  - The product of the number of hours worked by an asset and the market value of its rent
  - Calculation: weighted average growth rates of fixed capital stock by type of asset. Weights depend on the rate of return, inflation and economic depreciation.

4. Construction of capital services in the Russia KLEMS system

1. **Capital as a factor of production**

2. **How to evaluate the contribution of capital to growth**

   * Capital stocks
   * Capital services

3. **The Role of Capital in Russian Economic Growth**

4. **General problems of assessing capital dynamics**

   * Inertia of the Perpetual Inventory Method (PIM)
   * Low quality of primary statistics with direct observation of discards

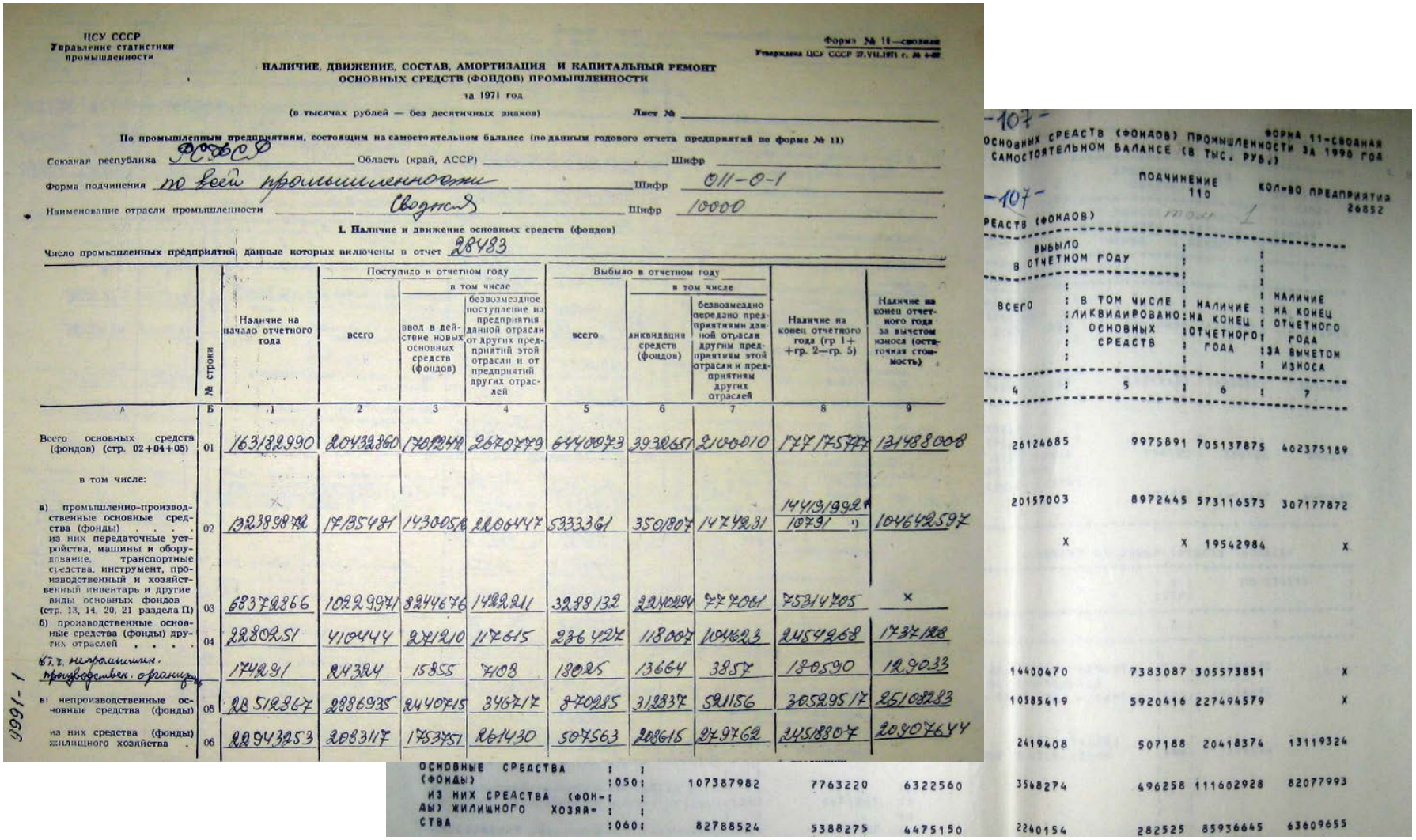
5. **Capital evaluation problems specific to Russia**

