Intermediate Inputs, Human Capital, Intangible Assets and Economic Growth in Russia

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Presented by Peter B. Meyer of the U.S. Bureau of Labor Statistics
Views are those of the speaker, and do not reflect the views of the Bureau

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Background work

The authors have been extending national accounting for the Russian economy toward SNA for productivity estimates in a variety of works for at least ten years.

Extensive reconstruction of GDP and national accounts since 1961.

One challenge was the changing classification of industries and absence of some key detail

- Earlier Russian standards, with less services detail
- BNE (MBS) category system, OKONKh, NACE 1.0, NACE 2.0

Many data sources and switching of systems over this period

- Turbulence in reality and in measurement
- Neoclassical assumptions don’t apply well in the Soviet period

Big field of study, much work along this line to match international standards

This paper

(1) Develops supply and use tables for 2003-2011 based on backcasting from official Rosstat ones for 2011-2016 (work in progress)

(2) Finds low or negative TFP residual in the extended oil and gas sector. Other countries do too, but in Russia it is a high fraction of GDP

(3) Reports first labor composition measures at industry levels, and contributions of labor composition to growth

Uses data sets from Rosstat, Russia KLEMS, and Conference Board's TED

Figure 1. Economic growth in global economy and Russia since 1990

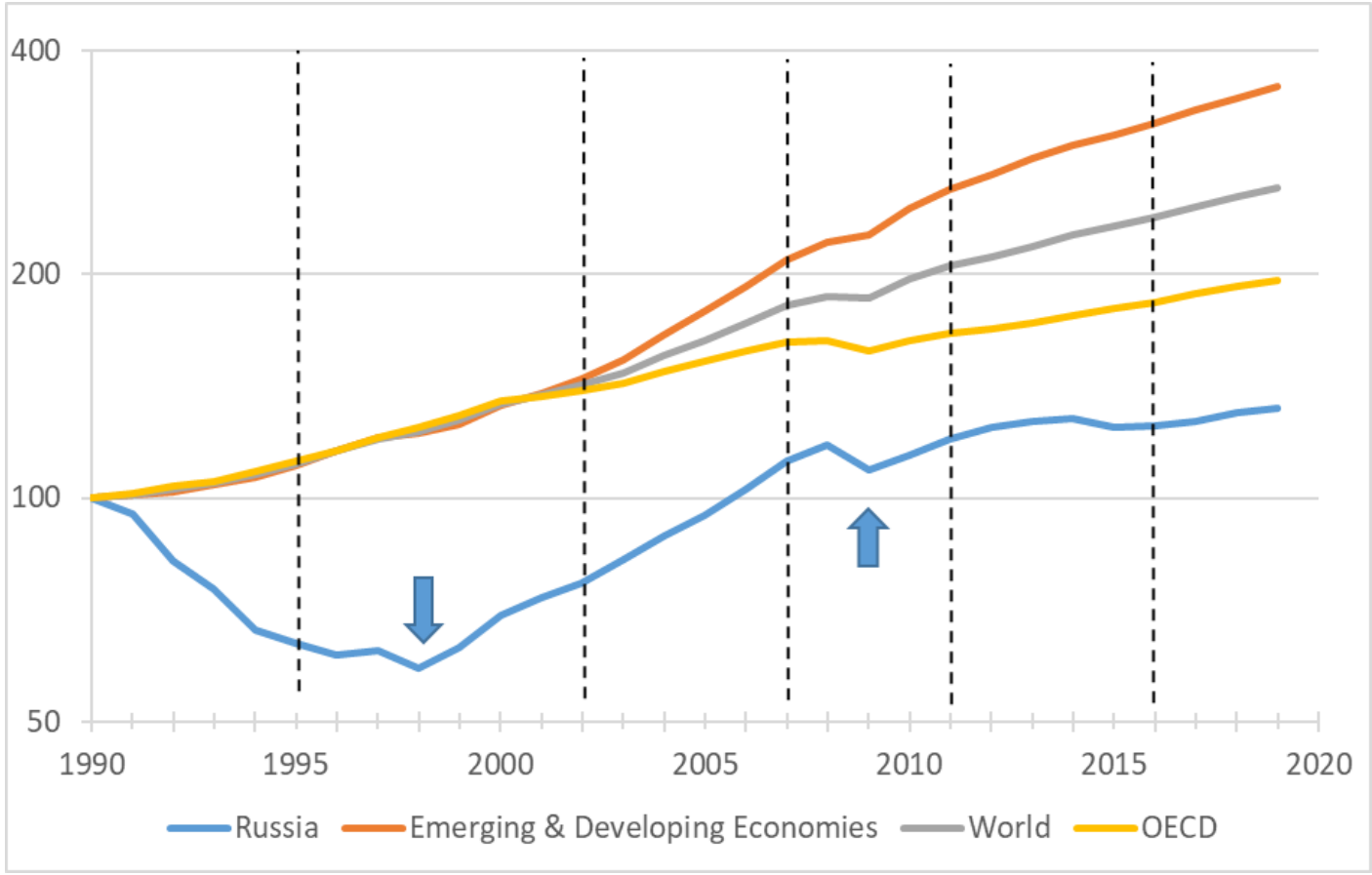
See Russia's path in blue

Note three clear periods since 1990

Sharp growth after 1998 associated with capital investment, higher oil prices

(Perhaps some of transition is completed, adapting to new market economy / standards)

Q: Do other economies dependent on oil production show comparable slowdowns?



Source: The Conference Board Total Economy Database™ (TED, Adjusted version), April 2019