6. **Russia KLEMS Approach**

*** Base year**
*** Investments in current prices (GFCF) by type of asset**
*** Investment deflators**
*** Service life and depreciation**

GFCF imputation by type of asset, 1961–present: inputs of fixed assets for large and medium-sized enterprises, the Form 11 Survey

Form 11 Survey in industry. Examples: 1961, 1990



ЦСУ СССР
Управление статистики промышленности

Форма № 11—сводная
Утверждена ЦСУ СССР 27.VII.1971 г. № 4-08

НАЛИЧИЕ, ДВИЖЕНИЕ, СОСТАВ, АМОРТИЗАЦИЯ И КАПИТАЛЬНЫЙ РЕМОНТ ОСНОВНЫХ СРЕДСТВ (ФОНДОВ) ПРОМЫШЛЕННОСТИ

за 1971 год

(в тысячах рублей — без десятичных знаков) Лист №

По промышленным предприятиям, состоящим на самостоятельном балансе (по данным годового отчета предприятий по форме № 11)

Союзная республика СССР Область (край, АССР) Шифр

Форма подчинения по всей промышленности Шифр 011-0-1

Наименование отрасли промышленности Сводная Шифр 10000

I. Наличие и движение основных средств (фондов)

Число промышленных предприятий, данные которых включены в отчет 28483

А	№ строки Б	Наличие на начало отчетного года 1	Поступило в отчетном году: всего 2	в том числе: ввод в действие новых основных средств (фондов) 3	безвозмездное поступление на предприятия данной отрасли от других предприятий этой отрасли и от предприятий других отраслей 4	Выбыло в отчетном году: всего 5	в том числе: ликвидация средств (фондов) 6	безвозмездно передано предприятиям данной отрасли другим предприятиям этой отрасли и предприятиям других отраслей 7	Наличие на конец отчетного года (гр 1+ +гр. 2—гр. 5) 8	Наличие на конец отчетного года за вычетом износа (остаточная стоимость) 9
Всего основных средств (фондов) (стр. 02+04+05)	01	163182990	20432360	1701241	2670779	6440073	3930651	2100010	177175747	121488008
в том числе:										
а) промышленно-производственные основные средства (фонды)	02	132389872	17135481	1430058	2206447	5333361	3501807	1474231	144131992 10791 1)	104642597
из них передаточные устройства, машины и оборудование, транспортные средства, инструмент, производственный и хозяйственный инвентарь и другие виды основных фондов (стр. 13, 14, 20, 21 раздела II)	03	68372866	10229971	824467б	1422211	3239132	2240294	777061	75314705	X
б) производственные основные средства (фонды) других отраслей	04	2280951	410444	27210	117615	236427	118007	104623	2454268	1737128
в т. ч. непромышлен. производственных. организ.		174291	24384	1585	708	18025	13664	3857	180590	129033
в) непроизводственные основные средства (фонды)	05	28512867	2886935	244071б	346717	870285	312837	521156	30529517	25103283
из них средства (фонды) жилищного хозяйства .	06	22943253	2083117	1753751	261430	507563	208615	279762	24518807	20907644

991-1

-107-

ОСНОВНЫХ СРЕДСТВ (ФОНДОВ) ПРОМЫШЛЕННОСТИ САМОСТОЯТЕЛЬНОМ БАЛАНСЕ (В ТЫС. РУБ.)

ФОРМА 11-СВОДНАЯ ЗА 1990 ГОДА

-107-

ПОДЧИНЕНИЕ 110 КОЛ-ВО ПРЕДПРИЯТИЙ 26852

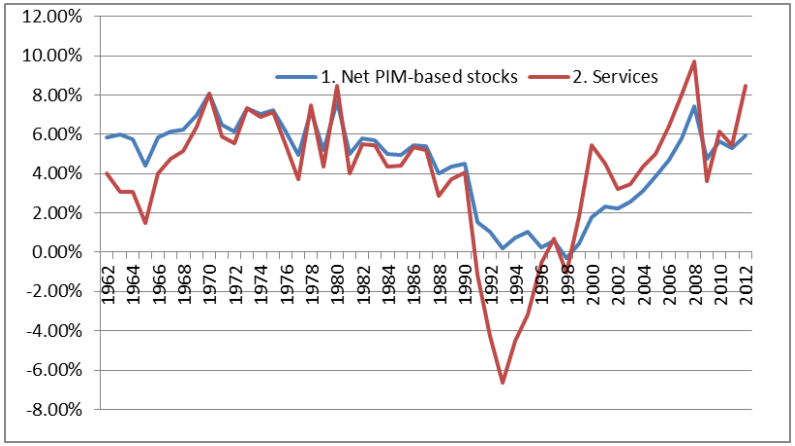
РЕДСТВ (ФОНДОВ)

ВЫБЫЛО В ОТЧЕТНОМ ГОДУ: ВСЕГО	В ТОМ ЧИСЛЕ: ЛИКВИДИРОВАНО ОСНОВНЫХ СРЕДСТВ	НАЛИЧИЕ НА КОНЕЦ ОТЧЕТНОГО ГОДА	НАЛИЧИЕ НА КОНЕЦ ОТЧЕТНОГО ГОДА ЗА ВЫЧЕТОМ ИЗНОСА
4	5	6	7
26124685	9975891	705137875	402375189
20157003	8972445	573116573	307177872
X	X	19542984	X
14400470	7383087	305573851	X
10585419	5920416	227494579	X
2419408	507188	20418374	13119324
3548274	496258	111602928	82077993
2240154	282525	85936645	63609655

ОСНОВНЫЕ СРЕДСТВА (ФОНДЫ)	050	107387982	7763220	6322560
ИЗ НИХ СРЕДСТВА (ФОНДЫ) ЖИЛИЩНОГО ХОЗЯЙСТВА	060	82788524	5388279	4475150

Capital services explain the transformational decline better

Annual yearly average growth of capital services in manufacturing in 1961-2012



Services or stocks of capital?

- Services versus stocks
  - Grow slower before 1970
  - Demonstrate similar trends in 1970-1990
  - Fall in 1991-1998
    - Changes in imputed rental prices of capital
  - Grow higher in recovery years, 2000-2008

What is KLEMS?

The system of harmonized industry-level indicators of output, inputs and productivity

- A system of industry dynamic series of output and factors of production suitable for cross-country comparisons
  - K: capital
  - L: labor
  - E: energy
  - M: raw materials and supplies
  - S: services
- *It is not* a full-fledged alternative to the official statistics data of the SNA
  - based on model calculations
  - designed to solve a significantly narrower range of problems compared to the SNA

What is KLEMS?

- The theoretical basis is the system of sectoral indicators of economic growth accounts (growth accounting) of Jorgenson, Gollop and Fraumeni (1987)

- https://www.worldklems.net/wkhome

- https://www.worldklems.net/wkanalytical

- Allows us to represent the rate of GDP growth as the sum of sectoral contributions

  - factors of production

  - the effect of reducing real costs per unit of output - total factor productivity (TFP)

Global Initiative World KLEMS & Russia

Russia KLEMS 2025

Russia KLEMS 2024

61 "primary" types of economic activity in accordance with the data on the dynamics of the VAT of OKVED2 of Rosstat

Formal and informal sectors of the economy

Production for market exchange and own consumption

2011 – 2022
(2023 – preliminary)

LABOR SERVICES

6 age and gender groups

3 qualification levels – grouped according to ISCED, levels 6-8 – highly qualified