1990 = 100. "World" includes all 122 countries in TED. The Emerging and developing economies include China, India, developing economies of Asia, Latin America, the Middle East, Sub-Saharan Africa, Russia, Central Asia, South and Eastern Europe

Table 1B. Growth accounting decomposition of the Russian economy in 1995-2016

B. Market economy (pp)

Market economy includes all activities excluding real estate, public administration, education and healthcare.

Based on Russia KLEMS 2019.

Standardized presentation.

Observations:

Notable growth slowdown after 2007

Contribution of ICT capital is high

TFP residual is small, and authors comment

	1995-2002	2002-2007	2007-2011	2011-2016		1995-2016
1. Real value added (2+3)	***2,62***	***8,08***	***1,10***	***0,72***		3,11
2. Hours worked	-0,34	0,96	-0,17	-0,05		0,07
3. Labor productivity (4+5+11+12)	2,95	7,12	1,27	0,77		3,04
4. Labor reallocation	1,34	0,74	0,04	0,57		0,63
5. Intra-industry growth	1,61	6,38	1,23	0,20		2,41
(6+7+8+9+10)	-0,20	2,19	3,10	1,87		1,49
6. Capital intensity	0,22	0,18	0,12	0,02		0,10
7. ICT-capital	***0,12***	***1,21***	***1,05***	***0,58***		0,57
8. Machinery and equipment	-0,35	0,55	1,51	1,14		0,69
9. Buildings and Constructions	-0,19	0,25	0,42	0,13		0,14
10. Other assets	1,61	4,16	-2,03	-1,91		0,75
11. Total Factor Productivity	***0,20***	***0,03***	***0,17***	***0,25***		0,16

Table 2. Sectoral shares,1995-2016
B. Shares of value added (%)

Source: Russia KLEMS 2019

Market economy concept
(Total economy also available)

Extended gas and oil concept

Sector	1995	2002	2007	2011	2016
Total economy	100,0	100,0	100,0	100,0	100,0
Market economy	***85,9***	***84,2***	***84,7***	***81,0***	***80,9***
Agriculture	7,6	6,6	4,4	4,2	5,1
Extended gas and oil	20,0	23,3	24,9	24,8	22,5
Manufacturing	22,5	19,2	17,4	14,6	15,8
Retail, Construction, Telecom	19,1	18,7	19,6	20,3	17,5
Financial and Business Services	5,0	8,3	11,1	10,7	13,0
Transport	11,7	8,1	7,2	6,3	7,0
Non-market economy	14,1	15,8	15,3	19,0	19,1

Figure 6. Sectoral contribution to total factor productivity growth
Source: **Russia KLEMS 2019**

Note Extended Gas and Oil in the recent period
TFP is negative for this sector in many countries, but in Russia it is a large fraction of output.

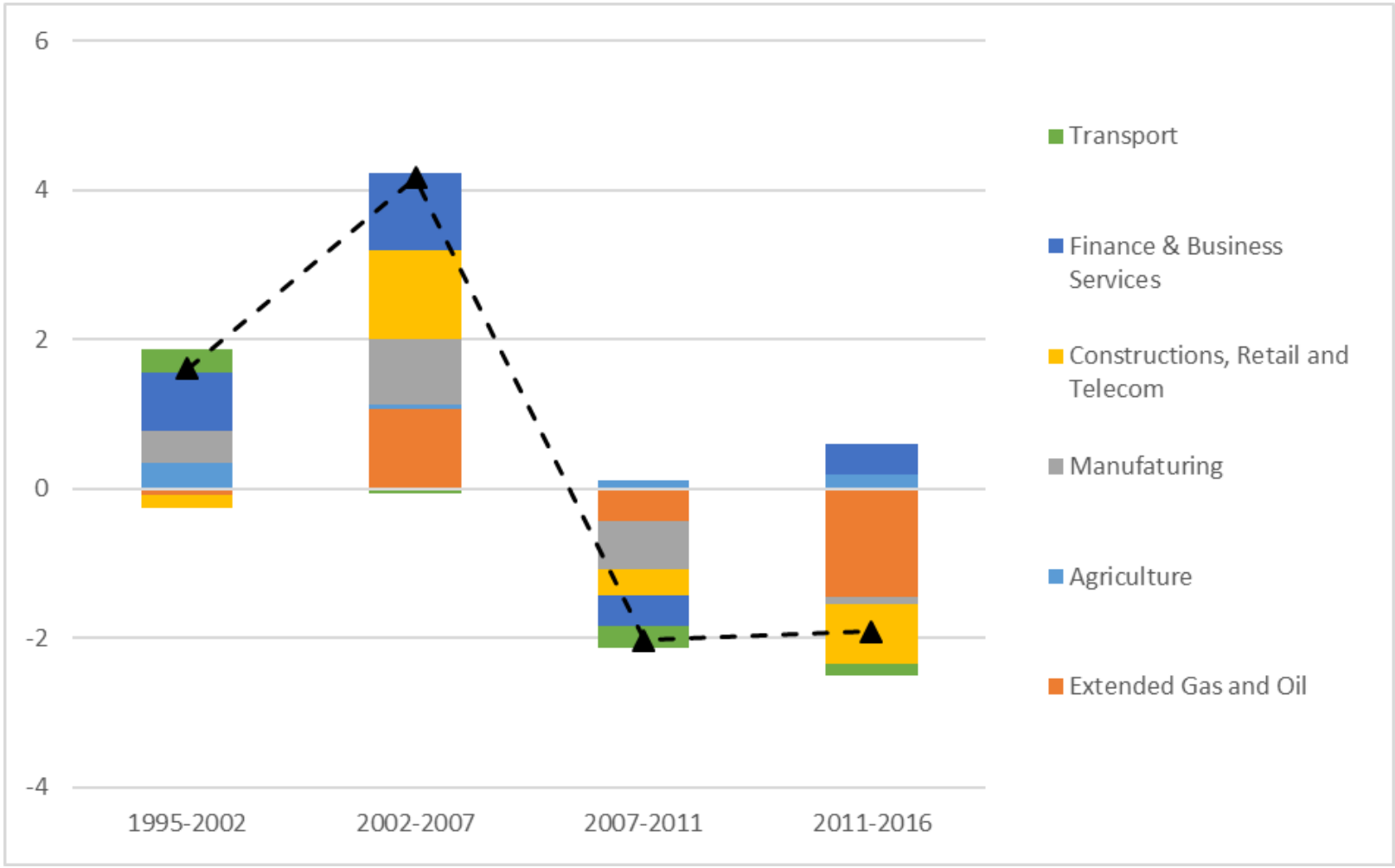