CAPITAL SERVICES

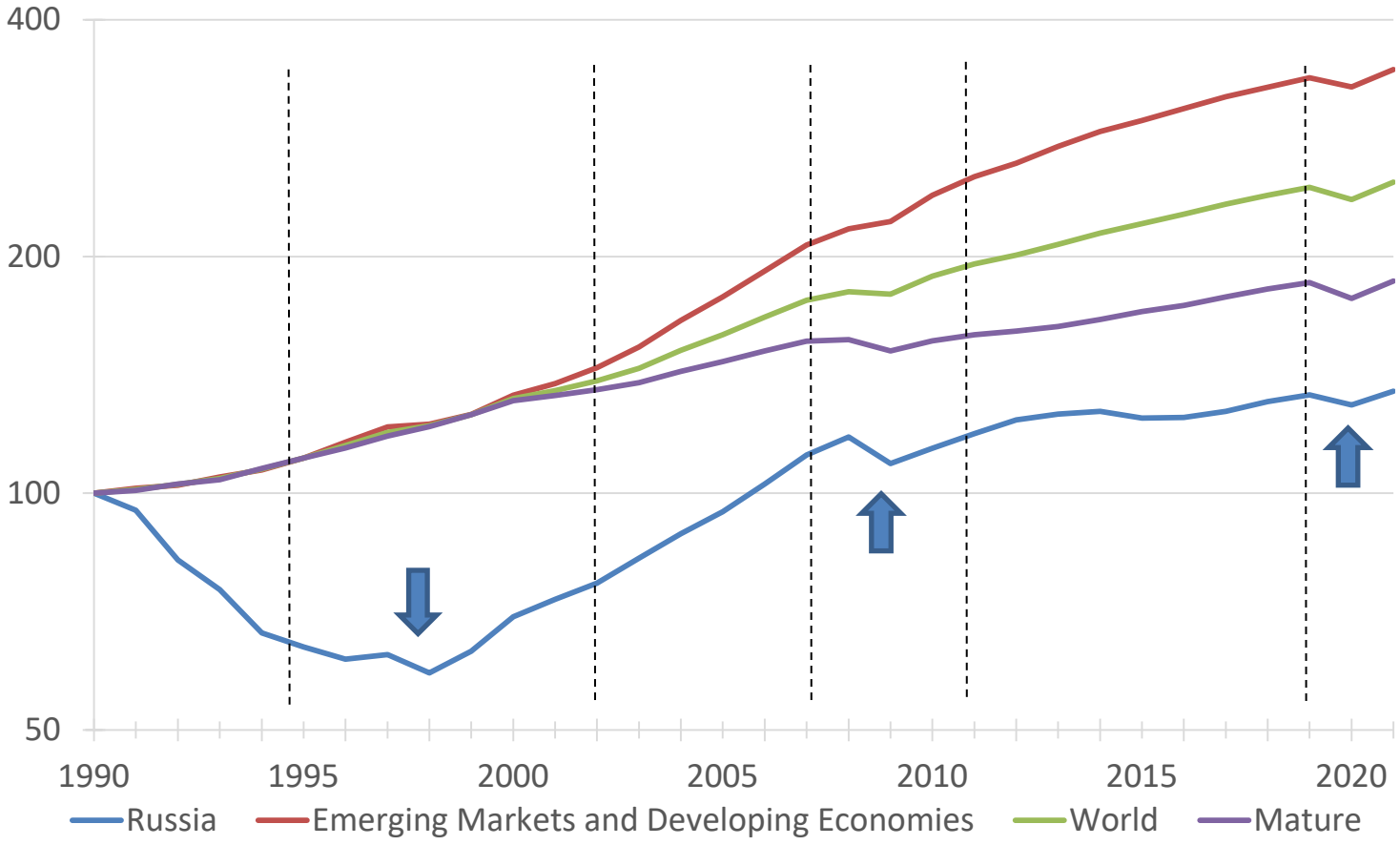
9 types of fixed capital corresponding to the 2008 SNA classification

For the purposes of this report :

Mining sector	B
Industrial production	C with exceptions
Manufacturing and ICT services	C (26-27), J (61-63)
Other production	A, D, E, F
Distribution services	G, H
Financial and business services	M, N
Non-market services	L, O, P, Q
Personal services	I, J (58-60), R, S, T

Russia and the World in 1990–2022: what are origins of growth slowdown in Russia in 2010-s?