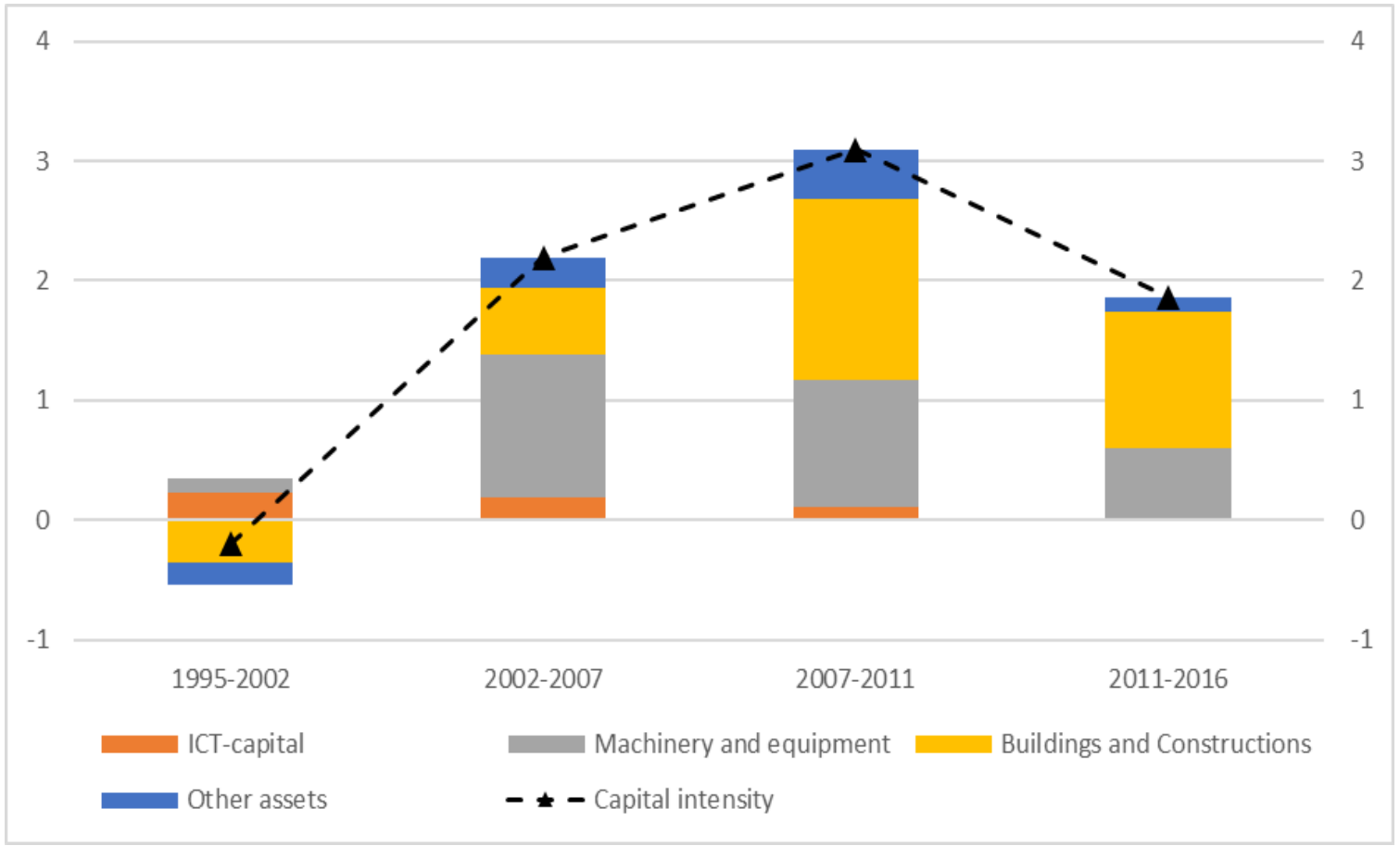