Russia and the World: Economic Growth in 1990–2022



Source: The Conference Board Total Economy Database™, August 2021
Note: Emerging markets include India, China, Southeastern Europe, the Middle East, Latin America, and several countries in Asia and Africa; developed economies include OECD countries, the United States, and Japan.

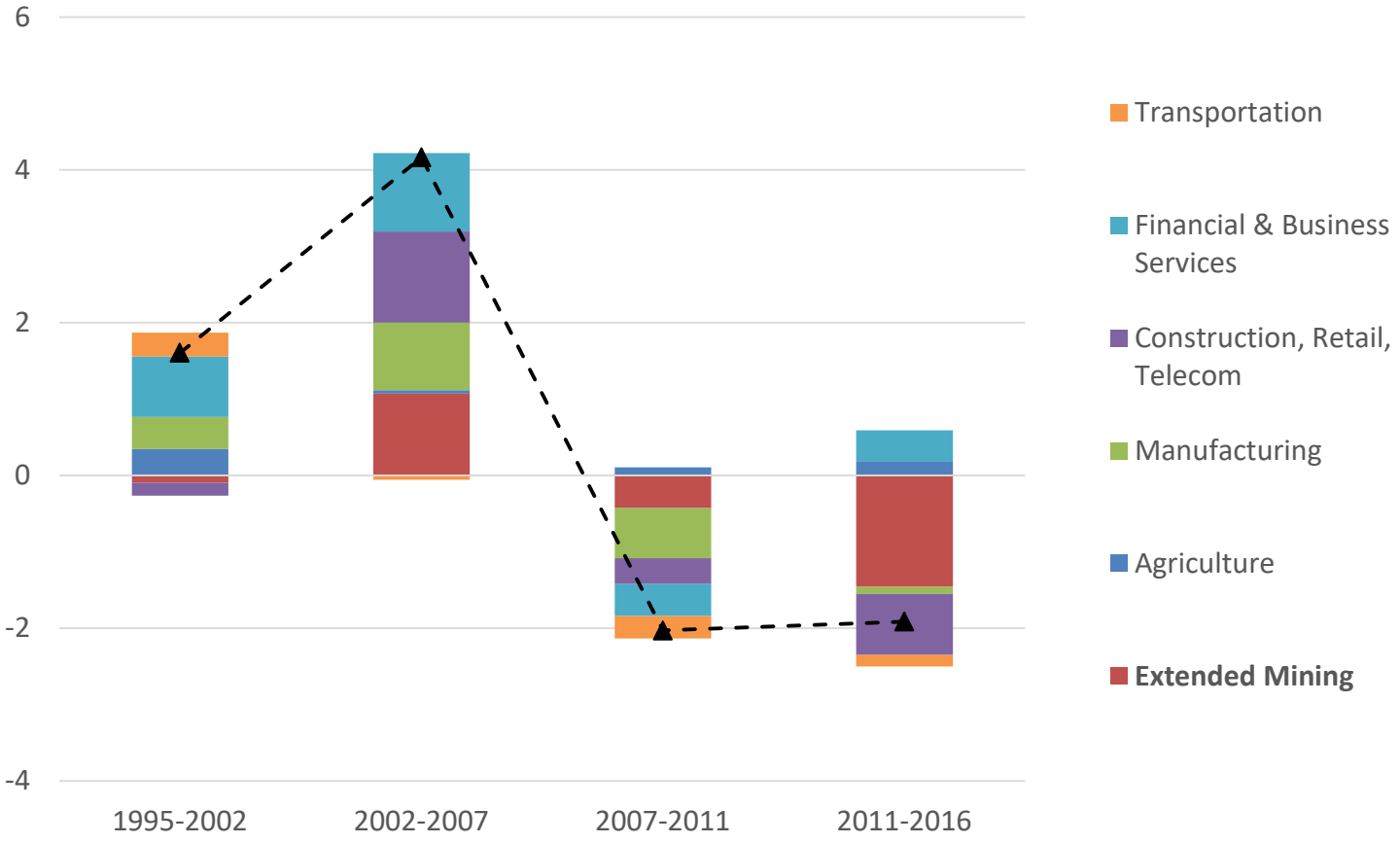
The role of capital ratio