Figure 4. Sectoral contributions to aggregate capital intensity growth
***Source*: Russia KLEMS 2019; Table 1**

Breakouts by asset types. Capital input explains a large fraction of overall growth.

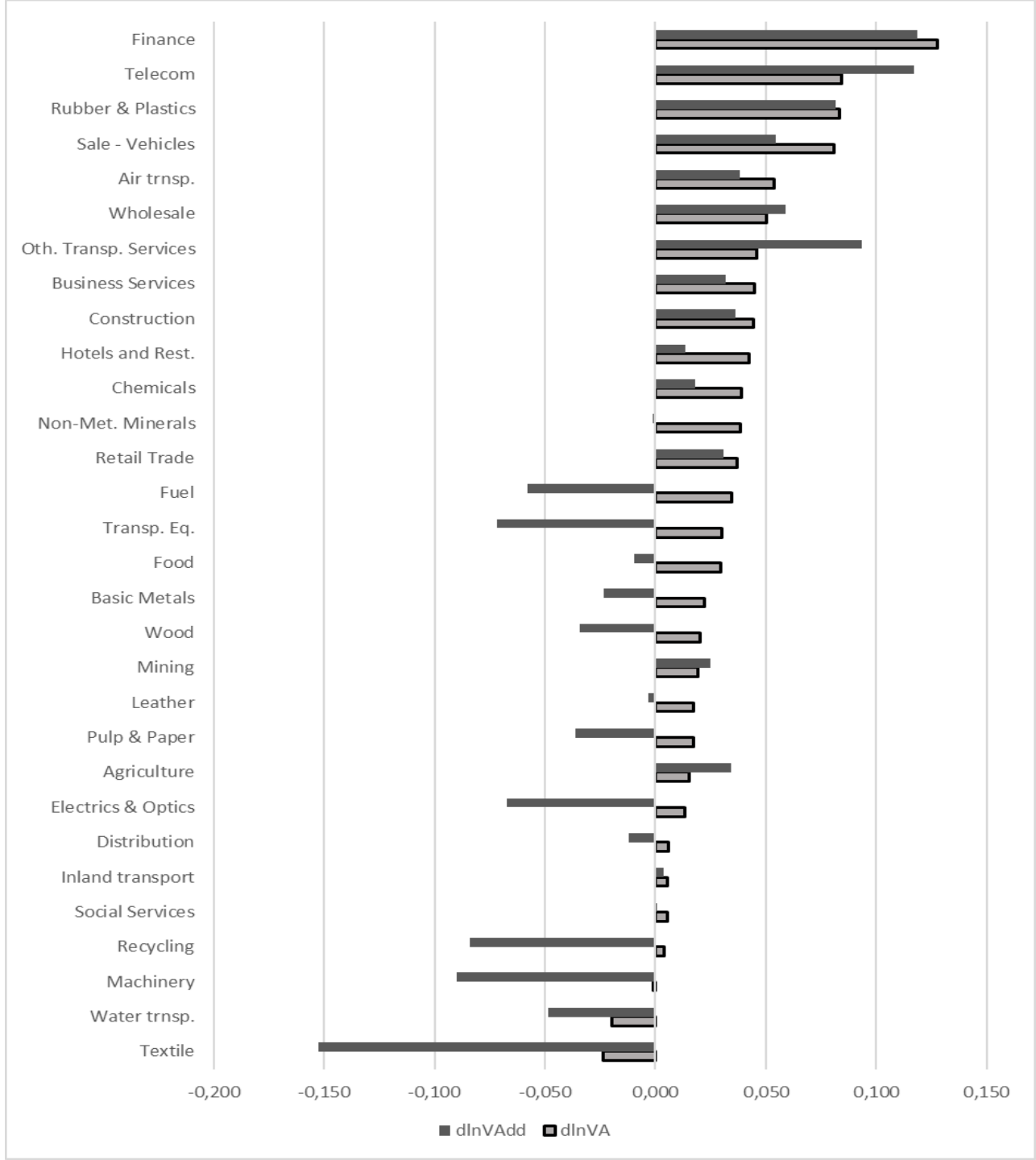


A2. Yearly growth rates of single- and double-deflated real value added in 30 industries of the market economy, 2003-2014 (Annual compound growth rates)

Multifactor decomposition can help us understand the growth rates of industries at a smaller scale – 30 industries here

High: Finance, telecom, rubber and plastics

Low: Machinery, Water transportation, textiles



New data in this paper

Table A3. Labor composition in chemicals and chemical products, 2003-2014

Incorporates detailed labor data, as other labor composition measures do, by demographics, industry, and time

Full specification of the methods and data sources would be of interest.