Capital ratio growth rate in the market sector of the Russian economy (pp)

Source: Russia KLEMS 2019

Sectoral contribution to total factor productivity (TFP) growth: expanded oil and gas complex has been the main contributor to the slowdown in TFP since 2011.

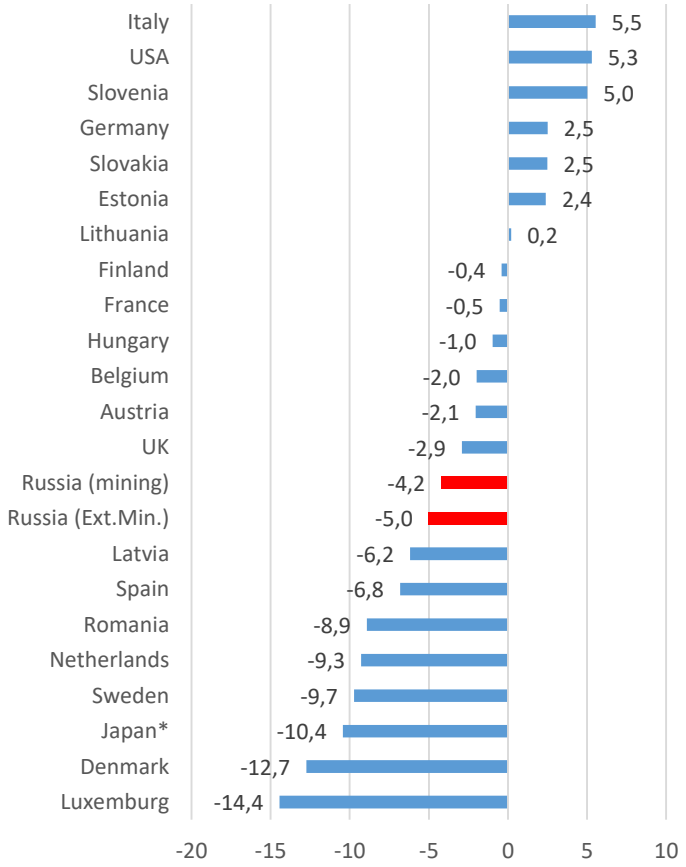
GDP level in Russia and in the world (1990 = 100)



Source: Russia KLEMS 2019; (Voskoboynikov et al. 2021)