Labor composition explained 0.0-0.3 of growth overall.

In the work force overall:

- University graduate proportion grew
- Population was aging.

	2003	2014	Average	Hours worked growth	Contribution	Lab. comp. per hour worked
	Share of value added (%)			Annual gr. rates	Percentage points	Percentage points
Total	100.0	100.00	100.00	-2.16	-2.16	0.51
Low skills	3.3	1.4	2.4	-11.10	-0.26	-0.20
Medium skills	66.9	55.3	61.1	-3.41	-2.08	-0.46
High skills	29.8	43.3	36.5	0.52	0.19	1.16
Male	64.1	64.3	64.2	-1.57	-1.01	0.70
Female	35.9	35.7	35.8	-3.21	-1.15	-0.19
Age 15-29	20.2	18.6	19.4	-2.72	-0.53	-0.01
Age 30-49	58.2	52.9	55.6	-3.15	-1.75	-0.27
Age 50+	21.7	28.5	25.1	0.48	0.12	0.79
Low skills, 15-29, male	0.60	0.22	0.41	-13.14	-0.05	-0.04
Medium skills, 15-29, male	10.35	7.91	9.13	-3.68	-0.34	-0.09
High skills, 15-29, male	3.73	4.79	4.26	1.11	0.05	0.16
Low skills, 30-49, male	0.86	0.52	0.69	-7.42	-0.05	-0.03
Medium skills, 30-49, male	24.65	18.86	21.76	-3.81	-0.83	-0.25
High skills, 30-49, male	10.25	14.09	12.17	1.02	0.12	0.45
Low skills, 50+, male	0.80	0.30	0.55	-9.37	-0.05	-0.04
Medium skills, 50+, male	9.12	11.04	10.08	0.57	0.06	0.33
High skills, 50+, male	3.78	6.54	5.16	1.63	0.08	0.22
Low skills, 15-29, female	0.21	0.08	0.14	-13.08	-0.02	-0.02
Medium skills, 15-29, female	2.95	1.95	2.45	-6.63	-0.16	-0.10
High skills, 15-29, female	2.33	3.60	2.97	-0.09	0.00	0.08
Low skills, 30-49, female	0.58	0.14	0.36	-17.58	-0.06	-0.05
Medium skills, 30-49, female	14.76	9.34	12.05	-6.93	-0.84	-0.51
High skills, 30-49, female	7.08	9.97	8.53	-1.12	-0.10	0.13
Low skills, 50+, female	0.29	0.13	0.21	-11.30	-0.02	-0.02
Medium skills, 50+, female	5.04	6.24	5.64	0.35	0.02	0.17
High skills, 50+, female	2.62	4.28	3.45	0.97	0.03	0.13

Comment on framing/interpretation of TFP

My preference is not to speak of multifactor productivity (TFP) as causal, but as a residual.

(Not both cause and effect.)

Low TFP suggests we have explained the changes in output; a statistical success

Illustrated by effect of including labor composition

High TFP can be caused by:

- Improvements in networks which are not owned by the private actor who benefits (e.g. highways, phone networks, computer networks)
- Economies of scale
- Standardization and other efficiencies
- Organizational improvements

Analysis of these sources will help us understand changes in output over time in Russia