TFP growth in mining in 2011–16: Russia and the OECD

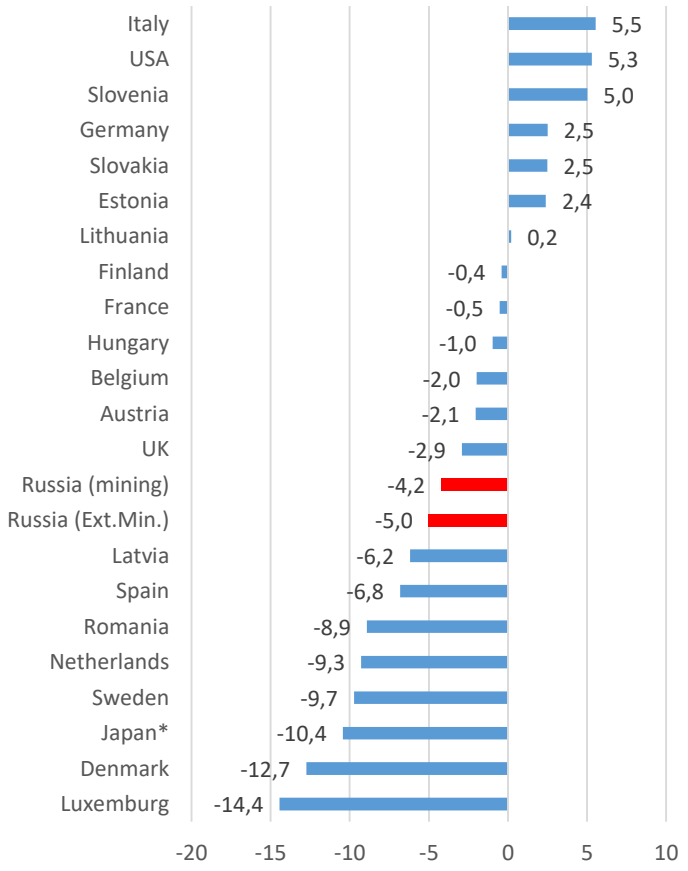
TFP growth rate in mining (% per year)



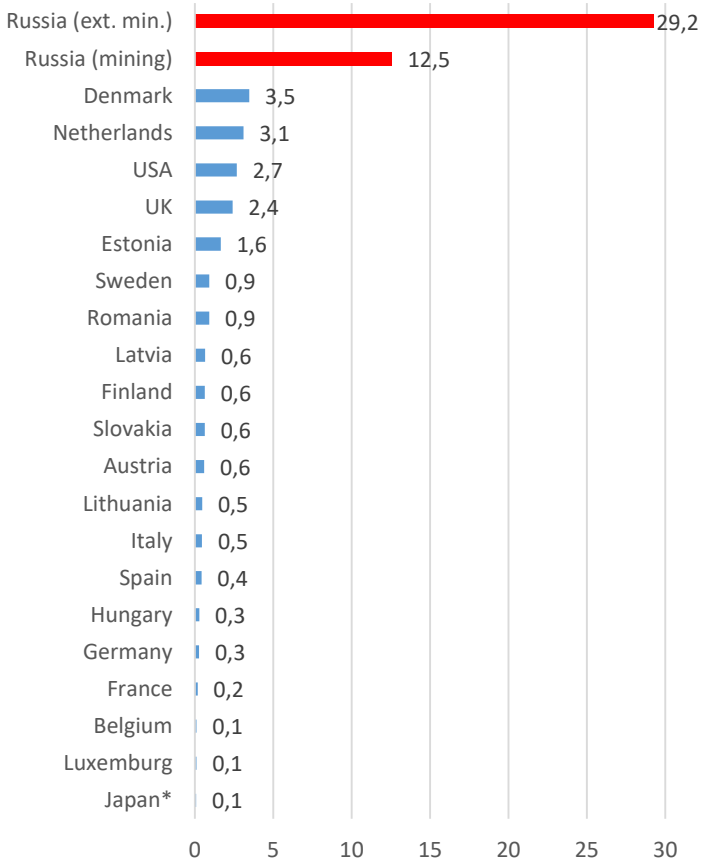
Source: Russia KLEMS 2019; EU KLEMS 2019
Note: (*) Japan – 2011-2015.

TFP growth in mining in 2011–16: Russia and the OECD

TFP growth rate in mining (% per year)



Average share of mining in GDP of the market sector (%)



Source: Russia KLEMS 2019; EU KLEMS 2019
Note: (*) Japan – 2011-2015. Market sector excludes public administration, education, and healthcare.

Conclusions

1. The shift from stocks to capital services changes the understanding of the sources of productivity growth
    - Transformational recession
    - Slowdown in 2010-s as the contribution of TFP fall in Extended Mining
        - Important for resources abundant economies CIS – Azerbaijan, Kazakhstan
2. Capital services allow for a better assessment of the quantitative contribution of short-lived “new economy” assets of new types of capital to productivity growth.
    - Intangible assets (intangibles)
    - ICT Capital

Thank you for your attention!