Questions to the authors

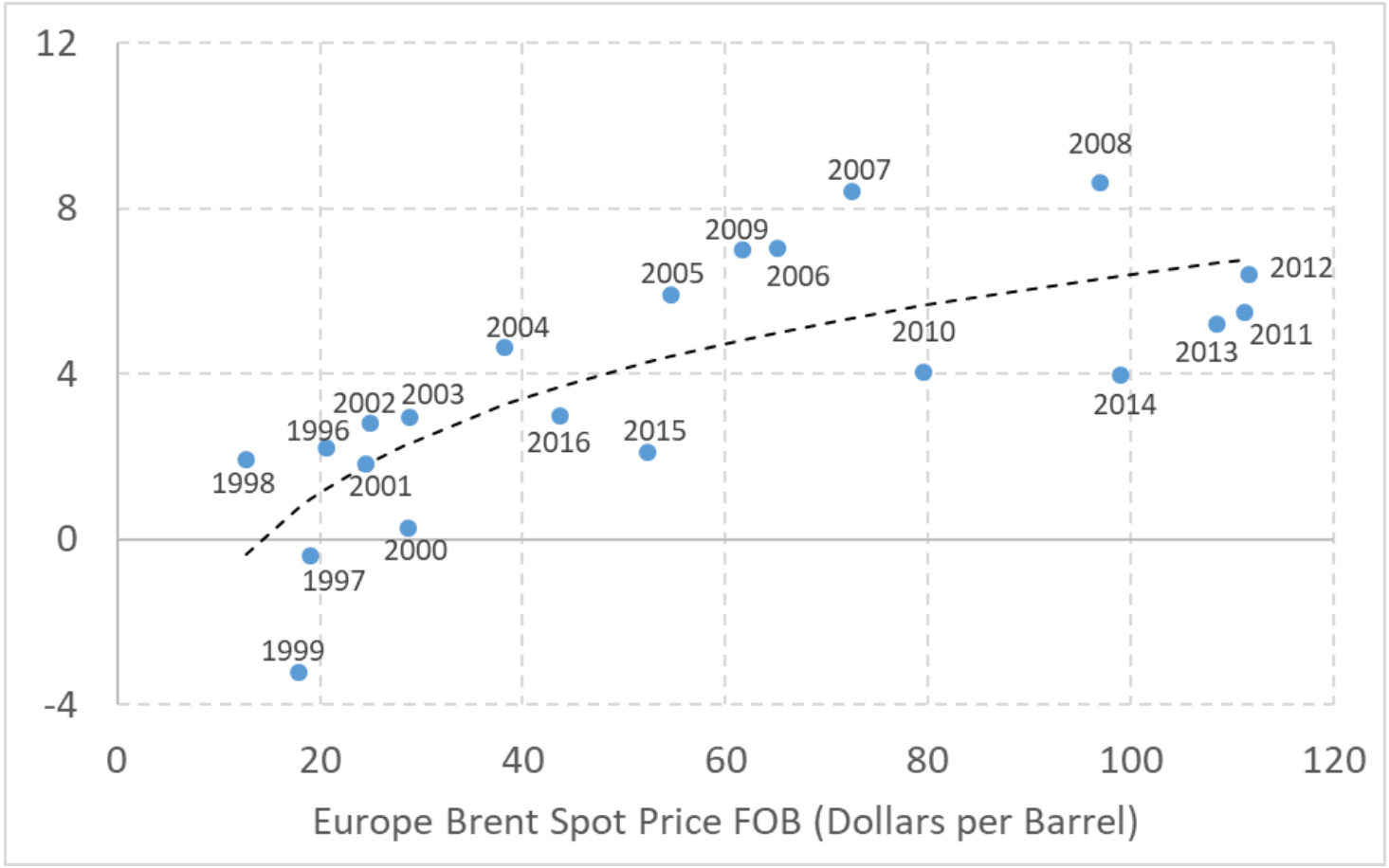
- Can we explain more about declining sectors? Notably, transport declines. Why?

- Did SNA and KLEMS standards meet your needs?
- Late 1980s-1990s period had reduced equipment maintenance and more capital discards
  - Is the PIM method and age-efficiency enabling you to capture this?
  - Is a maintenance account needed, or choice of geometric vs hyperbolic decline in efficiency?
  - Is there data capturing this reduction in maintenance? (late 1980s, 1990s)

- Surprises regarding labor composition and its modest effect on productivity?
  - How business-cyclical is it?

Figure 3. Capital intensity growth rates and oil prices
***Sources*: Russia KLEMS 2019 and IEA**

Authors, can you explain how oil and gas prices drive capital intensity immediately?



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